MC 143
Pit Range 2

Index and Questions

The Libraries
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MC 143

Bush, Vannevar, 1890-1974.
Oral History, 1964. .7 cubic foot.
In Massachusetts Institute of Technology Libraries, Institute Archives and Special Collections.
Electrical engineer; Vice President of M.I.T.
The 1,120-page transcript of Eric Hodgins' 1964 oral history of Bush which was done in preparation for his autobiography, Pieces of the Action. Topics covered include the differential analyzer, patent policy, Raytheon Company, Radar.
Unpublished index available in the Institute Archives.

Added entries:

Differential analyzer

Hodgins, Eric

National Science Foundation

Oral history

Patent practice

Radar

Raytheon Company

United States. National Defense Research Committee

United States. Office of Scientific Research and Development

MC143

VB: Vannevar Bush
EH: Eric Hodgins
HK: Helen King
AB: Aileen Bauer
JK: Joan Kaufmann
AM: Alta McKay

July 28, 1966

B U S H B O O K

Questions: "A" Series 112 questions
"B" Series 59

171 questions

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MC 143, Box 1

DH to VB June 9, 1964

Q. 1. Let's begin with the year 1919--that of the Boston Police Strike and Woodrow Wilson's illness, among other things. That was your first year at MIT, as an Associate Professor. Let's recall your first conversations with D.C. Jackson and how you "resolved his doubts."

Bush Answer on Reel # 1 at Counter # 216.

June 9, 1964

Q. 2. Before that, at Tufts, you earned your varsity letter as Manager of the Football Team "which twisted Eisenhower's knee." What other recollections?

Bush Answer on Reel # 1 at Counter # 070.

June 9, 1964

Q. 3. And recollections of your years and jobs with General Electric?

Bush Answer on Reel # 1 at Counter # 176.

June 9, 1964

Q. 4. Now back to MIT. Subjects to discuss:

a) Your doctoral dissertation

b) Relations with A. E. Kenneally

c) Budget rumpus with D.C.J. "Well, Phoeb, I guess we're all through at MIT. Where'd you like to go now?"

Goes over to 2d side of reel 1.B Counter again started at 000

Bush Answer on Reel # 1 at Counter # 312.

June 9, 1964

Q. 5a) Dr. Maclaurin's death almost instantly after the great dinner which revealed George Eastman as "the mysterious Mr. Smith."

b) The Administrative Committee of Norton, Talbott and E. B. Wilson with Elihu Thomson as the Acting President who didn't act.

c) Inauguration, near fatal illness and resignation of Ernest Fox Nichols

d) The Administrative Committee again!

e) Samuel Wesley Stratton (and Morris Paris!)

f) From 1920 to 1930 and the coming of K. T. Compton-- a bad decade for the Institute. What had been your concerns during this decade?

Bush Answer on Reel # 1B at Counter # 097.

June 9, 1964

Q. 6. Now about the state of science and engineering in the U.S. at that time. The impact of Planck, Bohr, Einstein, etc., had been comparatively little felt, or am I wrong?

Bush Answer on Reel # 1B at Counter # 186.

June 9, 1964

Q. 7. But ± 1930 the Bush Differential Analyzer made its appearance. You have always paid appropriate homage to Chas. Babbage here, yet it was you, was it not, who began the trail to the modern computer? What electronic advantages did you have that the world of Babbage was innocent of?

[I have not had time correct this Q. since you set me straight. But maybe my error was fortunate in calling forth a fuller answer.

Bush Answer on Reel # 18 at Counter # 251.

June 9, 1964

Q. 8. Now, prior to 1935, you are Executive VP of MIT [a new post] and Dean of the School of Engineering, which was also relatively new. What was the Compton/Bush relationship and how did it develop? ("When you're a deputy, always act in the name of your chief.")

Bush Answer on Reel # 13 at Counter # 294.

June 9, 1964

Q. 9.a) Incidentally, about how many patents did you by this time hold and what fields, inside and outside of electrical engineering, did they represent?

b) Like to add any more comments on patents and inventions at this point?

Bush Answer on Reel # 1B on Counter # 318.

June 9, 1964

Q. 10. Your Presidency of CIW began formally as of January 1, 1939, but Aileen Bauer remembers that you spent "quite a bit of time" prior to that in Washington. To size up the landscape? What had your Washington associations been prior to 1939? (Chairman of NACA, but let's expand on this.)

The question of "Why Bush?" is obvious in one sense, but let's pretend it's unobvious to the reader.

Bush Answer on Reel # 1B at Counter # 351.

June 9, 1964

Q. 11. In discussing why you took the CIW post you've already said to me, approximately:

a) "Of course today I like to think I saw the war storm coming and wanted to be where I might be able to do the most good. But of course motives are very mixed, so I certainly don't claim that that was the reason."

Will you rephrase that in your own terms and expand it?

b) Also--"While I was at MIT those last prewar years, I realized I was headed for a university presidency--and that was the last damn thing I wanted. And it wouldn't have been the life for Phoeb either, and I had to think of her." Rephrase and expand?

Bush Answer on Reel # 2 at Counter # 000.

June 9, 1964

Q. 12. The public needs to know something more about the Carnegie Inst. of Washington. Of course all its formal history, from founding in 1902 onward, as Andrew Carnegie's good deed toward Science, is on the record. But what would you, as its head, like to add to the cold-turkey record. (Including confusion in the public mind between CIW and the Carnegie Corporation.)

Bush Answer on Reel # 2 at Counter # 075.

June 9, 1964

Q. 13. a) In being president of CIW from 1939 to 1955 [?] didn't you set a record of tenure?

b) Didn't Henry Smith Pritchard, Maclaurin's predecessor at MIT, leave MIT in 1909 for Carnegie Corporation? Pritchard wasn't very beloved at MIT, I seem to remember. Any comments?

Bush Answer on Reel # 2 at Counter # 129.

June 9, 1964

Q. 14. Backtracking now, via my remembrance of Pritchard, I think of the McKay Trust. Maclaurin once thought that the accord he had worked out with Abbott Lawrence Lowell whereby Harvard just about closed its Lawrence Scientific School, and sent its students down to MIT, was his finest achievement. Then came the "friendly suit" brought by the McKay Trustees for a court test--and the whole plan blew up. What VB comments and recollections here?

Bush Answer on Reel # 2 at Counter # 167.

June 9, 1964

Q. 15. Backtracking some more to the case of Sacco and Vanzetti: Lowell, S.W. Stratton and old Judge Grant were appointed as an informal court of final review by Governor Fuller. I think some comment is appropriate concerning the political climate of Massachusetts in the mid-1920s. What comes to your mind to say?

Bush Answer on Reel # 2 at Counter # 247.

June 9, 1964

Q. 16. Still further backtracking: You are a "Cape Cod Yankee" and a minister's son to boot (just as I am). You are certainly the modern archtype of the 19th Century "ingeneous Yankee," but that is far from all you are. You are quizzical and speculative about "unknowable" matters. Whence came all this? And whence came your ability to administrate?

Bush Answer on Reel # 1 at Counter # 000.

June 9, 1964

Q. 17. Your first name is not a family name, you once told me. Who was John Vannevar? [And how many people know it should be pronounced Vann-É-ver, not VANN-e-var?]

Bush Answer on Reel # 1 at Counter # 051.

June 9, 1964

Q. 18. You are not an egotist, but neither are you fake-modest. You are, to many, "cantankerous" but you are kind. You can get good and mad, but you can throw it off. You can be very frank, but you can also be Foxy Grandpa. I am asking you to discuss, as if looking at a third party, your personality as you see it.

Bush Answer on Reel # 2 at Counter # 308.

June 9, 1964

Q. 19. Now back to the year 1939. You took office at CIW in January. The Germans attacked Poland in September. What had been your concerns in the intervening nine months.

Bush Answer on Reel # 2 at Counter # 323.

June 9, 1964

Q. 20. And when Senator Borah rose up to say "There's something phoney about this war"--because with Poland crushed the Nazis did not attack France until May 1940, what feelings did this arouse in you? [From A. Bauer I particularly need your first, 1939, Annual Report.]

Bush Answer on Reel # 2 at Counter # 368.

June 9, 1964

Q. 21. In peacetime what had been the previous traditional role of the President of CIW, in its relationships with Government.

Bush Answer on Reel # 2 at Counter # 386.

June 9, 1964

Q. 22. Let us recall the story of your development of the machine for cryptoanalysis:

a) Its basic principles, describable within today's limits of "Security."

b) Your long-hand only-copy to Naval Captain NAME

c) The subsequent visit of the young lieutenant and the anecdote, "You forget, sir, that our specialty is cryptoanalysis."

d) Your visit to WHAT LOCATION and seeing six or seven of your machines in operation, whereupon you said, "Now I know you're obsolete."

e) You take no credit that your machine helped break the Japanese code, but others here said it did. Without undue modesty will you discuss this a little further.

Bush Answer on Reel # 2B at Counter # 003.

June 9, 1964

Q. 23. Still staying with codes and cryptoanalysis, you spoke to me of methods whereby the "message" could be contained under or in a period at the end of a sentence. Can you enlarge on this? Also: you described a Navy development (in which you had a part?) whereby a frequency-within-a-frequency could contain the essential "message." Utilization of this was never made because the danger of possible German cracking was deemed to outweigh all advantages to our side. Will you straighten me out on this and discuss.

Bush Answer on Reel # 2B at Counter # 074.

June 9, 1964

Q. 24. Idea-association leads me here to questions about the German exploitation of uranium fission. You told me (June 9/64) that Allied or British reconnaissance had established the existence of a German heavy-water production ~~side~~ site (where?) and that British bombing had knocked out the penstocks (correct word?), and Allied (meaning Bush & Co.?) estimation was that it would take the Germans six months to restore damage. But Hitler threw such a task force into restoration that deduction was made that the objective was restoration in two months. (Actual times not completely specified by you, but you did say that ratio was approximately 6 to 2.) And from this, deduction was made that we were at least six months ahead of the German in re fission, etc. Will you expand on this, please.

Bush Answer on Reel # 2B at Counter # 113.

June 9, 1964

Q. 25. Re the pre-bomb days. If one freewheeling neutron knocked only one corresponding neutron loose from its nucleus, this one-to-one correspondence would mean--no bomb possibilities. You said to me, June 9, 1964, "I hoped the correspondence would prove to be only one-to-one, but the verification had to be made, and when, within a fortnight, three separate laboratory confirmations came in that the correspondence was greater than one-to-one, we knew we had to go ahead."

To me, this incident is a pivot around which a great part of our narrative turns. Other men obviously hoped the same hope--but

(OVER)

Bush Answer on Reel # B2 at Counter # 152.

Bush was in charge, and in a sense your inescapable decision to go ahead was a harder decision to make than the decision of Stimson-Truman to drop the bomb. Please treat this situation as fully as you can.

June 9, 1964

Q. 26. I remember the reporter's question to you: "Dr. Bush what were you really thinking about as you waited for the blast at Alamogordo?" And your response. "Well I was really thinking, If this thing goes off with a hell of a lot more force than we've calculated, they'll have to get a new head for CIW and OSRD--and if it goes off with a hell of a lot less force. . . they'll have to get a new head for CIW and OSRD. I wish you would retell this story in your own words, and in so doing describe Bush-at-Alamogordo in more detail. Also: in your opinion, whose already published account of Alamogordo is the best?

Bush Answer on Reel # 28 at Counter # 205.

June 9, 1964

Q. 27. This question is a complete break with continuity and is based on your small anecdote of June 9/64 about the focal plane shutter camera, counter-torque in the camera as its reels revolve, but no blur where it "ought" to be in the vertical of the 1/8th inch white cross in the black background you photographed. Quote--"And I don't know whether I've made a mistake in mathematical computation or in reasoning." This leads me to the remark--based on 40 years experience in interviewing people--that I know no one who felt less necessity for defending his Ego or for rationalization after-the-fact than yourself. Most people, when interviewed, play Hero in various ways, ranging from the overt and blatant to the covert and fake-modest. But

(OVER)

Bush Answer on Reel # 2B at Counter # 230.

Bush remains Bush. How is it done? Your answer to this Q. need not be personal if you don't want it to be, but some generalities about Personality on a Phenomenon will certainly be interesting.

June 9, 1964

Q. 28. And don't forget our talk about what it takes to be an administrator. Item: when you went to Washington to be new President of CIW, there was Merriam in the president's office, giving no signs of moving out. So you found the board room: "This is a nice big room; how often is it used?" (Once a year.) "All right, get me a desk and I'll move in here." This should lead to a chain of anecdotes--and by the way, when did Merriam finally move out?

Bush Answer on Reel # 2B at Counter # 252.

June 9, 1964

Q. 29. Merriam turned your "inauguration dinner" into a vast testimonial to himself. Mrs. Carnegie was there. (Must have been a very old lady.) You and Phoeb were the only personages to pay her requisite courtesies. These were acts of instinct--yet thereby the CIW staff became solid behind you. I have for years wanted to write an Essay on Manners--the use of manners for the accomplishment of ends. (Nothing calls for such a good working manners as a Rebuke--vide you, Lord Mountbatten and "the nut" Wilde. "Wait just a minute: I take my orders only from the President of the United States." - V. Bush.) Maybe you would like to respond on the use of Manners--not Etiquette--as a technique of executive high control.

Bush Answer on Reel # 28 at Counter # 300.

June 9, 1964

Q. 30. My Memex Trail leads me straight from here to "How to Testify Before Congress." Here, also, Manners play a vital role. Beginning with some do's and dont's will you talk to your heart's content on this subject. You have probably testified before more Congressional Committees than any other person in the U.S.: usually on matters involving high security. I think now of the black book (or red book) that you kept by your side in testimony before Senate sub-Committees: "The answers are all in here, Senator"--and the Senator's then extreme anxiousness that you should not open the book.

Bush Answer on Reel # 28 at Counter # 324.

Ran out of reel — so this will continue on reel 5.

June 9, 1964

Q. 31. Memex branch-trail a propos of executive control and administrative gift: during week of May 26, 1964, when I was working in Bush Room of CIW, Caryl Haskins came in to say hello. We had about five minutes of pleasant conversation. He was over-affable. Heaven knows I like affability but after CPH had left I kept asking myself,"In this gifted, learned and charming man, what can be the inner insecurity which causes him to be over-affable to me?" Mind, I draw a sharp line between affability and over-affability. Obviously, we shan't discuss such a question directly but if it leads to general considerations, they will be valuable.

Bush Answer on Reel # 3 at Counter # 034.

June 9, 1964

Q. 32. I would still like to get at the time when you talked about Artificial Harbors to me. It must have been after January 1939 because the conversation was at 1530 P Street, Washington, but before the formation of NDRC because after that you would not have spoken to me on such a subject. To read Churchill is to gain the impression that the idea was his and that moreover he pre-cast all the concrete. Although the British did do the work and their harbor served them well whereas ours was weather destroyed, I wonder if your 1939 speculations were picked up by others or whether the same idea spontaneously occurred in other minds too.

Bush Answer on Reel # 3 at Counter # 125.

June 9, 1964

Q. 33. It is important to our narrative that you coined the term "guided missile" because "rocket" was semantically no good in Admiral Leahy's mind--and in many others. Also important to emphasize that Hitler's V.1 and V.2 buzz bombs were not guided missiles, but rather propeller-aided shells, or whatever the proper term is. Will you please discuss. Also: my notes of June 9, 1964, are unclear as to when and to whom you voiced your fears as to what might be in the warheads--and to whom you expressed comparative relief that it was high explosive and that the Germans were not resorting to gas or bacterial warfare via buzz bombs.

Bush Answer on Reel # 3 at Counter # 168.

June 9, 1964

Q. 34. Allied to Q. 33: you quoted Ike as saying to you "Now you've got me scared," but again my notes are unclear. Was this re buzz bombs--and the necessity for bombing out their launching sites? I think the whole puzzle of interpreting photoreconnaissance pictures needs plenty of detailed recollection. And PS: what was it "we didn't know for sure until we got into Strasbourg?"* (Hazards of taking notes on a cushion instead of a desk. E.H.)

* The Nazis had left behind a girl with a notebook full of stuff

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Bush Answer on Reel # 3 at Counter # 239.

June 9, 1964

Q. 35. On the proximity fuze: you mentioned on June 9/64 that we deliberately began by using a mechanism which was, by choice, not our best, on the theory that this might deceive the Germans into thinking they had countered us, whereupon we would then give them our very best. But as I remember you, even our least tight fuze so totally demoralized the Germans that our "deception" was scarcely necessary. Comment?

Bush Answer on Reel # 3 at Counter # 271.

June 9, 1964

Q. 36. Memex brand trail: the little heat-seeking device that everybody thought had gone randomly off course but which was in reality seeking a Jap cook stove or something. (Again my inaccuracy stems from writing on a couch pillow. E.H.)

Bush Answer on Reel # 3 at Counter # 289

June 9, 1964

Q. 37. I don't think Col. Cox's letter to you of 5 June 1964 is at all over-rhapsodic--BUT I have somehow missed "Dr. Vannevar Bush," Robert Lovett's tribute, and even what was "the program" to which Col. Cox refers. Will you enlighten?

Bush Answer on Reel # 3 at Counter # 277.

June 9, 1964

Q. 38. From Cox letter of 5 June: "To me General Marshall and Vannevar Bush were the two great figures and true leaders of WWII." I echo this sentiment but I bring it up here because it reminds me to ask you to expand on two things:

a) "Marshall and Ike very seldom asked me technical questions--quite a different way from which the British operated with their scientific equivalent." V. Bush.

b) "The Germans never had any counterpart of their own to our OSRD." Even granting Hitler, this seems so un-German that I think it deserves quite a few words.

Bush Answer on Reel # 3 at Counter # 304.

June 9, 1964

Q. 39. Memex back to Cox brings up an intensely personal question, one which you may not want to answer--although I hope you will:

You fell seriously ill during the war. Of this illness let me say (guardedly, so that I won't stir you up) that if the rumor was correct and if the original, provisional diagnosis had also been correct, then the prognosis could have been very bad indeed, for you and for the Allies. Perhaps I would not have had the nerve to bring this up had it not been that after I had had a breakdown in 1954 (deep depression) but was in circulation again and visited you in Washington, you filled your pipe and said, "What hit you?" That was a perfectly phrased question, which I now try to imitate: "What hit you?"

Bush Answer on Reel # 3 at Counter # 331.

June 9, 1964

Q. 40. Here's one I should have asked you a long time ago. It's about your studies at and after Tufts. You spoke of your early interests in the non-Euclidean geometries of Lobachevsky, Reiman, etc., and of the mathematics of NAME (?). This reminiscence came from you on June 9 when I asked you about the state of mathematics and physics at MIT in my undergraduate days, when math courses were strictly tailored to engineering requirements and Course IX, Physics, was, along with Course XIV, the refuge for those who couldn't make the hot courses of that day: VI and X! My diffuse question here is designed to evoke some reminiscence and some important generalities about the changes wrought in science and engineering education from between post World War I and post World War II--a quantum jump if ever there was one.

Bush Answer on Reel # 1 at Counter # 126

June 23, 1964

Q. 41. There has always been a hell of a muddle in the public mind (fostered by tooth-paste advertising) as to what science is. Many people are now trying to make many other people understand the difference between basic science and applied science. But what is the difference between applied science and technology? I don't know the answer to that one. Vide page xiii, Science the Endless Frontier. (SEF for short.) And what is a technologist? How does he differ from an engineer--which you insist you are, despite having been head of the OScience RD? ~~DSF~~

and page numbers refer to the re-issued Edition

Bush Answer on Reel # 4 at Counter # 025

VB: N.B. All the following ~~qtns~~ questions up to #75 are ~~Q~~ based on Science the Endless ~~Frontier~~

June 23, 1964

Q. 42. p viii, SEF. Today we have the NSF, but also the President's Science Advisory Committee and the Fed. Council on Science & Technology. p.viii spells out the differences, but in such formal prose I can't draw much meaning from it. And we still have NAC /from Lincoln/ and NRC /from Woodrow Wilson/ What the hell? Science itself has built itself rather confusingly into what Gov. Wallace would call "the Centril Govament." Or so it seems. Enlightenment?

Bush Answer on Reel # 4 at Counter # 080

June 23, 1964

Q. 43. p. viii SEF. We now have 3 Congressional Committees concerned with "Science & Technology." How well can they function, when they scarcely know what's being talked about? How might an expanding technology force a change in the Composition of the Congress?

Bush Answer on Reel # 4 at Counter # 123

June 23, 1964

Q. 44. p.x, SEF. Question of VB's recommendation of a Science Advisory Board. How did this transmute itself into NSF, or did it? How did National Institutes of Health grow out of OSRD-Medical Division, in case that is how it happened.

Bush Answer on Reel # 4 at Counter # 182

June 23, 1964

Q. 45. p.xi. VB recommends a Dir. of ~~Med~~ Medical. Res. of the Nat. Res. Foundation. This is just an extension of Q. 44: how come the various pieces of things settled to the ground the way they did after OSRD was disbanded?

Bush Answer on Reel # 4 at Counter # 199

June 23, 1964

Q. 46. SEF xiv. There is here a lot of very starchy doubletalk about "Science Advisor to the Sec'y of State." Manifestly something is being covered with autumn leaves. What was it? Who was first Science Ad. to Sec. State? Why did he quit; why did program lapse? /We're in Eisenhower administration now./

Bush Answer on Reel # 4 at Counter # 206

June 23, 1964

Q. 47. Geophysical Year of 1957-58. How much did VB have to do with this? If not VB, to whom should major credit go for this unparalleled international scientific cooperation?

1 example of

Bush Answer on Reel # 4 at Counter # 219

June 23, 1964

Q. 48. SEF xiv. "Peaceful uses of Atomic energy" What is to be said about this in non-formal language?

Bush Answer on Reel # 4 at Counter # 238

June 23, 1964

Q. 49. SEF xix. "The five years of legislation debate in which the scientific community urged upon Congress the necessity for establishing" a new Scientific Board, Foundation or something. "President Truman's veto of bill eventually passed by both houses of the Congress in 1947 was a major disappointment." What were Truman's real reasons for veto of this bill?

Bush Answer on Reel # 4 at Counter # 248

June 23, 1964

Q. 50. SEF xv. Memex trail. When the Congress finally passed a bill /differing how from the bill Truman vetoed in 1947/ the Congress strangled NSF by appropriating substantially no money for it - and even wrote into the act a $15 million limit on NSF funds. Although this limitation was repealed in August 1953, why the limitation, and why the repeal, both in 1953?

Bush Answer on Reel # 4 at Counter # 264

June 23, 1964

Q. 51. SEF p.3. FDR writes to Bush, saying of OSRD, "Its work has been conducted in utmost secrecy, and carried out without public recognition of any kind, but its tangible results can be found in communiques coming from battle fronts all over the world. Some day the full story of its achievements can be told. [Emphasis added.]

Comment by EH:

a) The day ~~for~~ the full story has now come.

b) But obviously this book is not going to be OSRD only. Also it will be the pre-war climate which made OSRD possible,--AND how OSRD beat it swords into plowshares.

Bush Answer on Reel # 4 at Counter # 274.

June 23, 1964

Q. 52. SEF. pp 6 & 7. Bush: "One of our hopes is that after the war there will be full employment." Well we've had that, all right, and for more or less 20 years. But now "automation" is a ~~bugey~~ bogey word, and factory & farm employment are decreasing because fewer hands can do more work. I haven't the GNP figures for 1963 before me, but I seem to remember that Henry A. Wallace was gently jeered when he said in 1944, or so, $80 billions was not an impossible post-war goal. What is to be said here?

Bush Answer on Reel # 4 at Counter # 286

June 23, 1964

Q. 53. SEF, p.8, Bush said: "The government should accept new responsibilities for promoting the flow of new scientific knowledge and the development of scientific talent in our youth. These responsibilities are the proper concern of the government...."

I totally agree, but this statement reminds me to raise a point: every major advance in technology tends to raise problems which only the Federal Government can decide. Taking a very "simple" case: New York City badly needs a fourth airport. The only place it can ~~go~~ be placed is west and somewhat north of Megalopolis--which plunks it into a haughty part of New Jersey whose center is Morristown, more or less. The contentions are already bitter. And they will not be resolved by town-meeting, nor by the Mayor of Morristown, nor by the

cont. on other side of 000

Bush Answer on Reel # 4 at Counter # 320

(OVER)

Governor of New Jersey. They will eventually be resolved by the President of the U.S., acting on the best advice he can get from the appropriate technical and other staffs from the Federal Government. It is unnecessary to labor this case, but I think also of the AEC's relations with its Prime Contractors, whether GE, Union Carbide or whoever. Or NASA's power over God Knows how many companies. I myself am not at all afraid of this, and do not consider it "creeping" anything, but I think the point deserves a long and thoughtful discussion.

June 23, 1964

Q. 54. Still chewing the same cud, I think of Mr. Justice Brandeis' famous remark, "I hate bigness." It was a perfect expression of love for the rural and agrarian /and isolationist/ America of pre-World War I. But rural and agrarian America is vanishing. It will continue to vanish except for our National Parks. Long before 1914, Henry James berated his native land for its "contempt for the past." What say you here, Engineer?

Bush Answer on Reel # 4B at Counter # 083 431

I didn't get the counter back to zero so it runs the real over.

June 23, 1964

Q. 55. SEF, p.15. On this page the word penicillin /to be taken up later/ fires my personal Memex into thinking of DDT. As I remember it, DDT, used in Naples, prevented what might have been an endemic outbreak of typhus, with what results to the globe only God Knows. It is well known that chlorinated hydrocarbons are not soda pop and that compounds like parathione are strictly for professionals. But Rachel Carson's overemotional book, Silent Spring, promoted a new outbreak of talk about "upsetting the balance of Nature." The "balance of Nature" is to be found at its best in jungles--and the man who first laid a cobblestone walk upset it. Sparrows waxed fat on the nutritive elements in horse droppings, but thereby the Nitrogen Deficit began. I wish you would comment broadly on this. Man is a dangerous animal

Bush Answer on Reel # 4B at Counter # 108. (OVER)

alright, and some "progress" turns out to be backward steps. But. /I'm not sure which chapter you answer will belong in, but you are a Humanist as well as an Engineer, and this needs emphasis./

June 23, 1964

Q. 56. Memex trail here leads straight to the Bush squirrel-proof bird house. Descriptions, please, of this and similar ingenuities.

Bush Answer on Reel # 4B at Counter # 172

June 23, 1964

Q. 57. Memex backtrack to Q. 55. My son is "authority" for statement that for every ton of animal life on this globe there are three tons of insects buzzing or crawling around it. Momentarily assuming this to be true, please make the first remark that comes to your mind whether as Bush of Merck-Sharpe & Dohme, or of MIT or of OSRD.

Bush Answer on Reel # 4B at Counter # 192.

June 23, 1964

Q. 58. Further backup to Q. 55. When 2-4-D first came on market Texas ranchers bought it by the ton, for it was a sudden death to that royal nuisance, the Mesquite bush. Then, slowly, they had second thoughts, because they discovered that when a Texas drought got really desperate the cattle ate the Mesquite berries, because of their comparatively long water retention. I'm not sure what question I'm intending to ask you here: please just say something.

Bush Answer on Reel # 4B at Counter # 211

June 23, 1964

Q. 59. SEF, p.18. There is a key paragraph at the top of this page in which you speak of NACA for many peacetime years conducting basic research for the Army and Navy on the problems of flight. Then, by analogy you say "There should now be permanent civilian /my emphasis/ activity to supplement the research work of the Services in other scientific fields so as to carry on in time ofpeace some part of the activities of the emergency wartime Office of Scientific Research and Development." I re-quote this because I have a continuing and continuous interest in the paths which lead you eventually to the reality of NSF. Tell me something more. . .

Bush Answer on Reel # 4B at Counter # ~~263~~ 225

June 23, 1964

Q. 60. The above passage is worth rereading many times and prompts a side-trail Memex: you as head of the NACA. It was a brilliant choice, but what men and what forces brought it about? Who's Who fails to give the dates of your chairmanship, but my own memory suggests it began plus-or-minus 1935. Will you talk for a few moments about NACA and you, with special reference to the point of who first thought of you, an "electrical engineer," as the man for the job?

Bush Answer on Reel # 4B at Counter # 263.

June 23, 1964

Q. 61 (Associated with Q. 60). Sometimes it is possible to pin-point the date when a hitherto private citizen becomes a man-in-the-news. With you, I think it was when the newspaper wire services picked up your first Differential Analyzer and christened it, in journalese, "The Brass Brain." Do you agree, or not? Here also is the place, I think, to talk about "The BB," the antecedence of Charles Babbage, etc. For example, you completely surprised me, in Belmont last June, when you told me that your first model was mechanical, in the sense that it did not employ any thermionic tubes. I had always thought otherwise. Discourse here will be very interesting. /Side note: when I seem to be repeating a question this isn't necessarily through carelessness. Differently phrased similar questions, asked at different times may evoke different

Bush Answer on Reel # 4B at Counter # 285 (OVER)

circuitries of reply. Hence I am not ~~combining~~ combing my questions to eliminate repetitions. EH.7

June 23, 1964

Q. 62. SEF, p. 19. On this page is one of many statements about the desirability of free scientific information exchange. But in 1946, the year after SEF was first published, Harry Truman signed the McMahon Act and other Acts which made secrecy the law of the land in the domain of the AEC, created that year. Recently I had an argument with my friend Max Isenbergh, once General Counsel to the AEC and the actual author of Ike's "Atoms for Peace" speech of 1953, in which Max took the position that the secrecy provisions of the McMahon Act were "very sad, but very necessary." With all the benefits of hindsight will you now give me a long comment on the above? In doing so will you bear in mind a remark Karl Compton made to me in 1945: "If we gave the Russians

Bush Answer on Reel # 4B at Counter # 332.

(OVER)

the actual shop drawings of Oak Ridge it would take them nine years to catch up with where we are now." Why do you think Karl said what he said, and why did it turn out to be so wrong? And why do you suppose he said nine years, not an even ten?

June 23, 1964

Q. 63. This is not a question at all but a small anecdote which may spark something in you. In 1951 I was appointed by Pres. Truman to "The Paley Commission" (Paley; Arthur Bunker; Edw. S. Mason of Harvard; George R. Brown of Houston; Hodgins.). This was, formally, The President's Materials Policy Commission.

The last story I had written for Fortune before going on leave for this had been "The Atom and the Businessman," which David Lillienthal had asked FORTUNE to write. It had two very good illustrations. One was a map of all the U.S. Atomic Installations of the time. This huge map hung in almost every office of the AEC, so I asked for one and was forthwith given it. The other illustration was more spectacular: a splendid KodaKchrome aerial photograph of the K-25 plant at Oak Ridge. I got that by asking the PRO man of the AEC if he hadn't anything better than the junk he had been showing me. That stung him, and 48 hours later he handed

Bush Answer on Reel # 5 at Counter # 000 (OVER)

me two 35-millimeter color transparencies, saying "Maybe these'll satisfy you." One of them was good enough for blow-up to 5 X 9. . .

About three weeks after the FORTUNE story appeared, Harry Truman let loose with a press-conference blast at "irresponsible journalism" and when reporters asked him what he meant he cited "that goddam FORTUNE story, for example." A vast hubub followed, and HST sent for Luce and chewed him out, although Luce knew no particulars whatever about the FORTUNE story. /Meanwhile, of course, I had written official letters to all the AEC boys in Washington, Oak Ridge, Argonne and Hanford, thanking them for their kind cooperation./ My story also reflected the AEC's then vast dissatisfaction about the way GE was running its Prime Contractor job at Hanford, so GE joined the general ruckus. . . . At this same time the FBI was solemnly running a field check on me, preparatory to issuing me the Q-clearance a PMPC Commissioner had to have. Finding nothing subversive, it issued the clearance. So the situation was now that HST, who didn't know me from Adam, had appointed to his newest Presidential Commission a man he was continuing to denounce, although not by name, as an irresponsible publicist of vitally secret information. It was obviously my duty to ask Bill Paley if he thought he should fire me, but Bill decided to wait and see if any connection was ever going to be made between these two sets of facts. None ever was, and when the PMPC finally issued its report in June 1952, we were all photographed with HST in his office and he shook all our hands and said "Well done." /Unlike Ike, destined to become HST's successor in January 1953, HST <u>really</u> read our report and had some very intelligent and appreciative things to say about it./ That's the end of my anecdote. I am sure it will bring many, and much more important analogues to the front of your mind.

June 23, 1964

Q. 64. SEF, p. 20. "If the colleges and universities...etc....are to meet the rapidly increasing demands for new scientific knowledge their basic research should be strengthened <u>by use of public funds</u>."

So much for the Goldwaters of our nation. We will be seeing, either in July or next November, how many Americans still fail to see this point, and/or who think, as Harry Byrd of Virginia does, that the running of the United States of America should be along the same lines as the running of a mom-and-pop grocery store. I hope you will want to expand on and modernize your point, not only to enlighten today's Goldwaterites but to enlighten also those who continue to make meaningless but derogatory noises about "Government in Education."

Bush Answer on Reel # 5 at Counter # 075.

June 23, 1964

Q. 65. SEF, p. 21, has a recommendation that "the Internal Revenue Code should be amended to remove present [1945] uncertainties in regard to the deductability of research and development expenditures as current charges against net income." I'm not aware of what has ~~happened~~ happened since; therefore, I don't know whether anything important remains to be said here. But my personal Memex leads me to recollection of "The A. P. Smith Case" where, in 1953, a New Jersey Supreme Court decision in a stockholder suit removed a serious roadblock to corporate contributions, not just to R & D but to education more generally. As I remember it, Frank Abrams and SONJ helped this small test case along.

What should be the relationship between corporations and universities? In 1919, when Matt Brush was in charge of MIT's post-World War I Endowment Drive [for

(OVER)

Bush Answer on Reel # 5 at Counter # 135.

$2 million, which was a hell of a lot of money then?/ somebody thought up the idea of "The Division of Industrial Cooperation and Research" of which, later, Charles Ladd Norton became ~~Director~~ Director and Earl Bowman Millard the Associate Director. But not without opposition. I remember angry talk about this "crass idea of selling Tech." To what an old, old world such a remark now belongs. But I hope it will fire across some of your synapses, so please refill your pipe.

June 28, 1964

Q. 66. SEF, p.21. Bush on "certain abuses which have appeared in the use of patents... and should be corrected /because/ they have led to extravagantly critical attacks which tend to discredit a basically sound system." I have two questions:

a) Behind this formal prose lurked what substantive situations, and

b) are they, or other allied situations, important for discussion today?

There are times when proprietorship and the general society are on collision courses. I admit I am going far, far back for an example but when the Wright Brothers were denied a basic patent on the Art of Flying they were enraged to the point where they picked up the "Wright Flyer" and took it and themselves to France. On the other hand, and in the 19th Century, Thomas Alva Edison's patent application on his phonograph did not, so folklore tells us, encounter any previous application, no matter how remote. I don't present these as antithetical cases, which they

Bush Answer on Reel # 5 at Counter # 160. (OVER)

aren't, and I'm not trying to "prove" any point by raising them. But I earlier asked Bush The Inventor to discuss some of his own patents--or applications--and here is a good chance for discussion of what is pertinent in this arena today.

Time was, perhaps, when nobody "assigned" a patent; the one-man inventor wanted protection and grounds for suit for infringement, and that was that. A lot of social change is wrapped up in the Patent Office; I think you could here discourse on a great deal of it.

June 28, 1964

Q. 67. SEF, p.22, is prescient indeed in talking about "the desirability of a rapid flow of technical information, including translation service. . ." [My emphasis added.] Am I wrong in thinking that we sat on our fannies after World War II while a torrent of Russian scientific papers poured in on us to which we never paid any particular attention until post-Sputnik? I wonder why the U.S. press painted for us such a false picture of Russian intellectual capability over the years?

Also, pursuing a private Memex side-trail, were we not terribly smug in the years between the wars about our own technical capabilities? Momentarily disregarding the pure science of Rutherford, the Braggs, the Thomsons, Bohr, Planck, et al, we had the British to thank for such intense practicalities as radar, penicillin [but see later!], the combustion turbine and, correspondingly, "the jet engine," etc., etc.

Bush Answer on Reel # 5 at Counter #236.

(OVER)

The gas turbine seems to have particularly bugged the General Electric Company, because its Sanford Moss had indeed devised the turbo-supercharger--hence /as of 1943/ "we've had more combustion turbine horsepower in the U.S. than the British have ever had!" Trouble was, it hadn't occurred to us to apply the idea to propulsion. Folklore has it that even when the British flew one of Frank Whittle's-Roxbie Cox's-Jets Incorporated's knocked-down combustion turbines over to Schenectady, GE's engineers couldn't reassemble it so that it would work! Hell was to pay. You will remember 100 real stories here; I'm just working on your synapses again. However, this leads me directly back to -

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Bush Answer on Reel # _____ at Counter # _____.

June 28, 1964

Q. 68. SEF, p.22. Bush: "We can no longer count on ravaged Europe as a source of fundamental knowledge." Would you now want to modify this statement somewhat? Ravaged Europe came back stronger, it would seem, than anyone presupposed possible in 1945. The "brains drain" of which Quentin Hogg recently complained seems to be compounded of American salary scales and a natural British desire to live in Southern California. And isn't much of "fundamental knowledge" in the U.S. today provided by European-trained minds? Like the late Hashimuro Togo (invented by Wallace Irwin, an American humorist) "I ask to know."

Bush Answer on Reel # 5 at Counter # 331.

June 28, 1964

Q. 69. Allied to above. When I interviewed I. I. Rabi in 1955 he said [re-quote] "When I first went back to Europe a quarter of a century ago, I was provincial; when I went to Europe after the War [WWII] it was Europe that had become provincial." Will you take this quote together with one of the same year from Manny Piore when he was Chief Scientist of ONR: "There is no question in my mind that within the next 25 years America will become the intellectual center of the world"--and frame some Bush thoughts that will be applicable now? Consider also this, also from Manny Piore and also dated 1955: "Let's divide all scientists into two groups: call 5% 'the top' and the other 95% 'the rest.' Our American 95% is much better than Europe's 95%--but Europe's top 5% still surpasses ours." Discussion, as of 1964, from VB strongly requested.

Bush Answer on Reel # 5 at Counter # 345.

June 28, 1964

Q. 70. Said Bush in 1955 [in his CIW Annual Report for 1954]: Means toward "avoiding excessive subsidy of the mediocre" must be constantly sought. Will you take your ten year old quote and contemplate it beside this from J. A. Gengerelli, in that same year Head of the Dept. of Psychology at U.C.L.A.: "We have a social force that selectively encourages and rewards the scientific hack... and...a great plethora of $50,000 grants for $100 ideas." As of 1964, better or worse? I think worse, which is not important. What does VB think?

Bush Answer on Reel # 5 at Counter # 349.

June 28, 1964

Q. 71. SEF, p.23. Bush: "It would be folly to set up a program under which research in the natural sciences and medicine was expanded at the cost of the social sciences, humanities and other studies so essential to national well-being."

You then go on to quote the Moe Committee but I find nothing here one-tenth so persuasive as your own "The Gentleman of Culture." I think great chunks of it ought to fit in here and maybe the whole works. Will the author please re-read it and then comment, expand, up-date, etc., in the light of the following:

That intellectual prig, Jacques Barzun (u), author of Teacher in America, The House of Intellect, etc,, in late 1963 or early 1964 declared that "science and technology were eating up the humanities." [The quote is not accurate, but I'll make it so later]. Two responses to Barzun occur to me:

Bush Answer on Reel # 5 at Counter # 361 (OVER)

a) It is not true;

b) If it were true, it would raise an all-important prior question: why?

I think we ought to tangle with Bernie here, perhaps naming him, and calling his hand. Memex trails lead not only to the Gentleman of Culture but to Science Pauses, and to other things also. I will remember Sir A. T. Quiller-Couch, King Edward VII Professor of English Literature at Cambridge, years ago made the distinction: "Art is to be practiced. Science is to be studied." Ten thousand other things press in here, in our own American experience: "The Liberal Arts and Sciences," a particularly American phrase; the establishment of the Land Grant Colleges; "the study of the Agricultural and Mechanic Arts," etc., etc. I think all this is worth a complete three-inch reel all in itself. It ought to leave the Baconian-oriented mind a bleeding pulp.

June 28, 1964

p. 72 SEF, p.24. Bush is talking about the accumulating deficit "in our trained scientific personnel" of which he says "it will continue for many years." He goes on:

"The committee advising me has stated the following principle which should guide our planning" but the quote, in my opinion is not very good beyond its first sentence, because it is a Home-and-Mother statement with which no one would wish to disagree. Much more crisp is Bush himself on page 25, SEF:

"...ability and ... family fortune is made to determine ... shall receive higher education in science, then we shall be assured of ... constantly improving quality in every level of scientific activity."

But preceding this is the Bush statement: "Higher education is largely for those who have the means." This sentence, in my opinion, is now showing signs of the ravages of time. Today's every mediocrity proposes to go to college--and

Bush Answer on Reel #5B at Counter #775

(OVER)

the universities propose to take him in, instruct him by mediocre teachers /because there are not enough good ones to go 'round, and never were/ and they solemnly give him an A.B. or S.B., unless he becomes a drop-out. Our whole system, in my opinion, will be hopelessly out of control within five years as one of the earlier, but most devastating, effects of too much population. What do I rouse in you by these intemperate remarks?

More constructively: we now have National Merit Scholarships--I forget how many per year. What hand did you have in bringing this system about beyond what I can discover in the formal language of Henry Allen Moe's Committee? Should we have other nationally-supported scholarships, less exacting, for the student who will, hopefully, profit from higher education although he does not land in Predictive Rank I? More generally, how are we going to sort out and just handle the upcoming educational traffic-jam?

June 28, 1964

Q. 73. SEF, p.26. As of 1945 your figures are that "For every 1000 students in the fifth grade 600 are lost to education before the end of high school and all but 72 have ceased formal education before completion of college." This is the opposite side of the coin from Q. 72. If the numbers demanding college education are frightening, so are the numbers of those who cannot, or do not, survive the march to college graduation. I am at a loss (hopefully momentarily) to frame an actual question here, but will you discuss what I have been trying to grapple with?

Bush Answer on Reel #5B at Counter #165.

June 28, 1964

Q. 74. SEF, pp 28 & 29, Part Five. Here is Bush's best plea (1945) for promptest possible lifting of security regulations: "Basically there is no reason to believe that scientists of other countries will not in time rediscover everything we now know which is held in secrecy." That one goes in spades, doubled and redoubled today! I realize this is the third time I have addressed you a query on this point: I repeat myself now because some further reflections may by now have occurred to you. Yes? No? And should we not discuss, in general, and also in particular, the Rosenbergs, Alan May Nunn, Klans Fuchs and others such? And the phenomena they represent? /cf, The Meaning of Treason, Rebecca West, 1950/

Bush Answer on Reel # 5B at Counter # 184.

June 28, 1964

Q. 75. pp 32 & 33 of SEF are vital to understanding the setting-up of the NSF. The NSF, as of today, has disobeyed certain of your injunctions; e.g., that it should not get caught up in operations. Extended comment solicited, not just on this point but, as broadly as possible on Science and Government: their complementary roles in theory and in practice.

Bush Answer on Reel # 5B at Counter # 207

June 30, 1964

Q. 76. P.34, SEF for the first time sets forth the Bush proposal for a National Research Foundation. Under the heading of "Organization" on p.35 sub-subhead C. calls for the Division of National Defense, which was eventually knocked out when the Nat. Res. Found. eventually became the NSF. Here is another opportunity for VB to talk additionally about the whole 5 to 6 year period after Science the Endless Frontier but before the NSF was created and the further period (dating from when?) before the Congress began approrpriating adequate funds.

Bush Answer on Reel # 5B at Counter # 254

June 30, 1964

Q. 77. Page 35, SEF reminds me that today's National Science Board, governing body of NSF, is very seldom heard of. Why? How many members has the Board had since its inception,who have they been, and what, as expressed in informal language must they be like as men and citizens?

Bush Answer on Reel # 5B at Counter # 274.

June 30, 1964

Q. 78. On p. 40, SEF we have the first proposed budget, in millions of dollars for Nat. Research Foundation, for first year and for fifth year as follows:

	First Year	Fifth Year
Div. Medical Res.	$5.0	$20.0
Div. Natural Sciences	10.0	50.0
Div. National Defense	10.0	20.0
Div. Scientific Personnel & Educ.	7.0	29.0
Div. Publications and Scientific Collaboration	0.5	1.0
Administration	1.0	2.5
	33.5	122.5

6

Let's discuss how these figures look today, taking into account not just their increases but more importantly how the ratios between them have varied, with plenty of exposition as to why. What subsequent increases or decreases were not foreseen at the time? What increases or decreases seem wise or unwise to VB today?

Bush Answer on Reel # 6A at Counter # 000.005

June 30, 1964

Q. 79. Obvious Memex drift: we must once and for all correct the record, besmirched by TIME, the Weekly Newsmagazine, and by the Chilton Publishers book, whereby you were made to appear "opposed to rockets" when what you were saying was hardware must wait upon solution of guidance and re-entry problems. You are fully on the record here but some words of your own, formulated as of 1964, will be highly appropriate. [Not at all incidentally, we'll have a prodigious job of eventual record checking, etc., and now isn't any too soon to begin thinking how to handle it.]

Bush Answer on Reel # 6A at Counter # 074.

June 30, 1964

Q. 80. By extension from above: the Bush adverse opinion on the Moon Shot is most important to our book purposes here. Your letter of public record to The New York Times, by a deep misfortune arrived there just a day or so before President Kennedy's assassination; if it got publicized I never saw it. But it should be read into the record here.

Bush Answer on Reel # 6A at Counter # ~~125~~ 126

June 30, 1964

Q. 81. Before I deal with the appendices to SEF, I want to ask you something about the persons on your various subcommittees, as of 1946. I know, for example, of your very high regard for Merle Tuve. I know how close you were to Karl Compton (and to Arthur). I know of your affection for A. N. Richards. Therefore, I find it slightly odd that, unless my own memory has a crack in it, I don't think I've ever heard you speak of Jim Conant in the last few years. Any particular reason? In discussing personalities we are, of course, walking on eggs. For example, I happen to think that Phinney Baxter is just about the most unintellectual historian or college president I ever knew: just a very nice, very dull guy. Have you any disposition to rebuke me for this view?. . .

Below, I am listing some names which occur in SEF Appendices, mostly because I either know or know of them myself. The questionmark after each name is an

Bush Answer on Reel # 6A at Counter 173 and on 6B (OVER)

invitation to make some comment, of whatever kind you are willing not to repress, in relation to the person's general helpfulness as you observed it. Occasionally I'll make a comment of my own just in case it may trip a trigger:

Isaiah Bowman? (deceased)

Oliver Buckley?

Oscar Cox?

Bradley Dewey?

Edwin H. Land?
(This brilliant man is certainly capable of arousing strong friend-or-foe emotions in others.)

Harold G. Moulton?

I. I. Rabi?
(Was I wrong in thinking I detected a certain arrogance without which this Nobel Laureate would have been more attractive?)

(QUESTION 81 CONTINUES ON NEXT CARD)

Warren Weaver?
(The wonderful simplicity-of-statement in this gifted man always struck me.)

Robert E. Wilson?
(Quite a guy for anyone quite so profit-obsessed.)

Henry Allen Moe?

J. B. Conant?
(See above)

Watson Davis?

Harlow Shapley?
(I always happened to like his iconoclasm.)

GB here

E. B. Wilson?
(Whiskers, statistics, sharp tongue, what else?)

J. P. Baxter III?
(See above.)

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63

Carroll L. Wilson?
(I thought he was a wonder, but when he was AEC's first General Manager did he cut his own throat or did Congress? And, Memex stimulated, will you say a word or so about the late Senator McKellar of Tennessee?)

Linus Pauling?
(No one can be neutral about him; was he capable of team-work?)

Alton Ochsner?

And who have I not mentioned that I should have?

June 30, 1964

Q. 82. This is a gossipy question: I have heard it said in Washington that a certain coolness sprang up between Frank Jewett and yourself in the years after the war. But my copy of Endless Frontiers, copyright 1946, American Council on Public Affairs, carries an Introduction by Jewett that would seem not to bear out this piece of gossip--or else assign the date of the coolness to well post-1946. Any comment?

Bush Answer on Reel # 67 at Counter # 161.

June 30, 1964

Q. 83. This is a long back-track, because it reverts to the McMahon Act. I seem to know that one of its drafters was James Newman, later author of The World of Mathematics and an editor, now, of the Scientific American. (Two other names of draftees escape me because they're in the hands of Aileen Bauer.) Newman, by reputation, is not the most pliable person in the world and a friend of his, in defending the built-in secrecy of the McMahon Act argues that whereas Russia and France now have "nuclear capability" against our express wishes, this is at least lots better than if 35 to 50 nations had it, and went dropping bombs on one another in all possible permutations. To me, this argument seems not wholly convincing. Will you comment?

Bush Answer on Reel # 6B at Counter # 170.

June 30, 1964

Q. 84. Inch-up on Memex: I should also have asked you sooner for your extensive comments on the partial nuclear Test Ban Treaty of 1963, plus all that led up to it, plus all that may (or may not) flow from a continued success for it. This, of course, is another good question for as much of a 3-inch reel as you feel like.

Bush Answer on Reel # 6B at Counter 210

June 30, 1964

Q. 85. From here to Question 92 I am handing back to you, in card form, the Topics for Discussion you handed me on 24 April 1964. All I have done to them is insert some chronology and append a few comments in square brackets. What follows now is Bush to Hodgins to Bush:

Harry Hopkins

Relations with inventors.

Origins of NDRC. [June 27, 1940]

Medical affairs - OSRD [May, 1941]

The Churchill episode. — separate

Bush Answer on Reel # 6B at Counter # 128

June 30, 1964

Q. 86. Medical Committee [May 1941]

Newton Richards - Keefer

Roosevelt and Weed - perhaps [Urge you to proceed without perhaps. EH]

Roosevelt and the Surgeon General

Bush Answer on Reel # 6B at Counter # 334

June 30, 1964

Q. 87. OSRD /June 28, 1941/

How organized.

Relations with military.

The business affairs, contacts. Irvin Stewart.

Bush Answer on Reel # 6B at Counter #536.

June 30, 1964

Q. 88. Atomic Bomb /May 23, 1940, et seq., et seq./

Hundreds of points.

Remarks with Senator Wolcott. —000
/I urge comment re Senator Kilgore, too. EH/

German progress - report to Smith. —026

Roosevelt on the chance of failure. —080

How the money was raised. —103

Groves and Oppenheimer - perhaps /Urge you to proceed without perhaps. EH/ —120

Bush Answer on Reel # 7A at Counter #000.

June 30, 1964

Q. 89. Churchill

Session at Downing Street

Cherwell - Tizard /Tizard Mission, September 1940/

Bush Answer on Reel # 7A at Counter # 209.

June 30, 1964

Q. 90. The Proximity Fuze

Admiral King's change of position.

Test in the Carolinas (April 1942). Nature of the fuze.

Session with Beadle Smith at Versailles.

Battle of the Bulge - Patton's remark. (December 1944)

Eisenhower's blind spot (Dec. 1944?). Also Marshall's. Jake Devers and General Tony McAuliffe. Military and civilian relations.

Continued on 7B

Bush Answer on Reel # 7A at Counter # 342.

June 30, 1964

Q. 91. The Dukw (Spring, 1942)

Hartley Rowe. Palmer Putnam and the rest of the gang.

Invasion of Sicily. [July 10, 1943.] Eisenhower's message to Marshall.

Getting the instructions to North Africa. [Fall 1942 (?)] elsewhere

Bush Answer on Reel # 7B at Counter # 190.

June 30, 1964

Q. 92. Truman [April 1945]

Briefing on the bomb. Appox 260 [?]

Release of Smythe report [August 12, 1945] 275

The cabinet meeting on policy. – later 291

Reappointment as Chairman of R & D Board. 294

Why did he get mad? 305

John Steelman and the medal. 310

Bush Answer on Reel # 7B at Counter # 257.

June 30, 1964

Q. 93. In the preceeding questions, which you propounded for yourself to answer, you mentioned various generals and admirals, but always in specific contexts. But I think we should also have some specific appraisals of the strengths, weaknesses and contributions of these men as viewed from your unique vantage point. Will you let the tape have some discourse here? These are the men you have mentioned one way or another:

Gen. Groves	Ike
Adm. King	Gen. Marshall
Gen. Beadle Smith	Gen. Patton
Jake Devers	Tony McAuliffe

Admiral Leahy

Bush Answer on Reel # 7B at Counter # 317.

June 30, 1964

Q. 94. But following up from Q. 93 these are some of the men you have not mentioned:

Omar Bradley.	General MacArthur
Jimmy Doolittle	Gen. Wainwright
Adm. Kimmel*	Gen. Strong*
Adm. Halsey	Lord Mountbatten
Gen. Mark Clark	Vinegar Joe Stillwell

Gen. Somervell, etc., etc., etc.

Comment on these gentlemen would also be appropriate; and on many more I am not thinking of at present.

* Cashiered after Pearl Harbor

Bush Answer on Reel # 8 at Counter # 900

June 30, 1964

Q. 95. I know that Karl Compton was dispatched to open a Pacific Theatre branch of OSRD but that just about as he got there the Japanese ~~got there~~ surrendered. Your own brief memo to me suggests that in some ways /what ways?/ your own face was turned more toward Europe than the Pacific--except of course for the bomb. At any rate you haven't mentioned Pacific or China-Burma-India commanders in at all the same way you've mentioned our European commanders. Broadly speaking, why not?

Bush Answer on Reel # 8 at Counter # 106

June 30, 1964

Q. 96. Pursuing this line, I think we ought to have some remarks about the Scientists in which we abounded during the war. You mention Oppenheimer, but what, for example, of Szilard, Fermi, Rabi, Bohr /in the US under careful wraps/, Urey, von Neumann, etc., etc., etc.

Bush Answer on Reel # 8 at Counter # 173.

June 30, 1964

Q. 97. Then there were the politicos of the time. Except for FDR and Truman you haven't mentioned any but Harry Hopkins, John Steelman and Jimmy Byrnes. Did such persons as Harold Ickes, Henry Agard Wallace, Dean Acheson, Fred Vinson, etc., etc., etc., enter your life in any significant way, and have you any comments on them?

Bush Answer on Reel # 8 at Counter # 218.

July 11, 1964

Q 98. Re p. 53 SEF -- mark at "treatment of malaria by atabrine" -- reminds me that Sir William Perkin was trying ± 100 years ago to synthesize quinine when, instead, he stumbled upon mauve -- thus starting the dye-and-drug push of organic chemistry. The English men of affairs of Perkin's day saw nothing in this, but the Germans did -- and Germany's attack upon British trade then began. To me, this was a decisive turning point of history -- world history. Will you respond to this in whatever mode and mood appeals to you, please?

Bush answer on reel # 8 at counter 272.

July 11, 1964

Q. 99: I can't find anything in my Memex to account for this question -- but I remember your saying to me years ago (well pre-war) that it was too bad the steam engine hadn't been given a better break as the power plant for automobiles because, if intensively developed, it would have had many advantages beyond the obvious one of good torque at low rpm. But all this was now impossible [this is still Bush speaking] because, for one thing, you couldn't garage a car with an open flame under its boiler in the midst of cars with tankfuls of gasoline. Generality: there are some paths, many paths, which, once taken, completely occlude what was once a free alternative choice. Will VB, in a philosophical and historical mood, please discuss this point? It is this point-of-no-return problem

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which the enemies of technology raise against it again and again. We need a better answer than "You can't unscramble the eggs."

Bush answer on reel # 8 at counter # 294.

July 11, 1964

Q. 100:

We should have a coffee break here, I think, in which you should criticize my questions to here, and point out areas I have been neglecting.

Arch & Normandy
Pol Sci — Cab. mtg
Atlee coef.

Bush answer on reel # 8 at counter # 368

Q. 101: July 11, 1964

P. 51, SEF: Was what is referred to here as "National Foundation for Medical Research" the progenitor of today's National Institutes of Health? With whom did you work in establishing NIH, and what salient points might here be discussed?

Bush answer on reel # 8 at counter # 387.

Q. 102. July 11, 1964

What began your interest in those fields which lead to your eventual ~~en~~ chairmanship of Merck-Sharpe and Dohme? An easy conjecture is that it was the placing of the Medical and Health committee under OSRD by FDR's Executive Order -- but I think there must be vastly more to it than just that. Ample answer solicited.

Bush answer on reel # 8 at counter # 432.

Continued on 8B

Q. 103. July 11, 1964

This follows from Q. 102. Long ago, in Belmont, you told me a Merck story somewhat as follows:

A research man came to you and said, "Dr. Bush we have a new tranquilizer that looks pretty good except that it has some undesirable side effects and we figure that if we could move a methyl radicle from the ortho to the para position" (let's say) "we'd get rid of the side effects." VB said, "Why ask me? Go ahead." After months of chemical sweating, same research man came to VB, very happy, saying, "Dr. Bush, we've got that methyl radicle moved at last, and the side effects have disappeared!" Bush said "Congratulations!" In telling this story to EH, VB added this: "And do you know what?"They'd got the methyl radicle in the wrong place!"

I recall this story now because

a) I'd like you to make some remarks about Empiricism and Accident as forces which still strongly effect Discovery and

b) their diminution (or persistence) in our future which, presumably, will gain much in rigor over our past;

c) a CIBA man told me recently that despite vant'Hoff and Linus Pauling and everyone in between, the pharmaceutical industry was still governed in large part by cut-&-try.

d) Your remarks of 7/11/64 about Boss Ket as a gageteer who happened to invent the self-starter at just the right time, and who had "a contempt for science" are very important even though

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we have no need to name Kettering. [unless you want to, which I hope you do.]

Bush answer on reel # 8B at counter # 083

Q. 104. July 11, 1964

That was a hell of a long question, and it ain't over yet. I suppose Kettering was a sort of minor-league Edison -- and with Edison the untutored ingenious Yankee reached his apogee. I'd like comments here. Also: It was Kettering who ordered Tom Midgley to get busy on a new refrigerant which would have the disadvantages of neither ammonia nor methyl chloride. Midgley came up with difluoro-dichloro methane essentially because of an error in the International Critical Tables... A painter says to his students, "Take advantage of your mistakes." What corresponding advice should a weathered scientist or engineer give his young men?

Bush answer on reel # 8B at counter # 169.

Q. 105. July 11, 1964

Memex branch trail from Q. 102. I am in favor of "automated medicine" -- up to a point, and less so after my own 1960 illmess than before it. A version of Memex Revisited (which you wrote in the 1950s) made a heavy point of Memex diagnostic aid. I don't doubt its efficacy -- or that a central monitor station with closed-circuit TV will enable one nurse to observe 50 patients. But it won't be care. American medicine is lab-happy right now -- but we have no Sir William Osler. Comments, please.

Bush answer on reel # 8B at counter # 268.

Q. 106. July 11, 1964

Perhaps the tapes, or The Gentleman of Culture will already have taken care of it, but that a Scientist-Engineer can also be a Humanist needs a lot of pounding through the public skull; C.P. Snow and Jacques Barzun (to name only them) have thoroughly confused this issue. Any comment here in addition to the G of C or Two Cultures?

Bush answer on reel # 8B at counter # 283.

Q. 107. July 11, 1964

C. P. Snow was playing One-upmanship when he said [paraphrase] "No man can be considered cultured unless he is as familiar with the Second Law of Thermodynamics as with the works of Shakespeare." Baloney! But would you agree with me in this more general statement: "It is as important to know what Newton was up to as to know what Shakespeare was up to"? Or how would you reformulate?

Bush answer on reel# 8D at counter # 323

Q. 108. July 11, 1964

Riding Snow some more: against "scientists" in his Rede Lecture he was able to contrast only "~~lieterary~~ literary critics" -- a very bad antithesis. But, alas, "scientist" has no antynym. Should it have? Will Humanist grow to be it?

Bush answer on reel # 8B at counter # 334

Q. 109. July 11, 1964

From something written by EB [I can't cite which work] I paraphrase as follows: "Physicists have grown increasingly preoccupied with talking to each other; it is to be hoped that after a while they will rejoin the general conversation." This was post-war; can you cite your exact words, and will you expand upon the theme?

Bush answer on reel # 8B at counter # 346.

Q. 110. July 11, 1964

Sudden Memex switchback, a propos of automation. There are certain disadvantages in living in an Affluent [i.e., high wage, high cost] Society which Ken Galbraith didn't point out. One is the tendency of personal services to deteriorate. Small e.g.: when weather is sufficiently bad a ~~measureabben~~ measureable number of New York's 12,000 cab drivers go home or back to the garage. They've "made enough." Another: at $20 for an 8-hour day many Registered Nurses prefer to take days off or to pick-and-chose patients: essentially preferring to take a "social dividend" in the form of more leisure than to get more money. God knows $100 for a 40-hour week is not much -- but the choice is now possible, and it is the nurseless patient who takes it on the chin.... Perhaps I should first have cited Electrical Workers Local 3 in New York and the 25 (?) hour week Harry Van Arsdale wangled for them a year ago. Local Three is a complete way-of-life union. Comment strongly solicited.

Bush answer on reel # 8B at counter # ~~360~~ 365

Q. 111. July 11, 1964

The above taxi drivers and Registered Nurses remind me, non-invidiously, of what Professor Yerkes did at Yale, in seeing how far he could go in teaching economics to chimpanzees. A "task performed" earned a poker chip. Ten poker chips were worth a brass check. In general, after a chimp had acquired "enough" brass checks he could not be further interested in "tasks" that day. This is less a question than a recollection, but I hope it will propel you somewhere.

Bush answer on reel # 88 at counter # 380.

Q. 112 July 12, 1964

Today's New York Times has a front-page story headed " U.S. is Criticised on Manpower Use in Science Fields." This refers to the report "Toward Better Utilization of Scientific and Engineering Talent" -- prepared by the 17-man committee headed by Jim Killian. The first sentence of the Times's story says: "The Government was criticised today by a National Academy of Sciences committee for plunging into such major undertakings as a moon expedition or a supersonic airplane without assessing the effects on the nation's limited scientific and engineering manpower resources." ...Later the story said:"Nowhere in its 153-page report did the committee suggest that the lunar expedition had unduly diverted manpower from other fields —

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a claim frequently made by critics of the space program."

The Times story doesn't read to me like a very informed one -- because its entire emphasis is on diversion of manpower and nowhere in the story is it suggested that Jim's report may [I don't know] have had something to say about apparent intrinsic worth of this or that program... I know your own views on the moonshot and this reminds me to say that one of your major points surprised me -- that some day, due to the circus atmosphere with which television has surrounded orbital flight, not only the nation but the world may become helpless spectators to a tragedy because we can't get our men back or out of orbit. The reason this surprised me was that I had expected your major argument against lunar shots to be based on vast cost for very dubious results. Here again the Engineer-Humanist emerges, and among the many things this question suggests is a further expansion on this theme -- with, of course, reference to "Science Pauses".

Bush answer on reel #7B at counter #796.

Motto: HST

Dennis, August 6, 1964

VB:

The following new set of questions, Series B, begin by asking you to supplement remarks you have made on reels 1 to 8, or are to memind you of things you've said "we'll come to later," but have not been taken up through reel 8. I present these questions in the order in which they crop up, but you may want to shuffle the cards into the order of their importance to you.

After that, I have framed some questions that have developed from our Dennis conversations of July, 1964.

E.H.

Comments on reel 1 to 8

8/6/64

QB1: On reel 1, speaking of your Navy days during WWI you say, "I remember the materiel officer, name of MacDowell, and I had lots to do with him in connection with submarine warfare, and also in connection with the big telescope, which we'll come to later." Will you please come to it now.

Answer on reel 9 at counter 021.

8/6/64

QB2: Reel 1: "I was teaching at Tufts, and I was also doing consulting for a little outfit named Amrad, the story of which is also interesting." Please tell the Amrad story now.

Answer on reel 9 at counter 019

8/6/64

QB3: Reel 1, on the subject of submarine detection: "I developed a piece of equipment that worked." Please specify. Also: "It was pretty crude stuff... But I could tell quite a story about its development." Please tell that story.

Answer on reel 9 at counter 176.

8/6/64

QB4: Reel 1: You tell about D. C. Jackson hiring you and your saying to him, re consultations, that all you needed to do was "follow his example." But I would like to know more about who were your clients and consultations in those early years. Please give a few specifics.

Answer on reel 9 at counter 277.

8/6/64

QB5: Reel 1: You never state the topic of your doctoral thesis at MIT. I think this is needed, together with some remarks about its pertinance to the Electrical Engineering of the day. Also: what was the "first class error" in your mathematics?

(A reminder: today, young electronics grads have a derogatory phrase: "oh, he's a 60-cycle man." Well, in the 1920s, being a 60-cycle man was to be on the engineering forefront. Please comment.)

Answer on reel 9 at counter 3231.

8/6/64

QB6. Suggested by QB5: We have talked about Elihu Thomson and about Tom Edison, but we have not talked about the big AC versus DC controversy which Thomson (AC) won. Some reflections on today's rise in status for DC would be interesting and I hope you'll make some. Specifically, rectifiers used to be rather sad affairs. I gather they have now grown up mightily in engineering aspects, yes?

Answer on Reel 9 at counter 350.

8/6/64

QB7. Suggested by QB6. I'm amazed that Elihu Thomson wasn't "properly taken care of in the light of his contributions" to GE. I had always thought, because of the Thomson-Houston Co., (and of the watthour meter, which was his invention, I think) that he was a wealthy man. This isn't a question; just a comment which may elicit something more from you.

And by the way: you're astray on an interval: MIT didn't have 20 years of bad administration; it only had ten. Maclaurin died in January 1920; K.T. Compton was elected in 1930.
And it surprises me that you've not said anything yet about KTC as a physicist. He was Professor of Physics at Princeton

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when MIT tapped him, wasn't he? How did he stack up to his brother Arthur as a physicist?

Answer on reel 9 at counter 366.

8/6/64

QB8. Reel 1B: What was the "very important suggestion" Norbert Weiner made in connection with your machine set up to solve integral equations?

Also: "We solved one problem on it, namely the motion of a ship in a seaway..." It is important that we try to give the reader some notion of the kind of problem-solving involved; will you please make a brief lay exposition here?

Further: the differences between digital and analogical "computers" ought to be briefly set forth.

Answer on reel 9B at counter 000.

8/6/64

QB9. Reel 1B: In answering my question on running organizations you say "I'm one of the few men, I think, who has had an organization in government, in business and in the academic field. The problems are very different. My conversations with Eisenhower when he was going to Columbia might make interesting reading, even if we didn't want to use it." Yes indeed. Will you please put on the tape.

Answer on reel 9P at counter 076

8/6/64

QB10. Reel 1B. You say "I never did make any money out of patents directly because I assigned them all the time -- to the companies I was consulting for or to the companies I helping to build up from little beginnings into things that would amount to something."

Two questions: a) to what companies, for example, are you referring? b) I guess I don't really understand what it means to "assign" a patent although I do understand (I think) what it means to be a licensee. How can a young inventor afford to "assign" a patent? What is the quid pro quo?

Further: What was the patent application you filed while an undergraduate at Tufts? Was it granted? Were you able to

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license it profitably?

Answer on reel 9B at counter 143.

8/6/64

QB11. I have long been fascinated by the unobtrusive patent, which perhaps has made millions for someone nobody ever heard of. Take the American railroad car knuckle-coupling, for example. Seems to me it's about as old as the ICC -- and a lot more useful today. I'd like to get you going on the subject of some specific patent grants like this, or better. The subject of patents is terribly dry unless some stories about money lubricate them.

Answer on reel 9B at counter about 190.

8/6/64

QB12. Further related to patents: around reel 5 or so you discuss Lee deForrest and the thermionic tube, pointing out that he made no real innovation. But you didn't mention one thing, ~~with~~ which may be folklore, but is this: Edison is supposed to have noticed an induced current when he put an extra wire into one of his early incandescent lamps, but to have made no useful inference from what was once known as the "Edison three-electrode effect." Have I dreamed this, or can you add interesting observations here?

Answer on reel 9B at counter 223

8/6/64

QB13. By the way, another "wizard," contemporaneous with Edison but a very different kind of being, was GE's Charles Proteus Steinmetz. Does the mention of his name evoke any recall which is useful to our present purposes?

Answer on reel 9B at counter 267

8/6/64

QB14. You spoke the other day of the Spencer ("click-clack") Thermostat. Although you speak of the company on reel 1, you do not there tell the wonderfully funny story of giving the thermostat one final New York test before meeting the financing group -- whereupon you plugged it into a DC outlet, and consequently took the next train back to Boston. I wish you'd include that here...

Also: You haven't told me, on reel 1, enough about the Raytheon Company or Spencer Thermostat as a company. Who was Spencer? Also what was the "key invention that made it possible to manufacture the expensive thermostats in quantity so that

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they would stand operation at very high temperature?"

Answer on reel 13 at counter 283

8/6/64

QB15. Reel 2A: When you speak of the days when universities were eyeing you for presidencies you say, "I had several conversations with John D. Rockefeller, Jr., in regard to the Rockefeller Foundation, and some interesting shows with Columbia." I wish you'd elaborate on these for the tape.

Also: I've always heard it said that one of the lousiest jobs to be had anywhere was to be Dean of Engineering at Columbia, but I've never understood just why. Any comment?

Answer on reel 10 at counter 000.

8/6/64

QB16. Reel 2A. In discussing your retirement from CIW and return to New England I think you leave out too much. This was all pre-Sputnik and that Ike would call Jim Killian down to Washington was anything but apparent. When I asked you, once in 1956, what you were going to do, you said, "Oh, I'll fool around with some things I'm interested in -- and Jim's offered me a small laboratory of my own, which was darn nice of him..." So your reappearance at MIT only a matter of months before Jim was called down was quite providential, and I think all this deserves more extensive treatment than you gave it in reel 2A.

Answer on reel 10 at counter 086

8/6/64

QB17. Reel 2A. When speaking of the Carnegie Corp., you say, "...and the Institution occasionally handled things for the Corporation when they got into a bit of a mess, for example with the chimpanzee colony down in Orange Park, Fla." There must be a very funny story to tell here, somewhere, about the chimps and what the hell they were doing in Orange Park and why you had to bail out the Corp. -- but you don't tell it. Please do!

Answer on reel 10 at counter ~~123~~ 149

Digression at 123

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QB18. Reel 2A. You say, of your early days as President of CIW: "There were a few instances where it was necessary for me to make it perfectly clear who was running the show -- but that the heads in the departments were going to run the departments, and I wasn't going to interfere with them in any crazy way. There was an incident out at Mount Wilson that I may recite to you some time -- it was a honey!" Please do recite it now.

Answer on reel 10 at counter 167

8/6/64

QB19

~~QB18~~. Reel 1B. You say: "The first time I ever appeared before a Congressional Committee I made a mess of it. I was scared stiff and I took a beating." Reader curiosity must be fulfilled: when was this and what was it all about?

Reel 10 at 218.

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THE NEXT FEW QUESTIONS ARE BACKTRACKS:

QB20. Reel 1 discloses the very real force your father was in your life. I think a few more words about him are called for. You have recorded that his understanding was not confined to his parishionners but extended to "the chap who kept the saloon down the Street." Since the days when your father and mine were men in their middle years the Protestant Clergy (in my opinion) have become so namby-pamby that I'd like you, if you will, to give a few more anecdotes about your father. What were the pool-playing anecdotes, for example?

Answer on reel 10, counter 233

8/7/64

QB21. Suggested by reel 1: you say nothing of scientific aptitudes in the Bush progenitors. If there is nothing to say here, that is interesting. And if there is something to say, that , too, is interesting.

Answer on reel 10, counter 286

8/7/64

QB22. I agree we should not dwell unduly on early years. But some stories are too good not to record. For example:

a) The care and management of the Stanley Steamer you owned (when you were courting Phoeb.) The technicque of climbing an icy hill, whereby you pulled the throttle way back to get enough mv so that you could coast up the hill. (And what technique for coasting down?)

b) Was the Stanley engine a 2-crank affair with Stevenson-link valve gear -- i.e. a miniature steam loco, essentially? What else do you remember about Stanley heaters, boiler, engine, brakes and body? What was the position of the engine, 'fore and aft? Could you alter valve cut-off point to use

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the steam expansively? (At what psi?) Please discuss best techniques of handling kerosene flooding fires, and recall a few anecdotes concerning them.

c) On whose farm was the old gas engine whose tail-pipe you were able to bend so that it became an anti-cow apple-propellant? Who was your co-worker here? Will you please re-tell, to the tape, the story you told Patty and me in Dennis.

d) It may not be engineering, but who said "That bull's afraid of me?" Will you retell the anecdote, with names, places, and dates, please.

Answer on reel 10, counter 296.

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QUESTIONS 23 TO 28 RELATE TO DENNIS CONVERSATIONS VB-EH of July/64

QB23. In our July talks on Cape Cod you have added to your taped remarks about various people, [illegible] other interesting remarks which I think should also go into the record. For example, a propos of J. Robert Oppenheimer you showed Patty and me his translation from the Sanskrit which you keep in your wallet. Will you please read that piece of paper into the record, which will serve us as a reminder that we want to verify the translation with JRO and ask his permission to quote it.

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Answer on reel 10, counter 357.

Also: The night before Almagordo, more or less, you had dinner with Oppenheimer in a Chinese restaurant. where? This kind of tiny detail is fascinating, and no "future historian" will ever know about it. what did you eat? How tense (or not tense) were either/both of you? what did you talk about? Etc, etc.

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QB24. Further about Oppenheimer: you approved of what I quoted from what he once said to me: "To teach a mistake is unfortunate; to teach indifference is a crime." I think we might quote this; he said it to me when I was interviewing him on the qualities that go to make an effective teacher. Meanwhile I wish you would use this a s a springboard into the subject of teaching. Teachers are terribly insecure: they "are afraid to open up," as you put it, because they live in fear of that bright young sophomore in the rear row who may bust them up with one question. Contrast this with the attitude which encouraged dormitory bull-sessions whose aim was, "Let's see if we can stick Bush."

Answer on reel 10, counter 385.

8/7/64

QB25. Still further about Oppenheimer and his remarks to me: "It is good to say to a student, 'I don't know' -- provided this does not carry the connotation '---but I'll look it up in the Encyclopedia Britannica this evening.'" The implication here is that some teachers are so damn dumb they think every question is bound to have "an" answer. How do you get this sort of thinking uprooted from the teaching profession? ...Indoctrination is not teaching. Training is not teaching. Even though we may not have a chapter on Education I think we should have lots to say about teachers and teaching. Pragmatically, "Education" is the summation of what teachers teach, whatever their "approaches," philosophies, aims or methods. Or their effectualities.

Answer on reel 10B, counter 000.

8/7/64

QB26. Further on Education: We spoke about Jerome Bruner's quotation which I here paraphrase: "Any subject can be taught to any child at any age in some intellectually honest form." I'd like your comments here, particularly because subjects like Set Theory are now taught to kids, here and there. Set Theory is a total mystery to me, of course, and I think even you characterized it as "very complex." But obviously if you get it into your head early enough, it isn't. The Russian language is also "very complex" to adult learners -- but not to a child brought up in a bi-lingual English and Russian-speaking family.

Pardon the digression, but in highschool physics I had the greatest trouble comprehending the statement, "Mass and weight are different," or why it was important -- and I was not alone in this difficulty. But today, every six-year-old "knows" this, as a matter of course. And he wasn't taught it, he learned it; he took it in through his pores. I hope this card will set you going on learning versus teaching, etc.

Answer on reel 10B, Counter 033.

8/7/64

QB27. Still further on Education: an old Professor of Philosophy I know once said to me: "I have only one conscious teaching technique. It's to say, for example, 'Mr. Kaplan, how in the world have we wandered so far from the subject that whereas we started this session with Aristotle we're now talking about the Kinsey Report?' This feeezes Mr. Kaplan into terrified silence, but it permits all the rest of the class to free-associate." If you have no comment on this, skip it-- but I hope you'll have a comment. Once again, it's an example of the unafraid teacher.

Reel 10B — 090

8/7/64

QB28. Footnote on Education? When you became Dean of Engineering at MIT Harry Tyler said to you, "Ha-ha, now you'll have to get out of the AAUP," and you replied, "Ha-ha, I was never it it." The AAUP has always struck me as much ado about almost nothing, but it does raise the subject of Academic Freedom.

In 1918 Nicholas Murray Butler and the Columbia Univ. Trustees got into hell's own trouble by firing psychology professor J. McKeen Cattell. They'd wanted to fire him for years because he was a horse's ass. But in 1918 they fired him on the grounds that, by making speeches to students, urging them not to register for the Draft, he was conspiring to obstruct the Selective Service Act, Whereupon the whole faculty blew up.

At MIT, in a year I've now forgotten, Jim Killian faced the problem of "Communism in the Faculty" and faced it very well, the case being that of mathematics Professor S. D. Zeldin. I don't know whether the facts elicited were that Zeldin was a card-carrying Communist or not. (If he was, he was the meekest Communist I ever knew.) But whatever the facts, I'm sure I remember that Jim stood up to some intense pressure from some 102% Americans. This is exactly the sort of vague inquiry I know you don't like; nevertheless, I hope it will move you to say something about Universities and Freedom. It isn't quite enough to invoke Freedom in the domain

OVER...

of Science only; Freedom must also be invoked to permit heated discussion between contending systems of political economy -- which isn't a science and never will be.

Answer on reel 10B, counter about 125

8/7/64

QB29. It was Elton Mayo of the Harvard Business School, I think, who once made the wonderful distinction between "the successful sciences," by which he meant physics, chemistry, biology, etc., and "the unsuccessful sciences," by which he meant specifically economics and sociology. Somehow, these remarks flowed out of the great Hawthorne study by Western Electric, et al, which you spoke of two weeks ago, which began as a study of illumination intensity and then went so much further. Much of this is on the record, and I can get it, but I wish you would add what you can to supplement it.

Answer on reel 10B, counter 205

8/7/64

QB30. Speaking of economists, from Adam Smith to Keynes and Ken Galbraith: they seem to me to be singularly ignorant of technology. Only in recent times have they even tempered their theories or prognostications with "at present levels of technology." But conversely, it seems to me that engineers, even you, dismiss such problems as Poverty, much too glibly. Because the U. S. has the "highest standard of living in the world" doesn't mean that we may not have some terrible social explosions, a la Harlem, in every city in the country. Our most explosive problems have shifted from rural to urban in the last 40 years. The engineer has brought this about without much realizing that he has done it. Now it is up to him to

OVER...

RE*TRIM THE SHIP, AND I (typist's apologies..) see little evidence that he has even begun to think how to do it. Do you?

Answer on reel 10B, counter 240.

8/7/64

QB 31

QB~~26~~. Relating to Claude Shannon: I think you should talk about this terrific graduate student of yours. I was glad to know that the story I'd heard was correct that Shannon had "re-discovered" the Boolean algebra before he knew that George Boole had existed. You spoke the other day of Shannon's work on relay circuits as a beautiful example of applying the right mathematics to the appropriate problem. I'd like to ask you please to put some of this on the tape.

Answer on reel 10B, counter 268

8/7/64

QB32
~~QB28~~. Shannon, continued: I've heard it said of his Information Theory, "It's the most important general statement since the Quantum Theory." Is this an exaggeration? If so, please put the theory in its place -- and, by the way, which is correct: Information Theory or Communications Theory?

Answer on reel 10B, counter 292.

B33 ressor

8/12/64

Q-B31 Now will you please consider your remark, which I paraphrase, "When a society begins going for motor-driven toothbrushes, it may be coming close to running out of consumer wants." Well, yes; if we're talking about gadget-wants. But when will engineers turn their attention to reducing rat-infestation in cities, for example? Millions of people would share your delight in poodles, catbirds, goldfish, etc., etc., if they could ever get off the asphalt. Despite the millions of cars, roads, national parks, etc., in this richest and most mobile of nations, they can't. The U.S. is a high-wage, high-cost nation. The nation's engineers, hired by the nation's management class, thus turn, in all logic, to "automation." Fine! But I'd increasingly hate like hell to be a U.S. citizen who earned less than $3000 a year, wouldn't you? What will the engineer do for these people? Is it too much to ask that every citizen have hot water to do the wash and bathe in? Since 1934 the outdoor privy has been vanishing from marginal farms or rural slums. There's been little corresponding improvement for marginal city dwellers, or urban slums. Why so?

Answer on Reel 10B at Counter 304.

B-34 error

8/12/64

Q-332 Motor-driven toothbrushes remind me of G.E., and G.E. reminds me that yesterday's New York Times carried the story that Ralph Cordiner is going to be Chairman of the Republican National Finance Committee; objective, Barry Goldwater in the White House. Good God! This makes Gerard Swope seem by comparison to be Charles Evans Hughes. If you can't understand how Engine Charley Wilson ever got to be President of G.M. [he came up through the sales route, remember], your bewilderment is nothing to mine when I contemplate how an ex-head of G.E. can be so dangerously dumb as to think that the United States, world superpower, could be led into anything but catastrophe by this man? I'm afraid I could make a very long list of heavyweight corporation executives, perhaps led by George Magoffin Humphrey, who believe that the kind of thinking which leads them to produce satisfactory Income & Expense Statements is projectable without change into the management of world affairs. The parallel goes to your Reel 9 comments on Ike's belief that he could run Columbia University by Army methods. Discouraging, isn't it?

Answer on Reel 10B at Counter 331.

B-35 error

8/12/64

Q-333 Oh yes; in 1920 a U.S. shibboleth took the form of the cry, "A businessman for President!" This caused The New Republic to utter one of its most memorable sentences: "The search for a complete political idiot as President has led inevitably to the door of Henry Ford." If I have a question here, I suppose it is, Do we never learn? I hope you can find something conforting to say.

Answer on Reel 10B at Counter 259.

B-36

8/12/64

Q-B34. Now, because I'm going to be away for five days, I'm going to make an additional rapid run-down of everything in Reels 1 through 8 where you promise or suggest amplifications of subjects which you haven't yet amplified. The first such I find is:

Reel 2B: "During the war some of the chaps in my organization had relations with Intelligence, and we had a section, which I'll talk about later, devoted to the business of unconventional warfare, work with the OSS, and so on . . ." Now is the time.

Also on Reel 2B you say, "probably some of the fanatical resistance of the Germans after they'd lost the war . . ." This leads me to ask when it was, in your opinion, that the German fate was sealed even though their military operations continued far beyond a point where a Field-Marshal would have sued for peace?

Some of FDR's political enemies used to insist that his-and-Churchill's demand for "unconditional surrender" was also a factor in prolonging the German struggle against the inevitable. Did this argument ever impress you?

Answer on Reel 10B at Counter 368
also 11 - 000

B-37

8/12/64

Q-B35. Reel 2B contd: "This is juat a shorthand note" /about the non-use, by the Germans, of the Differential Analyser they found in Norway./ "The full story is a fascinating one." Will you please begin to tell the full story.

Also on Reel 2B, speaking of "this chap Pike", whom Mountbatten brought to your office, you say "about whom I could tell all kinds of stories, and who was a confounded nuisance." But the only story you do tell is that Mountbatten failed to shut him up in your presence, as he should have done -- which is a story about Mountbatten, not about Pike. Please tell something about Pike now.

Answer on Reel 11 at Counter 102.

8/12/64

B-38

Q-B36. I may be repeating a question, but I find two unamplified remarks on testifying before Congress:

> Reel 2B, at Counter #365, "The first time I did it, I was scared stiff . . . and I made a mess of it . . ."
>
> Reel 3A at Counter #025: "I'd been on an appearance before Kefauver that I enjoyed, but I also had an experience over in the House that I didn't enjoy at all."

I'd like lots of amplification here, please, because these occasions must have been three different ones, and my curiosity is fully aroused, generally and specifically.

Answer on Reel 11 at Counter 148.

8/12/64

B-39

Q-B37. Reel 3B is full of references to radar almost always coupled with Merle Tuve. I'm not well enough loaded to ask any specific questions yet, except this elementary one: At the war's beginning, and before we got into it, published accounts of radar always coupled the name of ~~William~~ Robert Watson-Watt, now Sir ~~William~~ Robert. You haven't mentioned his name. Why not? [As far along as Reel 5A you say, "I'll have quite a lot to say later about the origins of radar," but you're not yet down to hard-pan.]

Answer on Reel 11 at Counter 178.

8/12/64

B-40

Q-B38. Reel 4A. "The whole story of the creation of the National Science Foundation will come later, no doubt." Since Reel 4A you have had more things to say about it, indeed, but a great deal still remains to be said. This is not a question so much as a nudge.

Answer on Reel 11 at Counter 212.

8/12/64

B-41

Q-B39. Reel 6A: "I've told you the story of Phinney and the hornets, and I needn't do it again." Have I blown a fuse? I don't remember the story, and I can't find any other reference to it.

Answer on Reel 11 at Counter 232.

8/12/64

B-42

Q-~~B40~~. Reel 6B. Apropos of Engine Charley Wilson, you invite me to ask you to ask about "the Board under Nelson Rockefeller which recommended reorganization of the Defense Department -- and I'll be quite glad to put that on the record." Please do.

Answer on Reel 11 at Counter 243.

8/12/64

B-43

Q-~~B41~~. Reel 6B: "My relationships with Stimson were grand stuff that I can go into at many places."

This is so large and important a subject that it's better at this stage to just make a few observations rather than ask over-specific questions. For example:

On these tapes, when you first spoke of him, you said, "He was practically like a father to me." Well, he was your senior by twenty-three years. It's interesting, on the tapes, that you usually speak of him as Mr. Stimson or Secretary Stimson, very seldom as "Stimson" and never as Henry or Harry S. In fact, he's the only personal Mister in 3000 feet of tape to date -- aside from "Mr. President," or "Mr. Chairman."

I note that Mr. Stimson had, as you have, a Hugnenot stain in his ancestry -- although I doubt the two of you ever had much time to talk genealogy. Were the two of you ever able to talk about non-pressing matters? When did you first really get to know him?

The dedication of Modern Arms and Free Men to Henry L. Stimson is significant. I hope you will be moved to speak of HLS again and again. [On Reel 7A you say, "At some point I ought to tell you quite a bit about Stimson and his relationships with me." Yes!"]

Answer on Reel 11 at Counter 295.

8/12/64

B-44

Q-B42: Reel 7A: I never knew you went fishing with Herbert Hoover! For this old Republican, on whose ninetieth birthday I write this, I happen to have less veneration. Maybe my only question here should be, How many fish did the two of you catch? I think of President Hoover as being like a civilian Eisenhower whose luck ran out. Unjust?

Answer on Reel 11B at Counter 000.

8/12/64

B-45

Q-B43: Reel 7A: Small point : What was Air Marshal Portal's "clever trick with the matchbox"?

Answer on Reel 11B at Counter 085.

[This is no question B44]

B-46

Q-B45: Reel 7A: "I'll undoubtedly tell more about the Tizard Mission in some other place." Although you have spoken a fair amount about Tizard and about Cherwell, and made clear your opinion that Tizard was superior scientifically to Cherwell, you haven't yet settled down solidly to the task of talking about the Tizard Mission. I think now's the time.

Answer on Reel 11B at Counter 089.

8/12/64

B-47

Q-B46. Reel 7A: What did "that scandalous poem" the Oxford dons recited about Cherwell imply? When Cherwell was Prof. Lindemann as he was throughout most (all?) of the war, what was his specific scientific domain? ~~Why~~ Who did you consider Sir Henry Tizard's superior ?

Answer on Reel 11B at Counter 109.

8/12/64

B-48

Q-B47. May I have a confidential copy of your piece on Churchill, written for Ted Weeks?

Answer on Reel 11B at Counter 128.

8/12/64

B-49

Q-B48. Reel 7B: "Somewhere I'll tell you the story of General Motors in connection with the DuKw. The story ought to come in at some point; it involves patent relationships." May we please have the story now.

Answer on Reel 11B at Counter 131.

8/12/64

B-50

Q-B49. Reel 7B, Counter #290: Have you previously talked about "getting the messages to North Africa," as this passage says? I don't think I would have forgotten if you had.

Answer on Reel 11B at Counter 147.

8/12/64

B-51

Q-B50. Reel 7B: In answer to original Question 92, in which I fed back to you your own reminder "the cabinet meeting on policy," you respond: "I think this should be postponed; I can't jump subjects quite so fast. The cabinet meeting on policy was postwar; closely tied in with the Atlee Conference, the Acheson Committee, the Baruch Committee, etc., so we'll make a package out of that and get at it later."

As of 8/9/64 and through Reel 9, you have pretty well discussed the Acheson Committee and Bernie Baruch. But -- the Atlee Conference has yet to have a full discussion, and "the cabinet meeting on policy" has not come clear to me. Will you concentrate now on Atlee.

Answer on Reel 11B at Counter 164.

8/12/64

B-52

Q-B51. Reel 7B, Counter #350: In context of discussing John Steelman you say, "The President [Truman] was then very annoyed with me for a reason I can tell later, having to do with the conferring of medals generally." Let us have the story now.

Answer on Reel 7B at Counter 252.

8/12/64

B-53

Q-B52. Reel 7B, Counter #375: "When I get to talking about submarines, as I undoubtedly will, I can tell you of an instance up the Clyde; the British were 'way ahead of us on hunter-killer groups . . ." The context here is Ernie Kind's rigidity. I am eager to hear the Clyde instance -- and, more broadly, of British vs. U.S. sub tactics.

Answer on Reel 12 at Counter 000.

8/12/64

B-54

Q-B53. Reel 7B, Counter 380: "I don't know that I've recited the story of the very troublesome Britisher who tried to get one of our generals court-martialed for nothing whatever. That was General Moses, an excellent indivisual." No, you have not recited this story, and it sounds like a very good yarn for here and now.

VB goes on: "And sometime I want to say something about one of our finest generals, General Henry." Please do; on 7B you comment only on a) Gen. Henry's responsibility for the WACs, and his Southern Gallantry toward Mildred MacAffie Horton and b) his conquest of cancer. You obviously have much more in mind, and I imagine it has to do with Gen. Henry's job in Army New Developments Division of the Staff.

Answer on Reel 12 at Counter 192.

8/12/64

B-55

Q-B54. Reel 7B: Says VB: "And I also want to tell the story of the lost reports, which is quite a story -- of how the White House lost one of mine and also one of Gen. Marshall's."

Also: "I can tell the story of Stimson and the smoke generator; of how he grasped it, and nearly got me into trouble."

And: "I can tell the story of the radar when he first learned what it could do, and got very excited."

And: "I want to say something more about Tony MacAuliffe and _____" [Name lost at end of tape, Reel 7A.] Jake Devers

Answer on Reel 12 at Counter 200.

B-56

, 12/64

Q-B55. Reel 8A: VB says: "I can tell the story of my visits to Montgomery after the war when I went over to the Chateau de [OBSCURE] on some planning re exercises on handling an Army in the field in the presence of an enemy equipped with A-bombs. Montgomery and I had sme interesting occasions." Yes. The stories you have so far told about Monty involve:

a) The misgivings of his staff, sitting with you in his anteroom, lest he put his foot in it during a press interview, which he didn't.

b) How Monty said, "Propose a topic for discussion" and you said, "Very well; I propose the topic, The heavy tank is obsolete" -- and Monty said, "splendid topic."

c) Monty's loyalty to Al Grunther in clearing with him re "I want to talk to your President."

(BUT: you have not yet said anything about the planning for exercises against a hypothetical army with the A-bomb.)

Answer on Reel 12 at Counter 275.

8/12/64

B-57

Q-B56. Reel 8A: Says VB at Counter 190 re the CBI Theatre: "There's a story that ought to be told about a new type of radar that was being shipped out there to help planes get over the hump there." I'm not clear whether the story is the one about the gallant chap who flew out there, crashed, broke his back, but directed operations from a wheel chair [this you have told] or whether there are strategic/technical recountings to come also. Please enlighten.

Answer on Reel 12 at Counter 296.

8/12/64

B-58

Q-B57. Reel 8A ends with a host of future story reminders as follows:

a) "The famous Cabinet meeting where Truman made the decision on the post-war handling of the Bomb."

b) "The Atlee Conference with all the strange things that occurred there." NOTE: On Reel 9 you speak of Jimmy Byrnes, straw-hatted and jaunty in the night, but you haven't yet presented your own self-titled topic: "How not to run a conference."

c) "The extraordinary episode of ~~Rochamband~~ Archambault /?/ in Normandy and the German Radio Set."

d) "Conferences I had with Al Grunther after the war."

e) "Stepping out before being pushed out; the Art of Retiring is worth taking a crack at."

f) "I ought to tell you about Newton Richards' appearances before the Appropriations Committee, and one particular time he made the remark about his age."

Answer on Reel 12 at Counter 700.

8/12/64

B-59

Q-B58. Reel 8B: In context of your days on the Merck board, you have alluded twice to the "primary rules for organization" you wrote out, and how they were approved and promulgated by company president who wasn't conscious he frequently violated them. What you haven't told is what some of those primary rules are. I think these belong in the record.

/Temporary stop 8/10/64 on eve of brief New York trip with Patty./

12B is blank

Answer on Reel 12 at Counter 333.