



Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

DRAMA

0411/11/T/PRE

Paper 1

May/June 2017

PRE-RELEASE MATERIAL

To be given to candidates on receipt by the Centre.



READ THESE INSTRUCTIONS FIRST

The questions in Paper 1 will be based on the stimuli and on the extract from Tom Morton-Smith's play *Oppenheimer* provided in this booklet.

You may do any preparatory work that is considered appropriate. It is recommended that you perform the extract, at least informally.

You will **not** be permitted to take this copy of the material **or** any other notes or preparation into the examination. A clean copy of the pre-release material will be provided with the Question Paper.

This document consists of **30** printed pages and **2** blank pages.

STIMULI

Choose **one** of the following three stimuli and devise a piece of drama based on it. You should work in groups of between two and six performers. Your piece should last approximately 15 minutes.

In the Written examination, you will be asked questions about your piece that will cover both practical and theoretical issues.

Stimulus 1**Quotation:**

'There is flattery in friendship.'

From William Shakespeare's *Henry V* [Act 3, Scene 7]

Stimulus 2

Grimms' Fairy Tales: *Rumpelstiltskin*

Stimulus 3

Photograph: *Carnival, Buenos Aires, Argentina*



EXTRACT

Taken from *Oppenheimer*, by Tom Morton-Smith

These notes are intended to help you understand the context of the drama.

Tom Morton-Smith's play *Oppenheimer* was first performed by the Royal Shakespeare Company in England in 2015. The play traces the events surrounding one of the most significant scientific developments in the twentieth century, the atomic bomb. The man who led the project was J. Robert Oppenheimer, an American theoretical physicist, who is often referred to as 'the father of the atomic bomb'. Convinced of his own importance, Oppenheimer commanded immense respect from his research students, and also attracted the admiration of several women.

The historical span of the play covers the period from the 1930s into the Second World War. It opens at the time of the Spanish Civil War (1936–1939), which was a period when some American intellectuals held strong left-wing, even communist, beliefs.

The play is in two Acts, and the extract consists of an abridged version of Act 1. The play has been edited to reduce the length of the extract, which means that a number of scenes have been omitted.

Characters in order of appearance. Capitals indicate the name by which the character is identified as a speaker in the text.

J Robert Oppenheimer (OPPIE)	Theoretical physicist and 'father of the atomic bomb'
FRANK Oppenheimer	His younger brother
Giovanni Rossi LOMANITZ	Physicist, aged 18
Bob SERBER	Physicist, aged 30
JACKIE Oppenheimer	Wife of Frank Oppenheimer
JEAN Tatlock	A close female friend
Joe WEINBERG	Physicist, recently arrived at Berkeley
HAAKON Chevalier	Friend, a novelist
CHARLOTTE Serber	Friend
Robert WILSON	Student
Albert EINSTEIN	A world-renowned physicist
KITTY Harrison	RICHARD Harrison's wife, later married to OPPIE
RICHARD Harrison	Husband of KITTY at the start of the play
Hans BETHE	Colleague
Professor Edward TELLER	A rival physicist, Hungarian
General Leslie GROVES	Military commander on the atomic bomb project
Kenneth NICHOLLS	US Army Colonel
DOCTOR	
Military POLICEMAN	

ACT 1

1 – LECTURE SERIES: INTRODUCTION

A lecture theatre.

J Robert Oppenheimer [OPPIE] *addresses a gathering of students. He reads from a slim, red book: Atomic Theory and the Description of Nature – Niels Bohr, 1934.*

- OPPIE: ‘The task of science is both to extend the range of our experience and to reduce it to order.’ So says Niels Bohr. It is only by experience that we can discern the laws that govern our universe. So as we learn ... as we grow ... we must be prepared to alter our methods for ordering our experience ... because we come to surpass those techniques ... those patterns ... that once instructed us. Life is nothing if not a constant re-evaluation of what we believe to be correct, and a constant reassessment of the ways we gauge that correctness. What was true yesterday can be less true today, because we have learnt ... and will learn ... better. My name is J Robert Oppenheimer. You will come to know me as Oppie. I expect you to be attentive. I expect you to be present. And if some aspect of the lecture doesn’t make sense, then perhaps we are getting somewhere. There is no negotiation ... no debate ... with the complexity of the universe. If the work eludes you ... if you simply lack the ability ... then take your leave. I can make it clearer, but I cannot make it simpler. Let us begin.

2 – A FUNDRAISER FOR THE RELIEF EFFORT IN SPAIN

The Oppenheimer residence – Berkeley, California.

A party is in full swing. Music plays. The room bustles with people – people who are drinking, dancing, laughing and generally having an excellent time.

People present include: OPPIE, FRANK Oppenheimer, Giovanni Rossi LOMANITZ, Bob SERBER, JACKIE Oppenheimer, JEAN Tatlock, Joe WEINBERG, Robert WILSON, HAAKON Chevalier and CHARLOTTE Serber.

- FRANK: Roosevelt!
LOMANITZ: Ha! Roosevelt!
FRANK: Franklin Delano Roosevelt!
SERBER: My goodness, Frank, you’ve got to give it a rest.
FRANK: Roosevelt’s greatest achievement has been to get people thinking ... about employment ... about economics ... once the working man actually considers employment, economics, race-relations ... that’s the start ... that’s the route to socialism ... communism.
- SERBER: Frank ... you’re kicking at an open door!
LOMANITZ: A specter is haunting Frank Oppenheimer.
FRANK: What the New Deal has done ... the legacy of the New Deal ... it has opened people’s eyes ... the Great Depression ... the Wall

	Street Crash ... that way no longer works. Robert ... brother of mine ... big brother ... big Robert ... back me up ...	45
OPPIE:	If booze is present in your glass then your argument cannot maintain its structure. It will inevitably collapse.	
FRANK:	My glass is empty.	
JACKIE:	Frank, will you lay off the sermons?	
FRANK:	Hey baby ... hey sweet-cheeks ... how's about I spin you round the floor?	50
LOMANITZ:	Please, Jackie ... take him dancing.	
SERBER:	Burn off some of that liquor.	
JACKIE:	Show me your moves, mister.	
OPPIE:	Frank's not wrong ... the people's eyes are open.	55
LOMANITZ:	To be fair to the guy ... if you're going to air your leftist politics ... where better than a Communist Party fundraiser?	
SERBER:	I thought we were raising money for the relief effort in Spain?	
OPPIE:	It's getting dispersed ... distributed ... through the Party.	
LOMANITZ:	What difference does it make? Sign me up to the union. I'm there.	60
JEAN:	[<i>Standing on a table, banging on a collection bucket.</i>] Workers of the world – unite!	
	<i>The music and dancing stops and everybody turns their attention to JEAN.</i>	65
JEAN:	For too long the White House has ignored the rise of fascism in Europe. Our government sits impotently by while Franco marches on Barcelona. Civilians fleeing the violence are interned in camps across the French border. I ask you – do you believe, even if there are thousands of miles between you, that your brother is any less your brother? We are not asking for money to fight a war ... we are asking for money to feed children ... to pay for medicines ... to return some dignity to those who fascism has stripped bare. Compare their sacrifice with the dollar bill in your wallet and please give generously. Thank you.	70
	<i>Cheering and applause. Some voices in the crowd start singing 'L'Internationale'. More and more people join in until eventually everyone is singing.</i>	75

3 – THE DEPARTMENT OF THEORETICAL PHYSICS – OMITTED

4 – A FUNDRAISER FOR THE RELIEF EFFORT IN SPAIN [continued]

	JEAN <i>moves around with a collection bucket in hand.</i>	80
LOMANITZ:	Here she comes ... prepare yourself for a fleecing.	
JEAN:	So, gentlemen ... dust off your wallets. [<i>To SERBER.</i>] Are you a socialist?	
SERBER:	Yes, ma'am.	
JEAN:	Then put your money in the pot. [<i>To LOMANITZ.</i>] Are you a socialist?	85
LOMANITZ:	Through and through.	
JEAN:	In it goes. And you?	

WEINBERG:	I might have only just joined Oppie's department, but I'm a fully paid-up member of the Communist Party USA.	90
LOMANITZ:	Comrade!	
JEAN:	Robert! Robert, your boys ... you must be a proud Papa Bear.	
OPPIE:	Give the nice lady your donation.	
JEAN:	I want to see paper money. This nickel and dime crap is weighing me down.	95
WEINBERG:	I just wanted to take this chance to introduce myself properly ...	
JEAN:	Oh yes?	
WEINBERG:	You have such a lovely home ... and I'm a great admirer of your husband ...	
JEAN:	Is that so?	100
WEINBERG:	It's a pleasure to make your acquaintance, Mrs Oppenheimer.	
OPPIE:	Joe, Jean and I aren't married.	
WEINBERG:	Oh, I ... I'm sorry ... I just assumed ...	
OPPIE:	It's quite alright.	
WEINBERG:	Oh god.	105
LOMANITZ:	This way, Joe ... there are some folks over here you've yet to embarrass yourself in front of.	
JEAN:	Not very smart, your new disciple.	
OPPIE:	He's a bright kid. They're all bright kids.	
JEAN:	[To SERBER.] How old are you?	110
SERBER:	Thirty.	
JEAN:	'Kids'.	
OPPIE:	Serber doesn't count. Rossi, how old are you?	
LOMANITZ:	Eighteen.	
JEAN:	That proves nothing. [Takes LOMANITZ's drink] And you ... you should not be drinking.	115
LOMANITZ:	And how old are you?	
JEAN:	I don't think I like this one.	

5 – THE DEPARTMENT OF THEORETICAL PHYSICS – OMITTED

6 – A FUNDRAISER FOR THE RELIEF EFFORT IN SPAIN [continued]

OPPIE:	Haakon – thank you so much for coming.	
HAAKON:	For the cause and for you – how could I not?	120
OPPIE:	How was France?	
HAAKON:	Excellent, excellent. Tout est possible!	
OPPIE:	And how is the novel coming?	
HAAKON:	Slow.	
OPPIE:	Send me what you have.	125
HAAKON:	I have a chapter ... a chapter and a half ...	
OPPIE:	Let me read it.	
HAAKON:	Thank you. If it's not too much trouble?	
OPPIE:	My friend, you bring me poetry. It's no trouble at all.	
LOMANITZ:	Oppie ... I wanted to return that book you lent me ...?	130
OPPIE:	On the bookcase is fine.	
LOMANITZ:	I wanted to say ... I haven't quite ... I'm still taking notes from it ... wondering if I could ...?	
HAAKON:	What's the book?	
LOMANITZ:	Henri de Saint-Simon.	135
OPPIE:	It's fine, Rossi. Hang on to it.	
LOMANITZ:	Thank you.	

HAAKON: You have your students reading socialist philosophy?
 OPPIE: I have them learning about the world.

CHARLOTTE *enters. She has lifted the front of her skirt in front of her so that she can carry a large amount of change.* 140

SERBER: There she is ... the love of my life. Where have you been hiding yourself?
 CHARLOTTE: There were some pockets unpicked in the kitchen.
 JEAN: In the bucket it goes! 145
 JACKIE: Have any of you seen Frank?
 SERBER: He was headed to the bathroom.
 JACKIE: Oh god.
 JEAN: Lost your dancing partner? Here, let me ... [*Pulls JACKIE to the middle of the floor.*] 150
 JACKIE: Oh, I ... I couldn't ...
 JEAN: Don't worry your pretty little face ... I'll lead!

JEAN *proceeds to dance JACKIE around the floor.*

7 – THE DEPARTMENT OF THEORETICAL PHYSICS – OMITTED

8 – FUNDRAISER FOR THE RELIEF EFFORT IN SPAIN [continued]

JACKIE: [*Nursing a drunk FRANK.*] I think it's time we left.
 CHARLOTTE: You're leaving? 155
 JACKIE: I'm going to drive him home.
 CHARLOTTE: It's been so lovely seeing you both.
 JACKIE: Give my apologies to Robert.
 FRANK: I've cleaned up the bathroom as best I can.
 CHARLOTTE: Goodbye, Jackie. 160
 JEAN: *Do svidaniya, comrade!*
 JACKIE: Goodbye, Jean.
 WILSON: Hey Jean ... how much did you make?
 JEAN: Enough to topple all the fascist regimes of Europe!
 WILSON: That much, huh? 165
 WEINBERG: My brain hurts.
 WILSON: You need a glass of milk ... a glass of milk with a raw egg cracked into it.
 WEINBERG: Why would you say that?
 SERBER: I don't want you vomiting in the back of my car. 170
 LOMANITZ: Any chance of a ride?
 SERBER: Grab your stuff.
 CHARLOTTE: Goodnight, Jean. Goodnight, Oppie.
 SERBER: Wilson, you coming?

LOMANITZ *pulls WILSON, SERBER and WEINBERG together and leads them in song. They reprise the chorus of L'Internationale. JEAN, OPPIE and HAAKON applaud as SERBER, WEINBERG, WILSON, LOMANITZ and CHARLOTTE exit.* 175

HAAKON: And then there were three.
 OPPIE: It's late, Haakon. 180

HAAKON:	It is. [To JEAN.] Can I offer you a lift?	
JEAN:	No.	
HAAKON:	Goodnight, then.	
OPPIE:	[Ushers HAAKON to the door.] Good night.	185
HAAKON exits. JEAN and OPPIE are alone.		
JEAN:	That was a night.	
OPPIE:	It was.	
JEAN:	What did you make of my speech?	
OPPIE:	Your clarion-call to the global proletariat?	190
JEAN:	Yes. Did it stir you? Were you stirred?	
OPPIE:	I was worried your shoes might scuff my tabletop.	
JEAN:	[Sings.]	
	Arise ye workers from your slumber,	
	Arise ye prisoners of want ...	195
OPPIE:	It has been two months.	
JEAN:	Has it?	
OPPIE:	Two months and no word ... no telephone call ...	
JEAN:	You sound like my mother.	
OPPIE:	What do you expect? Open arms? Where have you been?	200
JEAN:	You are not my only friend.	
OPPIE:	I am abundantly aware.	
JEAN:	You need to relax. You have nothing to lose but your chains.	
OPPIE:	You let yourself in as though you've been to the corner store. You take on the role of hostess. You fling my brother's wife around the floor like ... like ... I don't know what.	205
JEAN:	Jackie was having a great time.	
OPPIE:	Jackie doesn't know you like I do. Jackie's a waitress.	
JEAN:	Phooey.	
OPPIE:	This was a night of charity.	210
JEAN:	You think I don't care for the cause? My heart bleeds for the Spanish ... my soul cracks for them ... to think of their suffering ... it kills me.	
OPPIE:	I am sure that the starving and the dispossessed greatly appreciate your drunken behavior.	215
JEAN:	I may be a lush, but I am a sincere one.	
OPPIE:	No doubt.	
JEAN:	Look at you ... so aloof, so sanctimonious.	
OPPIE:	I will throw you out.	
JEAN:	You will do no such thing.	220
OPPIE:	You think I'm not capable of ...?	
JEAN:	I'm sure you're well versed in the theory.	
OPPIE:	[Forcibly grabs JEAN and goes to throw her out.]	
JEAN:	Oppie?! Oppie! Get your hands off me!	
Silence.		
The tension dissolves into laughter.		
JEAN:	It's cold out there.	
OPPIE:	I know.	
JEAN:	You want me to catch cold?	
OPPIE:	Can't you leave me alone?	230
JEAN:	I would die without you.	

9 – LECTURE SERIES: THE MODEL ATOM – OMITTED

10 – FRANK AND JACKIE JOIN THE PARTY – OMITTED

11 – LECTURE SERIES: A LETTER TO A PRESIDENT

Albert EINSTEIN reads from a letter.

EINSTEIN: 'Mr Roosevelt ... Mr President ... Sir. I believe that it may soon become possible to set up a nuclear chain reaction in a large mass of the element uranium ... thus generating a vast amount of power. This phenomenon may lead to the construction of a new type of extremely powerful bomb. A single bomb that may very well flatten a city. I understand that, since her expansion into the Sudetenland, Germany has stopped the sale of uranium from the Czechoslovakian mines that she has taken over. Are the Nazis aware of the potential of uranium? Of course. May I suggest that this situation calls for watchfulness and, if necessary, quick action on the part of your administration. Yours truly ...'

235

240

12 – THE LINCOLN BATTALION

A garden party in Pasadena, California. 245

The sun is shining and music is playing. Partygoers are having an excellent time. HAAKON is chatting to a group of people. OPPIE stands to one side.

A band strikes up and sings a jaunty version of 'Jarama Valley', a soldier's song of the Spanish Civil War. KITTY Harrison approaches OPPIE with a drink. 250

KITTY: Here.

OPPIE: What's this?

KITTY: A drink. You look like you need one.

OPPIE: Thank you ... 255

KITTY: Kitty Harrison.

OPPIE: Thank you, Kitty.

KITTY: That's no problem at all.

OPPIE: Are you not joining in with the ...?

KITTY: Discussions ... debates? No. My husband dragged me along. This is very much his sort of thing. 260

OPPIE: It isn't yours?

KITTY: Maybe once. My first husband died pointlessly in Spain. To hear the band sing of the Lincoln Battalion ... of the brave Americans ... volunteers in the noble battle against Franco ... 265

OPPIE: I am sorry.

KITTY: All of his friends ... all of our friends ... and that includes my current husband ... all believe passionately in the Communist ideal. Europe's either becoming a bootcamp or a graveyard ... and these people think they have the answer ... but they only ever talk to each other. 270

OPPIE:	Then why are you here?	
KITTY:	There's a free bar.	
HAAKON:	[Waves for OPPIE to come over.]	
OPPIE:	[Declines.]	275
KITTY:	A friend of yours? He wants you to go meet some people.	
OPPIE:	He wants to wheel me around. I expect he's losing an argument he'd like to win.	
KITTY:	You're his secret weapon?	
OPPIE:	Hardly.	280
KITTY:	Please. I cannot bear false modesty – my husband is British. [Beat.] What is it you do?	
OPPIE:	I'm a professor of physics.	
KITTY:	You're a smart one then ... you're a thinker.	
OPPIE:	It has been known.	285
KITTY:	If we left together now ... where would we go? If we threw off the garbage of the world ... where would you, professor of physics, take me?	
OPPIE:	If we were to leave right now?	
KITTY:	Right now.	290
OPPIE:	I have a ranch ... up in the mountains of New Mexico. A simple, wooden ranch. A forest glade ... horse riding ... the stars in the sky. A wood burning stove.	
KITTY:	It sounds perfect.	
OPPIE:	It's a bit of a drive.	295
KITTY:	If we could swing by a drugstore, I could pick up a toothbrush.	
OPPIE:	You don't want to stay for the lecture?	
KITTY:	Spontaneism and the dialectics of revolutionary yadda yadda yadda ... I would rather eat glass.	
	RICHARD Harrison <i>approaches</i> .	300
RICHARD:	Darling ... the talk is about to begin ...	
KITTY:	Richard, do you know ...?	
OPPIE:	Robert Oppenheimer.	
KITTY:	Robert, my husband Richard.	
RICHARD:	We should take our seat.	305
KITTY:	Will you not join us?	
OPPIE:	Please. I know what will be said.	
KITTY:	Yes.	
RICHARD:	Darling ... we really must ...	
KITTY:	It was a pleasure to meet you, Robert.	310
OPPIE:	And you.	
KITTY:	I hope that our paths cross again.	
OPPIE:	We should make certain of it.	
KITTY:	Yes. We should.	

13 – PEAS IN A POD

	<i>Several weeks later. The Oppenheimer residence.</i>	315
HAAKON:	I want your advice ... suggestions ... rewrites if necessary. Will you cast your eye over ...?	
OPPIE:	I'm flattered that you would ask, but you're the novelist, not I.	
HAAKON:	This isn't the novel, this is ... this is a pamphlet on behalf of the League of American Writers. This is for the College Faculties	320

- Committee of the Communist Party of California. This is a letter to be sent to Soviet Russia Today ... to be published in their September issue.
- OPPIE: And what do these pamphlets say?
- HAAKON: They are petitioning against war. Now more than ever, we have to be vocal. Europe is on a precipice and political discourse in this country is lurching to the right. The politicians are stoking our hate ... stoking our fear ... priming us for violence. 325
- OPPIE: You would have me throw my weight behind the Communist Party? 330
- HAAKON: The Party's beliefs are your beliefs.
- OPPIE: My beliefs would not allow for treaties with fascists.
- HAAKON: That is not ... that is ...
- OPPIE: The Soviets have signed a treaty of Non-Aggression with the Nazis. Is Eastern Europe a carvery now? The carcass of a roasted bird ... stripped for soup ... stripped for stock. People are tearing up their Party cards ... cursing Engels ... cursing Marx ... because the German military machine has no counter ... no balance ... no equal and opposite ... if the Soviet Union does nothing. And this treaty of theirs is formalized nothing. 335
- HAAKON: I cannot claim to understand diplomacy ...
- OPPIE: And the word ... from Russia ... the purges and the show-trials we hear of ... the forced labor camps ... the famine ...
- HAAKON: We all know the rumors.
- OPPIE: And so far we have dismissed them ... 345
- HAAKON: ... as Trotskyite lies and disinformation.
- OPPIE: But in light of the Non-Aggression Pact?
- HAAKON: It's garbage! The capitalists will say anything to discredit ... to harm ... to have us fighting amongst ourselves.
- OPPIE: So it's the Trotskyites and the capitalists ...? 350
- HAAKON: Yes!
- OPPIE: ... and we are to lap this up ... hold our nose ... and believe that water is milk?
- HAAKON: You say the Soviets are the only answer to the black-boots. I believe that. I believe you. 355
- JEAN enters.*
- HAAKON: I didn't realize ...
- JEAN: So good to see you, Haakon ... but Oppie's a little busy right now ... so perhaps some other time? 360
- HAAKON: Sure ... I'll ...
- OPPIE: Leave me your pamphlets.
- HAAKON: You'll look at them?
- OPPIE: I will.
- HAAKON: Comrades?
- OPPIE: Comrades. 365
- HAAKON exits.*
- JEAN: He is such a creep.
- OPPIE: He respects my opinion.
- [*Beat*]
- JEAN: Fine. I am taking you out to dinner. I am treating you to oysters 370

- across the bay. I have booked us a suite at the Majestic. I have chartered a boat to sail us down the coast. I have booked us on a flight to New York. I have organized tickets to the hottest show in town. I have bought you a new gold watch and a platinum plated cigarette case, inscribed inside in beautiful flowing script: 'Jean and Oppie – two peas in a pod!' [Beat.] Come and hold my hand. Come and kiss my face. [Beat.] I heard you and Haakon talking about purges ... show-trials ... famine. 375
- OPPIE: It's an ugly habit to listen at doors.
JEAN: These stories ... these rumors ... tell me they are lies and I'll believe you. 380
- OPPIE: They are unsubstantiated.
JEAN: I have to believe that everything is better in Russia ... that it is better somewhere ... but that belief is being taken from me in strips. I want to take the world ... shake it ... and scream in its face: 'This is how we live! United! And with love! And with fair pay and the means of production in the hands of the people!' 385
- OPPIE: When was the last time you spoke to ...?
JEAN: I don't need to speak to anyone. I've read those books ... I've studied them ... I can do it myself. And I have you – the smartest man I know. Why would I speak to some dullard? I am not special – everyone is suffering. I feel as though I want to sneeze. I want to look at the sun but it is covered by clouds ... smoke from destroyed Polish towns ... and it blots out the light, but not with a darkness ... not just with a darkness ... it drains the color ... Poland is a newsreel and German tanks gray the landscape. If we cannot rely on Russia ... fascism will swarm over us like ants on a dead bird. 395
- OPPIE: I'm going to drive you home.
JEAN: Let me stay. 400
- OPPIE: That's not going to happen. That isn't how this works anymore.
JEAN: Then tell me how it works.
OPPIE: You are not my only friend.

She leaves. Long pause. OPPIE walks slowly to the telephone.

14 – THE HOT DOG – OMITTED

15 – A PHONECALL TO RICHARD HARRISON

- OPPIE *dials a number on the telephone.* 405
- OPPIE: Doctor Harrison?
RICHARD: This is Richard Harrison.
OPPIE: We met some months ago in Pasadena.
RICHARD: Oh yes?
OPPIE: At a garden party in Pasadena. 410
RICHARD: Oh right.
OPPIE: My name is Robert Oppenheimer.
- Pause.*
- RICHARD: Oh yes.
OPPIE: I wish to talk to you about Katherine. 415

RICHARD: Katherine?
 OPPIE: Kitty.
 RICHARD: Yes, I know who Katherine is.
 OPPIE: Of course. [*Beat.*] She's pregnant.
 RICHARD: I see. 420
 OPPIE: Yes.
 RICHARD: I suppose you'll need me to get divorce proceedings underway.
 OPPIE: I would appreciate that.
 RICHARD: Of course. Congratulations.
 OPPIE: Thank you. 425

16 – LECTURE SERIES: CHAIN REACTION

OPPIE: There was a Maharaja who had a great passion for chess. Travelers ... as they passed through his court ... were invited to his throne room and challenged to a game. One day a visiting sage appeared at the palace gates. He was welcomed and brought before the king. 'Do you know chess?' 'I do.' 'Then let us play.' The sage smiled and politely inquired as to what his prize would be if he were to win. The Maharaja laughed and offered any reward that the old man could name. The sage modestly asked for a few grains of rice. 'How many grains?' enquired the king. 'Place one grain of rice on the first square of the chessboard ... two on the next ... four the next ... then eight ... sixteen ... and keep doubling the number of grains on every following square.' 'Very well.' And so they played. It was a hard fought game, but it did not go the way of the king. Having lost ... and being a man of his word ... the Maharaja ordered for a bag of rice to be brought to the chessboard. He placed one grain on the first square ... two on the second ... then four ... eight ... sixteen ... thirty-two ... sixty-four ... 128 ... 256 ... 512 ... 1,024 ... 2,048 ... 4,096 ... I could do this all day. By the twentieth square the Maharaja required a million grains of rice ... by the final sixty-fourth square he required more rice than had ever existed ... enough to cover all of India with a layer one meter thick. Such an amount would require paddy fields covering twice the surface of the world – oceans included. The Maharaja was astounded. It was at this point that the Lord Krishna shook off the image of the sage, revealing his true identity to the king. 'Now you are humbled before the power of exponential mathematics.' [*Beat.*] A neutron enters an atom ... splits it ... two further neutrons are released ... and what you have is a chain reaction. 430
 435
 440
 445
 450
 455

17 – NUMBERS

Over a year later.

SERBER: How's Kitty? Taking to motherhood? And Peter is ...?
 OPPIE: Seven months.
 SERBER: I hadn't realized it had been so ... [*Beat.*] Standing? Crawling? Teething? 460
 OPPIE: Standing. Teething.
 SERBER: We should definitely ... definitely pay a visit ... Charlotte is

	aching to ... we have some things ... we bought some things for the baby ... clothes ... for Peter ...	
OPPIE:	Thank you.	465
SERBER:	It's good to see you. Illinois is nothing like you're running at Berkeley ... but the department's good ... the work is good.	
OPPIE:	Fission ...	
SERBER:	Yes.	
OPPIE:	... as the basis for a bomb.	470
SERBER:	Yeah ... I ... since Pearl Harbor, it's all I can think about. That and signing up. But my eyesight's appalling; I wouldn't make it past the physical. Probably wouldn't make minimum height. And now the Russians have joined the war and I'm ... I'm cheering inside ... like a full-blown warmonger.	475
OPPIE:	How much uranium do you think we'd need?	
SERBER:	The minimum amount ...?	
OPPIE:	... for a chain reaction. Yes. How much?	
SERBER:	Well ... I don't know ... we've talked ... in my department ... we've talked ...	480
OPPIE:	Can you give me numbers?	
SERBER:	The amounts people are throwing around range from six hundred grams to a ton.	
OPPIE:	A ton of uranium-235?	
SERBER:	It would have to be.	485
OPPIE:	It would take time to separate ... to refine ...	
SERBER:	There would have to be a large-scale industrial ...	
OPPIE:	It would be easier if I thought it was beyond me. I know it is not. I see it so clearly ... in my mind I can picture a uranium device ... I can picture its components ... sometimes it has stars and stripes stenciled to its casing ... but more often than not it has a swastika. I see it ... it sails down the Hudson river ... or it hangs in the air above the Upper West Side ... I can see it ... and there I am ... a man of inaction ... knowing that I could have built it first ... perhaps quicker ... even by just a day ... <i>[Beat.]</i> So when I ask 'can you give me numbers', what I want to know is: can you give me numbers?	490 495
SERBER:	I don't have any for you right now, but I'm certain I can get them.	
OPPIE:	Do it.	
SERBER:	Sure.	500
OPPIE:	There needs to be gathering ... of minds ... there needs to be discussion. I'm bringing together people from Cornell and Chicago ... from Princeton ... Harvard. I need you with me in Berkeley.	
SERBER:	Sure ... sure ...	505
OPPIE:	We need to be solid on the theory and we need to consider the practical implications on design. What sort of fissionable material ... what sort of blast radius ... how much energy will be released.	
SERBER:	Of course ... of course ... my god ...	510
OPPIE:	Bob ...?	
SERBER:	Yes, Oppie?	
OPPIE:	The uranium bomb is entirely possible, therefore it is entirely inevitable. It's not a question of 'should'; it's a question of 'when' ... of 'where' ... of 'by whom'.	515

18 – THE FIRST FEASIBILITY DISCUSSIONS

Berkeley campus.

The room is filled with a select group of physicists, including OPPIE, Edward TELLER and Hans BETHE. SERBER, WILSON and WEINBERG are preparing to give a presentation. LOMANITZ enters – he is late.

LOMANITZ: Sorry ... I'm sorry ... I got caught up at a meeting. Gee ... it's like a Nobel longlist in here. 520

WILSON: Try not to say anything too stupid.

WEINBERG: I haven't pressed my shirt.

LOMANITZ: What are we talking about? Halifax? 525

SERBER: Halifax.

The lights darken.

WEINBERG operates a projector.

Black and white images of the devastated city of Halifax, Nova Scotia.

530

WEINBERG: This is Halifax, Nova Scotia.

WILSON: On December 6th 1917, a French cargo-ship, fully stocked with wartime explosives, collided with a Norwegian vessel inside Halifax harbor.

LOMANITZ: The resulting explosion caused the immediate death of two-thousand people. Nine thousand sustained injury. 535

SERBER: All structures within the one and a half mile blast radius were leveled.

WILSON: The subsequent pressure wave bent iron railings ... snapped trees ... dispersed debris ... up to as much as ten miles. 540

WEINBERG: The ship's anchor ... or a portion of it ... weighing in excess of 1,100 pounds ... was carried a distance of 2.3 miles.

SERBER: One of the gun barrels landed in Dartmouth, a town some 3.4 miles to the east.

LOMANITZ: The force of the blast is estimated to be somewhere in the region of 2.9 kilotons. 545

SERBER: That's the equivalent effect of 2,900 tons of TNT.

OPPIE: Thank you.

The lights are switched back on.

OPPIE: This is the level of destruction that we are hoping to achieve. We are familiar with the physicists the Nazis have at their disposal. We have studied with them ... corresponded with them ... worked with them ... lived with them. Heisenberg. If we are capable of building this bomb, then so are they. Tenfold. And we are behind. The British government have been making great strides and, in the spirit of our mutual struggle, they have agreed to share with us what progress they have made. It's not much, but it's as good a starting point as any. I'll be making those documents available to you. 555

BETHE: This British report ... what areas does it concern itself with? 560

OPPIE: Hello, Hans. For those of you who don't know, this is Hans Bethe, who is joining us from Cornell.

- BETHE: Hello.
- OPPIE: As for the report, it mostly deals with the cost estimates and technical specifications for a large uranium enrichment plant ... it also contains some ideas on assembly and some work on efficiency. I would also suggest that you speak with Bob Serber who has been diligently working on critical mass calculations. What I propose we do over these next few weeks is pool our ideas. Collaborate. Bring everything you have ... any epiphanies ... any eureka moment ... however outlandish ... I want to see it. We'll reconvene tomorrow. 565
- The gathered scientists break off into groups. Everyone is chatting. Everyone is excited.*
- WILSON: Professor Bethe? 575
- BETHE: Yes?
- WILSON: I have to say it is an honor to meet you ... and to have the chance to possibly work beside you ... gee ... I mean ...
- BETHE: That is very kind of you to say.
- WILSON: Your work on the subject of nuclear reactions ... cross-sections and atomic nuclei ... I mean it's ... wow ... just wow. 580
- BETHE: It is always nice to meet a fan.
- WILSON: I have a copy of Reviews of Modern Physics ... with your articles ... would you mind signing ...?
- BETHE: Of course. 585
- WEINBERG: Actually, we all have copies ... could you ...?
- BETHE: Of course ... of course ...
- TELLER: Oppie?
- OPPIE: Edward Teller! I am so pleased you could make it.
- TELLER: Hans and I shared a train carriage from Chicago. I hear it is you I have to thank for the change in my status. 590
- OPPIE: Ah, yes.
- TELLER: They denied my clearance for classified work simply because I am Hungarian. As though all Hungarians must support that fascist of an admiral who conspires with Nazis. This study group of yours ... it is a good start. I am pleased that finally something substantial is being done. 595

19 – LECTURE SERIES:
THE MAN WHO BUILT THE PENTAGON

- GROVES: September 17th 1942. I am called to the office of my superior. I know these corridors ... I built these corridors ... Colonel Leslie R Groves of the Army Corps of Engineers ... the man who built the Pentagon. My blood is in this mortar. These hinges are oiled with my sweat. 'You are familiar with the S-1 Committee?' 'I am, sir.' 'What do you know of the S-1 Committee?' 'The S-1 Committee is in charge of investigating the properties and manufacture of uranium, sir.' 'Do you understand the purpose of the S-1 Committee?' 'Not fully, sir. I can't say that I do, sir.' 'It is weapons development.' 'I see, sir. I was hoping for a combat assignment, sir. Overseas, sir.' 'That is not going to happen.' 'I see, sir.' 'The development of this new uranium bomb is to become a military operation.' 'Yes, sir.' 'It is to be instilled with a sense of urgency.' 'Yes, sir.' 'If you do this job right, it will win 600
- 605
- 610

us the war.' '...' 'Groves?' 'Yes, sir.' 'I said it will win us the war.' 'We have bombs already, sir.' 'The decision has been made. You will be promoted to the rank of general.' 'Thank you, sir. I was hoping for a combat assignment, sir.' 'Well, you have this instead.' 'Sir, yes, sir.' 'Congratulations, General.' 'Sir, thank you, sir.' I am handed some files. I am appointed a personal aide. If I am ordered to build a wall, I buy bricks. If I am ordered to shoot a man, I count my bullets. If I am ordered to throw myself in front of a train, I consult a timetable. Where to begin ... where to begin ...?

20 – THE OPPENHEIMER HOUSEHOLD

OPPIE *in one corner*. KITTY *in the other, reading*. CHARLOTTE *holds baby* PETER *in her arms*. SERBER *has a ukulele*. They *sing* PETER *a lullaby*.

CHARLOTTE: Say goodnight to everyone, Peter. Say goodnight to Daddy. 625
 OPPIE: Goodnight, my darling.
 CHARLOTTE: Say goodnight to Mummy. I'll put him to bed. Bob ...?
 SERBER: Sure.

SERBER *and* CHARLOTTE *exit*.

KITTY: I smell of sick. I smell of sick, off-milk and baby. 630
 OPPIE: You smell of perfume.
 KITTY: It masks the odor of baby. [*Beat*.] He has sharp little fingernails and he claws at me ... he's constantly sucking ... sucking and biting and scratching and ...
 OPPIE: Kitty ... 635
 KITTY: I'm chapped. I'm cracked. I'm broken and sore. He doesn't sleep.
 OPPIE: He's sleeping right now.
 KITTY: He doesn't sleep for me. I am falling apart!
 OPPIE: You have Charlotte. You have Bob. And what am I paying the nanny for? Four days a week she comes. 640
 KITTY: I cannot cope.

21 – THE OFFICES AT BERKELEY

The offices at Berkeley.

GROVES *and* NICHOLS *stand before* OPPIE *and* SERBER.

GROVES: The eagle on this man's collar ... do you know what it signifies? It signifies that this man has risen to the rank of colonel. Quite the achievement. A colonel in the United States army can command up to two thousand men. [*Removes his jacket*.] My uniform, as you can see, is adorned with three of these here silver stars. [*Hands jacket to* NICHOLS.] See that this is dry-cleaned. 650
 NICHOLS: Sir. Yes, sir. [*Exits*.]
 GROVES: Three silver stars, Professor. I am a commander of men. The rank of general puts the fear of a righteous god into the heart of the average serviceman. But I understand that rank alone is not enough to impress you ... not enough to earn your respect. So 655

- let me tell you this ... I am an engineer. I have a degree from the University of Washington in Seattle and a second degree from the Massachusetts Institute of Technology. I graduated fourth in my class at West Point. I am an educated man. I may not be your equal, but I am damn close. And I have these stars. 660
- OPPIE: Bob, would you fetch the General and I some coffee?
SERBER: Sure thing. [*Exits.*]
OPPIE: I am also a commander of men.
GROVES: Washington has decided to bring all of the governmental committees ... all of the civilian contracted projects ... all of the work on this new form of bomb ... under one banner. A military banner. My banner. 665
- OPPIE: I see.
GROVES: Are you a Communist? It is a yes or no question.
OPPIE: It really isn't. 'Are you a card-carrying member of the Communist Party?' is a yes or no question. 670
- GROVES: Are you?
OPPIE: No.
GROVES: Have you ever been?
OPPIE: No. 675
GROVES: Would you consider yourself a Marxist?
OPPIE: That is a ridiculous question.
GROVES: How so?
OPPIE: I understand gravity. I understand the laws of motion. I understand optics. Do I go around calling myself a Newtonian? 680
GROVES: This symposium of yours ... this gathering of minds ... it shows initiative. It is proving ... fruitful?
OPPIE: I would say so, yes.
GROVES: It smacks of ambition. I do not disapprove. May I offer you a word of advice, Professor Oppenheimer? 685
OPPIE: Please.
GROVES: You are, it seems to me, a uniquely useful individual. Your ambition is great and your capability is great. That one does not outstrip the other is something of a marvel. So listen to me as I say: your affiliations and your associations with the Communist Party ... with members of the Communist Party ... [*Shakes head.*] If you wish to progress, then there must be distance. Do you wish to progress? 690
- OPPIE: Yes.
GROVES: The US military is now the proud owner of 1,200 tons of as yet unrefined uranium ore. I placed that order on my first day. On the second day I purchased a refinement facility in Oak Ridge, Tennessee. That this had not already been done tells me that no one involved in this project is thinking practically. So think practically. If you had resource ... if you were 'the guy' ... what would be our next move? 700

22 – THE OPPENHEIMER BROTHERS

FRANK *and* JACKIE's house.

- OPPIE: Is he here?
JACKIE: [*Calls off.*] Frank? [*Beat.*] He won't be long.

Silence.

705

JACKIE: Hello, Jackie. Good to see you, Jackie. How have you been?
Well, I trust. You're looking well. How's work, Jackie? Have you
done something new to your hair?

OPPIE: When did you last meet with your Communist Party unit? 710

JACKIE: Excuse me?

FRANK: [Enters.] Hello, Robert. It's good to see you.

OPPIE: When did you last meet with your street unit?

FRANK: Oh god ... I can't remember ... when was it? Weeks ago ...

OPPIE: When was the last time you held a meeting here? 715

FRANK: Month before last. Why?

OPPIE: You're not to do it again. You're not to host meetings ... you're
not to attend. Do you still have your Party card?

FRANK: I guess.

OPPIE: Let me see it. Let me see you tear it up.

FRANK: Now just one second ... 720

OPPIE: Where is it?

JACKIE: In the desk.

OPPIE: Fetch it.

FRANK: What is all this ... ?

OPPIE: Fetch it. 725

JACKIE: No.

OPPIE: You're to destroy your Party cards ... you're to sever all Party
contact ... you're to avoid any and all known Party members ...

JACKIE: They're our friends.

OPPIE: ... you're to resign from the teacher's union. 730

FRANK: Okay ... no.

OPPIE: You need to put away your childish idealism.

FRANK: The Communists are the only answer to fascism ... in Europe
... here ... in Spain ...

OPPIE: To hell with Spain! To hell with the Spanish Cause! I am sick of 735
it! How many martinis ... how many buckets filled with nickels ...
how many ineffective, chattering parties ... how many pamphlets
... how many lectures ... and still the fascists take Spain!

FRANK: The labor movement ... workers rights ... segregation ... tell me
which other party – ? 740

OPPIE: This is not the time for those things.

FRANK: Not the time? Well ... either way ... whatever your thoughts ...
whatever your protests ...

OPPIE: Your career ...

FRANK: Let us not kid ourselves that this is in any way about *my* career. 745

OPPIE: You're a child.

FRANK: No. I am not. And these are my decisions to make.

OPPIE: You have a tendency to make very poor decisions.

FRANK: I'm sorry?

JACKIE: I think it's time you left. 750

FRANK: I'm sorry ... because I married a waitress?

OPPIE: You have to ... you have to ... distance yourself from ...

FRANK: What I should've done ... what I should've done was to find
myself a nice, wholesome girl ... someone of a comparable
status perhaps ... someone of breeding ... and sleep with her 755
behind her husband's back until she falls pregnant.

23 – THE OPPENHEIMER RESIDENCE

The Oppenheimer residence.

OPPIE, KITTY, SERBER, CHARLOTTE, BETHE, HAAKON
and TELLER are in little groups talking and drinking.

	KITTY opens a bottle of champagne and goes to pour some for BETHE.	760
BETHE:	Thank you, no.	
KITTY:	You don't like champagne, Hans?	
BETHE:	I was raised on the French-German border. I like champagne just fine. This – not so much.	765
HAAKON:	You're a professor?	
TELLER:	Indeed.	
HAAKON:	As am I.	
TELLER:	I've not heard of you.	
HAAKON:	Of the Romance Languages.	770
TELLER:	Ah.	
HAAKON:	Do I detect a German accent? I own an 1867 edition of <i>Das Kapital</i> .	
TELLER:	I am Hungarian. And I have not read Marx.	
HAAKON:	Oh?	775
TELLER:	People might mistake me for a Democrat.	
SERBER:	What are we celebrating?	
KITTY:	Can we tell them about it?	
SERBER:	Tell us about what?	
KITTY:	They'll know soon enough.	780
OPPIE:	I'm not supposed to talk about it.	
KITTY:	Robert had a visit from the military.	
TELLER:	Is this about the bomb?	
OPPIE:	It's all very hush-hush.	
BETHE:	We are all inside the circle here.	785
SERBER:	Well, with the exception of Haakon perhaps.	
HAAKON:	Do you want me to leave?	
OPPIE:	No ... I ...	
HAAKON:	I'm not in your department ... I'm not even the spouse of someone in your department ... it's fine. I need a trip to the little linguist's room anyway, so ... [<i>Exits.</i>]	790
BETHE:	Oppie?	
OPPIE:	You must understand, the details are not yet finalized ...	
CHARLOTTE:	Tell us!	
OPPIE:	A laboratory is going to be built. A laboratory dedicated to the building of this bomb ... probably somewhere quite remote. It will be a continuation of our discussions and work at Berkeley, but now ... well ... as a legitimate and sanctioned part of the war effort.	795
TELLER:	A central laboratory?	800
KITTY:	A national laboratory.	
OPPIE:	And I will be its director.	

24 – LECTURE SERIES – OMITTED

25 – OPPIE AND HAAKON

OPPIE *and* HAAKON

HAAKON:	Oppie, may I have a word? [<i>Pause.</i>] I will never suffer nor ever comprehend the suffering felt by those at the heart of this war ... but don't deny my empathy. The Russians ... Stalingrad ... they're fighting with their teeth and their hands ... with pitchforks and kitchen knives. [<i>Beat.</i>] It is clear to everyone on campus that the physics department is involved in ... that you are working on ... something very important. I have a proposition for you ... I think that you will want to hear it. I saw a friend of mine recently ... a man ... you are known to him ... he shares our sympathies. He has a means of getting technical information to the Soviets.	805
OPPIE:	[<i>Silence.</i>]	815
HAAKON:	Do you not believe that the Russians have a right to know? Or, indeed, that they may be able to help? I am no physicist ... I have no useful skills here ... but I can do this. So let me do this.	

26 – THE BOY WITH A BEAR ON A LEASH – OMITTED

27 – IGNITION

TELLER:	We were discussing Hans' work on the cycle of nuclear fusion in stars ...	820
BETHE:	... stars generate power by fusing elements together ...	
TELLER:	... in the case of our sun it fuses the lightest element to make the second lightest ...	
BETHE:	... hydrogen plus hydrogen equals helium ...	
TELLER:	... it is with the sun's own gravity ... the weight of itself ... the incredible pressure at its core that gives rise to fusion ...	825
BETHE:	... those particles have no place to go and yet are travelling at astonishing speed ... slamming into each other like blind and angry dodgem cars ...	
TELLER:	... and it occurred to me that ... in the split second of a uranium device's detonation ... an equivalent heat or pressure may exist ... equal to that found at the core of our sun ... and if you were to surround that fission device with enough fuel ... deuterium – heavy hydrogen ... then maybe ... maybe it would cause a fusion reaction.	830
BETHE:	We could make a star on the surface of the earth.	
TELLER:	Why stop at splitting the atom ... why not forge new ones?	
OPPIE:	Not just a nuclear device ... but <i>thermonuclear</i> . The energy released would be ...	835
BETHE:	... colossal.	840
TELLER:	A super bomb.	
BETHE:	A much higher yield.	
TELLER:	Much higher. Thousands of times more powerful ... than a mere fission device ... a mere uranium bomb.	
OPPIE:	A hydrogen bomb.	845

- TELLER: A blast radius of not just one or two miles ... but ... what? Thirty-five? Forty? Fifty?
- BETHE: A star on the surface of the world.
- OPPIE: A fundamental element of your hydrogen device is a uranium device. 850
- TELLER: Yes.
- OPPIE: So we build that first.
- BETHE: With a uranium device ... even with just a uranium device ... the temperatures and the pressures we are talking about ... what if we were to set fire to the earth's atmosphere? 855

28 – PEEL THAT POTATO – OMITTED

29 – AN ARMY HOSPITAL IN SAN FRANCISCO

OPPIE *is being given a physical exam by* DOCTORS.

He is made to stand on scales, X-rays of his chest are held up to the light. Blood pressure is taken. A stethoscope is placed against his chest.

GROVES *stands nearby.* 860

- GROVES: So, doc ... does he pass?
- DOCTOR: He's underweight. Eleven pounds short of the minimum required for active duty ... twenty-seven pounds under what would be ideal for a man of his age and height. He's had a chronic cough for some years ... 865
- GROVES: 'Some years'?
- OPPIE: Since 1927.
- DOCTOR: ... and x-rays of his lungs confirm a mild case of tuberculosis. The patient also suffers from lumbosacral strain ... lower back spasms ... and experiences moderate shooting pains down his left leg every two weeks or so. My considered opinion is that this man is not army material and that the physical defects I have mentioned render him permanently incapacitated for active service. 870
- GROVES: You understand all that? 875
- OPPIE: I do.
- GROVES: [*Passes OPPIE some forms.*] Sign here to acknowledge these pre-existing medical conditions and to request extended active duty.
- OPPIE: [*Signs.*] Can I ask ... what rank will I receive? 880
- GROVES: You will be commissioned at the rank of Lieutenant Colonel. Stand up, soldier. Welcome to the United States Military.

30 – OPPIE’S OFFICE AT BERKELEY

Alone with a neatly folded pile of clothes – his US Army uniform.

OPPIE *gets dressed.*

KITTY *enters.*

885

KITTY: Hello, soldier.

OPPIE: Ma’am.

KITTY: Hello, officer.

They kiss.

KITTY: Everything is packed. Peter is staying behind with Charlotte until they move to Los Alamos next week. I like your uniform.

890

OPPIE: Thank you.

KITTY: Can you order a man to kill?

SERBER *enters, also in US Army uniform, that of the rank of sergeant.*

895

SERBER: Lieutenant Colonel Oppenheimer, sir ... Sergeant Robert Serber, reporting for duty, sir!

KITTY: Look at you, Bob!

SERBER: Very natty, don’t you think? Very authoritative.

OPPIE: Atten-SHUN! Chin up, chest out, shoulders back, stomach in. Eyes front, soldier!

900

SERBER: Hey now, that’s pretty good.

OPPIE: Drop to the floor and give me twenty. That’s an order soldier!

SERBER: Sir! Yes, sir! [*Starts doing press-ups.*]

KITTY: Frank called the house.

905

OPPIE: When was this?

KITTY: This morning. I told him not to call again.

OPPIE: Was there a click on the line? Did you hear the click?

KITTY: I don’t know.

OPPIE: How is he?

910

KITTY: I told him not to call again and I hung up.

OPPIE: That was the right thing for you to do.

SERBER: No more ... no more ... I have a body designed for mathematics ... no more ...

KITTY: I’ll leave you boys to play dress-up. Look at you two ... glasses like milk bottle bottoms ... limbs like bamboo ... all dressed up to go to war. [*Exits.*]

915

SERBER: You heard about Joe Weinberg?

OPPIE: What about Joe Weinberg?

SERBER: He’s been drafted to peel potatoes in Alaska because they think he’s a Communist sympathizer.

920

OPPIE: Yes, I had heard that.

SERBER: Well?

OPPIE: We’re all in the military now.

SERBER: He should be at Los Alamos with the rest of us.

925

OPPIE: What would you have me do?

SERBER: Gee, I don’t know, Oppie ... get him reassigned. You have the stripes now – bark some orders.

OPPIE: And why would I do that?

	BETHE <i>enters.</i>	930
SERBER:	You're out of uniform soldier.	
BETHE:	It's not possible ... under these conditions ... to do as you ask. We will never find the manpower ... the grad students ... the PhDs. How am I to recruit them to a project I am not authorized to discuss?	935
OPPIE:	Any scientist worth our time would surely have guessed what it is we are asking of them ...	
BETHE:	It is unpalatable to me to coerce men onto this bomb project without the full facts ...	
SERBER:	We are not to call it the bomb project.	940
BETHE:	Excuse me?	
SERBER:	It is the Manhattan Engineer District ... for reasons of security.	
BETHE:	This world of codewords and obfuscation ... it is not my world.	
OPPIE:	I'm sorry, but it is.	945
BETHE:	I am already within the circle?	
OPPIE:	You are.	
BETHE:	These are academics and free-thinkers ... they are perhaps not so eager to be press-ganged into the military.	
OPPIE:	Then appeal to their patriotism.	950
BETHE:	Take to the seas when the men start wearing flags ... flags and thick-soled boots. I will build the bomb if I must. But I will do it as me ... as Hans Bethe ... not as ... not as a buzz-cut ... as a broken and rebuilt man. I would feel more comfortable if you were to build it as J Robert Oppenheimer ... as a professor, not as a colonel.	955
OPPIE:	Fascism is tearing Europe apart and you want to argue about the symbolism of our shirts and our pants?	
BETHE:	I know of fascism! As a German ... as a man with family still in Germany ... perhaps my understanding is just that little touch sharper. It must be built here ... I cannot fathom the other. But I will not wear a uniform. I suspect I will not be alone.	960
SERBER:	You are a US citizen, Hans.	
BETHE:	You think I would wear a German one? The Cult of the Soldier is not for us all ... not even in wartime.	965
OPPIE:	I will talk to the General.	
BETHE:	Thank you. And my recruitment drive?	
OPPIE:	There is no room for movement on matters of security.	
BETHE:	Fine. [<i>Beat.</i>] I am sorry to hear of your Joe Weinberg.	
OPPIE:	It is what it is.	970
BETHE:	To lose good men when we are trying to recruit ...	
OPPIE:	Is that all?	
BETHE:	No uniforms?	
OPPIE:	No uniforms.	
BETHE:	Thank you. Oh, and ... [<i>Hands OPPIE a folded piece of paper.</i>]	975
OPPIE:	What is this?	
BETHE:	The proof that we are in no danger of igniting the atmosphere. A near zero possibility. Perhaps it slipped your mind between salutes. [<i>Exits.</i>]	
	<i>Silence.</i>	980
OPPIE:	Get out of that uniform – you look ridiculous.	
SERBER:	At least I'll have something to wear for Halloween.	

OPPIE:	I need you on a train to Santa Fe in the morning. I need you in Los Alamos as soon as possible.	
SERBER:	Charlotte and I ... the plan was to move next week ... we were to look after Peter ...	985
OPPIE:	Then Charlotte stays behind. It's not an inobvious solution.	
SERBER:	I can't ask that of her ... you can't ask ... of us.	
OPPIE:	You need to take your share of responsibility for what we are doing.	990
SERBER:	Yes, Oppie. [<i>Exits.</i>]	
	LOMANITZ <i>enters.</i>	
LOMANITZ:	Everyone is packing for Los Alamos. Apart from me. I am supposed to remain at Berkeley.	
OPPIE:	Yes.	995
LOMANITZ:	Could you explain to me the reasoning behind ...?	
OPPIE:	Rossi ... I have a great many things to ...	
LOMANITZ:	You want me to join the Rad Lab ... under Professor Lawrence?	
OPPIE:	Yes.	
LOMANITZ:	The man is a Republican nightmare ... the merest hint that the boys in the lab might form a union and he –	1000
OPPIE:	Giovanni Rossi Lomanitz – that you would even take the idea of a union to Earnest Lawrence ... it boggles the mind.	
LOMANITZ:	The radiation laboratory is a workplace ... the boys who work there are workers. The fillings in their teeth have become radioactive. Hold a Geiger counter to their mouths ... the damn thing sings like fat in a pan. You expect me to work in that kind of environment without representation from a union?	1005
OPPIE:	I expect you to acknowledge that there are sacrifices to be made during wartime.	1010
LOMANITZ:	I should not have to throw myself on a spear to prove that I am willing to die for my country.	
OPPIE:	You need to be less vocal ... in your politics ... in your dealings with people ...	
LOMANITZ:	Are you punishing me? Are you ... for what? Because of the books I have read ... the convictions that I hold? The books you lent me ... the convictions that you instilled. Your lectures ... those first few weeks of lectures ... those discussions ... drinking in the small hours ... science and art ... Niels Bohr and Roosevelt ... social reform ... Engels ... Hindu scripture ... and I find myself in my spare time trying on porkpie hats ... training myself to enjoy pipe tobacco ... reading Marcel Proust. I'm from Oklahoma!	1015 1020
OPPIE:	The Berkeley work will be good work ... essential work ... isotopes ... electromagnetic separation. Professor Lawrence is a good man. You will learn a great deal.	1025
LOMANITZ:	I guess I should be grateful I'm not being shipped off to Alaska to peel potatoes!	

31 – THE HARVARD CYCLOTRON – OMITTED

32 – A TOWN OF TIMBER FRAMES – OMITTED

33 – LECTURE SERIES: TAMPER MATERIALS

SERBER:	How to Build an Atom Bomb 101.	
WILSON:	Get yourself two lumps of uranium ... smack 'em together. Boom.	1030
SERBER:	Here endeth the lesson. Any questions?	
WILSON:	'Then why is it so difficult?' I hear you ask.	
SERBER:	Ah, well now you're moving out of the theoretical world ... now you want to be practical.	1035
WILSON:	Raw uranium ore won't cut it ... it needs to be enriched ... and the infrastructure you'd need to do that would have to be massive.	
SERBER:	I mean, there's a handful of countries with the right level of industry and infrastructure.	1040
WILSON:	And uranium is rare ... and the refined stuff you'd need from it ... the isotope uranium-235 ... makes up maybe 0.72% of the naturally occurring stuff.	
SERBER:	There's also plutonium ... but that's a bit too new.	
WILSON:	We just don't know that much about it yet.	1045
SERBER:	Well, shoot ... you want to do this quickly, right?	
WILSON:	You're in kind of a rush?	
SERBER:	Then you're going to need several processing plants ...	
WILSON:	... you're going to need about 10% of the national grid of the US to run these plants ...	1050
SERBER:	... and still you'll be lucky if you get a couple of hundred pounds of uranium in a year.	
WILSON:	'Well, how much do you need?'	
SERBER:	We don't know ...	
WILSON:	and this stuff is far too precious for Trial and Error testing...	1055
SERBER:	Getting it together and keeping it together – that's the trick.	
WILSON:	You bring it together too slowly ... you bring not enough of it together ...	
SERBER:	... and hey, you'll kill everyone in the room ... well done.	
WILSON:	But it won't be a bomb.	1060
SERBER:	A billion dollar suicide and the Nazis won't give a damn.	
WILSON:	So we've got make the most of every last ounce.	
SERBER:	Which brings us to ... tamper materials.	
WILSON:	You know on a flashlight how you've got a reflective surface behind the bulb? It's the same deal, only we're putting two flashlights together – face on. No escape.	1065
SERBER:	This diagram represents a mass of uranium that is currently undergoing fission ... but it's wasteful. We are losing quite a lot of neutrons through the surface of the mass.	
WILSON:	But surround it with a tamper material ... a material that will reflect those neutrons back into the uranium ...	1070
SERBER:	... a jacket of something reflective and non-reactive ... tungsten, say ...	
WILSON:	... and those neutrons attempting to escape can't get out.	
SERBER:	They're corralled. They're a pack of wolves in a broom cupboard and they'll tear themselves apart.	1075

34 – THE COMPLAINTS OF CAPTAIN DE SILVA – OMITTED

35 – MILITARY BASE AT LOS ALAMOS

A MILITARY POLICEMAN *enters*.

POLICEMAN: Excuse me, Professor Oppenheimer ...?
 OPPIE: Yes?
 POLICEMAN: Professor Teller is here to see you. 1080
 OPPIE: Of course.
 POLICEMAN: Professor Teller isn't wearing his white badge.
 OPPIE: Let him in, for god's sake.
 POLICEMAN: Yes, sir. [*exits*]
 TELLER: There you have it! Right there! Unbelievable. One cannot visit 1085
 the bathroom without the correct certificate ... the appropriate
 permission slip.
 OPPIE: Hello, Edward.
 TELLER: I am tired. I sleep in a dormitory with ten other men. I shower
 in a communal shower. When my wife and son join me we will 1090
 be given a house. It will not be such as yours ... but as long as
 there is space for my piano ... [*Beat.*] My mail is being censored.
 My wife complains in her letters that my correspondence is
 mostly thick black lines. Any names – redacted. Any mention of
 the building situation – redacted. Any complaint about my lack 1095
 of privacy – redacted.
 OPPIE: You think they would allow them to pass unchecked?
 TELLER: Two more weeks and they will come. Until then there is the
 work. I am not tired when I work. I am not tired when the work is 1100
 interesting.
 OPPIE: No, Edward.
 TELLER: No?
 OPPIE: No, you cannot work on the super bomb.
 TELLER: But a hydrogen bomb! The processes of the stars themselves!
 This is what is fascinating to me ... not lumps of rock ... not 1105
 lumps of degrading rock ...
 OPPIE: There is not the resource to follow up on the super ... not at the
 moment ...
 TELLER: The numbers you have me working on ... the calculations ...
 any member of Hans' theoretical division ... 1110
 OPPIE: But they would not do it as fast or with as few mistakes as you.
 You will do the work that you are assigned.
 TELLER: No, I will not.
 OPPIE: No?
 TELLER: It is beneath me. 1115
 OPPIE: Beneath you?
 TELLER: It is a nonsense to have someone of my ability scratching out
 sums that would barely challenge a college freshman.
 OPPIE: Take your offence and your boredom and your ego – I have no
 use for them. 1120
 TELLER: There is opportunity here. The things we are learning about
 atomic structure – a decade's worth of peacetime research in a
 handful of years! We have funding ... we have resource ... and
 you would have me hold back?
 OPPIE: Our enemies are upon us! We have within our reach a blunt 1125
 instrument and we will grab it and we will use it and we will win.

- TELLER: There is no beauty or elegance in these equations.
 OPPIE: Thousands of people – at Los Alamos, Oak Ridge, Berkeley, Chicago and across the entire country – are working toward a single purpose ... and, contrary to what you may believe, that purpose is to end this war ... not to enable fantasies of a hydrogen bomb. 1130
- TELLER: I have not fantasized this science ... it is reality.
 OPPIE: It is not! It is not a reality unless I say it is. It cannot exist unless I say it exists. And I say that there is no resource for a hydrogen bomb ... not here ... not now. Oh ... oh ... but excuse me ... I have forgotten myself ... you are the great Edward Teller ... how remiss of me. Of course you may work on your pet project, Edward. The world will simply all have to tolerate a little more war ... a little more slaughter. How shortsighted of me. You may have an hour. 1135
- TELLER: I'm sorry?
 OPPIE: I will give you one hour ... every week ... to come and discuss with me your ideas on the super. That is what you want, isn't it? 1140
- TELLER: An hour is no ...
 OPPIE: Edward ... it is all that I will give.
 TELLER: And I am supposed to be grateful?
 OPPIE: It is an hour or it is nothing. 1145

36 – KITTY AND OPPIE'S LOS ALAMOS HOME

KITTY and OPPIE's Los Alamos home.

Nighttime. A party in the distance. 1150

KITTY and OPPIE. KITTY is visibly pregnant.

MILITARY POLICEMAN enters from the bedroom.

- POLICEMAN: Peter's tucked up snug as a bug in there, Mrs Oppenheimer.
 KITTY: Thank you.
 POLICEMAN: Just yell out the window if you need anything, sir. 1155

The MILITARY POLICEMAN exits.

- OPPIE: Our security detail double as babysitters now?
 KITTY: I may as well make use of them.
 OPPIE: Groves is unhappy that all the women are pregnant ... and that my wife is leading by example. 1160
- KITTY: You build a new town in the mountains ... kids running in the street ... tricycles ... jumpropes ... you provide free government funded healthcare for the men and their families ... and you're surprised by the birthrate? It's a boomtown, Robert. You've built a boomtown. 1165
- OPPIE: You reek of booze.
 KITTY: It's the chemists' punch. They mix in the alcohol from the lab. Two hundred percent proof. I can still feel it in my throat ... feel it in my blood. Do you begrudge me a social life?
- OPPIE: No. 1170
 KITTY: What else is there for me to do?
 OPPIE: No ... go ahead ... besides, we may need some new friends.

KITTY: What does that mean?
 OPPIE: Don't expect a dinner invitation from Edward and Mici Teller.
 KITTY: I can live without the Tellers. I can live without his appalling records ... his awful Beethoven. 1175

OPPIE: He smarts because I made Hans a division leader and not him.
 KITTY: He smarts because Groves gave you Los Alamos ... but he could not build this bomb. He could not rally the men and guide the work. Can you imagine Edward Teller as the Mayor of Boomtown? He has the arrogance ... and there is an arrogance required to build this weapon of yours ... to even consider the idea. What is rare is when arrogance is partnered with sacrifice. 1180

OPPIE: And what have I sacrificed?
 KITTY: Oh Robert ... Robert ... where is your brother? 1185
 OPPIE: There has to be distance.
 KITTY: Yes.
 OPPIE: There has to be distance. [*Beat.*] Haakon ... before we moved up here ... before work truly began ... Haakon said ... he came to me and said that he had been approached by someone who was in contact with the Soviet consulate in San Francisco. He was asking if I wanted to feed information about the bomb to our Soviet allies. 1190

KITTY: What did you tell him?
 OPPIE: I told him nothing. I may have used the word 'treason'. 1195
 KITTY: You need to tell Groves.
 OPPIE: Yes.
 KITTY: You see that, don't you?
 OPPIE: I do. But Haakon ...
 KITTY: ... should never have come to you. 1200
 OPPIE: He's my friend.
 KITTY: Not if he were to ask that. Cast him off. The bomb will not be built by some spineless weakling.
 OPPIE: No. 1205
 KITTY: The man who builds this bomb will be hailed a hero.
 OPPIE: I have never asked for that.
 KITTY: But you have wanted it. Everyone will know your name. Everyone will want to bask in your light.

OPPIE: My 'light' ... if I were to show it ... would strike the world blind.
 KITTY: You cannot be scared of your own potential. 1210
 OPPIE: I have it within me to murder every last soul on the planet – should I not be scared?

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