

U. S. Air Force Oral History Interview

K239.0512-1066

Col John R. Boyd

28 Jan 1977

Corona Ace Interview



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TAPED INTERVIEW WITH:

Colonel John R. Boyd
USAF (Ret)

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Lt Colonel John N. Dick, Jr.

D. I would like to start off with some of your background; your family, schooling, and then into your Air Force career. This way we can gain a little historical prospectus of your life.

B. Okay. I did not expect an interest in my early background. Well, from the time I was in grade school, I have always been very athletic. In other words, I have always liked sports of all kinds. I played team sports and individual sports. In early life, I leaned towards team sports, but later on I began to enjoy individual competition. In grade school, I was not what you would have considered a good student. I only went to school because I had to, but I was, even back then, tremendously fascinated by athletics. I have always carried a fantastic fascination for sports. I played softball, dodge ball, and all the other kinds of games acknowledged in my grade school at that time. The experience made me, I would

say, very competitive. I know that I liked to win and I liked the attitude, the feeling brought something out of me.

D. Were you the first born?

B. No, I am from a family of five and I am the fourth child; three boys, two girls, and I am the third boy. I had a younger sister but she just recently passed away. That is a good question you asked because it brings out something I might not have touched on. My father died when I was about 3 years old, so I was raised by my mother. We were hit pretty hard by the Depression, and my mother had to spread herself thin among all of us children. As a result, I did not get a lot of attention. I am not faulting her. she had a tough job. So in a sense, I was given the opportunity to have a little more freedom when I was younger than maybe others had. Oh, if I got out of line, I was disciplined, yes. What I am talking about is that the circumstances were such that I was able to be a little more curious, to explore and do things at a younger age than most. When my older brothers and I talk about childhood, the feelings of not having the early independence which I had come across as something they missed. However, mine was just a matter of circumstances because of the conditions of the times. It is true, I did have a lot of freedom to do things as long as I tended to produce. My mother was German and as long as I did things well, or at least tried to do them well, she would continue to give me a lot of freedom.

D. Were you born in a big town, small town, and in what part of the country?

B. I was born in Erie, Pennsylvania. It is a fairly large town with over 100,000 people. I lived near a lake and had an opportunity to do a lot of swimming during the summer and ice skating during the winter. I was very sports minded; in fact, in junior high school, I would play some sport every season. During baseball season, I would play softball; during football season, I played that; during basketball season, I played that; and during the winter when the lake was frozen over or the bay was frozen, I would play ice hockey. So, you see, I tended to march right around the year. After I was in high school, I became very interested in swimming. We had a very good swimming team; I also played water polo. So, in high school I was a jockstrap in the sense that I was a swimmer and a water polo player; I participated in both competitively. I made ^{first} six letters; 10th, 11th, and 12th grade letters, I was team captain in my senior year, and ^{team} ~~won~~ state championship in swimming my last year. After graduation from high school in 1945, I enlisted in the Army Air Corps (this was just before the war ended). I was sent to Sheppard Field for boot camp. Some people were very disturbed with boot camp for some reason, but it did not bother me. I even thought it was a challenge going through their obstacle

course. Oh, I didn't love it; I would rather have been doing some other things.

D. Did you ever think about going to college?

B. Well, I did not have the opportunity. When I went to high school, I took what they called the "college path" curriculum. The school offered two kinds of curriculum; the college path and, I think, vocational. So I did have math, physics, and chemistry in high school, and I did very well. I was an honor student.

D. Why did you go into the service?

B. I was 18 years old in 1945 and Uncle Sam said, "Hey, we want your hot body." But even if I had been thinking of doing something else at the time, I would not have had the opportunity because of the circumstances. I don't know, if the war had been over, maybe I would have thought a different way about things. I don't really know how to answer that; if the war had not ^{come} ~~been a~~ war, would I have been interested in the service? It is hard to tell.

The fact is, however, we were at war and there was a lot of high emotion, or patriotic sentiment, or whatever you want to

call it. Anyway, I went into the Air Corps. Obviously, I did ^{eventually} not get to flying school ^{because I did not qualify and} because everything shut down in April. So

I became a part of the Occupational Forces in Japan; in fact, I was even on the Far Eastern Swimming Team there. ~~When~~ I got out in

January of 1947, I went to the University of Iowa on the GI Bill that following September; I majored in economics. I had not given much thought to making a career out of the military at that time. I do remember thinking, "Well, the war is all over now. There, of course, might be another one some day. ~~I really enjoyed being an~~ ^{accepted} ~~enlisted man.~~" I ~~also~~ remember enjoying my independence while going to college. However, it turned out that in my junior year, I needed some money, so I joined up for the ROTC [Reserve Officers Training Command] course. Being a veteran, I did not have to go through those first two years of training. I do not know what the rules are now.

D. It is the same thing.

B. At that time if you were a veteran, you did not have to take the first two years. However, it was compulsory for the non veteran to finish those first two years in order for him to complete the course. Anyway, at the beginning of my junior year, I thought, "I sure could use some more money." The Government paid something like \$27 or \$28 a month for going to class in ROTC. I knew I could do that standing on my head, and I really needed the money--so I joined. I guess, at that time, my interest in ROTC was purely economic. But then after I got into it, I started thinking, "I might want to go to ~~that~~ flying school, then when I get out I will have a reserve commission." I remember that is when I began to think about it, not real strongly ~~yet~~, but it occupied

my mind some. The day Korea invaded South Korea, I was on my way to ROTC summer camp. I believe it was June 25, ^{1950.} ~~1949.~~ We arrived there at camp, but with the invasion and all ^{The Air Force was} ~~they were~~ not sure what they were suppose to do with us. In any case, we did manage to complete our duty. When I went back to college, ^{the Air Force} ~~they~~ told us that we would probably be called up. That is when I seriously thought, "They will need fighter pilots. If I am going, I am going as a fighter pilot." I did not even think about being any other kind of pilot; I just wanted to be a fighter pilot.

D. Why did you want to be a fighter pilot? Did you talk to somebody about it or did you know somebody who was one?

B. Well, of course, I talked to various people about being a fighter pilot. I also felt that, "Well, bomber pilots are a bunch of truck drivers or Greyhound bus drivers." I did not want to be ^{in a} ~~crowded bus~~ ~~up here instead of down here and~~ have a bunch of ~~crowded buses~~ and people continually telling me what to do. I really did not want to get all that advice. There was a kind of esprit, some freedom about being a fighter pilot; it seemed like a big challenge. You know, you get in there and the whole load is on you alone-- "Can you or can you not do it?" I was convinced I could do it, and it triggered a lot of excitement within me. I really believe it was a carry-over from competing in sports. I guess it is a bad thing to say, but to me it was like a different kind of

a sport or a continuation of that kind of competitiveness. So while the penalties in terms of losing might be much higher, the tremendous interest, the passion and the drive to try to win and come out on top are very much there. Granted, you are going to work with your teammates, but a lot of it depends on how well you do, how well you are trained, how well you think, how well you move. I am trying to think in terms of that time; I remember I had those thoughts going through my mind. That winter during my senior year at the University of Iowa, I went to Omaha and took the physical and various other crazy tests they gave you then. I cannot remember exactly, but they said something like, "Okay, you see and hear lightening, so we will let you go to flying school." So they sent me down to Columbus, Mississippi, where I flew T-6s; I really liked that. I don't know if you want me to talk about this or not but I tended to violate a lot of regs. Do you want me to talk about that or not?

D. Sure do. Were you a risk taker before that?

B. Oh, yes. I have always been a risk taker. I frequently found myself in trouble; in fact, they were threatening me with Article 15 while going through flying school. This is what happened: I had learned how to fly solo pretty fast, so I started getting some books on flying. The instructors at that time were making us do those stupid gliding turns--maybe you remember those.

Well, I wanted to go up and practice loops, rolls, and all those other different kinds of things. Of course, I could not let my instructor know I was doing it because he would get angry. So I taught myself how to do these maneuvers--like Immelmann, for example. I will always remember this because I was so proud of it--the guys would want to go up and do a regular Immelmann, but I wanted to do three kinds of Immelmanns, three ways. I wanted to be able to do the regular Immelmann in both directions, I wanted to do the point roll-out, I wanted to do the barrel roll-out, and I wanted to do the snap roll-out. So I learned it three ways, both sides by turning right or left. I was very proud of that. I was doing all kinds--the slow-speed loops I really enjoyed doing. But I never practiced the gliding turn. One day my instructor takes me up and asked me to do these gliding turns; it was a disaster, I couldn't hold ^{the correct airspeed, etc.} He was furious. I said, "Hey, can I show you something? Since I did so badly on the gliding turns, you probably want to know what I have been doing." He said, "Yes, I really do." So I went up and did all these Immelmanns and various things. He said, "Who taught you that?" I said, "I read it out of a book. I kept trying it until I got it good." He was really impressed. However, he was very concerned about my final checkride in Columbus which was coming a few days later. This pilot who took me up for the check ride had apparently talked to my instructor because it was only about a 30-minute check ride.

Of course, I had practiced the past 2 days on the gliding turns, to be sure I had all that crap right and did everything in the correct sequence. Anyway, this instructor said, "Show me an Immelmann." So I did a regular one. "I understand you know how to do other ones," he said. I said, "Right." He said, "Show me those, too." So I did them all. He said, "Let's go home, that is all I need to know." I was very proud of that. I knew I had passed, and I could tell that he was impressed. That was the end of the check ride--I said, "How do you want me to go back?" "Any way you want to," he said. So I went Vroooooom, and he kind of liked that; I was off the hook!

After that, I went to Willy [Williams AFB, Arizona], no, that is not right, let me go back.

D. It wasn't advanced training in 6s then, was it?

B. I think there was a split. Let me see; I am trying to recapture that thought. Some of the guys went to bases where the first half of training was in either T-6s or T-28s, then on to the B-25 multi-engines; I am trying to remember where that occurred. In any case, I really told ^{Lemons} Lambert (?), "I will not stay in the service if I have to go to multi-engines." He said, "You are too tall for fighters." I said, "Well, I will just have to learn to hunch down a little bit." The fighter pilots were flying F-80s and F-86s at the time. He said, "I think you should

fly multi-engines." I said, "No, I don't want to fly those. As a matter of fact, I would just as soon resign. I came here to tell you that; if you are going to send me to multi-engines, you need another guy. In fact you will need two, one for that plus somebody for something else. I just will not stay in the Air Force. I do not want to drive a truck, I can tell you that right now." I asked him, "Am I not good enough for fighters?" He said, "You are good enough." Anyway, we had a big argument. He wanted me to go to multi-engines and I said, "Bull shit, I will not go to multi-engines. I will resign, I'm telling you." So I got to go to Willy. I had asked for Willy and got it. I was very pleased. It was really great, and I was very impressed. I really wanted to fly that jet!

When I got to Willy, I flew T-6s for the first half of training. A lot of the things they were doing there I had already learned, and I wanted it to go a bit faster to pick up ^{the} pace. I felt as if I was being held back; that is until I got that first jet ride, then I really liked it. They gave us two or three rides in the T-33 and then flung us out into the F-80. They had a very limited number of T-33s.

- D. You had less room in the F-80 than you did in the T-33. Did you have to hunch over a little bit?
- B. Oh, yes. That was one of the things they were talking about; I had

to learn how to hunch down in the F-80. But it did not bother me. I recall in the F-80A, I am not sure about the F-80B, they did not have an ejection seat, just a regular punch out. Anyway, I started to fly the F-80, which I really enjoyed. Then I started to do my dirty tricks again--I just could not avoid them. We had to make all these stupid cross-country trips (to the Grand Canyon, et cetera) where we would have to call in periodically. Well, I had flown a couple of them before and never did worry about getting lost. During this time, I had some friends who were flying F-84s out of Luke AFB [Arizona]. They had already received their wings. I had heard that they were going down to Ajo and that they were going to do some of their air-to-air stuff, so rather than go on my cross-country I decided to fly down there to join in on their air-to-air practice. I thought, "Bull shit, I will just tell them I made the goddamn points." Well, I didn't do that, but I did manage to do my initial air-to-air while I was still a student at Willy. I finally did get caught, however, and by an instructor from Willy. It turned out that he was not supposed to be there either, so we both kept our mouths shut.

D. Did you have any concepts at all?

B. Yes, I was thinking about-- I knew you had to turn. I was thinking about it in the T-6, that I wanted to get inside the other guy. So I had been experimenting. I had developed some

ideas when I flew down there, like how I wanted to get behind a guy-- knowing that the first time there would be some of those other guys who would do it better. I remember I was very attentive. So I thought, "Okay, I have the game." Getting an idea when you want to slow down, I would start getting initial ideas of how to overrun a guy. You want to yo-yo off, and I would start getting some of those feelings. Not in a very deep integrated sense--but I would be getting them. I got a lot of hassles down there at Willy before I went on to my next assignment which was at Nellis [AFB, Nevada]. I did not exactly arrive at Nellis to begin air-to-air, as I already had a little experience (even though I had gotten it on my own).

D. What were you thinking about when you got on the defensive in these air-to-air?

^{Tv}
B. I had bent the shit out of that airplane.

D. Was it all over the damn sky?

B. No, I just tried to turn. I would fling the guy to the outside because I knew I had to get him out there in order to turn.

On the other hand, I wanted to stay on the inside of the turn when I'm playing it the other way. I knew that. But then the question was, "What are all the different kinds of gimmicks you can do in order to play that game?" Well, you stay on the inside

and you fling the other guy to the outside, whichever way you want to play. The guy who is on the inside sort of has it made and that is kind of the driving strategy. I remember there were times when I would try to ^{do} turn reversals and I would do them at the wrong time and end up putting the guy in a better position-- but I never rejected a turn reversal as being a bad thing. I talked with some guys afterwards and they would tell me, "It's a dumb thing. You never reverse a turn." I just couldn't believe that. There had to be a point where you do it right. I just had to find out under what circumstances you play turn reversals; these were my thoughts while doing a scissors maneuver, but didn't actually realize it.

- D. Did you think about negative Gs during that period?
- B. Oh, yes, pushovers and all that. My thoughts were rather than just doing a gimmick of a pushover, of how to get the guy on the outside--and I was thinking about many other things. Rolling maneuvers? I didn't know how to use them right at that time. I figured a roll would be a very good maneuver but I really didn't have it right.
- D. So you never got caught by anyone except the instructor who should not have been there himself.
- B. So I was off the hook. He thought it was great that I would even

try something like that. Then I went to Nellis and that is where I started to develop a lot of feel for it. The first half of the program we trained in F-80s, the second half in F-86s.

D. Mostly air-to-ground?

B. Oh, no. It was mostly air-to-air. You would get some air-to-ground but you had a lot of air-to-air--what they called AT [Applied Tactics], which was the air. They had a whole bunch of those missions there, in the 86s particularly. We did a lot of air-to-ground in the 80s but mostly air-to-air in the 86s, this is what I am trying to tell you. Most of the guys who went to the 86s figured that they would probably be earmarked for the 51st or the 4th Wing over in Korea (the Korean War was on). I guess they were just starting up the 8th Wing.

D. Were you accelerated at this time at all?

B. Oh, yes. I arrived there in September, 19⁵²~~72~~, and I finished in December--got in my 80 hours. So, you are humming; it was a fast program--80 sorties or something like that and it took about an hour per sortie. And there we were: Bing, Bing, Bing! Two or three sorties we had a day.

D. Good instruction?

B. That is a good point. Let me touch on that. I was very curious about the air-to-air in regard to, What should I do? I remember

I was very deeply curious about that. You ^{see} sense the instruction was about 5 minutes, "Stay inside, hose him down, and do what I tell you." Gee, there has to be a lot more to it than that. "That is very nice but there has to be a hell of a lot more to it than that." So at that time I ^{tried} served in a lot of experimenting, and I found out I was able to beat some of the instructors. That made me feel good. In the meantime I was getting my skills up, and I was learning about rolling maneuvers--high G rolling maneuvers, a fling to the outside, maybe a little speed break (whistle) watching the crowd go by because you couldn't pivot around a roll fast. I learned to yo-yo, you know, when I hit a guy hard and was overshooting; I would just hook up, roll off, come down, and bang him. I was teaching myself a lot of that stuff and I was getting kind of a nice feeling for it. When I would get behind a guy, a good instructor, he would fling me forward, but rather than try and stay in a position I would move around the plane and let him wear himself out--then I would come on down and laugh at him.

- D. You are not playing the game right?
- B. I would say, "What do you mean I am not playing the game? I am still here and you are out there. I am playing exactly right. I know how you want me to play it." Because, you see, if you played their way, pretty soon you would get out of place and they would close in (whistle)--so I would roll off and then he would look for me and (sound effect) I would be right back in position.

- D. That is what was so dumb about the way we used to do it.
- B. You remember some of those things we did then. So I got into that early, "Nobody screws me in." When I left Nellis, I was pretty goddamn good. I could take on any instructor. I developed a good feel; I knew when to make the hard turns; I figured out my reversal points. Remember? I told you I knew I was right on that. After I went over to Korea, I ran into a guy by the name of "Ace" Whitehead [~~Maj Gen Ennis C.~~]. He used to be a good gunner at Nellis. He was in the squadron over there. He was a good pilot; he was good! Before we were allowed to fly combat missions, we had to go for a couple of quick rides where they would fling you around the skyride.
- D. Which outfit were you with now?
- B. The 51st. The 25th Squadron. I remember when Whitehead got me up there and he said, "Get in trail," I knew what their game was. He was good; he started flipping around, so I just rolled up off the side and when he whirled around I would pop down. I did that a couple of times and he was pretty impressed. Whitehead said, "You know what you are doing." I said, "Why don't you get in back to see if I can fling you out." So he got back there and I took that Son-of-a-bitch and in a crazy roll (sound), I just sent him forward. He did not play the game then. I am behind now. I was doing that kind of stuff then. He said, "Where did you learn that?"

I said, "I have been thinking about it." Before I left Korea, I only had 22 combat missions before the war ended. I got over there very late in 1953, the war ended that summer.

D. Did you ever have any encounters?

B. I will tell you about that in just a minute. Most of time you go up in these damn sweepsters and there is nobody around, plus it was always "flying the wing." I never did get to fly the lead because the policy in our squadron was that you had to have 30 missions or something like that. I was anxiously waiting to get that element, but in the meantime I had to fly wing. In any case, I learned that position pretty well; I was pretty good.

I started to notice that I was getting more and more sweeps. I was with my leader one day, Baldwin I guess, ~~I think he got killed.~~ Anyway that was a big day, we ran into a very good engagement.

They did shoot down a lot of people and we ended up coming home low on fuel. There was a lot of swirling around with guys trying to get in position. I could fling them out and still be covered.

I knew if the war lasted that I would get a few.

The day that made me feel better than any other was when Jock Maitland, who was an RAF [Royal Air Force] exchange officer, asked me to sneak across the border with him. Jock had been there a long time and had not gotten any kills. Guys were sneaking across the border all the time, and he wanted to try to sneak across. He asked me if I would

go with him. I said, "Sure I would go." He said, "I knew you would." I said, "We have to be careful how we plan our IFF [Identification, Friend or Foe] and all that kind of stuff." He said, "I just have to get a kill before I get off this tour." I said, "I am with you, let's go." So, we flew into the clouds and made a right turn; the others went one way (sound effect) and we went for the border. Up on the Yalu, we turned off the IFF. I guess they probably skin painted us, but at least it made us feel comfortable. We had not been up there for very long and I was looking around. I remember I had been reading all the Intel [Intelligence] reports and talking to other pilots trying to find out where the MiGs were--I had the feeling there was a lot of goddamn bull shit going on when they would say, "You can find them up high," and all that. I said to Jock, "I think they are down low." Anyway, we went up as high as we could, 40,000 feet, and we could not find anything. Yet we heard there were a lot of airplanes there. I thought, "Well, if they are not up here, we know they have to be down low. They are hiding in the weeds. I am convinced they are going through that stuff. I am going to look low. They just don't want to run into us." So we went down there and saw about 19,000 ~~people~~ ^{at}. I said, "Jesus Christ, there they are!" It couldn't have been better. I was in there, tucked in pretty close. We had not been out of the weather very long because we were still looking around. Jock looks at me and rolls off, and I am right with him; I ~~delved~~ ^{dived} right into them. Boy! Those MiGs ~~were~~ ^{were} everywhere. Remember, there were only two of us. ~~we~~ ^{we} hit about 14 or 16 of them, a whole gaggle.

Boy, Jock swooped right in on one of them; Christ! Jock was not shooting! I could not figure it, so I ~~peeped~~^{lunged} in behind him. He was about 200 feet behind the enemy. "Damn, Jock, why don't you shoot? Goddamn, Jock, those other guys are coming, you have to hose that guy," I called to him. But I received no response. I figured, "Oh-oh, I goofed. He must have switched channels and missed that goddamn channel change." So, with quick presence of mind, I went over to another channel--"Comms Ops," I said, "try the other channels. See if you can get so-and-so (Jock) and call me back to let me know so I can make the channel switch." The communications people knew I was in a hassle and they said, "Where are you?" They could hear me breathing; I was very excited. I said, "Never mind, just check the channels and come back. I have a problem, and I do not have time to talk." They came back later with, "We cannot pick him up." So I figured Jock had radio failure. I told the communications people, "Okay, I want to get off the channel now." I went back to the channel Jock and I were originally on. Then all of a sudden--I looked back and could see some guys whistling in from behind, so I hooked fast and saw them shooting. I rolled over to get them off Jock--Jock was still chasing the same guy! I thought, "What in the hell is he doing? We are both going to get hosed down." I couldn't figure it out because Jock was a good pilot. I just couldn't figure out what the hell he was doing. I knew he had a radio problem (what I did not know was that he had a complete electrical failure and his guns would not shoot). Boy, I was pissed! Here we were playing the game as dumb as we could.

Of course, I was thinking the guys were going to ~~come~~^{come} in on me and I am trying to roll off. Then he wiggles his wing. One time he sliced it and I said, "Oh, my God! Somebody has snuck in on me!" I thought he had made a break and somebody had snuck in behind me. What I did not know was that Jock was trying to get me to take the lead to hose the guy, but I thought someone was coming in on me because I was worrying about all the other guys. Finally, we worked our way up towards ~~the dam~~^{big yellow} there. We were pretty close to the area where it happened (where all this crap started coming up) and the MiGs just took off. We did not get anything, not one kill! That was terrible. We were both low on fuel, and by this time I knew Jock had a complete electrical failure. Then he gave me the signal to make the letdown; I had to make the letdown back at K-13 but that was no problem. I made the letdown and Jock stayed on my wing. After we landed, Jock got out and I never saw a guy so mad in my life. He took that helmet and smashed it right down on the ground. He said, "Jesus Christ, the only time I get a good opportunity and I have a goddamn electrical failure; nothing would fire! nothing would shoot!" I said, "I didn't know what the hell was going on, you had me so damn confused." He said, "Well, no problem, you did the best you could." I said, "I knew you had radio failure because I checked with Comm~~Ops~~ Ops, but I did not know you had electrical failure until we joined up again. I knew something was wrong but I couldn't figure out what it was.

I thought maybe your gunsight was out." Anyway that was really the last time I had that kind of opportunity. I think there were maybe two or three more missions before the war ended. I also remember at that time, since those guys were able to take a hook at me and I was able to roll off and fling them off, I felt very confident. I was not worried about getting my head pounded in and I really liked it. In fact, I thought about that for a couple of nights, "Jesus Christ, I really like this stuff. If I could only get five on a mission (ping! ping! ping! ping! ping!)," Of course, I was always thinking where we would be going next. I would look at the Intelligence reports as to where I thought those MiGs would be, so I could go over and get them when I received my ~~leave~~^{lead} slot on my 30th mission. Well, hell, I never got the 30 missions; the war ended. So at the end of the war, I was in the 51st there. I used to fight all the other guys and I could just beat everybody; so they made me wing tactics officer. (I remember when I was just a young balloon out of flying school, I could beat everyone, even the older guys like Ace Whitehead.) The guys would say to me, "Why don't you lay out a course curriculum to teach when the war is over?" I had never really thought much about it before, so I kind of mulled things over in my mind, then I began to make notes on different things, putting briefings together, et cetera. I really got into tactics, along with some gunnery. At the end

of 1954, I went to Nellis AFB. While there, they had tried to assign me to a maintenance squadron but I just raised hell. I said, "Bull shit on maintenance! I don't want anything to do with it." At that time, they had a lot of instructors but were quite low on maintenance officers, which is why they wanted to make me a maintenance officer, but I would have no part of it. So they sent me to Nellis, to the 97th Squadron, the Thunderbird Squadron, as an instructor. I started to develop all these tactics and techniques. Of course, by word of mouth, we would hear about all the other good instructors, like Cal Davey [Col. Cal Davey]. He was in the 98th Squadron, a very sharp guy. After I had been at Nellis a year, I was asked to go through the Fighter Weapons School. I really thought that was great, I knew they liked my work. I said, "Sure, I would love to go." They said, "Then you can come back to us as a weapons officer." So I went to weapons school and they kept me on there as an instructor, so I did not get back to Nellis. *TH 97*

- D. What were they teaching you at weapons school?
- G. Well, it was primarily a gunnery school. They did not use many tactics; it was just gunnery. So really I started the revolution, and I am very proud of that as a matter of fact. I got there and said, "We have to tweak up the tactics." That was all I thought about; the gunnery, hell, they could hit. We had to get these guys in a position so they could use the guns. They were not going to

be flying against a 6 by 30 banner all the time, and that was all we flew against in the air-to-air or against target circles and that kind of stuff in air-to-ground. I agreed the 6 by 30 banner was necessary and it was also a lot of fun--you have heard of the ~~polyethylene~~ ^{polyethylene} Pauley-Efman banners? But the banners only, were not going to produce a good gunner. So I started experimenting on tactics. Finally I said, "I have some really good ideas. We need to put up four more academic courses." (I had developed my notes continuously from the 97th Squadron, plus what I had brought back from Korea.) Then I had a very fortunate thing happen to me. I did something I was sure I might have regretted, but I never did--back at Fighter Weapons School, they had three sections. They had the Operations Section, the Academic Section, and a TR&D Section [Training, Research & Development]. I do not know how it is organized now. At that time nobody wanted to be in academics, they either wanted to be in ops or TR&D. I think you can understand why. In the meantime, one of the guys was leaving academics and getting reassigned. Normally they would take a guy from ops and put in academics. Usually the guy did not have a choice. So my evil mind went to work, I went to Col Giraudo [Gen John C.] who was Commander of the Fighter Weapons School. Maybe you know him as General Giraudo now. I said to him, "I have a bargain for you. You need a guy over in academics, right? I will honestly volunteer if you will allow me to try one thing. He said, "I

don't have to." I said, "I know that but I am coming here to you volunteering, straight-laced, and I am going to lay it out for you. Here is what I want to do. I like tactics. You know that I know this tactics stuff and with your approval I want to put it in the Weapons Squadron. I believe we have to do more than just..." He said, "I like the idea. Okay, under those bases and you'll volunteer." I said, "I'll volunteer for academics but I have to be given that opportunity. You can put tactics in academics and also as part of the curriculum in a flying program, rather than just having the guys go up and shoot a 6 by 30 banner. There is more to shooting than that." So he said, "Okay, lay out your program. You may be over there in academics for no reason." I said, "I am willing to take the risk. I am convinced that I can give you a good program. Will you please tell the guy, the head of academics. I do not think he is going to want to do this. He is a real straight-laced guy. So you had better inform him before I go over there, otherwise, you are not playing straight with me." You see, I was sent to Fighter Weapons School as a volunteer, and I was kind of implying that as a volunteer I might not want to be a part of Weapons School any more. I could go back to the 97th Squadron, lay out the whole package and beat the Weapons School. I did not really give a shit because I knew that I could beat them. So Colonel Giraudo went over and told Captain Baker [] . When I met him, Baker said,

"I understand I have to give you the opportunity." I said, "Well, I volunteered on that basis and I was brought over on that basis, so I think it is only fair. If you do not want to give me the opportunity, then you can turn me loose." He said, "No, that is fair. It may not amount to much." I said, "That is your opinion, but I want to be given a shot at it. You may be right, but it is yet to be determined." Anyway, I started laying the whole thing out and developing training syllabuses. I had a couple of practice groups teaching, and gradually the thing built up. Then I told him I was ready and would like to submit what I wanted to lay out for the academic programs with teaching classes, and the kind of missions I wanted. I had the mission cards and everything. Most mission cards said how we taxied out and how we would come back, ^{with only about} in 5 minutes ~~we~~ ^{on how} we could do it in the air. Bull shit! I wanted 5 minutes clocking out, 5 minutes coming back, and 50 minutes on a pre-flight briefing to discuss what was to be done on the mission and how well the guy was trained to do all these different things. So I briefed them at the Academic Section on the program and I asked for their criticism. There were a couple of things they did not like. I wanted to put snap rolls in there because I found out you could snap roll 86 at slow speed and the crowd really goes by. It does not snap on a point, I don't know whether you know that. Most people think it does. I thought I was the guy who dreamed up the maneuver but, independently, this guy Davey had been doing the same thing in the 98th. I never thought of him until some guy told me,

"You and that Davey are bastards. You both do the same thing in order to fling everybody out front." I said, "What's that?" He told me again. I said, "I did not know Davey did it." He said, "Davey did not know that you did it either, but you both do the same thing." So Davey found independently the same method that I had found, that the airplane did not snap on a point but that it whips around. Can you imagine the whole airplane going through the air like this (demonstrates), then stopping while ^{the} crowd goes by. When you are the defense, you see, you hook that in and throw the guy by. It is kind of hard on the airplane though because you have to be slow or you can break the airplane. So the academics people said, "No." I had to take that out of the curriculum. Then I said, "Well, I will put more emphasis on the high G rolls.

- D. Did you take it out of the ground, even out of the academic part?
- B. Oh, yes. I took it out of both the flying and academic programs. I did not stop doing it, however. But if I had taught anybody else, I would have been fired. Don't forget I was teaching these guys and if one of them had shot his mouth off, I would have been fired. They just told me, "It will not be done." They asked me if I was still doing it and I said, "Yes." They told me, "No more of that crap." They laid it on me very hard. I said, "Okay, fine. I won't do that anymore." I could have taken it off base,

but they would have found out from the guys who were going through the course, so I struck it out of the curriculum.

- D. So they bought the rest of it for the flying portion, too.
- B. Well, we tested it for awhile. I said, "Let's try a couple of ideas. Let's not dive in too fast, let's just feel our way in and then we will expand it. There are a couple of things I want to do to be sure they get the bait. Instead of flinging a guy in a four-ship flight where nobody knows what the hell is going on, I want to have one instructor and one student in the initial flight." That was a hard fight; they just did not want to do that. I said, "I want to give these guys individual attention. Those first few rides are so important, from then on it becomes easy. If they were taken in formation, it would go must faster. The sorties would not be wasted either." They were really inclined to want to do it; they did not fight me now. They were only worried about how many flying hours would be generated. You know, that is a problem, particularly for the commanders. I was not angry, I understood what their argument was because they had only so many sorties and had to pump many, many students through. So for them to change to my method would screw up the whole mess, which in a large organization can be a real problem. I recognized their concern. So I said, "Well, maybe there is a second best scheme. We will just take the guys up and have two guys stand off

and work with one guy, then work with another guy, and then work with a third guy. In other words, have the guys watch what is going on rather than have everybody just mix it up. Like, I would say, "Now stand out there to the side and watch this." Then I would bring another guy down to watch during the first few missions.

Of course, the guys do not get as much out of each training period this way. But anyhow we did do that for awhile. Finally, we went back to the team way of instructor and student. But at least we tried it. We said, "We will give it a try. We are not going to fight it." And it was still better than before with everybody going over there and beating over the green spot and wrestling all over the sky.

- D. You know, if an instructor is going to take up a new student, he should be able to wax his butt pretty easily starting right off.
- B. Yes, we trained the instructors, too, if that is your question."
- D. Well, do you feel that the instructor should allow the new guy to have an initial success? In talking with people, there is nothing like initial success for reinforcement."
- B. That is a damn good question. I am really glad you asked that because I might not have touched on it. There are two things you have to consider: (1) I had the feeling that if you just kept beating a guy, that you would destroy him. I remember I

had that on my mind a lot of the time. (2) I also remember there were a bunch of hardheads who did not want to learn, so they would have to get the 2 by 4. What I am trying to say is that you have to treat each guy on an individual basis. If the guy really wants to learn and has some problem, you do not have to give him the 2 by 4. But if the guy has an obstruction, which is what I would call it--as soon as I would spot him, I would cut his balls off in 10 seconds, and I would do it (bing!bing!bing!bing!bing!) five in a row, then the guys would be ready to learn. I would say, "Now are you good?" The guy would answer, "No." Then I would think, "Now we are going to go through a very nice program." Otherwise, you see, these guys were not going to pay attention. They had to have that cockiness knocked out of them. ~~As for the~~ ~~guys who had some insecurity--~~ the guys who thought they had to beat the world or they were not worth a damn--if you let them win, they would say, "Shit, we are not learning anything out of the program." So then they would not even try. Do you understand the psychology I am giving you? Anyway, we all agreed that was the way to teach them and that was the way we did it, and it paid off. There were a few guys who were a little bit uncertain, so you would say, "I do not want to go out there and do that to him. He will never be any good if I do." This was your comment, John. So you say, "Okay, let's go up there." Then you say, "Hey, you are doing pretty good." You would fling him on the outside like

I do sometimes, but then not take the advantage and come back on him. In other words, you hook back for all you got then you just don't take it. You would say, "Okay, let's go back and do it again." This way you don't make the guy look bad. You say, "Okay, you went a little bit too far, let's set it up and try again," because you want this guy to get those points. This was the kind of thing particularly we did at that time that was different. We tried to some extent--and I am not trying to toot my own horn--to tailor the program at least a little more on an individual basis, recognizing that when you are working with a lot of people, you cannot go as far with some as you want to.

D. Were you flying much during this time?

B. All the time.

D. There was no hassle there as far as being in academics?

B. No. That was one nice thing we had in the Weapons School. The academics instructors were expected to fly just like the ops guys. We were put on the schedule and treated fairly; in other words, they did not give the academic guys a bunch of tow target missions while the other guys got all the good missions. That was one thing we had, we had good discipline in the Fighter Weapons School. There was a guy in the combat crew who went to academics and all he flew were tow target missions or the morning recce (Reconnaissance)

mission or some other damn thing like that. He didn't get very many instruction missions, air-to-air missions, or tactics missions. We knew this was going on, and we thought it was bad. We felt there had to be a good rapport between the guys in ops and the guys in academics, so that what was being said in academics and what was occurring in ops meshed together. Otherwise, one guy was saying one thing and the other guy was off doing something else. What kind of a program is that? You want to have a good correlation, recognizing the fact that there will be some individual differences. Some people have a different style, but that is all right. That is good because you tend to look at other ideas; that is, it is good as long as it doesn't become totally incompatible. But you don't want a real rigid standardized program, then you would have nothing but a bunch of robots. I remember that was something I worried about, "Hell, we don't want to get the thing so damn rigid." We have to have some differences, but we cannot have one guy going one way and another guy going another. Then the whole thing comes apart. So you worry about those things all the time. Yet you want to have the freedom to think you tailored it the right way. There are times when you don't do as well as you would like to have done but you would like to think that you have.

D. What was your next step after the Weapons School?

B. Because of the work I did at academics, they were going to transfer

me over into TR&D. Let's see, I was in ops first, then I went over to academics and I was there for about a year or so. Then they said, "You have done such good work in academics that we want you to go over to TR&D." Everybody wanted to be in TR&D; that was the plum! (In the meantime, we had a lot of problems with the F-100s coming in at Nellis. The Weapons School did not have any yet. We were flying the 84s and 86s. I flew the 84s a little bit, then we got rid of those and stayed with the 86s; the 84s went down the loop. I am talking about the G models now.) Then when that was about to happen, of course, they had to type orders and Colonel Hinton [], who was the fighter group commander, called me down and said, "You are not going to TR&D, you are coming with me." I about died, "Headquarters Weenie!" He said, "You don't have any choice. One thing about me though is that I will let you talk for 5 minutes; however, the end result will still be the same, you are going to run Training Analysis Development." "What is TA&D?" I asked. He said, "You will have to put out the curriculum and be sure the guys are doing the right thing. I want you to have the curriculum, the mission cards, and then go around and monitor their progress." I said, "I really don't want to do that, Colonel. I don't want to do that at all." I raised hell. But then he brought up another guy whom I liked, so he did the right thing. This other guy was Major Clifton [Maj LeCroy], a real smart guy. I was a first lieutenant at the time.

Major Clifton did some good things but was never given credit for them. It really made me mad. I always liked him because he was a good thinker. Colonel Hinton asked, "Can you work with Clifton?" I said, "Hell, yes. He is a good guy." The Colonel said, "Well, some people can't work with him. He gets kind of rough if people screw up." I said, "He is the kind of guy you need. I like him. He is a good man. I can work with him just fine." The Colonel says, "Well, LeCroy says he wants you, too." Then I went down and talked with LeCroy. I said, "It looks like you and I are leaving the Weapons School." He said, "You got the bad news, too." He did not want to go either. We agreed, "What the hell, we would make the best of it." So we went to TA&D. They had agreed to permit us to fly the 100s they were bringing into Nellis AFB at that time; the F-100A. So I was checked out in the 100s. But we were having all kinds of problems with the students because this airplane flew so much differently than the others. So we went to see Colonel Hinton after the problem became serious with the students and instructors. Finally, he said, "Bull shit! We are going to lay out the course in color." What did they call that? The Panther Course, I believe. You know what I mean, a cadre course to upgrade the instructors. I, myself, had gotten pretty much up to speed; in fact, I could make the 100 even do better than the 86 because I practiced and figured out how it responded to me. You have heard of the opposite stick? Well, you know who dreamed

that up, don't you? I am the guy.

D. Is that right?

B. I could beat the best instructors only after four rides in the F-100s because I figured out how the ailerons worked. I figured out how they rolled off one way. I thought about it in the classroom one day and said, "I am moving the aileron this way and if it goes all right, that means it is acting as a speed board. All I have to do is use a cross control technique for the goddamn thing to really hook around or just neutralize ^{the aileron} the rudder being the primary control. So I went up and tried it, and sure enough it actually worked. I practiced a number of times and took a couple of guys up with me. We did it in rolls and everything else. Anyway, I was the first guy to accomplish that, to develop those techniques. The company engineers said it could not be done. I told them, "I do not care what you say, this will work." They just would not believe it, so they sent a guy down with the attitude of, "Well, we are going to prove that you do not know what the hell you are doing." Bob ~~Kazz~~ ^{Cass} [Robert] who was in the Service took this North American test pilot up and had him try it. ~~Cass~~ ^{Cass} ~~Kazz~~ said, "Watch." (Sound effect.) The guy just could not believe it. He noticed the techniques when ~~Kazz~~ ^{Cass} took him through. So when they came down, he told the aerodynamics guys, "They do know what they are talking about. We don't know what we are talking

about." That was the end of that! In any case, we went through all that stuff in the 100s and got that going and then we put in the Panther Program. Actually, it was an instructor upgrade program because the guys just were not learning how to handle the airplane. I ran the tactics phase of the program, Cal Davey ran the gunnery phase, another guy ran the formation phase, another guy the air-to-ground phase, and the other guys then became assistants. We all flew all of the phases but there had to be just one guy in charge of each, you see. The guy who tended to be good in a particular phase was the guy put in charge of it. He would then lay out the program. He would decide what had to be done, monitor its progress, be sure everybody was getting the job done, et cetera. So we upgraded all of our instructors by doing that. Colonel Hinton was responsible for putting this program into effect. Then in 1957, which was kind of a breakthrough, I wrote ^{on the tactics part} the Fighter Weapons Newsletter. I don't know if you remember that newsletter on fighter tactics with the diagrams in it and all that.

D. Oh, yes.

B. Well, that is the one I wrote. ¹⁹⁵⁷ ~~I did that in late 1959;~~ it was somewhat of a departure from No Guts, No Glory. I am not taking anything away from Blesse [Maj Frederick C., "Boots"] because his was the first and I recognize that. He did a real super job, too. Mine was a departure in the sense that at the time -- a lot of people

realized it, but now they do not recognize it--it was sort of rigid in terms of the way he used the wingmen and all. I thought we had to open up a little bit and all that stuff. So instead of talking about wingmen always being with the ~~guy~~ ^{story} and wing guys ~~leading~~ ^{leader with}, we talked about the fluid separation. The first time this maneuver was exposed was in the newsletter. We called it the Fluid Separation Maneuver. You go in and split the guys off, and after you have one guy split off then you play the two-on-one game. So we exposed that maneuver at that particular time because we had been trying it, and it worked very well. We did it in the F-100 and all that. So we wrote it up in the newsletter, which was one of our first TA&D papers. We laid this newsletter out specifically for the F-100 program. Well, the editor of the newsletter liked it so well, he said, "Will you kind of tweak it a little bit and make it the Fighter Weapons Newsletter?" I said, "Yes, how do you want it laid out?" He told me, and there was no problem. Of course, it was necessary to modify it because it originally was primarily a training kind of a prospectus thing. The first newsletter was put out in June of 1957. Do you remember the ribbon diagrams and all that sort of thing? Well, we did that. We received a good response on it because it showed instead of just going up there and turning inside and hosing him down, other maneuvers could be applied. So in that sense, it was a more systematic way of looking at tactics, if you want to put it that way.

On the other hand, we did not want it to be standardized. Do you want to talk about this stuff?

- D. We sure do, absolutely.
- B. We did not want it to be standardized. And right away, the goddamn inspectors are getting into it. They started going out and watching us do the various maneuvers and telling us that we could not do them that way. I said, "That is bull shit! You cannot tell us how to do a maneuver. Those things vary according to circumstances. Don't think a maneuver has to be done in a hurry." We had some terrible skunk fights over there. It was about that time that the F-100s were getting expensive, so all these flying safety guides were being put into effect to eliminate airplane losses. I said, "Christ, you cannot standardize that. What are you going to do? Measure the goddamn maneuver, for Christ's sake?" We had some terrible fights. It really got bad. We were literally throwing the verbal crockery at one another. Well, even though we did not want it, some people did tend to standardize somewhat. It really bothered me, too. Then I thought, "What the hell, when I go up there, they don't know what I am doing anyway." So I told the other guys, "Tell the bastards, 'Yes, we will do it their way,' and then we will go ahead and do it the right way, and we are not going to write it up their way. If they want to write it up, fine. But we are going to have it written up the right way;

if they want to make some detail out of it, that is all right. But to actually do it their way would screw up the whole damn thing, and we just cannot do that." In any case, while in TA&D we went through all that, those debates and counter-debates. As a result, we really got a lot of the schools going. The Fighter Weapons School was beginning to go down the tube because of an argument as to whether it should still be in crew TAF or a part of TAC. They just did not know what to do with it at that time, so everything was kind of (sound effects). They were robbing people out of it and everything else; I was one, and pretty soon they started robbing other people. Then we started to raise some hell. We said, "Damn, here ~~you are~~ ^{have} a wonderful school, and you are going to let the whole thing go down the tubes. Well, you know, once it is gone, you will never get it back again. It would take too long of a process to build it back up to where it is." Colonel Hinton became very concerned about it, and he eventually decided TAC would pick it up. Some of the guys they were letting out and new guys were coming in, plus guys from ~~the~~ other squadrons. One day I said to Colonel Hinton, "It looks like they are going to go to TAC. If they do and this thing goes crew TAF, can I be released from my obligation and go back to Fighter Weapons School?" He said, "You can, that is only fair. I pulled you out of the school with the understanding that you would go back." In the meantime, Lt Col Floyd W. White became the commander, and I went

up to see him. I said to him, "Colonel Hinton told me that if you have a slot for me to fill, he will release me." Colonel White said, "I am not going to let you come back to ops or R&D. Do you want to work in academics?" I said, "Yes. I will tune up the program like you have never seen before. I will outfly all those other guys." He said, "When can you start?" So I was transferred and made supervisor; I ran the academic program. That is when we really went to work. We incorporated the F-100 into the Fighter Weapons School. We redid all the curriculum. We were going to redo everything the ops guys had done, redo their mission cards. We took a look at R&D. We laid out the whole thing. What a spirit! Piss and vinegar! We got some of the other guys who had been spread out back in there plus some new guys who had just come in. That was good because you can kind of get addled in your ways.

- D. How long had you been there? It must have been a pretty long time.
- B. I was assigned there in 1954 and did not leave until 1960. I was told that I was not going to leave, that I was going to stay there for 7 years. I was supposed to stay until 1961 except I went to AFIT [Air Force Institute of Technology]. I kind of wanted another assignment at the end of 4 years, but they said they would not let me go.
- D. You didn't really want to go, did you?

B. Not really. I loved it, I felt like I was doing some good work. So then I went to Fighter Weapons School and ran the academics program. I laid out all these lectures and really expanded the ideas from the tactics I wrote back in 1957. I had all those beautiful notes and tapes. We were really doing it; we could beat anybody. We just cleaned their clocks--40-second bets. We really did have a good program. We learned fast in the F-100 and could wipe out those 86s. "Bring your airplane, we don't give a shit. In the meantime, we are going to cut your balls off." We had all the guys trained that way; the students had the same kind of spirit. Initially, you see, we had the 86-Hs, then we got the F-100s. I was able to fly both. Do you remember the H? It was just an 86 with a big engine. It was in ¹⁹⁵⁸~~1957~~ that I went back to Fighter Weapons School; I am trying to remember dates. Then the summer of 1959, I said, "Jesus, they are going to keep me here forever. I have to look for another good assignment." I remember I kind of wanted to go to ADC [Air Defense Command] down at Tyndall [AFB, Florida] to fly F-104s. They would not let me go, however; I got shut out ~~of~~ there. The assignment was set up and then the whole thing fell apart. I really did want to fly that 104. I had talked to the base commander there and he was familiar with my background. He was all for me coming to Tyndall but TAC, for some reason, would not release me. I do not know what hanky-panky was done, but it was obvious I was not going

anywhere. So, in the meantime, I said, "Well, I have to get the hell out of here. I have been here a long time, since the spring of 1954¹⁹⁵⁵; in fact, before that in early 1955." I decided to send a letter to AFIT to see if I could go to school. I sent them my records and they said that I was eligible. They told me what they wanted me to do. I said, "I don't want those programs." They wanted me to take a graduate course. I said, "No, I don't want to do that. I want to go back to undergraduate school to get a degree in engineering." (My original degree was in economics.) They said, "We don't have any provisions for that. You have to go for a graduate's degree in either economics or business." Well, I just was not interested in doing that. So they wrote me back and said, "Well, too bad then. We can't help you." However, a short time later, I lucked out. They called me on the phone one day (apparently because they weren't reaching their quotas) and said, "Are you Boyd?" I said, "Yes." They said, "Well, remember that letter you sent a few months ago (this is the summer of 1959) stating that you wanted to do undergraduate work in engineering?" I said, "Yes." They said, "Well, we can give you a waiver on that now because people are needed in that field. We normally do not do this but in your case, we will give you a waiver. We have your records, and it has already been approved by the general. All you have to tell us is "yes" that you are willing to go by letter. In the meantime, if you TWIX your acceptance to

us, we will start running the paperwork through to get you into the university." I said, "You have to be kidding. I will get that damn message out today." So, I did. Then they sent me a message back in a few days stating, "You are frozen. Nobody can touch you." In other words, because I was going to school, I was locked up in that assignment I had until I left for school. A few days later I received another message stating, "You will be leaving for school the summer of 1960." That was the coming summer and I was very happy about it. I had originally wanted to go to Edwards [AFB, California]. I had thought about that for awhile and then decided I did not want to be a test pilot. I did not want to read all those fucking gauges and all that stuff; it did not sound like much fun.

D. Why industrial engineering?

B. I was interested in a math degree, but for some reason they did not want me to go for an undergraduate degree in math. At that time, engineering was what they were pushing. I received the curriculum and looked at it. They would have liked for me to go into electrical engineering; however, industrial and mechanical engineering were also open to me.

D. When did you get into math?

B. Well I always kind of liked math because I enjoy problem solving.

Of course, in engineering, math is used but I wanted to be more general in using it. They said, "No, you cannot get a degree in math." So, I said, "Okay. What can I get one in." They said, "We would like to have you get one in electrical engineering." I said, "Wait a minute. Let me think about it. Let me get some curriculums to look at. Send me your curriculum and I will get some others from various schools." Well, I received the curriculums and I looked at electrical engineering and said, "Bull shit on that!" It was just too narrow; all I would do was worry about generators and motors. I did not care about that crap. Let somebody else worry about that. I looked at mechanical engineering and it looked kind of interesting. I said, "Well, I would probably like that." Then I looked at industrial engineering and liked that even better. I thought, "This is very broad. It covers physics, math, production lines, et cetera. I really like this, it really appeals to me." I have always tended to think in sort of broad terms, and industrial engineering appealed to me because it had the broadest range of courses. I had classes in calculus, differential equations, vectors, physics, and numerous other courses such as production lines, et cetera. So they approved my choice and I went to Georgia Tech for 2 years--1960 through 1962.

D.. It was a 2-year program.

B. Yes. Eight quarters straight through. I had never had any

engineering before, and I humped. You would not believe those 2 years; I was glad when they were over.

D. Were you single then?

B. No. I had a wife and four kids. In fact, my fifth child was born when I was down there.

Let me track back to before I left for school that summer of 1960. This would be around September of 1959, after I had been accepted to AFIT. You remember I had written all these notes, et cetera. Well now the students were concerned. They said, "What is going to happen with that? You will have to write that information up before you leave." I said, "Oh, Christ, there are so many notes, I just don't have time to do that." I figured if I started to write everything up, I would not have time to fly anymore. So I was very upset about it, and they were putting the squeeze on me. I could only think, "This is my last year here and I really want to get some good flying in." Finally, Sprad (Vernon) gave me the idea. He said, "Hey, John, we have some good dictaphones. Why don't you dictate the damn thing?" I don't know if you ever knew Vernon Spradling. He used to be a civilian consultant out there. He said, "We will have the typist pull it off the dictaphone. Do you mind dictating?" I said, "No. It might be a little clumsy but we can use a lot of glue and paste. It

would be much quicker that way." Of course, I had to make an outline first; you just don't start dictating. I had all my notes in front of me and I said, "Now that I am going to dictate, I don't want to present it necessarily the same way as I would in a classroom where I could use my hands and a blackboard to stress a point. I am going to have to convey those images with my mind and with very simple diagrams since I cannot erase and change as I could with a blackboard." I had to constantly be in that frame of mind. It took me about a month until I had the outline worked up the way I wanted it. It seemed long but I wanted to be very careful. I showed the outline to Sprad. He agreed that it looked good. I said, "Well, it is time to get that mechanical monster in operation." So I started on that around September or October of 1959. I dictated the whole thing. When it was finished, it was a 150-page, single-spaced manual. I have a copy here. Have you heard of the Aerial Attack Study?

- D. Yes, I have heard of it. I have not read it.
- B. I have it (looking for it). This is a 1964 version. The same thing, only the other one had a green cover. I did this when I was a captain. You know all these modern tactics -- all these maneuvers and counter maneuvers, this is where all that stuff came from.

- D. How long was this hidden away, do you know? Isn't there something written where a guy who is interested can find out...
- B. Well, the 1960 one was classified and I cannot find out where it is now. They finally made it unclassified by cleaning up a couple of diagrams and a few words. It almost reads exactly the same. You see, this here 1964 manual is nothing but a revision of my 1960 manual; the outline is exactly the same. Look at all this, "Fighter versus Fighter," "Maneuver, Counter Maneuver," and all this about the AIM-9B. Oh, I remember in the 1960 manual, we called the ~~A-9~~^{AIM-9} the GAR-8.
- D. Were the academic people in the whole Fighter Weapons School all in agreement with this?
- B. I am not so sure that they all were, but most of them were. In the Weapons School, it was used as our teaching document for classes in tactical formation, flight tactics, et cetera.
- D. What happened to it then? I don't remember seeing that...
- B. It was classified; they classified the damn thing. I got madder than hell and said, "I don't want to classify it, I want it unclassified." They said, "No, you have to have it classified because you are talking about the damn tactics we are going to use in combat." I said, "Hell, if you classify it, then nobody will get to use it. So, damn, what good is it?" The one I had in

1957 was unclassified. Remember the one in the newsletter? Well, that one was unclassified. But because there was so much more detail in this manual--maneuver after maneuver. Have you ever seen the diagrams?

D. Yes, I have seen the diagrams.

B. Guess where they came from, when they were first put in? I was the one who had these damn things drawn up.

D. Did you do the latter part of this at the same time?

B. Yes, this here map, this is my work. I am very proud of this manual. A lot of people do not realize it but some of these equations I got out of other books. They applied perfectly and then I just described how to use them. Some of this stuff I have on missiles, I got out of Navy documents. I have the sources listed back here in the bibliography. Well, I guess it is not in this one; it is in the 1960 one. I guess they pulled the bibliography out. I wonder why they didn't leave that in? Goddamn, I hate it when people do that. Well, my 1960 one had the whole bibliography in it.

D. Are there any copies available now?

B. No. I can get them Xeroxed. There are not many around now; it is a classic.

- D. Are there any copies in the Archives?
- B. Probably not. I heard that some guy was looking for it there but could not find it.
- D. I sure would like to get a copy.
- B. You see, look at this, we have everything in this manual; "The Overhead Attack," "How You Execute the Attack," "What the Advantages are in G," "The Overhead to High Side to 6 O'Clock, the Other Side," "Calculations"...
- D. And they classified it, so now nobody gets to see the damn thing.
- B. "High Sides," "Underside," "Non-maneuvering Targets."
- D. During the time I was an instructor in IP [Instructor Pilot] in basic, I looked all over for something like this.
- B. Here, look at this, "Basic Limitation of AIM-9 Against Maneuvering Targets," "Fighter Maneuvers," "Tactical Range," "Flight Tactics." They talk about all this stuff. Look, here is your G diagram. I don't know if you people realize it but we had those back in 1960. We laid out all the plans. See that with the limitations? We laid all that stuff out. Here are your "Fighter Maneuvers," and "Defending Turns, "Procedures for Adverse Yaw,"--the F-100 we are talking about now. I had all that in there, see?

- D. In 1968-69, they were not teaching those kinds of things out at Luke [AFB, Arizona].
- B. See, look at this--"Do not arbitrarily use full rudder and opposite aileron to achieve the maximum turn." Look at this--"Maneuvers."
- D. Here we were training people to go to Nam and nobody knew from nothing. Can I please be sure to get a copy?
- B. Yes, I will get some Xeroxed if you want me to.
- D. I certainly would.
- B. In fact, I know what happened, they all were stolen. I know guys right now who have them in their homes--who swiped them before the classification was released. "Bull shit! They classified that document!" Anyway, I am very proud of it.
- D. Well, I will make sure a copy gets down to the Archives and to other places where people can use it.
- B. In any case, what happened is that you found out where a lot of your tactics really derived from. In fact, there was a guy who had done some historical work, I will show you when we finish here. He talked about this document and how it really set the stage for a lot of modern tactics. He actually researched all the way back to World War I.

- D. Had you done any research in what had gone on before?
- B. No, I did not know where to look. I developed those things as a result of investigating and practicing new ideas in the air. That whole thing came about as a result of just trying new things. But this document is really the second one.

I am going back to when I was at Nellis--I did not know that much about math, so I was teaching myself calculus at night. I was reading math books and figuring out how to do it. Then I laid all that stuff out and about February of 1960, I had my first manual completed. This is another interesting story; I forgot to tell you about this. It is funny how an institution behaves when you come out with something new. What happened was I completed the manual around February--I had started in September, then I had to edit the first draft; it took a lot of drafts because we wanted it to sound right, the sentences had to be correct and everything had to be in proper sequence. There was a lot of effort involved in this project, it was not something we did over the weekend. So after we finally finished with it, I took it to Colonel Newman.

I [] and said, "Here is your new manual." I was as proud as a goddamn new father. He said, "Well, we are not going to use your manual." I said, "Why not? You are not going to find a better one." He showed me a 10- or 15-page document that TR&D did. I said, "That is bull shit!" He said, "But we have to

recognize that they had a charter to do it and you did not have one." I said, "What are you trying to tell me?" Now, the story becomes interesting. Well, a lot of my guys were really mad about it. I knew these other guys were playing politics with me. Do you understand what I am saying? So I thought, "I know how to play this game, too." It turned out that my friend LeeCroy Clifton, who they did not keep track of, was in in the tactics shop at TAC; you see, we were a part of TAC. (Laughter.) They would find out shortly that LeeCroy was coming out to make a visit. I had called him at TAC and asked, "When are you coming out here?" He told me it was soon. I said, "Okay. I have something to show you then. I want you as an independent observer to have your team look at my manual and this other thing Newman is trying to sell. There is a big skunk fight going on here, and I think I am being screwed." LeeCroy said, "I heard you were working on something." I said, "Yes, but they won't let me publish it. The bunch of notes I took were classified secret, so now I cannot get it published anywhere. If it were not secret, I could take it to some other market. I am really screwed." So when he came out there in 1960, he said, "Where is this manual?" I let him read the whole thing, which took him about two nights. His comment was, "That is a beautiful piece of work." I said, "Get the one from R&D now and read theirs and also the other ones. They have said mine is not good enough to publish. I just want your opinion." So he got pissed.

After reading them all, he said, "I will tell you what we are going to do. I have to give the manuals to an independent panel at TAC to review. It is only fair because everyone knows I am a friend of yours. However, I have read all of the manuals and yours is the better one." I told him, "Yes, that is fair. That is what I wanted, an impartial review of the goddamn thing." So after LeeCroy went back to TAC, a request came in for five copies of my document for review and the one from TR&D, plus some other stuff. That's when Colonel Newman said to me, "You were talking to LeeCroy Clifton, weren't you?" I said, "He is a good friend of mine." He said, "Well, I have already told him I like the one from TR&D better." I said, "That is all right, but we will just see how the review panel feels about it." So shortly thereafter we received a message from the panel stating, "We are going to publish Boyd's. We have decided to use his as the training prospectus at the Fighter Weapons School for students coming in, or for any other squadron that might want to use it. The other ones are not good enough." (Laughter.) When they said that, I went straight up. I told Colonel Newman, "You ought to be glad. This way you are ending up with the better book. It is a better reflection on you as the commander. Why are you protecting a bunch of goddamn losers over there for who cannot even do their homework? You know they did not do as good of a job as me. They are losers."

- D. How did that endear you to him?
- B. He looked at me. He was so pissed. He said, "Get out!" He threw me out. Then the next day, he called me to his office (he really is a good man) and said, "I want to apologize to you. I really never read your manual before last night. Yours really is much better than the one from R&D." Then he called the guys over from R&D and I understand he ate their ass out. He told them, "I backed your position and you did not even produce a good piece of work, plus you convinced me Boyd was wrong and he wasn't."
- D. Had they looked at yours.
- B. Oh, yes. So they got frapped out. Colonel Newman said, "I want to apologize to you." Of course, I had assumed he had read it before. I did not know he had given it to R&D for their review. With outside competition, you can understand what happened there.
- D. But it is still in a secret form?
- B. Yes. I could never get that changed. After it was published and the Fighter Weapons School students learned all that stuff, a copy of the manual was given to them to take back to their squadrons.
- D. When you were in the Fighter Weapons School and flying with these new guys coming in, how long did it take you to sense the good jocks,

the ones who were going to learn fast?

- B. When the new ones came in, of course, you got first impressions. There were some guys who were more aggressive and outgoing, some were more passive. Your first impressions were not always right--some of the quiet guys were good, too. They just did not tend to reveal themselves quite as much.
- D. But they do, finally?
- B. Oh, yes. Are you talking about when they first arrived or after we had worked with them for awhile?
- D. From the time they first came in--we are looking for some kind of an identification.
- B. Now you have to remember at the time we were doing this, the program was pretty revolutionary. What had taken place prior to our curriculum was about a 5-minute briefing; they just did not have all the stuff laid out. We were teaching them a lot of academics and showing them in the air how everything worked, et cetera. It was quite a new development. I remember, however, I used to have some preconceived opinions about how well a guy would do. I always felt it was some kind of a challenge to get that quiet guy, to see if I could draw the aggressiveness out of him. Toward the end of the course, you would find out that some

people might do some maneuvers very well but they would tend to be a little bit more rote--mechanically oriented. Then there would be the other guys who reeked with the essence of flying. They knew when to move, how to move, they were very confident, very outgoing and very aggressive. I would say these guys tended to be better--leading back to your question--even though other guys could perform the maneuvers, they would do it in a passive fashion, which meant the end result was not too good. I think the fighter pilot has to be very competitive. He has to want to win. He has to have--well, blood in his eyes. So much of it is attitude. If a guy has a real good attitude (wants to win), he doesn't necessarily have to be a real good pilot initially, you can teach him to be. I am convinced of that and I always have been. Sometimes you get some ~~good~~ pilots in ~~and all that rat shit~~ ^{but} ~~and~~ all they are is a bunch of defeatists; good cocktail and pussy circuit officers! Yes, I really think it is the attitude. I can think of one guy in particular. I cannot remember his name now. Anyway he was probably one of the best students I ever had. When he first came in, he was the clumsiest son-of-a-bitch I ever saw in the air. I thought, "Jesus Christ, he is going to kill himself. How can a guy ever get this far and still fly like that?" I could not believe what I saw, but I liked the guy. Somewhere somebody obviously gave him bad dope. I told him, "Look, you have the attitude, and I like that. I am going to make you good. (It was

a personal challenge on my part.) You are going to be real good when you leave here, and, goddamn, I am going to smack you in the mouth if you are not good." I did not know if I really could do it because he was really bigger than I was, and that is pretty big. He was a tough son-of-a-bitch, too. However, he said, "That sounds fair to me." I said, "Okay, from now on there is no screwing around. We are going to go at this hard. I am going to chew your ass out and everything, but it is going to be positive. So don't get mad at me, we have to get those goddamn errors knocked out of you. I don't want you to become angry and fight me on anything, if you do, nothing is going to happen. What I say and do will not be personal, but will be necessary to rid you of those bad habits. We will work hard together until those errors have cleared your system." Well, we did work hard together but it did not take very long, just like a revolution (snap of fingers) because he already had the attitude. Pretty soon you could see the rhythm coming and just everything seemed to fall in place after that. I said, "You got it! You got it!" So now I started putting him in the lead slot, which I always did with my good students. I always moved them up to the lead slot--always, as soon as they could do it. I would say, "Lead. You make the decisions. Today I do nothing." This was my favorite technique. They would say, "What do you mean, nothing?" I would say, "I mean I am Joe Dumbshit and you call the shots today. I will turn when you turn. I will

tell you when a guy is coming, but I am not going to tell you what to do because the decision is yours. You are going to tell me what to do. You do what you think it right and I will execute on what you tell me to execute. I am not going to do what I think should be done. However, if I do not do very well and keep getting shot down in the engagement, I am going to have to 'pink slip' you. This will be your motivation. We are going to discuss the mission afterwards and you will either be rewarded or penalized for the action taken. So I want you to really make the right decisions." Some of the guys would become a little nervous. I would say, "Don't get nervous. You are ready for this. I would not put you in the lead slot if you were not ready. You might make a couple of goofs in the beginning but you have it; you just don't know you have it yet." And so it went. Al Parks [Lt Col Allan L.], that was the guys name. He flew Recce later on. Maybe you know him? He was really good. I heard that from people who flew against him; they could not believe what he hit. I would put him up against instructors or anybody, and he would beat the shit out of them. ^{in the beginning} He could hardly walk out of a doorway without falling on his face, let alone flying an airplane. But this guy had the attitude; it was just fantastic. All he needed was somebody to help him smooth out the rough spots. He just had too many in the beginning, and naturally they made him look kind of bad. He flew something like 300 or 400 missions over there in Southeast Asia

and they had to kick him out. He was flying Recce 101s and all that stuff, plus I think he flew the 105. In any case, he was one guy I remember very vividly. Of course, a good friend of mine is Henry Buttelman [Lt Col]. I don't know if you have had the opportunity to interview him, but he is one of the Korean aces. He has the attitude. He has always had a tremendous attitude. I really liked Henry. In terms of being a smooth stick and rudder guy, he wasn't. However, he had a real progressive attitude; he knew what to do, how to do things right, plus that "I want to win" attitude.

- D. How do you sense that? You can have a top gun, a guy who is the best on the gunnery range, and yet in combat when he finds out that somebody out there is trying to kill him, he just doesn't care for that too much.
- B. Guys like Henry--maybe I cannot articulate it well enough--but they like to get in there. That is the aggressive part of the game. Then there are guys who are kind of smooth and when things get kind of rough, they sort of back off. They are good until the real squeeze comes on, like the combat squeeze. In other words, I don't know, you see guys in combat and all of a sudden they become different people. It is like they are reborn. They are killers, and they love it. I could sense it in other people, guys who like war. I remember when I went to Korea

some of the guys in combat didn't want to go over there, then when they got there they loved it. I don't know why they love it.

D. But not air-to-ground combat because they know they are going to get their butts...

B. Air-to-ground is bull shit!

D. But air-to-air?

B. That is a good point. One of the big reasons why people don't like air-to-ground is because a person tends to feel he is not in complete control of the situation as he would be in air-to-air. In other words, if you are really skillful in air-to-air, you would say, "Not only can I come out alive but I can also get a bag full in the process." Where in air-to-ground, you'd say, "Jesus, I can be skillful but some dumbshit down there with that goddamn BB gun or some \$10 weapon can make it really tough for me."

There is a lot of that kind of thinking. I have thought about it myself. Air-to-ground -- I am very good in putting the bullets and bombs in on target. I have gone through many unmarked targets and all that but I just do not feel that I am in control of the situation. I cannot determine or fix the outcome. In other words, I do not get a biased deck. In the air, I can kind of mark the cards. You understand what I am saying? You have a marked deck because you know you are on top of the situation. You are in

direct competition with the other guy, and you know when you are better than he is. But with air-to-ground, some guy out there is pumping something at me and I don't even know if he is near me.

You understand what I am saying?

- D. I sure do. What do you think of these bomber pilots? I think they ought to give every goddamn one of them a Congressional Medal of Honor because we could not anymore sit there in a bomber going straight to a target than anybody in the world. But air-to-air is different, just as you say.
- B. I have always liked air-to-air better than just flying a gunnery at 6 by 30. That's static, no challenge, like bobbing bullets through a polyethylene rag. I like to challenge that other guy. We are working one another; who is the best man?--that is what it is about. Air-to-ground really doesn't come through. I mean if you think like an air-to-air pilot; who is the best man?--the fighter pilot knows all the time because he can beat the other guy no matter what the situation.
- D. If we got the best air-to-air pilot, how would you run the identification on that guy who is going to kill. Is there something that you can find in that quiet guy who is down there listed number 8 or 9? This identification must be sensed somewhere along the line.
- B. Okay. Item 1--It is going to have to be something related to stress

because obviously the combat situation is a stress situation.

Item 2--It has to be some kind of a stress situation where it is a competitive situation, where stress is involved in such a way that the pilot thinks he can control the situation. There is stress in air-to-ground missions, too. You understand what I am saying?

D. Yes.

B. But Christ, if the guy says, "I don't have any goddamn control. It is not clear that I can get on top of this thing." Of course, I have to admit I like air-to-air better, it is a different kind of game. It would be part of my thinking, I know, to say, "I don't think I can control air-to-ground because I just like air-to air better. It is more of a challenge to me." But if I really took all that thinking that I put in air-to-air and put it into air-to-ground, and concentrate about where all these guys could possibly be and practice that in detail, maybe I could also get on top of it.

D. Too many inputs there though.

B. Well, maybe. It might be impossible to get on top. I am just saying that is the part that occurs to me, but maybe it is wrong. You know, I have not flown air-to-ground. I have done so much thinking, investigating, et cetera, in air-to-air combat. I have written all these books and manuals, energy maneuverability, that

I can see all the crap and I know how I can get on top. But in air-to-ground, I have not done anything; however, I know that the stress is there. The stress has to be laid out such that it is a competitive stress, where in some sense there is an opportunity to get on top of the situation. A guy can perceive it in a competitive sense against somebody else so he knows when he is on top. In other words, we are going to have a challenge here and he knows who the winner is before the game has started. He knows he is good. He might even be clumsy as a pilot but he knows in a stress situation, in a competitive situation, he is going to make the right decision.

D. He knows it. What do you mean, he knows it?

B. Well, I think he knows it.

D. Well, what makes you think he knows it?

B. It is inside of him.

D. Does he feed on it?

B. Well, he has been success oriented in the fact that his past experiences have been good. Not knowing everybody's history, I could look back in his Air Force record and see that he has done certain things in an outstanding manner, and he knows that he has done well. Plus my suspicion is he has had some kind of a competitive environment before coming into the service. It

might not have necessarily been in athletics. It could have been some other kind of competition--it just turned out, that my competitiveness was in athletics--but some competition where he had to take the reward or penalty for his action, where he was not independent of the thing.

D. Say that again.

B. In other words, he had to take the reward or the chop or penalty for his actions; he participated and succeeded in an event where he was not independent from his actions or not removed from his actions. You see, in air-to-air combat, everything is dependent upon your actions, nobody else's. In other words, if you compete against somebody else, you are going to get the chop. If you do well, you are going to take the reward--a winning game.

D. What kind of person do you think has always assumed that.

B. Well, put that same person in the same situation whether he wins or loses is not necessarily a reward or something like that. It could be like we are talking about--air-to-ground would be a case in point, or you know, "Gee, I am the super hottest pilot in the world but I have to drive a bomber and not vary my course one degree. I am going to get blown out of the air." What is the reward for your skill there? No reward. No challenge match. You just hope like hell somebody doesn't shoot you at that point. That's

why Captain Bower said, "That guy has to have a new set of balls." God, I really have to admire that guy because here he is, super hot, and he cannot do a goddamn thing but walk through all that crap. He may or may not make it. Whereas the fighter pilot could say, "You know I am going through that stuff but I am going to dodge about a bit. I am going to get a few and still get back." In other words, "I am going to get them and in the meantime I am going to dodge about and still get back. In fact, I will get him." So I think it has to be a stress situation and also a competitive stress situation where the rewards are dependent upon his own skills. In other words he survives, he wins, he receives a personal challenge, which means the reward is his alone. That kind of a guy is not going to be too interested in flying air-to-ground combat. I cannot imagine a fighter pilot wanting to be in a goddamn bomber?

- D. Be a guy like Catch-22 when he came out?
- B. He would say, "Screw you guys. What the hell am I going to get out of that shit. When do I get blown apart no matter how good I am?"
- D. Moody Suter [Col] and some other guys were talking about these guys in 123s and 130s dropping all that stuff. I cannot even name...
- B. Ranch hands.
- D. Yes. Bullets coming through over here; number two had been shot up. They just pressed right on.

B. That is a different type of person. A fighter pilot is kind of like a poker player, they can both win or lose in a round of play.

However, I think the fighter pilot thinks just a little bit more than a poker player; he thinks, "I can"--he feels he has the marked deck.

D. The ace in the hole.

B. They have a marked deck and they know they have a marked deck; they have marked it. That is what I am trying to say, "We are going to play poker, only guess what? You guys do not have a prayer."

Eric Hartmann

D. ~~Jerry~~ Garden has 352 kills.

B. Marked deck.

D. You don't just go up there and start dogfighting.

B. You get in there and do everything you can do to stack the odds in your favor. You don't want to go out there and just hit a guy. You see a guy straggling down there and say, "Hell, I can hit him before he can get to me. I am going to take him and then bring out and come back and clobber that guy." It is a hit-and-run; a quick kill. In fact, what I am trying to really say here is that you not only want to hit-and-run, but you want a short engagement. A long engagement means a number of things: (1) you are vulnerable to somebody else; (2) a long engagement probably results in a

standoff, and both have to head for home; and (3) if the engagement is quick, you have the element of surprise on your side. In other words, you really are putting pressure on the other person. Hit them and go. We used to teach the guys, (sound effect) go!--next guy (sound effect), go!--next guy (sound effect) go!...

- D. Also having the awareness of what is going on around you--where that number two is going to be?
- B. Now there is a visualization that I used to have. I do not know if you ever heard this one before. I really did not realize it was unique--but when I used to fly air-to-air combat out of Nellis by simulation, I remember planning all that stuff and always being able to tell where the other people were. I would be looking around and all that stuff. Very few people ever snuck in on me. In other words, I would see myself in a vast ball--I would be inside the ball--and I could visualize all the actions taking place around the ball, all the time, of course, I am maneuvering...

(End of Tape 1, Side 2)

I naturally did not have all the visualization the first time I went up. I started out simple and played it for awhile. I know if I was in combat now, it would all come back; I just know it would be there. The other thing I tended to do or had been able to do, I could visualize from two reference points. When I was fighting

air-to-air, I could see myself as a detached observer looking at myself, plus all the others around me. Do you understand what I am saying?

- D. I understand. I do not understand the ability to be able to do it but I certainly understand.
- B. I remember I could see that once in awhile. Even though I was here, I could also see myself as an observer at the side looking in on it. I don't know if I could still do that anymore. I had to develop that skill. The other one I know would come back if I had to fly air-to-air combat again. I have a tremendous capacity to visualize in my mind, to tear things apart and put them back together.
- D. So we are talking about stress. You are going to find out who this potential combat ace is going to be; however, along with the reward, it is necessary to have the other things, too.
- B. Yes, but it has to be stress recall, where there is a reward or penalty for his actions.
- D. Right.
- B. You have to feel like there is a reward out there, a carrot, if you will. If you don't let the guy receive his reward or penalty for his own actions, I think then you could remove the competitive

nature. Does that make sense?

- D. Yes, it makes a lot of sense,
- B. You have to feel like it is a reward. If you don't, there is no challenge.
- D. It doesn't necessarily have to be a "biggie." It could be a--I was thinking of this Walker's Machine and all--small thing with all the elements still present.
- B. Yes. You might not necessarily have to fly an airplane to do that but I think you have to at least have those functional relationships there to bring in that competitive nature. In other words, you are appealing to the hunter instinct in a guy.
- D. Yes.
- B. We are talking about the hunter here. Think about that. The hunter gets the reward depending upon what? I am not talking about the guy who goes out there with a "burp gun" or some goddamn thing and has all the odds stacked against him because of a mechanical thing. I am talking about more primitive times when the hunter had to go out there with a spear and track down that animal knowing he might even lose his own life if he did not do it right, but he knew he was going to do it right. We could bring that forward and put the guy in the airplane, same thing--stress, reward, and penalty based

upon his own skill. If he is a sharp individual, he may still lose his life. He can lose his life by making a small mistake; he just did not do something right.

- D. One recurring thing we keep hearing about is desire. The guy's eagerness. He wants to get on the schedule. He wants to go; he wants to go; he wants to go. . .
- B. He wants to do it. What does a hunter want to do? He does not want to lay back in the goddamn weeds. He wants to go out there and track, right? He wants to go.
- D. How can you develop this eagerness to get this part of the equation along with the stress?
- B. Going back to my analogy; if you are a competitive sportsman, isn't the desire there? If you are a real true competitor, doesn't the desire just come naturally.
- D. Well, look at all the people in the Olympics competing. They are all the very best. Yet there is some guy there who may have all the parts but he doesn't have that...
- B. You are just taking it up to the nth degree. A real good fighter pilot might shoot down a hundred guys, but put him against one more situation and he may lose his life. He may think he is on top, however, that other guy may be just a little bit better. It is

always possible to run up against that kind of a situation. That could happen is what I am trying to say. So when you use the Olympics, don't forget in order to get there, those people had to compete in their own country and win. They had to have a lot of desire to begin with.

- D. But still, that is what I am saying. . .
- B. What you are saying is even at that level, you will find a different type of competitor, a little bit more. . .
- D. He is a killer.
- B. He is the killer and he is the winner. He ends up with a Gold Medal, stands on a Dias with everyone talking about him. He received the reward dependent upon what he did, upon his own ability. Notice that, "dependent upon what he did," the track star, the gymnast, the boxer, the swimmer...
- D. My mind is working right now on some kind of testing. Say a machine that would work with stress...
- B. Let me give you something else. I may be wrong in this, it might be too close to my own thing. You have two kinds of athletes; the kind who tends to be very team oriented and the kind who is not very team oriented, the type who depends upon his own individual skills. Like in playing tennis, for example, you are

on your own against the other guy. You are competing directly against a person; whereas, in golf you are competing against some score--it is not direct competition, it is indirect competition.

D. You and that white ball.

B. You understand what I am saying? Golf is an indirect kind of a competition. But in tennis, you know, you have to slam that ball down the other guy's throat. It is a direct competition. Boxing and wrestling are even more direct; swimming and track are a little more direct than golf, but still indirect in the sense that the competitors are just trying to get to the tape. You are not coming head to head in these two sports; whereas, in tennis it is head to head competition. I am most familiar with tennis and football, which is why I am expounding on tennis. Football is a good sport but it is necessary to depend on the other players to win the game. Why I am bringing this up, I would tend to think that unless a guy is a complete clod, the guy who would tend to be the direct competitor (not too much team oriented) but who would depend upon his individual skills--or a guy who does play on a team and has such exquisite skills (like O. J. Simpson, football star) that he pretends to be an independent player, and he makes playing the game a personal challenge...

D. That is a good point.

B. It would be important because you have varying degrees of directness there. At tennis, for example, you are trying to drive yourself down the other guy's throat. So in comparison to golf, tennis tends to be a more direct sport, as well as wrestling and boxing. In track, of course, the competitors are going for the tapes. So it is not as indirect as golf yet not as direct as boxing, wrestling, or tennis.

D. Something you can psyche the other guy out maybe would be...

B. Yes. In other words, kind of bending the other guy down; controlling the other guy's destiny in sort of a direct fashion--and that takes me back to that hunter instinct again.

D. That is a good point. You know weight lifters psyche each other all the time.

B. Now weight lifters...

D. Going into their space. That is what you are talking about, taking away their space.

B. Now weight lifting is kind of an indirect competitive sport in a sense. They lift the weights, but they do not throw them down. They do not hit the other guy over the head with them is what I am trying to say.

- D. That is true, however, they are still trying to achieve their...
- B. Oh, yes. There is competition. They are going to find out who is best; a head-on competition.
- D. They are going to macho them out too, if they can.
- B. You know that might be interesting. Maybe we have uncovered something here that might be interesting to look into, for some of the researchers to look at various competitive enterprises. Like, how competitive are these various events, games, et cetera. For example, golf--you want to get 70 and if the other guy gets 72, you beat him. But that is on a scorecard, you do not compete against him directly in that sense.
- D. Yes, you do. You are there with a 5-foot putt to make and he has a 3-foot putt to make. If you can make your 5-foot putt, you are going to climb his goat right there.
- B. In a psychological sense.
- D. There are a lot of things in golf where your timing must be right.
- B. But in air-to-air, do you take the club and hit the other guy over the head and knock him off the course. I am talking about air-to-air--that's what you are doing. I am not trying to preempt the thing, but here is what I am trying to say; I frankly feel there must be a competitive environment in which the reward or penalty

is dependent upon your skill--remember, I said, "dependent."

- D. It is also whether you break or whether you can take the stress.
- B. Oh, yes, there's stress. You must have the stress and everything else. There is a reward at the end if you can handle it, or maybe a penalty, depending on how well you perform.
- D. But there is the one on one when you play golf. In fact, it is easier sometimes playing tennis because what the other guy is doing. . .
- B. Well, the reason why tennis--what I am trying to say is, I think it would be an interesting thing to investigate the degrees of competitiveness in various sports. There might be some subtleties we are not aware of. Maybe you can take sport-like categories or other competitive enterprises as categories; it doesn't necessarily have to be sports. Anything competitive, even chess. I don't care what the hell it is. It just turns out that I have been an athlete, so naturally I think in those terms. But, anyway, take the competition and look at its degree of direct one-on-one competitiveness. Do you compete against the scorecard, or do you try to drive something down his throat, or do you hit him over the head literally. There are different degrees, you know. It is not just black and white. Then, you see, you have to match whatever those things are. Match the fighter pilot against them,

or the guys who are skillful, do they tend to come up the same way, do they tend to be in certain categories? Do you see the point I am trying to make here?

D. I agree with that one, too. It is very valid.

B. Let me go to the blackboard here. It might be a good idea-- and I have a feeling it is more than one on one. Now, I like golf but it just doesn't give me that much of a grab. Let's say that you and I go up to shoot air-to-air against a 6 by 30 polyethylene target or dart, whatever the newest things are--am I really competing against you directly? I am competing against you in a sense that if I shoot with the same number of bullets on the same number of missions and I shoot down more, I am going to get the Gold Trophy.

D. But there was no stress.

B. That is the point. Now on the other hand, if you know you have to compete against me and you might get your head knocked off like in boxing or wrestling--they might not be the right sports, might not give you the right dynamics for a fighter pilot to reckon--this is only an analogy to get the direct stress situation, a one-on-one competition, where you are really going against the other guy. If you are good, you get the reward; if you are not good, you get the penalty. However, normally if you are real

good, you do not think you are ever going to get the penalty anyway because you are guile and clever, you know all of the dirty tricks, ruses, and strategies to come out on top. As far as you are concerned, "I have to keep score, but I know I am going to win. We are just going to keep score to be sure everybody else knows that I did, in fact, win. It is obvious that it is going to happen, that I will win." You see, the guy already knows he will win, which means that he is going to overcome his stress; he is going to be able to deal with that stress. The other guy--if we were competing in air-to-air combat would be my environment and I would be his environment. In that sense, one of us is going to be able to cope with an environment and the other one is not; he is going to lose. He is not going to be able to cope. He is going to become unglued. You will see this in my presentation when it comes out. But if you could create some tests where you can show different levels of stress, it might also tell you which guy should be the fighter pilot, which guy the bomber pilot, and going even deeper, which guy should be the transport pilot.

D. Right.

B. Taking different kinds of stress, which you would be doing in a sense, and identifying guys against different capacities, you will surely develop a more effective force, whatever kind of a force you want--whether they become fighter pilots, air-to-ground pilots,

bomber pilots, transport pilots, or whatever other ones you are thinking about, even the guy sitting in a missile silo.

D. Seems to me the bottom line there.

B. Yes, but it is a different kind of stress.

D. Very much a different kind, but it is a demand.

B. Yes.

D. A stress demand.

B. Yes. I think that might be an interesting thing to maybe research, to look through and say, "What are the different kinds of stress?" Sports just came through as a convenient category for me. I would not want to say that just because a guy is an athlete, he is going to be a good fighter pilot. That is bull shit! We know that some guys are not good athletes but they are good fighter pilots. For some reason, they have just been unable to accommodate that stress on a one-on-one situation, maybe they have not had very strong legs--but, boy! they got a good feel in that airplane, so it became their legs, or their arms, or whatever the case may be. That is what I am trying to say. If you could set up some stressful situations and in different categories of stress, then start aligning guys against each category to see how they hop out. Do the fighter pilots do this

well? Do the high aces tend to stay in a certain category? Do the bomber pilots tend to pop out of the same category? Do the transport pilots or the missile silo guys pop out in different categories? This could be worthwhile. Does it make sense to you?

- D. It does because I believe that there are different people who do different things. If that can be proven true and you can sit there and intuitively say, "Damn it, there is a certain kind of a guy," then the rest of it makes sense to identify.
- B. I think a good analogy is "the fighter pilot has the hunter instinct," the desire. He is the hunter.
- D. But not reckless.
- B. Oh, I don't think he is going to dive into a boiling caldron. He is a hunter using all the cleverness, guile, strategy, every scheme he can throw in to come out on top; the mechanisms for keeping score. Whatever he is hunting, whether it is an animal, shooting down an airplane, or whatever the case is, he will get it.
- D. There does come a time though -- to hear the AVG (American Volunteer Group) guys talk about when they were shooting down the airplanes back before World War II, "Well, it was just business-like. It was not really any big thing, just business. We were sent over there to beat them. Yes, the AVG's did shoot the guys down in parachutes, simply because we said they would land, get another

airplane and come back again. So, it was business-like that way." Even the quiet guys would start talking about what a fighter pilot's dream it was. "The Japanese would all come over to China and we would fight over our field. If we got shot down, we would have parachuted out or landed on our soil. It was great; it was super."

(Coffee break.)

B. You should hear my brief. It turns out now that it has more bearing than I thought it had. You are going to see something here as a result of it, a discussion is going to come out in a very different way. When you talk about breaking space--I am going to give you precision in your comment on that. But I have to take you through some stuff so that you can develop some understanding. I didn't realize this is the kind of thing we would be talking about. My intent was just to give it to you and show you some of the latest work, but as a result of the conversation we are having it has become even more germane. I did not know that we were going to get into this, but I am glad--it is more fun. Well, let's sum up a little bit of what we have said so far and then we will go on. Item 1--I think there is a hunter instinct, definitely a desire. Also, in some sense--maybe I am wrong in saying this--the guy has to see the results of his own personal victory in part. He gives his all during that one-on-one competition

and he needs his due reward or penalty. So there is a definite hunter instinct, desire. I think it is a challenge due to the fact that it is a stressful situation and the fact that he can overcome that stress and come out on top.

D. Does he seek that stress?

B. Yes, I think he does. I know that I do. In many things that I do, I will set up an adversary relationship--not that I do not like the guy, that is not the point--because it sharpens me. In order to get that EM ^{Boyd's Innumerate} (Enlisted Man), I had to set up some adversaries to get the damn thing going. Everybody saying "ho-hum", it was necessary to get some people pissed off so they could fight me and I could get down to work. People notice that in me, that I tend to set up adversary relationships. It is not that I want to do it, I actually try to duck it. But inevitably I find myself being forced into that kind of a situation. I really don't mind it once I am in it; in fact, I love it.

D. How about work that you have to do, do you have to get down to a certain last minute point to really get going?

B. Yes, I tend to like to put things off until the very last minute. I tend to like to do that in the sense I like that real crashing crescendo; spontaneous response. I am not sure I really want to do that, I have regretted it sometimes when I wasn't better prepared.

On the other hand, there is a side of me that plans ahead very carefully, thinks it through and plays it out. This is the side of me I used in tactics and in many other things.

D. You do not wing it then?

B. Well, I don't when I lay things out. It is not what I consider a "detailed plan."

D. Do you have to listen to yourself to get it in your mind?

B. Oh, yes. I am verbal oriented. When I talk to people, they give me ideas.

D. Are you listening to yourself and judging your own words as you are saying them?

B. I am trying to establish not only my own words, but I am trying to establish a rapport with the other guy. In other words, I want to get a feedback on "How is he taking that?" By looking at him, watching him react, am I getting a negative feedback? Should I adjust my situation? And I deliberately try to adjust. I consider myself a very good instructor, a very good teacher. Other people have said that. The first 5 or 10 minutes may look terrible because what I am doing is playing the audience; pretty soon I start seeing a positive feedback and I start playing it, supporting success and then ram it--I have their attention for the rest of

the brief. The first 5 or 10 minutes, that is just jockeying to get success. Now if it is the same kind of person each time, that is different. But I am talking about when you are briefing different audiences, which is the kind of work I do. Don't forget I am dealing with generals, commanders--Christ, they don't even know how to spell signs, let alone know what it is all about. Then I speak to technologists, who don't even understand what the hell a general does. They are very smart in a sense, then again I call them 'idiot savant'. Do you know what an idiot savant is? They are people who know one thing, very narrow; they know only one subject and are super experts on it. If you go into something else, they are literally idiots, they cannot do anything else except in their field or subject area. It is a psychological term. They are an inch wide and one mile deep.

D. Do you spend a lot of time bull shitting these people?

B. Yes, I like to do that, but I would like to see a little something productive come out of it. I don't mind destroying an existing world, if that is what you are talking about. I can destroy a world, a mental work. I love to do it.

D. If somebody is being phoney, do you do it?

B. Oh, yes, but I am talking not only in terms of a mental world, Let's say we have an existing situation and we have some problems

and there are some people who may not perceive of the idea that maybe it is their world that is causing the problems and they are not too inclined to give up that world. They just keep trying to make their world better and better, but really it never does improve--it just does not work anymore. But these people become so attached to their own worlds, that they cannot change. Now I am very adaptable and that is why, I guess, I liked to fly air-to-air combat missions. I could always accept a changing situation and I still can; I love it. I can come up with energy maneuverability and destroy my own mental world. I can do it. I have done it. Then I start a new world. They say, "How did you do that?" I said, "That world was just not good enough, so I decided to create a new one. There was nothing wrong with what I had at that time but I found out there were some other worlds that were more important." There are other people who develop something new and then spend the next 50 years of their life trying to refine those points. Bull shit! I have written a paper on philosophy just recently entitled "Destruction ^{and} Creation." It is already being used as a teaching aid out at the Air Force Academy. A guy said to me, "All you know about is energy maneuverability?" I said, "That is your perception." The paper is very complex, I had a theoretical physicist and a mathematician look at it and they each said it was beautiful. They were a little disturbed, however, because it does make the world look a lot less permanent.

D. Why were they disturbed about it?

B. Well, it will become more known in about 4 or 5 years. That is the reason it is kind of disturbing right now. But I love it. I did not fix the answers either. I went through the paper very carefully. I used the ideas of pure mathematics, quantum physics, and thermodynamics. I was able to pull it all together and ended up with a nice product. In fact, that is part of my theory. I will show you the outline when I brief you. I will not take you through the hard part, only the result. I have already had it reviewed by a theoretical physicist, a mathematician, and a systems scientist--^{they} they all have okayed it, but as I said before, ~~there~~ ^{some} are ~~some~~ disturbed by it. However, I am not going to push it. I do not want to make anybody mad. I only did it because I knew there was something going on in my mind and in other people's minds for a long time and I wanted to prove that I could bring it out and compete against all the best guys in the thing. The University of California is using it now; some guys are referencing it in their Ph.D. dissertations in Logic and Polyscience [Political Science]. How do you like that? It is an unpublished paper, and I am very proud of it. I am very competitive, you can see that. I just wanted to prove that I could do something other than just being a fighter pilot. I ^{helped} ~~designed~~ airplanes, of course, you know that; the FX, F-15, I laid out the trade-offs, the lightweight

fighters.

D. I did not know you designed it but I know you...

B. They got the trade-offs. I laid out the shape of the airplane--
how much wing, how much engine, how should it size out, et cetera.
I have written books on tactics. I have written ^{a treatise} ~~books~~ on philosophy.
Now I have a treatise on war. This is what we are going to talk
about; it is very germane. I love it! You know how it makes me
feel? It makes me feel like everything is alive and good. I
do not like to go plugging down the same damn avenue all my life.
That is why I liked being a fighter pilot--all that adaptability
each and every day.

D. Do you like being known as The John Boyd.

B. That is my name at least and there is a distinction there of some
kind. Is that wrong?

D. No, not at all.

B. I do not like to have people angry at me but I like to feel that...

(Interrupted by telephone.)

Where did we leave off?

D. You were talking about the study you have just done.

B. I am very competitive. I think what I have learned how to do since I have become older is hone down the sharper edges. But I like a good skunk fight, I don't go in there like a babe in the woods. I have already done my homework before entering the arena.

D. Do you tire of things?

B. On routine things, yes. I am tired all the time. (Laughter.) But if I am working on something that is really challenging, my motor just goes constantly. I don't realize how much energy I use sometimes until the project has been completed, then I just totally collapse.

D. How do you recharge?

B. Well, in different ways. First of all, I want to get away from a lot of people and go to sleep and get everything back into gear. I feel exhausted all the way down to my tippy toes when I go through something like that. If I need a recharge from being bored, I just go read a book or change the things that I am doing to rid myself of the boredom. But I have this tremendous desire to get out there in that unknown so that I can adapt. I just love doing that; laying out a new world or challenging a different situation.

D. Well, you have had a lot of major successes. Have you had any

failures, or have your successes just continued to reinforce themselves to allow you to get to these higher and higher levels?

- B. Well, sometimes people do not see failures. Maybe I can see them and other people cannot. When I am working a problem, I tend to be somewhat inconspicuous. I like it that way because I am trying to work certain things out. However, when I arrive at the match, then I am not so inconspicuous; I am ready to play the game. If they want to be inconspicuous, fine. I will play it their way. I have had fantastic successes. Let me go over some of the ones I have had. I like to talk about them. I will also tell you about some of my failures, which I will admit I have had. The fact that I was able to come up with all these ideas in tactics that many people have since used gives me a very good feeling. I can remember the people saying about my original energy maneuverability ideas, "This has all been done before." I would reply to them, "If it has, then show me the source spot." Well, they could not come up with one. You know afterwards, it is always easy to say "It's obvious." I said, "You know why there is not a source spot? Because you are looking at it. It is my work. I have already gone through it. If you can find another source spot, then I will shut up and give the guy full credit because that is the way I play." There was a guy named Ritowski who did that kind of work, and I gave him credit in my manual. I laid it out in there, what he did, and gave him full credit. In fact, I rescued the

guy from the regular scientific committee, I was told, "They are going to tear you apart." I said, "Screw them. He is right. His stuff works and theirs doesn't. It is just that simple. If somehow they can prove that his idea doesn't work, then I will keep my mouth shut. Until then I am going to continue to use it." And I did. It works till this day and guess what? He is now referenced.

D. How did you determine that it worked?

B. Well, at first I looked at the stuff. I looked and looked at it. Then we tested it and I said, "This makes sense. How come we are not using it? Why don't they like this guy?"

D. How did you find it?

B. I came up with this theory I had on energy maneuverability when I was at Georgia Tech. Then I went down and met Tom Christy, who is the head of Plans and Development now. He was down at Eglin [AFB, Florida] as a mathematician then and I had just graduated from Georgia Tech. I discussed my idea with him and he said, "Sounds good to me." So we laid it out and as we were doing this, he said, "I have heard something similar to this before." I said, "You have? By who?" So I started looking for this guy. I only knew the name was Polish, that was all. I visited a lot of libraries and finally ran across an AIAA [American Aeronautics Institute] Journal with the article "Theory of Using Energy for

Performance Analysis" in it; the author's name was ~~Ritowski~~ ^{Rutowski}. I said to myself, "The name is Polish and he is talking about energy performance. He must be the guy." I read the article and sure enough he was the one. He was using the technique primarily for the climb, whereas I was looking at a much broader context. But the fact is I liked the way he laid it out and the way he expressed his charts. I liked his charts so well that I borrowed them; of course, he received full credit for them. I said, ~~"Ritowski"~~ ^{Rutowski} wrote this thing." Then somebody said, "Hey, wait a minute. Don't you touch his stuff." I said, "What do you mean, don't touch his stuff?" "Well, he is not in the favor of the scientific team," I was told, "Somebody else tried it and said it doesn't work." I said, "What do you mean it does not work? Where is the goddamn proof? It looks like it would work to me, and we are at least going to give it a try." And we did. In any case, that is all history. Of course, the energy maneuverability and that design worked, the trade-off worked I did with the F-15 and with the lightweight fighter, and of course my tactics worked. I am very proud of the fact that we set up the first formal Tactics Program in the Air Force Fighter Weapons School back in the mid 1950's. That had not been done before. The students would go up and the instructors would say, "In 5 minutes turn inside; break when I tell you and turn inside and hose him down." Well, I thought, "There has to be a little bit more to it than that." So we set

up the first formal program there. Then, of course, the planning thing we set up here--a big planning thing that they are starting to use now. I am the one who came up with the big theory of overall Air Force planning. They are starting to use it now over at AFSC [Air Force Systems Command] and in this building. It is just beginning to take shape. We worked on it in 1973 and laid out its basic structure by 1974. It took us one year. It was just before I retired. Now the stuff I have done on the theory--I have a new Theory Award called the "Asymmetric Fast Transit Conception of Tactics and Strategy." Very powerful.

D. Asymmetric. . .

B. Theory of tactics and strategy.

D. I do not understand that at all.

B. Well, the word does not mean anything until I show you what I go through and afterwards you will say, "My god, it is obvious." Everybody says, "It is obvious." I say, "Yes, it is, but it wasn't before." It is always obvious afterward--energy maneuverability. In fact, I ran into it accidentally. I really was not looking for it. I was looking for something else and said, "What have I got here?" My mind was just buzzing, and I am always looking for opportunities. I said, "There is something here that I have not seen before. I don't know what it is but I am going to find out."

At the latest AIAA Conference they had a journal where they used my exact words. They are starting to talk about it for a new design in airplanes--already. I only came out with it last summer, but it is already starting to leak out.

D. Now what is this? You jumped one step on me there.

B. I am talking about this thing on asymmetric fast ^{transients} ~~transiting~~ idea...

D. Oh, I see.

B. They are going to see how they can apply these ideas to design a new airplane. It has already come out. In fact, the guy gave me a copy of a paper that was given at the AIAA Conference. I gave a copy of my briefing to this company. A lot of companies have it and are looking at it in terms of design already. It has also been briefed to fighter pilots so that they can apply it in terms of actual maneuvering against a guy or getting in position or by using more guile and cleverness. Now, I also find out it applies to ground warfare. I have laid out a paper on ground warfare.

Have you heard of General Hollingsworth []?

I just briefed him the other day, and he loved it. He said, "That is magnificent." Here I am a fighter pilot and I am showing him how the blitz-krieg (war conducted with great speed and forces) works, why you would want to set it up, how you would run the guys through, how you would compare it against guerrilla warfare, how all

that plays the theory behind it and how you hose a guy...

D. And this has to do with the design of an airplane?

B. The same theories can be used as a design of an airplane.

D. That is where you confused me.

B. I said I could use it for either air-to-air combat or for warfare.

The idea came from air-to-air combat originally, but then I started to think about it and I thought, "Now, wait a minute. This is a very general idea. If it is true, it should apply to warfare in general." So now I have applied it to all warfare; I laid it all out. I have been researching this since last August. I went through history. They are trying to teach some of that out at the Air Force Academy. I call it "Patterns of Conflict." Do you want to go over this thing?

D. I sure would.

B. Okay, let me take you through. First let me give you some background.

I enjoy giving the background because these things are all ^{accidents,} acts.

People think it is some contrived plot, but it turns out that usually these things just happen--energy maneuverability was an accident. Let me tell you how it came about. What happened was when I was at Georgia Tech--I don't remember exactly when, I think it was the spring of 1962. I had already been sent my orders for

Eglin and the spring final exams were coming up. I had tried to go to Nellis but they told me, "You have to go to Systems Command." I found myself in a big skunk fight trying to play games with the general I had. A general in Systems Command learned about it and telephoned me to say, "You are going to get court-martialed unless you stop that shit. You are going to Systems Command. Drop all that goddamn other hanky-panky you are playing. Now we want to be fair about this assignment. If you can choose the base you want, will you stop all that crap you are pulling." I said, "Yes. I would like to go to Eglin." He said, "You have it. We will send a message out there. Now is that all over?" I said, "Yes, sir. Fine." He said, "Glad to have you on board." But in any case, when I was at Georgia Tech, I was very good in thermodynamics. I really knew that stuff. I hated electrical engineering [EE], you know. I had to take a thermal course and a double EE course with the double EE guys, and ^{they} ~~X~~ always seemed to have trouble with thermal. I don't know why. It is just like what we are talking about here, apparently people categorize the way things appeal to them. For some reason, I just did not like double EE. I was bored by all those circuits and fields, and trying to get that stupid 8-digit answer after looking at the problem for a whole goddamn minute. Bull shit! I don't want to spend a lot of time on something. "Just keep me up to speed as to how all this works so that when I go into those tests I

can get a good grade," I told those EE guys. "Two days after I take a test, I never remember what I did anyway. So as long as I can pass the test that is all that matters since the grade is all that counts." They said, "Okay, but you are going to have to do the same thing for us in thermal because you have a feel for it like we have never seen." I said, "Good. It's a deal." So the night before a test, I would give these guys a little fake test. I would tell them, "Let's assume I asked you this question, 'How would you handle it.'" When they left that evening there was no sweat that they were going to pass the test the next morning.

Interestingly enough, one night they were having a little problem. Finally, they started improving, and so I said, "Okay, you guys are in pretty good shape. You only need about another half hour. Let's take a break. I am kind of tired. Let's go and get a beer and a hamburger. After that we will come back, finish up, close shop, and go home. I guarantee you all will pass tomorrow. You will at least get a B. I am not worried about you at all."

They said, "Okay, let's go." So we went over to this place. Of course, I was a little older; I was 30-something when I went to Georgia Tech. They would ask me, "How come you waited so long to go to school?" I said, "Well, I have already been to college. I am an Air Force officer." You see, they did not know that because I wore civilian clothes all the time while I was there. I told them, "The Air Force is sending me here because they want to use me in

a certain capacity after I graduate." They said, "What did you do in the Air Force before coming here?" I told them that I was a fighter pilot. They seemed very interested. They said, "Tell us about it." Of course, I had just come from Nellis and so I started describing it to them. They became a little confused when I started talking about ^{tactics} the military. So accidentally--let me tell you what happened. We were sitting there in a bar discussing the transfer of energy from one form to another while we were eating hamburgers and drinking beer. . .

D. It happened accidentally?

B. Apparently it was born ~~out~~ of my mind. I did not know it.

I said, "Let me explain it this way. What have we been talking about?" I used an analogy--you know how I like to use analogies.

"We have been talking about the transfer of energy from one form to another, whether it's chemical, mechanical, or electrical--there is always some kind of energy transformation." I wanted to get that through to them. I said, "There is always an energy transformation. Now when you are in the air, what is altitude?

Isn't that potential energy?" I said, "What about airspeed?

Isn't that kinetic energy?" They said, "Right." I had never

said this before. "Fine," I said, "Let's maneuver. You might have to give up a little altitude, a little airspeed or both. If you have a lot of power and you soften a maneuver, you can gather in altitude, gather in airspeed or both." Then it hit me,

"Jesus Christ, wait a minute! I can look at air-to-air combat in terms of energy relationships. I can ^{lay out} ~~land~~ equations. I can do it formally now." I had never realized that before. The guys noticed that I became very excited. One of them said, "What do you mean, sir?" I said, "Jesus Christ, you guys do not know what you have done for me. In fact, I am not even sure what you have done for me." I only knew that something different had taken place right at that moment and it happened as a result of my conversation with these guys. I was very excited. I remember my hand--even now when I talk about it, look at my hand; my hair starts to stand on end. See what has happened? See that? I know when something is coming, that is why my hair starts to stand on end. I get this tingling all over my skin. It is happening now, just going back and talking about it. So I said to the guys, "Let's go back to the room. I want to finish you guys off." After they left, my mind was really buzzing, going every which way. So I started to jot down some notes. After I stabilized, I went over to the library and took notes for the rest of the evening. Then I went home and wrote down more notes. At 3 o'clock in the morning, I was deriving equations, laying the whole thing out. I said, "Goddamn, this thing is right. I just know it." I could feel it coming, see. So I am laying this stuff out, writing myself notes, and beginning to feel tired; I had to take a test that day in school. I really wasn't worried about the test because I knew all that shit. So

I persuaded myself to stay up and write down a whole list of questions while my mind was still active. I was afraid that I just might go to sleep and forget it all in the morning. So I made a list of things that had to be considered, what needed to be set up, lists to be prepared. I wrote all these things to myself, instructions and questions that I could consult the next day. I had 3 or 4 sheets full, from a long yellow pad that I had been using. Finally, I got to the point where I could not think anymore and decided to go to bed. The next day I got up and took my test. That night I took my yellow pad out to see if all I had done was a bunch of shit or whether it made sense. You know, it still made sense. It still looked right. I added a couple of items to it, did a little more work on it, then I put it away and forgot about it. I remember, at the time, I was tremendously excited about it. But this same thing happens whenever I come up with something new. I have always found it to be true. When I came up with my tactics, I went through the same thing. It is what I call a draw-down period; a period where I say, "Oh, hell, somebody has already done this. I don't want to waste my time. I just cannot believe it has not been done before." I would go through that period just completely ignoring the new findings strictly due to the thought that somebody else had already done it before me. But it is a typical kind of feeling with ups and downs.

Then one day, I decided I had to talk to those EE guys about it. They said, "We knew you were excited about it." I told them I felt certain that it had already been done by someone else. I felt very strongly that it had. Then all of a sudden my dumb brain said, "Wait a minute, if that has been done and had been related to tactics, that means I would have had access to it at Nellis. That kind of information would have had to come through there; it would have grabbed everybody's attention. I know it was not used there at school, and it is obvious that if it were known it would be used. So it probably has not been done before; otherwise, I would have seen it. If it has been done, it has been done in such an obscure fashion that it has never surfaced." So then, I became very excited again. I was convinced now that it had not ever been done before; otherwise, with the job I had, the kinds of things I was concerned with, and the people I worked with, it was hard to believe that it had not come to my attention. I had read all the current information on tactics, that stuff the Navy was doing, what we were doing, et cetera.

- D. It was about this time that you were going to be reassigned to Eglin.
- B. Yes. So the next semester started and I became involved with my courses and I kind of put the thing away. I wanted to do well in my last semester." I was doing a good job to that point and

I knew if I became too involved in that, I would tend to let other things slide because I would become so obsessed with it. If I thought of something I would write it down on my yellow pad, which I kept in a special place. There was no big hurry, I would work it out down at Eglin. At that point, I was not sure about what I had exactly or what I would ever do with it.

When I arrived at Eglin, they put me in maintenance again. People love to put John Boyd in maintenance and John Boyd does not like maintenance. (Laughter.) I said "Wait a minute. I have been through this once before." They said, "But you have just completed AFIT and now you are going to have to spend the next 4 years in maintenance." I said, "Bull shit! I did not come down here to spend 4 years in maintenance." They said, "Well, that is the way it is, a controlled assignment." Then I became real motivated. I looked at the colonel and said, "I am going to be out of this job in 6 months and I am going to get the job I want." I said, "I want to let you know it so that you will know ahead of time. If you write me a bad OER (Officer Effectiveness Report), it makes no difference to me. I am going to show you how to get out of a job if it is controlled or not." He said, "What?" From that night on, I went home after work and started laying out that work. The colonel had no idea what I was working on. Don't forget now, I had a pretty good reputation in TAC because of all the work I had done in Fighter Weapons School. Well, Colonel Gregory and

a couple of other guys from TAC were visiting Eglin and I had an opportunity to lay it out and discuss it with them. They said, "That is good stuff. What are they doing about it?"

I said, "Nothing. I have gone all over the base and the people here think I am kind of a nut. I showed them the yellow pad, drawing diagrams, et cetera, and they said, "That is bull shit." All these scientific types, see. They said, "It won't work. I have a Ph.D. and I say you have to be kidding."

D. Were you flying down there?

B. Yes. I flew T-birds at that time. I said, "What do you mean, it won't work? I know it will work." So then I got pissed.

D. Did it get reinforced in the air at all or was this all paper stuff?

B. All paper stuff. I was doing this in my head. Don't forget I had a tremendous background. I started to fly the F-100s but then they took me off of it because there were not enough of them.

D. It wasn't developed in flying?

B. No, I did not get that opportunity. It came all out of my head.

(End of Tape 2, Side 1)

Anyway, the TAC guys became excited about it and said, "You ought to push it." But nothing happened for a while. Then during happy

hour at the club one night in early 1963--my assignment began in October of 1962--I saw a couple of friends of mine and they introduced me to Tom Christie, who is a very good friend of mine now. He is a mathematician; a very quiet but very sharp guy. These friends of mine said to Tom, "You ought to have John brief you on what he is doing. You have the kind of mind that would go for it." I asked, "What is your background?" He said, "mathematician." I said, "Do you want to hear about how to use energy for performance?" He said, "Yes." I cleaned the shit off the tablecloth and began writing all over it. I said, "We are going to work." This was happening just like in the movies. I started laying out all these equations and shit. Tom is attentively watching and saying, "That makes sense." He said, "I think you are right." This was the first positive feedback I got. I said, "You do? I sure am glad. I can't get anybody else to go along with it. They think I am nuts." He said, "I think you are right. We are going to have to run that stuff out." I said, "What kind of stuff do we need?" Then we started to talk about curves and all that, about obtaining certain information on various airplanes. So then Tom had access to an IBM 7094 computer and I had to find a way that we could use this big computer. So we started writing out computer programs. It took awhile to debug them and get them straight. Then we laid it out. I said, "Gee, that is fascinating stuff. What we really ought to do, since we are not worrying about

competing our own airplanes against each other, is to get some foreign airplanes in on this program. This would give us some insight as to how really good our airplanes are." So I flew a T-bird cross country up to Technical Intelligence Center at Wright Patterson Field [AFB, Ohio]. Some of the guys who were with me at Nellis were assigned to the Center and they remembered me. I told them what I needed and asked for some plots to take back to Eglin. They said, "What are you doing?" I told them, "We are working on something that we are not even sure of ourselves, yet. We are going to use energy in order to measure performance. I will come back and show you when we understand it more fully." The guys looked at me and I could see it, "Boyd has blown his mind." I could see it on their face, "Another nut."

So I went back to Eglin and we started laying it out. I expected to see our airplanes, like the F-4 and all of those, look a lot better than the Soviet airplanes. I was really convinced in my mind--the way the writing went--that we were much better. Then we ran our first plots off. I said, "Gee, Tom, wait a minute. The Soviet airplanes are better. I think we made a mistake." I called the Air Technical people and asked, "Did you guys give me the right dope? Is some other factor in there that we have not accounted for which would change the performance of the airplane." He said, "No. What we gave you in the right information. It is what you asked for." I said, "Well, let's talk about points then

and see if we are using them right. Here is what we are going to do--do you understand the curve ratings?" He said, "Yes." So I said, "Well, our program is obviously all screwed up." Then Tom and I went back over the program to see where we had made our mistakes, but we could not find any. It never even occurred to me at that particular moment that the Soviet airplanes could actually be better than ours. So I am thinking, "All our stuff is wrong." I told Tom, "We have done something wrong here." He was in belief that we had done something wrong too. I said, "Let's go back to the beginning and just lay it all out again to see if we have made a mistake somewhere or if there is something we just don't understand in this whole process. But we could not find anything wrong. Then all of a sudden it occurred to me, I said, "I wonder if their planes are really better than ours." I said, "Christ, if that is true, we have to brief the Systems Command's generals, and they will go straight up because they believe just the opposite. Oh, can you imagine what they are going to say? They are going to call me a dirty..." I decided to make another trip to the Foreign Tech Center at Wright Patterson and talk to those guys again. They still may have made a mistake.

- D. Were you getting any more supporters about this time?
- B. No. This was all very quiet. We did not even have a formal program. We were doing it all on the side.

D. You were still in maintenance?

B. No. I had gotten out of maintenance. They had heard about my ideas and thought they should at least be looked into. General Roberts [Gen John W.]? who used to be Commander out at Nellis was Commander at Eglin at that time.

D. Yes.

B. So then Tom and I both went up to Wright Patterson to talk again with the guys at the Foreign Tech Center [Technical Intelligence Center]. We told them that we had a very serious problem, and explained the situation to them. They said, "Hey, that is good looking stuff." I told them, "Yes, but you don't understand the problem. Your airplanes are too good. They are better than ours. However, the prevailing opinions say that is not true. Now are you absolutely sure you gave us the right data? Are you sure that there is not some kind of screw up in the material you gave us." Well, they got nervous and said, "Who are you going to brief this to?" They got the message right off, I answered, "You are asking the right question there. But we are not going to brief anybody until you go back and check all of your information and you are totally convinced after checking all of your sources that it is correct." They said, "You are sure of your program, that it is right?" I said, "We have been through that. We have done a lot of soul-searching and have gone over and over the program trying

to discover what could be wrong with it and end up with nothing."

So these guys went back and checked everything.

D. What airplanes were they looking at? Were you looking at?

B. We were looking at the MIG-17, MIG-21, the Fitter, the Fishpot, and all those airplanes.

D. What about our aircraft?

B. We were looking at the F-4, F-105, F-104, and all that kind of stuff. They thought the F-104 would out-dazzle any of them. But it was not true; however, we did not know it. The F-4 proved not to be best either. Then we went through the whole thing--the F-105, the F-4, the F-104, and I guess we looked at the F-106 too. I don't remember exactly which ones but they were our so-called first line airplanes. At that time, we did not go back to the F-86. Eventually, we did go back, all the way to Korea. Well, what happened after all that searching was these guys came back with a few changes. They said, "We agree in some cases we were very optimistic." So they gave us the new data and we ran through the program again. Shit! the Soviet airplanes were still better. I said, "That's very nice. The margin was still huge, but not quite so huge as before. But it had not changed, the qualitative results were still the same. The Soviet airplanes were still better than ours. I said to the guys "If we brief some people and this leaks out to others and they

in turn call you, what are you going to say? What are you going to tell them when they call you and are as mad as hell, maybe it is some general who is pissed off, and asks you if it is true that the Soviet planes are better than ours? Are you going to defend us or are you going to tell them it is all bull shit?"

The guys at the Foreign Tech Center said, "We have to defend your view?" I said, "That is all I want to know. Man, the barricades! We are going to have to brief this, Tom. We just cannot keep it quiet. If it is true, our guys need to know." In the meantime, some TAC guys came down to Eglin and ^{we} showed it to them. They said, "Holy shit! Wait until ole'Sweeney [Gen Walter C.] hears this. He is going to come unglued, but we are going to have to tell him. The Colonel from Requirements said; "Holy shit! We are going the wrong way." They said to me, "Are you sure that you are right?" I said, "Look, let me tell you what we have done. We have not been able to find a mistake. I don't know where to go from here. What do we do now, throw it away? I wish that somebody could find a mistake, but we have tried and cannot find one."

- D. Did the those TAC guys completely understand what Tom and you were doing?
- B. Yes, I told them. I explained it very simply. Of course, I didn't give them all of the details but enough that they under-

stood the general thrust. I showed them charts and explained how they portrayed the superiority versus inferiority. They had problems comprehending energy maneuverability because it was something quite new at that time. But I said to them, "Here is what it means..." And they accepted my explanation because they trusted my judgment. You know, I did have a little reputation to fall back on from all of the work I had done at Nellis. I told them, "Now, maybe it is wrong but if it is, we cannot find out where the mistake is. I have to be honest with you, we are going crazy." I explained to these TAC guys about going to Wright Patterson and having the guys there double check their work, hoping that is where the mistake existed, et cetera. At this point I still had not told anybody outside of these TAC guys about it; I only told them because I worked in a TAC outfit. I had not even told General Ryan [~~Gen John D.~~]; I was afraid to mention it to anybody. Well, I received a message from TAC direct from General Sweeney; he wants to hear the briefing on my new airplane methods. I said, "Oh, shit. That is at the 4-star level." I was asked, "What is this thing on energy maneuverability?" They had went down through their program list at the base and found nothing on energy maneuverability. "There must be some kind of a mistake," they said. Do you understand what I am saying? (Laughter.) The cat is coming out of the bag fast. I had to go to TAC Headquarters now and brief them

and I knew they would approve it. So I went to ^{Cal}~~General~~ Ryan after receiving the message from Sweeney. I finally told him, "I know that you are not too interested in this but I am going to get you interested. You are going to sit down and listen to what I have to say right now." Can you imagine what he was thinking, boy! I continued, "For the first time in your life, you are going to listen, otherwise you are going to be fired. In fact, a lot of us will be fired." Ryan said, "It cannot be that serious." I said, "I am trying to tell you something. Will you listen?" So I told him and he said, "Holy shit!" "Now when Sweeney learns after I tell him, he will immediately go over to what's his name? Schriever [Gen Bernard A.], who is building the wrong airplane. Do you understand what will happen? Schriever will call out, 'Whose that asshole down at Eglin?' Now, ~~General Roberts~~ . . . You understand what I am trying to get across? We cannot make this briefing to any of those guys until we have run it through Systems Command channels. There is no way. We have to hold them off." I continued to say, "At least we have to give our guys the courtesy of being briefed before . . ." Now this was on Thursday and I was supposed to be in Langley [AFB, Virginia] on Monday to brief. They usually took the weekend off, and I was running out of time fast.

D. What was the time period on this?

B. This was in 1963 or 1964. I forget exactly. But I was running out

of time fast. "Here it is Thursday and I am to be there on Monday and I have not briefed anybody. I am in a serious squeeze as I only have one day to work with." I was trying to be very honest with them. They said, "Why did you brief those guys from TAC?"

I said, "I did not know that they were going to go back and tell headquarters about it. I told them not to. They even criticized me for telling them not to brief anyone on it. You do have to understand that I have done a lot of work for tactics and these guys respect my work." They said, "Are you confident you are right?" I said, "Yes. I went through the whole process. We cannot find anything wrong." They said, "Oh, shit! We are all going to get fired." (Laughter.) I said, "No, we are not."

I said, "Why don't you call and make arrangements for me to brief General Roberts. We need to set up a special briefing for him and his staff tomorrow. Tell him it is vitally important that he hears the briefing before it is presented to TAC. If they want to chew me out, fine--I will take the blame. But they have to hear it. Tell the General it is very urgent. Otherwise, he will not know how to respond to some nasty phone calls he may start receiving from TAC after I brief them."

- D. You did not have any self doubts at this point?
- B. No, by now I was thoroughly confident.
- D. Especially because you had taken the figures and ran the whole program through again, right?

- B. Yes, we had checked it and counterchecked it. We even brought some other guys in and had them check it.

Oh, they found a couple of ways to rewrite the program but it did not change anything. They just suggested setting the program up differently, basically the curve-fitting routines and that kind of stuff--equations. Like instead of 800 P_s , you would get 798 or 802. So what the hell? That is nothing. Anyway the appointment was made for me to brief General Roberts and his staff. Everyone was at fever pitch when I went over there. Everyone was present--General Culbertson [Brig Gen Allman T.], the Exec, and the whole staff. General Roberts said, "John, I know that you do good work and I hope you are right on this. We are really..." Needless to say, he was rather pissed off. I said, "Let me tell you what happened. Let me give you some background before I even talk about what I am going to show you. Here is what happened, I briefed the TAC guys on my theory and they went back to TAC Headquarters and took it to Sweeney. Now I have to report there on Monday to brief him on my program, and I feel as if I have put us in a box. I know you don't have any idea what it is about yet, but you will see." He said, "I cannot understand why it is such a big issue? Go up and brief it." I said, "Wait a minute." He said, "Don't you..." I said, "General, you are not going to say that after you hear the briefing." He said, "Oh, are you trying to say that the results are different from what is taking place?"

I said, "Right on." He said to his men, "Okay, everybody sit down."
That was when ~~he~~^{he} all of a sudden began to see the problem.
I said, "That is what I am trying to tell you." Now he senses
that I am trying to be fair to him. He said, "Go ahead, John."
I then laid the whole thing out. General Roberts looked and
listened and I could see the fucking color change on his face.
I explained the theory and used the charts. He asked a lot of
questions and showed interest. He said, "Oh, shit! I just don't
like this. If you are right, this means that we have everything
going the wrong way in Systems Command and TAC." I said, "That
is right. Now, General, what would have happened if I had went
to brief Sweeney?" He said, "He would have gone to Schriever and
I would have had my ass chewed out." I said, "That is why I am
here. Do you want me to go up and brief Sweeney now?" Roberts
said, "No, not yet. What you did--you were just talking to your
cohorts, see, and it just slipped out. No problem." ~~We~~^{He} told
Culbertson, "Let's get a message out and tell them right now that
Boyd cannot arrive up there to brief on Monday. Tell them to set
up a new date and we will ~~meet~~^{give} the briefing. We will advise them."
Well, do you know what Roberts wanted us to do? He wanted us to
get it checked out. I said, "Now we could have made a mistake in
our calculations. Let me go over it again. If we have made a
mistake, we are willing to live with it. Maybe you want to have
someone else check it out." Roberts said, "Who did you talk to

at Foreign Tech?" I told him. Culbertson, who is a real clever guy, said, "I know those guys up there. I am going to call them to find out if you are telling the truth." So he got on the phone and called up there. Of course, those guys up at Foreign Tech confirmed what I had said. Culbertson walked back into our room and said, "Shit!" Now Culbertson starts looking through his project books; he is looking for Energy Maneuverability and he cannot find it. Now the problem really starts to surface. Culbertson says, "I am missing something here. Where in the hell is it, the project?" He is being very careful now. He cannot find the project listed anywhere, and he has this strange look on his face. He said, "Show me in the book where this goddamn project is. It must be listed under some other name." I then tell him, "It is not in there." (Laughter.) It never dawned on him what I had done; he just figured somebody screwed up and put in the wrong name. He now looks at me and says, "What are you trying to tell me, the project is not here? I just heard you say a few minutes ago about the computers you had to use, the resources you had to get, et cetera, to make this thing go." I said, "That is right." He said, "But there is no way you can get those resources in the computer without having a project." I said, "Do you really believe that now? I can steal computer time on any computer you have in this whole command and you would never know it if I did not want you to." He said, "Now you are telling me you stole the

computer time." I said, "I am honest, I am leveling with you," Then General Roberts looks at me, "Everybody leave except Boyd. I want you to come into my office." The situation is getting really rough. He said, "I certainly hope you are right on this thing because you went against goddamn directives. If you are wrong, we are going to court-martial your ass." I said, "That sounds fair. I knew when I first began that I would not get any support, that the risk was totally mine. But we believed in the theory and had to move with it, so we just grabbed what fucking resources we could." Roberts says, "That takes a lot of guts. Goddamn, I hope you are right. If you are right, there will be a lot of critique action and a lot of hard...but if you are wrong, you are going to be court-martialed. Do you understand what I am saying?" (Laughter.) I said, "I hear you." He said, "I am on your court right now. I kind of think you are right." Then he said, "You know, I didn't know we had many officers like you left in the Air Force," which was a nice compliment. He said, "Goddamn, they can destroy you on this." I said, "Yes, I know. But I also know that I am right." So he had some other people check it out and finally realized that it was true. Culbertson said, "Well, we cannot find anything wrong with it. We will have to take it to Systems Command." Then they tried to set it up...

D. How long a period of time are we talking about?

B. Only a couple of weeks. So Culbertson called up Systems Command and said, "We have a touchy problem down here at Eglin which we must inform you on." I was there when he called, I forget the name of the general, and he said, "I do not know whether to tell you it is good or bad, I don't even know how to tell you whether it is good or bad. It is very touchy. It may turn out good, it may turn out bad. I do not know how you are going to react to it, but it is an uncomfortable feeling." Now can you imagine this general up there? It must have been blowing his mind to comprehend what this thing was all about--an uncomfortable feeling--don't know whether it is good or bad--you must be informed. . . . So the meeting was set up and I went up there to brief Marcus Cooper [Maj Gen Marcus F.] and a whole bunch of other guys. I did not want to spend a lot of time briefing (that is going into detail) but in any case after the briefing, they all were pissed. They were swearing at me, "You son-of-a-bitch, you are trying to say that we do not know what we are doing." You should have heard their responses--"You are saying we don't know what in the hell we are doing! You are telling us that we are buying the wrong airplanes! We have the best minds in the..." It was a terrible meeting.

D. Did you just present the facts and figures?

B. Yes.

- D. You gave the implication...
- B. I gave the theory and then the facts and figures.
- D. But you did not come right out and say it.
- B. No, I just ran a comparison. Oh, if you could have seen them. You could see their minds working. They said, "You son-of-a-bitch." I was called names and everything else. Culbertson just sat back there. I said, "Well, it is going to come. They are going to ask, "Who in the hell down there at Eglin authorized you to do this kind of stuff, trying to sabotage." Sure enough it came; it was bad, I tell you. Then a guy came up to me and said, "That has been done before, and it is a mistake." I said, "Who said that?" Then I became pissed, but I just let the guy holler; I knew eventually he would calm down. After he did, I said, "Get me the source document, Colonel." I let him have it. Culbertson sat there smiling because the guy had walked into the trap. I said, "Get me the source document showing that this has been done before. The guy said, "It has been done out at Edwards AFB [California]." But, you see, after I had said, "Get me the report," he knew that he had gone too far. That is when they all calmed down and this general looked at me--I forget who he was, one of the Systems Command guys--and said, "Are you trying to tell me this has not been done before?" I said, "That is right." Then I look at this other guy and say, "Oh, that's right, apparently it has been done

out in California. You bring me that information, and I will walk away from this project." This general who had been out at Edwards for a long time said, "It was never done at Edwards, I know that."

D. You were holding the marked deck, John.

B. I knew I had a marked deck. This general said, "I was commander at Edwards for a long time. If it had been done there, I would have known about it. It is new to me." Then he looked at this colonel and said, "Is there somebody else who did it that I am not aware of? He said, "Ritowski." I said, "Ritowski we know about. I heard about that stuff of his some time back but it was never followed up." The general said, "I was not aware of Ritowski's work that was not followed up on? Apparently you are familiar with somebody who followed up on what he has done. Let me see it."

D. What is your rank at this point?

B. Major. I said, "Okay, let me honest with you. I did not like these results any better than anybody else. My impression of this was no different than yours is now. Then Culbertson interrupted and said, "Let me explain what Boyd has done and what we have gone through." After the explanation he said, "Now we don't know what to do. We are here. We know the situation exists. Now what are we going to do about it--burn the study?--keep buying these other airplanes which will not compete? That doesn't

seem like the right thing to do. We can hide it, but then you are going to continue buying this same crap." Those were Culbertson's words. That was the problem, you see; their reputation was at stake. Finally, I briefed a couple of more guys. They asked if we had briefed Sweeney. I said, "No, he has not heard the briefing yet." They said, "Well, you know he is going to call as soon as he hears about it." (Laughter.) I said, "If we have to give him the briefing, it will not be changed." "If it is true, Sweeney will receive the briefing the way it is. In the meantime, we will inform General Schriever. He is out of town now, but leave us a copy of your briefing and be ready for a phone call," I was informed.

D. You had to brief before Schriever then?

B. Yes. You see he was out of town at that time. Then Culbertson said, "Jesus, we have to man the barricades." (Laughter.) I told the people again that I didn't want this to happen. They said, "No problem. Hell, these things happen, and at least we are informed. Nobody can bitch. We can argue about it afterwards." They were no longer mad at me at this point. They said, "Brief Sweeney." When I finally did go up to brief Sweeney, I saw those TAC guys and said to them, "Obviously, you have taken my theory to your commander. You guys have no idea what a box you have put me in. This has been a very touch-and-go kind of thing." Then I went up and had an hour's briefing with the general.

D. Two days later?

B. I don't know, 2, maybe even 4 days later. They set up the briefing with Sweeney. He had to know about it. Sweeney cancelled all of his meetings for the rest of the day after he found out what it was all about. Boy! Sweeney is really a nervous guy. He said, "Goddamn, that cannot be right! Cancel all my meetings for today. We have to talk about this." I said, "We knew you were going to say that, General. We have been through this before." Sweeney said, "Who else have you briefed? What was their reaction?" I said, "The same as yours." He said, "Get my intelligence guy in here. Call those dummies in Foreign Tech and make sure those goddamn numbers are right on those charts. This just cannot be right!" Boy, he was pissed. (Laughter.) I said, "I cannot say for sure it is right but we have checked it over and over and cannot find a mistake. We didn't know what to do about what we had found except brief you on it. We think we are right." He said, "Does Foreign Tech know?" I said, "Oh, yes." He said, "Well, I am going to check with them again." The intelligence guy came back after... (Laughter.) So he comes back and says "Hell, they have already been beat over the head. They have a copy of Boyd's brief and they agree with everything in it." Then Sweeney said, "When are you going back?" I said, "Tonight." He said, "Don't go back yet. We have to talk more about this tomorrow morning. You know, now the cat ^{is} ~~is~~ out of the bag. How many airplanes did you run this on." I said,

"We are just showing the interesting ones now. We were going to run them all next; however, we thought we owed a few explanations to some people before we began this next step." Sweeney said, "Okay, run them all out. We might as well find out. I am going to call Schriever." We knew he would do that so we had notified Systems Command that a phone call would be coming from Sweeney. I said, "They are waiting for your call." He said, "Oh, they know?" I said, "They know you are going to call." He said, "Well, how do they feel about it?" I said, "They are as disturbed as you are?" He said, "In other words, it will not be a surprise to them when I call?" I said, "It will be no surprise. They are expecting to hear from you and they anticipate your reaction." Sweeney said, "You bet your ass. Well, I really appreciate it."

So the next day we and Sweeney's staff discussed this some more. He had called over to Systems Command and Schriever was out of town. As soon as he returned, I briefed him and then the whole thing started penetrating the system. I went to the Pentagon and briefed at all levels. Then the interest in the F-111 started deteriorating. My charts indicated that we needed to start looking for a different kind of airplane. That is when the FX and other stuff started coming in. Now just think about this, all of this action began while we were out eating hamburgers and drinking beer one night down at Eglin.

D. At the school, you mean.

B. Yes, at Georgia Tech; just because some guy asked me if I was a fighter pilot. Then because this guy did not know what fighter pilots did, I had to interpret to him in a different frame of reference, using energy. As I was doing that, I saw the correlation and began the investigation and the rest is history. But at every stage, note what I did. I knew that I was going to win all the time

D. You developed it fully, checked your problems, and double and triple checked your problems. Now, please give me an explanation of energy maneuverability in a layman's terminology.

B. All you are doing really is using energy as a measure of maneuverability. Maneuverability means altitude, airspeed, and direction; in any combination. You can use energy to measure those changes. In other words, quantify. Obviously, you can do it for two competing airplanes and some numbers are higher for one airplane over the other.

D. You say then that you came to a rather striking conclusion of measuring the means of one airplane outmaneuvering another?

B. Right. So by looking at my comparisons, we could see which airplane *can* outmaneuver~~ed~~ the other, throughout the flight envelope. We could lay it out. You have seen all those different energy maneuverability

plots we have. So one airplane maneuvers better than the other. You see, I was the first one really to define maneuverability. People used the word but never defined it. I defined it. I said, "Hey, we have to define that word." It is the ability to change altitude, airspeed, and direction--ⁱⁿ any combination. Changing altitude is potential energy; changing airspeed is kinetic energy; and changing direction is turn ~~rate~~ ^{rate or G}, turn ~~in~~ radius or G. So now we can measure all of those things; we put them all together and they become energy relationships. Thus you can compare two airplanes, "Which one is better than the other?" Very fundamental.

D. The F-111 was to have a superiority role in combat. What did you discover lacking in it?

B. Well, they thought it was to be an all-purpose fighter. However, after we ran our analysis--energy maneuverability analysis--we found out it was not an all-purpose fighter. The intent for producing the F-111 was to use it for air-to-air, air-to-ground, dropping bombs, et cetera.

D. Where did the F-4E come in

B. Well, as a result of the analysis and some events that were taking place over in Southeast Asia, they wanted to put a gun on the F-4D; the AIM-7 (missile) was not that good. Also they wanted to jazz up the engine, to add a little more thrust to it. You know, the F-4E has a little more thrust than the F-4C/D. But then

after they added all the weight, they found out that the weight ~~the increased thrust~~ ^{offset} compensated for the -- In other words, the F-4C and the F-4E were not that much different. Even though there was less thrust in the F-4C, it was lighter; so do you know what I am trying to say. So the thrust to weight ratio really did not change. In fact, the wing loading was a little heavier in the F-4E.

D. Well, let's go into this?

B. Okay, but there was an accident. I don't know if you are interested in hearing about it or not.

D. Hell, yes.

B. Okay. Well starting back with Belkee? [] and [Rick Topin?] [] and those guys.

D. Do you write or do you dictate now? Did you pick up dictation from that first study?

B. Usually, I am very verbally oriented. What I tend to do is dream up concepts in my mind, then I structure them in outline form. Normally, everything is very sketchy at first. My initial writings are very fuzzy, I don't even write clear. I don't want to get locked in. It took me a long time to realize why I did that, but it is a defensive mechanism I use so that I don't get locked into anything prematurely; that is, before I am able to see beyond it.

As the concept becomes clearer and clearer in my mind, my writing also becomes clearer. That is a strange thing. I did not realize until recently I was even doing that.

What I am going to give you here today is a condensed version of the briefing. It is just more convenient this way. It is titled "Patterns of Conflict." Now the way this came about was really an accident. In other words, I did not intend to do this. In fact, I had a few little heel marks along the way because I had some other things that I was more interested in. Finally, I had to recognize there was some interest in what I had partially laid out, so I thought I had better proceed on with the work. The point is it happened when we had some arguments relative to analysis between simulation and the real world; the real world and the mock world in air-to-air combat. Even though we had EM analysis and we had simulation, both manned and digital, and also the so-called Southeast Asia ^{results} plus the things that the people were doing out at Nellis and Miramar, it turned out that we had some disagreements. In other words, all that stuff did not ~~get~~ ^{have} the kind of correlation we would have liked--you know, between the analysis and what the pilots said. In some cases, we got correlation and in other cases, maybe not as close as we would have liked to have seen it. So naturally, it raised some questions; not only in my mind, but in many other people's minds.

For instance, "If that is the case then what are the differences and if so, is there a possibility of removing those differences or at least accounting for them in some fashion?" You can never make a perfect analysis to represent the real world. In other words, we account for them in a rather systematic way if that is the best we can do. So then the big skunk fight started, and I mean that is what happened; guys who have done it one way are going to defend their viewpoint and the other guys will defend theirs, thus the verbal crockery gets thrown. Well, at the end of it, about the only thing that we could agree upon was that there were differences but we could not even agree upon what the differences were. Everybody agreed that they were there and maybe that is enlightening in some sense, but in another sense, it is kind of disturbing because where do you start if you cannot agree upon the differences. In other words, how do you rectify the problem you cannot see. Well, what happened was I said, "Hell, I am going to get away from it." I was worried about designing airplanes and planning programs; this thing had become a pain in the rear. I got up and said, "We will just do the best we can." I believe most of the other people involved with it felt about the same way. You finally get turned off of the whole thing. We were all honest with one another in admitting the differences were there. We were just at the point where it was impossible to identify the differences. Of course, when you try to work with a group of people it becomes difficult because they want to work within their own perception. It is not

that they are trying to deceive you necessarily, it is just that each guy has his own way of thinking, and it does not necessarily go along with the other guys' way of thinking, so it causes a problem or problems. In any case, to make a long story short, I received a call one day from a NASA guy named Al Mantle ? [] regarding the simulation. I had known Al for quite some time, and I couldn't help but sense that he was a little bit disturbed with me. He felt that maybe I was siding too much with the fighter pilots and was not paying enough attention to the simulation. You understand what I am saying?

D. No. What simulations are you talking about?

B. I am talking about the manned simulation--those domes. You know where they have a fighter pilot inside a dome flying against the enemy.

D. McDonnell Douglas?

B. Yes, they have them at McDonnell Douglas. They also have them at NASA, LTV (Aerospace Corporation) and there may be others. I am sure they have one out at Luke [AFB, Arizona] now. Anyway, the results in the real world and analysis proved what was right not to be too clear. The point is, they had done a lot of work down there at NASA and we had not paid too much attention to it, instead we just tended to listen to the fighter pilots. We had been working

with the viewpoints of the fighter pilots whether it was for design or for getting more money ^{on the} line, et cetera. Al's complaints were justified, so I told him, "Okay, I got the message. I accept what you are saying. You are right." Of course, his key point was, "It doesn't mean that we are all right and they are all wrong. We think that we have some things to offer and they may not be all right." But how do we recognize everything that is right, so it put us back to the same problem we had before. Of course, at this point in time I was getting ready to get out of the service. There was an idea I had been thinking about before, however, and I thought it would appease NASA. I said, "I will get on it. Let me put some more things. . ." I had been thinking about this idea for a long time, and as a result of that idea I came up with a brand-new thought. I will show you here. It gave me a whole new concept for air-to-air combat. That new idea in air-to-air combat led to warfare when I expanded on it. Now when I saw that at first, I said, "Oh, god, I don't want to do this. I will have to read history books and everything else." But the more I looked at it, there was no escape from it. I was trying to find an easier way around it, you see. Eventually, however, I went to work on it, and here is the final product.

- D. When you started working on this then, you were in the service?
- B. Initially when Al called me, I was still in the service. I had

not retired yet. I don't know exactly when it was. Anyway, I pretty much had a lot of it put together. I felt uncomfortable with a bit of it at first, but more and more it began to explain itself. Now I have a much deeper appreciation for it. And I might add that some of my stuff has already been published in the AIAA paper from their last conference. I will show you the words they used from one of my documents--here's their paper and here's my document--the words are the same. So it is already being used. It makes me feel kind of good.

Okay, with that in mind, let's go on. The reason I called it WARP-7 is because my kids like to watch Star Trek and all that. So I just jazzed up the name for the kids, just for kicks. However, people don't even refer to it as "Patterns of Conflict" anymore; they simply say, "What ^{Warp}~~war~~-party are you on?" You are bending it, you know. You are reshaping it all of the time. You will see why--it is not that you want to do it but you want it to come out right. You try to understand how things fit together. You will see why when I show you my other paper here. I got that paper and the instructions--you have to understand, this just did not "come out of the blue". But all of a sudden everything I had done before jelled into this kind of thing. I did not realize it at the time, which may seem strange to you but you will see when I show you this other paper.

D. Yes.

B. So the first two or three WARPS I did not show to anybody except a couple of guys in the office. Sure, it was beginning to make sense but still I was not that proud of it. WARP-4 was the first one that I briefed, and I was not even too happy with it. You know, it seemed to say the right things, but it was not quite complete enough; some things were just not quite right. I briefed for the first time at the Air Force Academy and I told the people, "I am still working on it, but here are the kinds of things that seem to be showing themselves." They kind of liked what I said. Then I went to WARP-5 and WARP-6. WARP-6 is the one I really began to like and I felt pretty comfortable with; it was in fairly good shape. Anyway, here is the background-- this whole thing came out of "Patterns of Conflict," my ^{asymmetric} ~~asymmetric~~ ^{transient} fast ~~transit~~ conception of tactics and strategies idea. I am going to unfold this whole story to you now. So don't worry about what that means; you are going to know what it means when we get to the end. It is something that comes out as a result of investigating and looking at these things. ~~Op-roi (Sp?) did not know that--Opstori (Sp?)--~~ that's the results. Right now, Just accept the word because if I start to explain it now I will only preempt myself. You will see what happens as we go through it. Now let's go back to what happened as the result of my investigation and looking at the energy maneuverability and all the other analyses and everything else. I do not really want to go through all that because it takes too much time. But the generalization we came up with after looking at this sort of

relationship really indicated we needed a fighter that could both lose and gain energy more quickly without turning an adversary. Well, you say, "What is so remarkable about that?" The reason being, prior to having done this (which was kind of recent), we tended to not think too much about losing energy but on gaining energy or on retaining energy; either retaining or regaining it. Now in defense of the question, "Why did we do that?", I can look back and understand it very well. We had no problems with the airplanes before except for them falling out of the sky. So, we said, "Golly, we just have to develop an airplane that will hang on to the energy." So that was in our minds all the time. We were trying to shape out new designs for holding and increasing energy and tended to forget some of the airplane's benefits by losing energy. This is the type of response received from talking to the people who were working in the program at that time.

- D. You have to know if it can be gained back again.
- B. Yes. However, if you lose it, you cannot gain it back again. You don't like that losing. . .
- D. Right.
- B. But if you would ignore that fact and realize that now you not only have the privilege of gaining energy but you also have the opportunity of losing it; that now you are able to play a two-sided

game. In effect, the analyses reveal that is what is happening. When you pump in more energy, you have provided a basis for losing it quicker, too. So there is a balance of energy, ^{charge} It gives you a basis for gaining ^{someone} position on ^{something} ~~something~~. I am not going to go through all of that. When I am talking about ^{we} ~~out-turning~~ ^{someone} --well, some guy will say, "I like to use Gs," or "highest G," or "best G," or "best turn rate," et cetera; I don't care which one you use. You can use it in a generic sense here because in most cases you might be more concerned with G; in a few cases, however, you are more concerned with rate. I am not going to show which is more important than the other because that would depend on the circumstances; sometimes you would interpret it one way, sometimes the other. So, for right now I shall just use turning as a more general frame of reference--Okay, with that in mind, you kind of suggest we need a fighter with ^{better} ~~higher~~ aerodynamics. ^G Why I say "aerodynamics" is because some people think in terms of making an airplane like an angle iron, you know, so that it can pull 50 Gs without falling apart. But we are talking about the ability ^{of to do} ~~of~~ ^{better} ~~higher~~ aerodynamics, ^{so the airplane} ~~because of whatever the structure of G is, it must~~ ^{will} have higher turn rates, ~~lower turn rates, positive energy rates,~~ ^{not} ~~but no discs, not necessarily that way.~~ You see, we might just want to fall out of the sky, so naturally we would not be too worried about getting a higher turn rate or... See what I am saying?

D. Okay.

- B. I will bring this out in a minute, but normally before we did not find that true; however, the evidence indicated that indeed it was true. Okay, building it up even further then, you get down to this statement. You say, "Okay, let's take advantage of all that data we have generated," and the result was this. Can you read that all right.
- D. Yes. In other words, you suggest a fighter that can be used to initiate and withdraw from engagement opportunities.
- B. Well, I will just read it. (Reads paper.)
- D. In other words, used to initiate and control engagement opportunities.
- B. What you want to do is have the option of determining where the fight is going to take place, how it is going to take place. In other words, you have the club over the other guy's head--a marked deck, if you want to look at it that way. The other point is, ~~you~~ ^{you} ~~have~~ ^{have} a fast transient. That is kind of an engineering term "fast transient;" the fighter pilot would like this word better, the "natural hook." They mean essentially the same thing. That is why I put both terms there. You tell an engineer about a natural hook, and he will give you a glassy eye. The fighter pilot, unless he is engineered trained, might get glassy eyed when you tell him about fast transients. So by putting both terms in there, each side of the fence can interpret the meaning which is it can be

used to either force an overshoot by an attacker or stay inside a hard-turning defender. In other words, what you really want to do is--if a guy pulls ⁱⁿ ~~it~~ to you, you want to be able to hook inside of him or if you are on the defensive, you want to fling him to the outside. So you can look at it either way, an offensive or defensive ^{variation} ~~variance~~. Note that one term, fast transients. They are the only two words I double underline. What do I mean by that? Here I had a very specific name, but then I started thinking about it. I thought, "I can expand upon that meaning in a very deep sense and drain out a lot more meaning. So fast transient has a very important meaning and now we are going to expand on it. Ready to go to the ~~idea~~ ^{idea} expansion. We are going to blow your mind now. So what happens here is, the idea of fast transients suggests that "in order to win or gain superiority, we should operate at a faster tempo than our adversaries," or if you want to put it in another way, "inside our adversary time scales", That is better yet, rather than "tempo"; or even better still, "get inside our adversary's observation-decision-action time scales". Let me illustrate that to show you what I am talking about. Let's assume you and I are both adversaries in air-to-air combat. And let's assume that you have the opportunity where, over a given time period, you can get a clear observation of me rather than me getting a clear observation of you. Likewise, you have the opportunity, over a given time period, to make a better

decision; you know, a more precise, more fundamental, or more subtle decision. Likewise, over that time period, for any action, maneuver, or event that you want to go through for that given time period, you can either get a better event or more events; or turning your problem completely around the other way, for any given action you want to take, you can do it quicker, or for any given decision you want to take, you can do it quicker, or for any given observation, you can do it quicker. They are equivalent statements. It is the same thing as saying, "For any of those observation-decision-action events, you can get inside my observation-decision-action events or time scales". Now what that means then is, if we are in a competitive situation, a hostile situation, "You are my enemy, I am your enemy," or "You are my adversary and I am your adversary." In that sense, I am your environment, you are my environment.

D. Right.

B. I am a hostile environment, you are a hostile environment, depending upon whose eyes we are looking from. In that sense then, let's say I am operating against you, and I am giving you this advantage. Now I am going to put an impulse in there to try to do something based upon a previous observation. I am going to make a decision and take an action to try to get an edge or advantage, whatever that advantage might be. When I do that, I am going to do something.

You are going to then see that happen, right? You are going to go through your observation... *begin action cycle*

(End of Tape 2, Side 2)

Okay, now I am going to expect a positive feedback. But guess what? I get a negative feedback. Why? Because you can get inside me and so when I go to look to see what happens, instead of the situation getting better, it tends to get worse. On the other hand, you are going to get the positive feedback because you are adjusting very nicely and the situation, whatever it was in the previous incidence, is going to tend to get better--all because of the very thing we are talking about here, the fact that you have all those advantages. Okay, having seen that, I now have to make another adjustment. That did not work so good; I have to make another adjustment. We go through the loop again. Once again, you react; once again, I get more negative feedback and you get more positive feedback. In other words, my solution is going divergent, your's is going convergent; precisely correct. What, in effect, is happening then is you are operating at one rhythm and I am operating at another rhythm. Your rhythm is inside my rhythm or your observation decision action events are inside my observation decision action events or time scales. The net effect then is pretty soon after that begins to happen, I am going to tend to become a bit uncertain because your actions appear ambiguous to me. I become a little uncertain and pretty soon I

am confused, disordered, and going into a panic situation. You have unraveled me, and that is what you wanted to do. So what I am saying here is this idea says, "What's happened?" You want to get inside, here is why--let's assume we are the guys who can do this and the enemy is the other guy who cannot do it as well. This situation will make us appear ambiguous or nonpredictable in relation to our adversary; thereby, generating confusion and disorder among our adversaries. This was suggested by Kurt Gödel's proof, "The Heisenberg [Werner] Principle, the Second Law of Thermodynamics" and supports my theory. Let's go back to our example to show you why it does. If you are quicker than I am, then on what basis am I making my decision? Am I making my decisions on your actions? There is no way I can on your observation decisions; there is no way I can make my decision because you are too quick for me. Every time I go to make a decision, it is because of a previous frame of reference I never get to play with; I am one frame back. In effect then, the only observation decisions I am making are on my own internal dynamics. So what you are doing is folding me back into my own system.

- D. Makes us appear ambiguous.
- B. No. I went back to the other thing. Pretend you are us and I am the enemy. You appear ambiguous to me. You are quicker. Don't read that--the only reason why I used this statement--I am using

you and me as examples. This is when the enemy is not as good as we are; you and I are on the same team.

D. Okay.

B. We will come back to this.

D. All right.

B. So what happens is then... .

D. . . .you are inside my time frame.

B. No, you are inside mine.

D. Oh, I am the good guy?

B. You are the good guy. What is happening then, because you are inside my time frame, your rhythm is better than mine. How then am I making my decision actions? What are they based upon? They cannot be based upon what you are doing.

D. Not anymore, not if you break them down.

B. No, never because you are doing them quicker than I am. How can I base something on something I cannot see? In other words, seeing in the sense of that instant of time, because you are doing better than I am.

D. But the sense of time is also that you are there, the real time.

- B. I know, that is right. But the point is, in effect, I am not making decisions based upon your observations, decisions and actions. I am making them on my own internal dynamics because you are ambiguous, you fold me right back into my own system. So I am generating ~~within my own~~ noise within my own system because you are too quick for me.
- D. You are getting a feedback from me.
- B. Yes.
- D. But you have to get it to see what I do first before you get a feedback.
- B. But how can I act? Since that happens at a certain instant, I go to do something against your action and then you react to what I do; you have already changed, so then I get a divergent feedback. I am really working on what you ^{are} ~~are~~ doing.
- D. Well, I am one step ahead of you.
- B. Then I am working on what you just did,
- D. No. You are working in real time but not on what I am doing because I am beyond that point.
- B. No, I am not working in real time. I am in imaginary time. You are doing what is real time; I am in some imaginary frame of reference.

- D. But I can be sitting here smiling at you right now and that is what you are looking at, I may be thinking about punching you in the nose.
- B. That is right. So I might get the wrong impression.
- D. You are taking what you see right now, but my thought process is beyond that, the next step. You are in real time and I am in time-plus.
- B. In that sense then--what's happening--all I am doing is examining everything within my own system dynamics, in terms of how quick I can observe, how quick I can decide, and how quick I can act.
- D. But you do not have time to go beyond that.
- B. No way. I can't. I am not clever enough.
- D. That is right.
- B. I set the circumstances up, so I am not clever enough because I am either dumb or because the systems I have don't perform adequately or whatever the case may be. The point is then, in some sense, you are folding me back into my own system, I am only looking at myself. I am not really looking at you.
- D. Gotcha.

B. In a sense then, you are folding me back and I am not really looking; I only think I am. Because when I go to look at you and to take action, you are not there anymore, so how can I be looking at you? When I say "look," in a general sense what I am talking about are observation, decision, action in a very general way. Isn't that nice? You got me?

D. I got it.

B. This is in conformity ^{with} Kurt Gödel's ^{and the} "Heisenberg, Second Law" ^{and} suggests that if that happens, initially there will be uncertainty, then confusion, disorder, panic, chaos, unravelment.

D. That does support it?

B. Right. Suggests it--assuming I am correct--not supports. Now if that does indeed seem true, the idea comes up that maybe you want to run some tests to support that. I say, you do not have to run tests to support it. There are all kinds of evidence; all I have to do is collect the evidence. Those tests have been run and let's see what it says. Three excellent examples come to mind: Blitzkrieg versus Maginot Line Mentality, 1940. Now listen to this; the Blitz, didn't they go much faster than the French and the British during 1940, in terms of the way they observed the action?

This one is going to get to you. You are going to love this. I am going through it a little more carefully; I am only going to

look at the external manifestations. If that is true, when I open a book and look at some history or reports of what had happened, I should expect to see words like chaos, panic, hallucinations, paralysis, and that kind of thing. If I don't see those kinds of words, then I am probably all wet ^{with} the idea ^{I had} got. I had never read that stuff before, you see, and the very first history book I picked up started to talk about when the Germans were going through France ^e, and how the French gradually became uncertain, confused, disordered--almost like I had said it, I felt like I had written the goddamn passage. Then I read about how the French started hallucinating when they would talk about where the Germans were and weren't. They started developing these bizarre mental patterns, trying to compete against it--total paralysis. Then the book portrayed everything from the German viewpoint. The Germans said, "Everything seemed very rhythmic." They kept pressing on and they could see the disaster coming up all around. So the external manifestations support it. Now later, I am going to take you into the internal dynamics and show you why that occurs; show you how you do a blitz and how it works. So, yes, we got tremendous support there. The words chaos, bizarre, panic, eccentric are all there. It was amazing; I read it and said, "My god, it could not have been more accurate." They even used a word I thought was my own. They said, "In a sense what you are really ^{seeing that} saying is the German rhythm was quicker than the French

or the British rhythm ." They were getting inside, you see, and everything collapsed.

- D. They didn't understand what was going on. They hadn't the faintest idea.
- B. That is right. Not only that, they started hallucinating divisions when they were not even there. They would think there were Germans someplace and there were not. This sounds bizarre, I know. Now here is an interesting case. If you could have compared at that time--I am talking about the Korean vintage now--the 86s and MiG-15s, you would discover that the MiG-15 could outclimb and out accelerate the 86. ____ G, P_s or energy rate, you have heard that term?
- D. Right.
- B. In terms of sustained turn rate, turn radius or G, the MiG-15 was also better. In terms of instantaneous G, the MiG-15 was also better. But we have a problem. We had 11 to 1 exchange rate of 86 over MiG-15; somewhere between 10 and 14 to one rounded off to 11 to 1--very high. It went the wrong way. We should have seen that the MiG-15 was a better airplane than the 86. Let's examine it carefully; it supports my argument here. If you look at the 86 and MiG-15 in silhouette ~~form~~ or size form, you will find out that they are both about the same size; however, the MiG is just a little bit smaller than the 86. It is not the big difference

that you have between the 21 and F-4. The 86 and MiG-15 are in the same size category; it is only a slight edge that the 15 really has over the 86, it is just a little bit smaller. As far as canopy visibility, the 86 was far superior to the MiG-15. The F-86 had the bubble canopy, while the MiG-15 had kind of an F-80 canopy which was hard to see through. The MiG also did not have a very good air-conditioning system. We tested the airplane and ^{the canopy} ~~fluid~~ would frost up. The point I am trying to make here is that from an observation viewpoint, relative to the ability to observe, the 86 had the advantage over the MiG.

D. Right, a lot.

B. Yes, quite a lot. Now let's go into another thing in the F-86. While the other airplanes in a more static sense could beat the F-86, the 86 had at that time, what we called, a breakthrough--the high-powered, hydraulic flight control system. Remember when that first came in? The MiG had a low-powered one, which is where the term "scissor" maneuver became famous; ~~the MiG would sound like (sound effect)~~. So the point is when the MiG got into a turn and held it, the MiG could gain an edge on the F-86. But transitioning from one maneuver to another--note the word "transition," transient--the F-86 was far quicker than the MiG. It had quicker transient; faster transitions. The fact that the pilot could observe, is also a transient. He could get his

observations quicker; you know, clear information over a shorter time period because he has a better canopy. Are you getting the idea of fast transients now?

D. The acceleration is part of that transient also.

B. That is right. What I am trying to say is the 86, if it held a turn one way, the MiG could get it in, but then if it started to roll off and flip maneuvers, it could fling the MiG forward. So rather than saying the 86 was superior because all the pilots were superior--we had what I called a "training hopper." We would put all the 11-to-1s in the training hopper, and we were superior in training. And I agree it had some impact. But when you start looking at the fact we could see better, we had quicker transients--in other words, faster dynamics with transients. And when we combine all those factors together: the ability to observe, the ability to make faster transients in our actions, and the ability to make better decisions because of our training, well, that is why we got the 11-to-1 exchange ratio. You understand?

D. Yes.

B. If you look at the 1976 Israeli raid at Entebbe, what made it so successful? Because it was so fast a maneuver; they were in, they were out. Idi Amin and the troops were so confused, "What

are those guys doing down there?" "Who were they going against?"

The Israelis were in and out before those Africans knew what hit them. By the time a guy had put his trousers on, it was all over.

Remember how they were? All bizarre. Here, I am only showing

you external relationships. What I am trying to say is, there

is a whole body of evidence that supports this idea that I am

talking about, of getting inside the other guy's observation-

+ decision-action time scales ^(S) and it is going to be quite related +

to the things you were talking earlier about on the board there.

You begin to see that?

D. Well, that is what surprise is all about, isn't it? A situation awareness that one side has that the other side doesn't.

B. That is right. Okay, let's go on then. Now with that in mind, here is what we are talking about in terms of these notions. When you put this together--Gödel ^(S) "Heisenberg and the Second Law"--^(S) put them together in this synthesis, you can break it down into two statements. In essence what we are saying is, "We cannot determine the character and nature of the system within itself."

But the more important part is if you try to do so, either explicitly or not even being aware you are doing it, then these

things will lead to confusion and disorder. That proof was in ^{statement (Gödel)} 1931, that ^(Heisenberg) proof was in 1927, and that ^(2nd Law) proof was also in 1859. ^{604.07.80}

^A
statement

statement

D. Kurt Gödel ^{and} ~~is~~ "Heisenberg, the Second Law" ^{of} ~~is~~ thermodynamics.

B. Right. So that implies this then--when you look at this implication, it suggests a statement, "knowing and having this information plus the previous comments we were talking about (the idea of fast transients or faster tempo, together with the synthesis here, associated with Gödel's "Heisenberg, the Second Law") suggest a new conception, not only for air-to-air combat, but also for waging war."

D. Okay. Will you explain the new conception?

B. What is that conception? Basically, if you want to look at it from the new conception, it appears along these lines. You need to exploit your operational and technical features to do these kinds of things: generate a rapidly changing environment, quick clear observations, fast tempo, fast transient, quick kill; or you can turn it around the other way, to inhibit an adversary's capacity to adapt to such environment. In other words, suppress or distort his observation by suppressing or distorting your signatures. It might be EW (electronic warfare), it might be camouflage, or it might be "hide in the weeds," or whatever. Always try to remain somewhat inconspicuous, at least more inconspicuous than he is. You got it? Putting all this together, you know what your goal is and the win is automatic. This permits

you to unstructure your adversary's system into a hodge-podge of confusion and disorder because what you are causing him to do is under or overreact to your activity, which appears uncertain, ambiguous, and chaotic to him.

- D. Well, these situations you hear all the time about World War I where both sides were that way. There was very little...
- B. Wait a minute. Hold off. Let me take you through this. Now this is what I call a recipe for air-to-air combat. ^{Here} ~~There~~ are two  things you worry about other than your decision-making capacity; (1) observation, and (2) your physical activity. Right? Observation-decision-action. For observations, here is the kind of thing you want: quick, clear scanning sensors--I don't care whether you are talking about the human eyeball or augmenting it with some device, it makes no difference. You also want to suppress or distort your signatures.
- D. Okay.
- B. From an activity viewpoint, we are talking about quick and precise performance in terms of super quick; you can cruise faster than the other guy, you can hit him and break out of there. That is a transient.
- D. Right.

B. Rapid energy gain and rapid energy loss we just talked about with high turn rates, low turn rates, high pitch rates, high roll rates and high yaw rates. In other words, the very thing we are talking about is in some sense found in the 86 ~~kill word~~ "quick shoot weapons and fire." You don't want to spend 80 seconds on a pursuit curve. You want to go, get the next guy, go, get the next guy, so he cannot react to you. You want to get inside his observation-decision-action frame. I don't care if you are talking about a gun, missile, laser, or whatever it is, or even some combination thereof; this is the game you are trying to play. In effect then, if you want to use a "buzz" word, you would send a quick message.

D. To generate and cope are the quickest ways to change your life.

B. If you hype up that rate of change and you can handle it and the other guy cannot, that is what happens. I am suggesting now that fighter pilots, the good ones, have the ability to do that better than other people. You can see what I am leading to now. That is the background. Now, I said, "Okay, all this appears to be true, but still we are only talking in a very concise sense about air-to-air. It is time to look at it in a broader sense, let's look at war." I really wanted to go back to look at the Blitzkrieg, which I did. You know, the more I looked at it, the more confused I became. When I started looking at it internally (the reason being they

would always tell me to go somewhere else to look). I thought, "Now wait a minute, this is based upon some previous things people did." Instead, I went all the way back to Alexander the Great and Sun Tzu and then just swept forward; that is when it all revealed itself. ~~Rather than doing it piecemeal, I went at it in a very systematic way.~~ I started out piecemeal and I became confused, so I did it this way. Here are the sources that I went through. I have just talked about this one, Bodyguard of Lies. I consider that very important. Now the way I have broken it up is in three different ways. The General Things About War by Fuller is a good example; The Conduct of War also by Fuller; Strategy by B. H. Liddell Hart, you have heard of him, of course; War Through the Ages by Lynn Montross (1944); and the Art of War by Sun Tzu, born in B.C. (before Christ) and Chinese, translated in 1971. I have those categories and War in General, plus the encyclopedia which I found useful. Then I had also gathered information not only on general wars but also on guerrilla wars. You will see things in here, for example, like Mao Tse-Tung on guerrilla warfare and a couple of other ones in here. Another category I have is on Blitzkrieg or Panzer warfare where you will see Panzer leaders, Panzer battles, plus some other ones in there. Then the other one I have there is on the dirty games department which is the Winterbottom's ¹ ultra secret and also The Bodyguard of Lies ^{by William Code Brown}. So I wanted to cover it rather generally; however, no matter where I looked there were millions

of documents regarding war history. I was trying to get a general coverage to see if anything from the past would support my theory, and I did not pick just one source because I knew ahead of time what it said. I just started grabbing sources to see if they supported my theory or not--sources ⁱⁿ ~~in~~ different categories. So with that in mind, I said, "Fine, with this body of evidence, I can now go back and look to see what patterns begin to emerge." But before I did that, I said, "Okay, look at my Destruction ^{and} ~~and~~ Creation," and one of the things that came out almost immediately was, "Why do you even have a war?" So what I am saying is the reason it comes about is because you are trying to improve your capacity for independent action. In other words, you want to survive, don't you? You also want to survive on your own terms, right? Now, if you want to survive on your own terms, you are trying to ^{improve yourself} ~~say on your own terms that the notes are implied to the~~ capacity for independent action. You are trying to improve that. Right? Also, there are other people trying to improve their capacity for independent action. Now let's say that we have limited resources and if you improve yours and somebody else depresses theirs, they are not going to like that too well, are they? So that when you try to improve your capacity for independent action, either explicitly or implicitly, in some cases you may tend to deprive other people ^{of} ~~of~~ their capacity for independent action.

D. Right.

B. The same way with nations, if we get a lot of oil, somebody else cannot have it. We improve our supply and deprive them. What I am trying to say is that is the basis for conflict and to war. It is this drive for survival on our own terms--to improve our capacity for independent action with limited resources; and when you improve your capacity for independent action and deny somebody else, there are arguments. If the arguments get violent enough, there is clubbed warfare. I don't care if you are talking about individuals or on a nation level, the same thing holds true. With that in mind, it kind of raises these kinds of questions, "How do we realize such a goal by waging war?", "Does history give any insight or suggest any useful ~~war~~ patterns?" And that is the purpose of this presentation. With these thoughts in mind, let's grind it out. Okay, here we go. Back to Sun Tzu (around 400 B.C.). Sun Tzu made the statement--now, you have to understand, Chinese talk comes in metaphors, analogies, and aphorisms, and it is kind of hard to get it out because we westerners are more pragmatic in terms of the way we have been trained. So you have to read and play with this stuff. As a matter of fact, I read this as one of the last things which helped me quite a bit. If I had read this without reading the others first, I probably would not have known what he was talking about. So it really helped me. I went through it and through it, and sliced it in a number of

ways. One of the big points that he makes is, "You not only have to know yourself, you have to know your enemy, know the terrain and know the weather." That is a nice way of saying, "You not only need to know yourself but you also need to know the environment," because weather, terrain, and the enemy are the environment. What he is really saying in a modern sense is he is trying to "cope with the environment." And the basis for his coping with the environment is always trying to make the environment weak relative to his strength. That is the whole basis of his argument, Sun Tzu's, and it is throughout the book. Now his theme in doing this is quote, "All war is based on deception." He keeps talking about it all the way through. In fact, deception drives his scheme of warfare.

- D. Let me back up. I don't understand--make the environment weak according to his strength?
- B. Yes. In other words, the environment may not change; however, if he gets strong, the environment becomes weak relative to his strength. For example--if you know your enemy, know the terrain, and know the weather, and your enemy doesn't know it as well, you can use it to your advantage. He cannot, you see, so he is weak relative to you.
- D. He is weak relative to you but the environment is not.

- B. He is part of the environment. Oh, I don't mean in terms of the weather per se, but in the sense where he becomes part of the environment. That is what I was saying, in that sense. Because if we were in a hostile conflict, you and I--you would be my environment and I would be your environment.
- D. You lumped them together.
- B. Well, I am just trying to show you that these things are all part of the environment. What is the environment? You and everything in this room, to me. To you, it is what? Everything in this room including me.
- D. It is how well you understand that.
- B. Yes, you are right. That is my point. The more you understand it, the better you can cope with it, and what you want to do is to be able to deal with that environment or cope with it in a positive frame of mine, or positive manner. Right? In a hostile situation, you want to be able to get on top of the situation and have some strength relative to that environment. Or if you are talking about an adversary, it would be your strength against his weakness.
- D. I guess I am just uncomfortable with the adversary being part of the environment.

- B. Well, I look at the enemy as part of the environment because I have to compete against him. He is a hostile environment.
- D. That is the whole purpose, to compete against him.
- B. I know. Now think about the hunters in earlier ages when the environment was very hostile and where they did not have a . . .
- D. You were using the environment in. . .
- B. It is just a convenient expression for me. I can conceive of the enemy as an adversary, and I can conceive of the weather, the terrain, and many other things, or I can lump them all together and call it the environment.
- D. The whole purpose of this is to go against the opponent?
- B. That's right.
- D. You are using up everything you know when you are in an airplane, all about your system in that airplane, yourself, all about his system, knowing his aircraft. But if you know everything...
- B. I would not get too hung up on that. I think you are pushing it too far. That is just a convenient way--I could say, "Okay, know your adversary and try to have strength against your adversary's weakness." Then you have to use the environment--you can make the environment separate in terms of terrain and weather if that makes

you feel better.

D. Okay, let's just go on.

B. What he says then is, "All war is based upon deception." This was his strongest statement. So everything that Sun Tzu did was based on the strong idea of trying to deceive somebody, of being treacherous; in other words, he was guile, clever, et cetera. He brings out the point that the essence of war is speed or rapidity. Now the reason I use the term "swiftness of action" is because Sun Tzu is not necessarily talking about speed in a physical sense. He is talking about speed in making decisions, the way you react to things. So he is talking not only in a physical but also in a psychological or mental sense because he uses words like thunderbolt, lightning, swift like the wind, doing all different kinds of things as well as moving. So that is the reason I say "swiftness of action," whatever those actions may be.

The other point that comes through is the idea of "fluidity of action." He talks about how an army behaves like the water. In other words, it is like water flowing downhill trying to find the crevices, the gaps or the fissures in order to gain an advantage on somebody--behaves like water, like a fluid. Sun Tzu talks about that all the time, the "fluidity of action." Fluidity of action is used as strength against weakness. Instead of going

against hard points, flow around it and go for the weak points. The other idea he brings out is the "idea of cohesion." This is one that many western people assume but don't address it quite explicitly enough. He does it in an implicit sense, too; however, it comes across very strongly. Like, he talked about people with flags, banners, bugles, drums, as standards. What they used them for was to allow small units to work inside the big units. This way there would be some kind of cohesion on the battlefield. The banners, bugles, drums, et cetera would be used to give signals; each guy knew his signal and knew how to respond to it. This way they could have little groupings working within the large groupings; little groupings working together to form a large grouping versus one large grouping. The message being to try to maintain some kind of cohesion of force, even when they are separated, in terms of coordinated actions.

- D. But each of these things are included down to the individual.
- B. Oh, yes, very definitely. That is why I said, "at any level from the individual all the way up to the organic army." Then what comes through is very interesting. Sun Tzu uses these ideas: deception, swiftness, fluidity, cohesion. Then he talks about dispersion and concentration. Now he is weak on dispersion, but the concentration is stronger. He says, "What you want to do is to have local concentration." In other words, local strength against weakness. You can have an inferior sized army as long as at a local

level, you are stronger than he is; that is, your concentration against his dispersion. So now he can get a 10 to 1 or 8 to 1, whatever his superiority may be, whether it is people, weapons, et cetera. Do you understand what I am saying?

D. Yes.

B. That is a very strong thing in an army. Sun Tzu also says you want to use dispersion, but he really does not address it hard enough. You will see it come through a little bit later on. I was a little bit disappointed in that. But in any case, he takes all of these things--deception, swiftness, dispersion, fluidity, concentration, cohesion--and he uses them as a basis for generating surprise.

D. I see.

B. Most people start out and say, "I am going to surprise the guy." Others will say, "Wait a minute. What do you mean you are going to surprise the guy? What is the basis for generating that surprise. He will be able to smell the surprise. He will feel it coming." What is being said is, here is the basis; By being deceitful; deceiving a guy, meaning one thing and doing something else. Like quickness in action. Whether it's thoughts or physical action. By the ability to shift, you see, the fluidity means the ability to shift gears. Cohesion, dispersion, going,

being dispersed, being concentrated at the appropriate time generates surprise and shock.

D. Yes.

B. I am saying he is using all of these things to generate this. Now here is the strategy. He recognizes that you have to really understand and know your enemy and all that.

D. Agreed upon.

B. Spies probe the enemy's organization and disposition in order to unmask intentions and learn his strengths and weaknesses. He is talking about reconnaissance, intelligence, spies, and all that stuff. The enemy is probed and tested to see how he reacts; this way you uncover his strengths and weaknesses. At the same time, however, you also start unmasking his what? Intentions.

D. I see.

B. That is what he means. It is not all clear, but eventually it comes through clear when you read it; it took a long time for this to come out. Sun Tzu likes to use the word "shape." To shape the enemy's perception and manipulate his plans and actions. In other words, by your behavior in that the other guy is going to be looking at you and he is going to start drawing certain conclusions. As a result of that, ^{this} ~~he~~ will start affecting his plans and actions.

D. Right.

B. The way you want them affected.

D. Yes.

B. So he calls that "shaping him." In other words, you are getting an imaginary perception of the worldly environment--the total environment.

D. Trying to give them imaginary...

B. You see, he is trying to give them an imaginary environment. Different from what the real world is.

D. Right.

B. Okay, as a result of that then he says, "Okay, now one of the best ways to go after the enemy is to attack his plans and best policy. Of course, he has already set himself up to do this, to undermine his plan. Next best policy is to ^{disrupt} ~~destruct~~ his alliances. Now this is very interesting. Have you ever read Liddell Hart? Did you ever hear of a thing where you want to attack a joint or connection between groups, fields, and armies? Remember, they are talking about ~~link~~ connections. What is an alliance? Isn't that a connection? So what Liddell Hart is talking about is what this guy was talking about in 400 B.C.

D. Sure.

B. He kind of sets up priorities. Then he says the next best thing was to attack the army. In other words, that was the third best choice. Then listen to this one, "attack cities only when there is no alternative." And, boy, he goes through that long and hard. Why don't you want to do that unless you absolutely have to? Mainly because of the casualties and time and everything else. Armies today know that, right? So that has not changed since 400 B.C. None of these things have. Isn't that interesting? Okay, here is the game then. He says, "Employ ^{cheng}chang and ^{chee}chee maneuvers to quickly and unexpectedly hurl strength against weakness. Do you know what a ^{cheng}chang and ^{chee}chee is?

D. Yes.

B. What?

D. To get into the act.

B. Pretty close. The chan--yen and yang are opposite but only opposite in this sense. The ^{cheng}chang if you want to look at it in the Pattonese--you know how Patton said, "Hold them by the nose and kick them in the ass"--to hold them ^{by}in the nose is the ^{cheng}chang and to kick them in the ass is the ^{chee}chee. This is regarded as a direct maneuver and this is regarded as the indirect.

D. Okay.

B. This is expected and this is the unexpected. This is the distractive maneuver and this is the slicing or attacking maneuver. One where you kind of fix his attention and (click) you hang him somewhere else. Liddell Hart is always talking about the indirect approach. He says you only use the indirect approach if you are going to go direct after awhile. The only way the indirect approach can work is if you have a direct approach working at the same time so when the guy is distracted by the direct, you can hook him in the mouth with the indirect. Whether it is a flank maneuver or whatever it might be, because this is not only in terms of maneuvers but it is at all levels; from an abstract level, down to a physical use of the army. In terms of Patton, "Kick them in the ass," what Patton is really saying is, "Use a fixing maneuver here to get his attention, then kick him in the ass with nothing more than a flank or rear maneuver in order to beat him." Did you see the movie "Patton," when he talked about that? "Pull him by the nose and kick him in the ass." Okay, now here is the desired outcome. He is very strong ⁱⁿ that, "Subdue the enemy without fighting and avoid protracted war--explicit."

D. Scary, isn't it?

B. The interesting thing is when you look at his words, they imply a very strong resemblance to Blitzkrieg ~~in~~ lightning war. In

other words, he wants everything to happen fast--Sun Tzu back in 400 B.C.

D. He didn't get into guerrilla warfare so much?

B. Hold your questions.

D. Okay.

B. You will see this. It is all going to come out. He doesn't talk about that per se. Now, with that in mind, let's move along here. That is just another way of showing the same thing. I just reversed it here--let's look at the early commanders: Alexander the Great, roughly around 300 B.C.; Hannibal, roughly about 200 B.C.; Belisarius, roughly 500 A.D.; Genghis Khan, roughly 1200 A.D.; Tamerlaine, roughly 1400 A.D.. I am not going to give you the exact dates, just the time period. So you can see that I have kind of picked some of the really top commanders up to around 1400 A.D. Now, it turns out that all of these commanders were quite consistent with Sun Tzu. Some may have emphasized more aspects as things were pulled together. But the interesting distinction which seems to come out when you look at this stuff is that the western commanders seem to be more directly concerned with the battle. In other words, when they apply their idea ^{to} of deception, guile, or surprise, or the various schemes they want to play, it tends to be within the confines ^{of} the context of the

battle; very battle oriented. Eastern commanders on the other hand seem to be much closer to Sun Tzu's ideal. This doesn't mean to say that they are right on it, but they seem to be closer to his ideal in the sense that they look at the battle as part of an overall thing; they like to have a guy ~~off-hold~~ before the battle actually begins. In other words, the enemy doesn't know it, but already he has been had. It is just a formal process now that must be played out. Of course, Genghis Khan was a master of this kind of thing. In fact, he applied the idea of a Sun Tzu--the spies, treachery, hallucinations--he actually had the people hallucinating that they were a part of a large force when really they were not. So the Eastern commanders, Belisarius, ^{Tamurlang} ~~Humayun~~, and Genghis Khan--Belisarius is an interesting case because he could play not only on the outside of the confines of battle but he could also play on the inside and as well as any of the Western commanders. He was very good in that way, at least from the interpretation of the material I have read. Have you ever heard of Belisarius?

D. No.

B. Byzantine general, around 500 A.D. In fact, he may have been the best of the lot. He was a very interesting guy--and the actions of his men, all the time a ^{cheng} ~~chang~~ and a ^{chee} ~~chee~~. That is, a direct action coupled with an indirect one; distracting the enemy by using an expected tactic and following that action with an

unexpected one. In other words, dazzle the enemy with the expected and hose him with the unexpected. Belisarius was always playing that game. I like to use chang and chee because they are defined very nicely. Some people like to hit in the nose, others like to hit in the flank. Sometimes a nose might be better than a flank, like when a hit is expected in the flank. ^{chevy ch's} ~~Chang~~ and ~~chee~~, you see, describes this type of procedure more adequately. With that in mind then, let us look at some examples. Probably two of the most famous examples--at least one of the most famous examples of all time is the battle of Cannae between the Romans and the Carthaginians. ^{Varro} The Romans were led by ~~Valerian~~ and the Carthaginians by Hannibal. Have you ever heard of Hannibal?

D. Yes.

B. What Hannibal did was seduce the Romans to attack his arch. The Romans outnumbered the Carthaginians, you see, and Hannibal wanted to entice the Romans to use all their force to push his arch back into a "V." The Romans fell into Hannibal's trap and just before the pressure was strong enough to break through Hannibal's formation, he first sent his cavalry in to drive off the Roman's cavalry and then he sent the rest of his calvary around to the Roman's rear, thereby encircling the Romans completely. Hannibal had them all jammed inside the circle where they could not fight and he just slaughtered them. He gave them a chang and chee. Here is the chang and here is the chee. He fixed them ^{then hose of them} ~~with a hose~~ in the rear.

The Romans all came in here, see, except for the ones who were driven off by the cavalry. This battle of Cannae is ^{one of} the most famous of all battles. The Germans and other armies think of it as the example of how to get an envelopment, how to suck the enemy in, how to whip around and encircle the enemy and then wipe him out. Hannibal figured out the strategy by himself. Of course, the timing was crucial. He could not wait too long or else the Romans would have the advantage by breaking through the formation and then encircling Hannibal's flanks. See what I am saying? Now this is what Liddell Hart would call a defensive-offensive. The army begins by being on the defensive, however, ends up being the offensive.

Another example of ^{cheng} ~~chang~~ and ^{ch'i} ~~chee~~ is the ^{flying} ~~planning~~ columns of Genghis Khan during the Mongol invasion. Now here is Genghis Khan and here are his generals. Note the scale of miles--over 500 miles separating these columns and yet they were all coordinated. The movements of these columns of course had to be preplanned to some extent. They had several lines of communication in operation to keep in close contact with each other--couriers, signal mirrors, smoke signals, and other similar communication devices. Through communication Genghis Khan was able to keep his columns coordinated and moving all the time. In other words, some columns would hold back while others moved forward. When a column needed additional

support, the order would be signaled back to the waiting columns for however many were needed. The needed support would then move in and hook into the original column's back door, playing chang and chee maneuvers.

D. How did this work?

B. What happened was they came in here, and the Sultan who was here was trying to get word out--I believe ^{Chape} ~~Claude Chappe~~ was the first column that went in and the Sultan tried to deploy against him, but in the meantime two others were moving in and the first one was moving out, so the Sultan had to move back to deploy against all three columns. Then the Sultan received word that Genghis Khan was coming. There was a short battle here and then the Sultan took off and Genghis Khan took both cities, wiped them out. The result being that the enemy was always in a panic, total confusion and disorder, because the unexpected had happened.

Blitz had manifestations of flying columns, you know. Napoleon used the battalion corelli which was composed of flying columns; of course, this was much later than Genghis Khan. Okay? These are just examples. So even though the columns were widely separated, they had this cohesion of togetherness that we are talking about. Working together--this is the point.

D. Even today, you can make it part of the communication zone.

B. Yes, that is right. Now, let's move up to the 18th century where we have Saxe, ^{Bourcet} Broglie, ^{Du Teil} Guibert, and ^{Bourcet} Gribeauval. Saxe was a French Marshal who wrote a good treatise on tactics and strategy. ^{Broglie} Broglie read some of Saxe's ideas and expanded on them. Guibert read both Saxe's ^{Bourcet} and ^{Du Teil} Broglie's ideas and expanded some more on them. ^{Gribeauval} Gribeauval read all of the three's ideas and expanded even more on them. So what I am saying is that each one expanded upon the other, and in general this is what they came up with: They all recognized the importance of mobility and fluidity of force and of cohesiveness. All of these factors were used to play the dispersion and concentration game. In other words, they wanted to keep their forces separated--to have them separated, initially. This way they could force their enemy to separate his forces by getting him committed to a certain way and then they would at the last moment bring their forces together to slice up the enemy. So these 18th century warriors used dispersion as the basis for getting the concentration a little more precise in formulation than Sun Tzu had said. Do you understand what I am saying?

D. Yes.

B. And they did it by playing the mobility and fluidity of force and cohesion game. Even though the units were separated, they were all communicating with one another. A commander would say, "Okay, now we are going to strike. Meet us at a certain point and then hit

them in the flank," or whatever the case might be to obtain that local concentration of force. He is playing dispersion against concentration in order to gain that result; that is the whole idea, you see. The other one is primarily ^{related} ~~dribble~~ ^{Barrett's} to Briglio's playing with several branches. You know, like if you really want to win a certain battle, you can do it with several branches. If you hook in and they frustrate you, you can hook in another wing and get them some place else. If they still bother you, you can hook in again ~~another wing~~ to get them somewhere else.

D. Flying columns.

- B. So, we have several branches which could always be kept sort of unbalanced--uncertain. They also had the idea of operating a line to threaten alternative objectives. Now a good example is when Sherman (Gen William T.) went down through Georgia and operated ~~right on the line--his columns in a line to go right between~~ ^{on} [^] certain objectives, on a line to threaten alternative objectives. You see when that happened, the other command was not sure where he was going. They had to spread their forces to defend two objectives, then at the last instant, Sherman went for one of their divided forces. His own words being, "Put them on the horns of a dilemma."
- D. Over in the CBI (China-Burma-India) Theater), the Japanese did not do that. They got on their line and stayed on it. They were predictable.

B. I cannot remember Sherman's exact words, but what he did was not make up his mind on what to do until the last minute. He was not sure of which groups to move 24 hours before the advance. Before a decision was made, he had to receive ~~all of the~~ reports from his Recce [Reconnaissance] outfit. After discovering where the strong and weak points were located, he would make the decision of where to go. So how could the enemy know where his troupes were going when he did not even know until the last instant? See how he got inside their observation to see? See how that kind of thing can happen? Then, of course, ^{putted} ~~Gribeauval~~ concentrated on direct artillery fire and key points to be forced. At that time, it was a cannister and grap shot kind of artillery.

Now what happened with Napoleon, he had read very deeply into all of these guys. Even when he was a young officer, he became very powerful and was fighting superior forces because he used all of these kinds of things to generate deception and surprise. He used these ideas magnificently, beautifully. Then he became extravagant and an introvert, his ideas changed and he began to use brute force techniques--hard force against hard force. He just stopped using ways to generate deception and surprise and began using pure offensive power, going against ^{regions} ~~reasons~~ of strong resistance. Know what I am saying here, A form of infantry columns, mass direct artillery fire and heavy infantry going against ^{regions} ~~reasons~~ of strong resistance. In fact, Napoleon himself

said, "Napoleon as a general was a good general. Napoleon as an emperor was a lousy general." Those may not be the exact words but he said words to that effect at ~~Almadorff~~ ^{Elba} or St. Helena.

Interestingly enough, also the American colonists and the Spanish and Russian guerrillas in unexpected ways--note those words--used mobility and fluidity of forces as the bases for dispersion, concentration to harass, confusion, and finally the defeat of the British and the French. We against the British and Spanish and the Russians against the ~~Polish~~ ^{French}. As a matter of fact, the Spanish guerrillas are an interesting case because Napoleon defeated their regular army, which forced them into a guerrilla war. And the guerrillas succeeded in driving the French out of Spain. The regular army was defeated by the French, however, the guerrillas were able to drive them back out of Spain. I think that is very interesting. But, you see, the guerrillas tended to use these kinds of things that were quite similar to the ideas of Sun Tzu?

D. Yes, they did.

B. So the impression you have been left with is the ideas of Sun Tzu, Saxe, ~~Broglie~~ ^{Bavre}, and Guibert seem to be at home with either the regular or guerrilla soldiers. So why do we have this tremendous chasm or distinction between guerrilla and regular warfare? I am going to take you further and show you that the categorization might not be entirely a good categorization to separate the two.

D. Okay.

B. With that in mind, let's move along. Let's move up to the age of technology, the 19th century, when the fields of science and engineering showed new ways to accomplish things. The railroad, telegraph, quick fire artillery, the machine gun, the repeating rifle, and the barbed-wire fences, just to name a few, had a great impact on society. If you recall, we had machine guns and the repeating rifles during the Civil War--the Gatling guns and the ^{Spencer}~~Spence~~ repeating rifles. In fact, the ^{Spencer}~~Spence~~ repeating rifle is an interesting story. Lincoln (Pres. Abraham) forced that rifle down the Army's throat. They did not want to buy it because they already had a competing rifle. However, Lincoln decided to have the ^{Spencer}~~Spence~~ repeating rifle tested and liked it, which resulted in he telling the Union Army to buy 10,000 of them (or some such amount).

(End of Tape 3, Side 1)

Well, the repeating rifles did not stop there, they found their way out west. The Indians had ^{acquired the}~~their dispensary~~ repeating rifles. The Calvary had single-shot carbines, and they lost a lot of people. Then they got the message that maybe the repeating rifle was not so bad after all. In fact, it proved to be a better gun. The point I am trying to bring out here relates to these early trends. What happened after they found out they could get all this artillery fire? They realized they had to have the railroads and

logistics networks in order to support it. So there was a tremendous emphasis on fire power used now in a different sense to blow away people--the game of attrition is what we are talking about here. General Lee [Robert E.] started the Civil War using a hole-in defense--you know, dug-in riflemen--to hold off the Union Army. He would then send a broad force around to hit the rear of the Union's flank in order to gain a victory. Eventually, of course, the Union generals adopted those same techniques. But even with all those clever techniques, the Union and Confederate Armies used infantry frontal assaults against each other's strong points all the way through the war. Both sides had all this artillery fire, musket fire--they were blowing one another away. What I am trying to explain is the impact of this and the way these people took advantage. They each had huge armies which were using massive amounts of fire powder and requiring vast amounts of supplies, and all of their support was coming through a narrow fixed logistics network; the end result being the deception, surprise, and mobility of the operation had to be suppressed. You see, the railroads are kind of a one-dimensional animal; they have to run on tracks which cannot be laid everywhere. So the deception, surprise, and mobility of the operation had to be forfeited to a large degree because the trains were a necessity to refurbish the armies with supplies and ammunition, et cetera--now with the visible tracks, the enemy could tell where the offenses were going to generate from. Oh, he might

not know exactly when or the exact nature of the attack but the enemy had a pretty good idea. So, in that sense, these techniques became a little obscure.

D. Right.

B. Let's talk more about deception, surprise and mobility. Continuing on then, you tend to telegraph ~~in~~ your punch. Looking at it in that sense, the way we tend to apply our technology is kind of a mental set or mind set. Technology was being used as a crude club, it generated frightful and debilitating casualties on both sides during the Civil War right down to World War I. These were wars of attrition, wars of fire power, instead of wars of maneuvers.

D. What is wrong with World War II?

B. We will talk about World War II in just a minute. I want to only look at World War I now. Did you know that the Russo-Japanese War tended to be a precursor to World War I, like it actually was a small-scale World War I. Both sides had trenches, barbed wire, machine-gun nests, both sides used centralized controlled artillery, radio/field phones, and search lights. It really looked like World War I, and guess what they found out in this Russo-Japanese War? The Cavalry does not perform well against barbed wire and machine guns. Now this realization was written up in many reports but everybody said "b-s." So, the same experiment was repeated

during World War I, and guess what they found out? The Cavalry does not perform well against barbed wire and machine guns! It was 10 years later, but the lesson was ignored. In any case, what I am going to do now, rather than look at all of these wars, is take a grand crescendo of 19th century technology, where it all kind of focussed on World War I, to see what kind of impact it created. So, let's divide World War I into three parts: (1) plans and execution, (2) stagnation, and (3) finale--for lack of a better word. Regarding the first part, you have heard of the Schlieffen's [Alfred von] plan and also of the French plan ¹⁷ ~~of 1917~~? Well, these two plans unfolded between August and October of 1914, and then they pooped out. The Schlieffen's plan was better conceived, but I am not going into all the details. You know, of course, how the Germans bastardized it and everything else. Somewhere toward the end of 1914 stagnation set in and lasted until 1918, and then the finale followed. Now let's discuss the three parts.

¹⁷ Whether one is talking about the Schlieffen or the French plan ~~of~~ ~~1917~~ or any other attempt to make an offensive attack on a very wide front, you discover that when they made their advances they tried to keep them pretty even; in other words, to protect their flanks. Heavy artillery was brought up in order to break down or reduce strong points. Interestingly enough, the Reserves were thrown in whenever the attack was held up against points of strong resistance. In other words, they were committing their Reserves

against strong areas. That was the action; now here is the reaction, the way the defenders tended to react to these kinds of things. They organized the defense in depth in terms of fortified trench lines, barbed wire coupled with centralized control, artillery machine-gun nests, et cetera. The idea being, when an attacker tried to come through, the heavy artillery would be dumped on him which would break up the attack. This would blow a lot of the enemy away; next the machine guns would be used to pin the rest of them down--"Spin the counterattack and throw the bastards out." Fundamentally, that was done. Then they would try it and the same thing would happen to them. What was the result?

D. Stagnation.

B. Right, stagnation and enormous attrition. Why? Because they generally knew where those advances were coming from and how--along paths of hardened resistance because of the dependence upon railroads and the choice of tactics, of trying to reduce strong points by mass infantry and firepower, such as in World War I.

D. Okay.

B. It was bad in World War I. There were some days when 100,000 men were lost. Then around 1918 or earlier, we had two other things happen--infiltration and guerrilla tactics. The authors of infiltration tactics were ^{La Fajard, Hatcher} LeFevre, Houdiere and Ludendorff."

Guerrilla tactics--you heard of Lawrence of Arabia? That was not quite as decisive in the Middle East but it had some very interesting implications that I want to talk about. It was decisive in the Middle East in that it turned out to be very good, but how these things had future warfare is what I am bringing out. Now ^{Le Fe're} ~~Le Fe're~~ was a French captain. Around ¹⁹¹⁵ ~~1916~~, he wrote a paper, or pamphlet, entitled "Infiltration." This pamphlet worked its way up through the French Command and also worked its way over to the German side and ^{onto} ~~into~~ Ludendorff's desk. When he looked at it, he said, "This is what I have been looking for." You see, the French had not been alone, the Germans had also been experimenting with these same techniques. So this pamphlet served to crystallize their thoughts to the point where the techniques were used in 1918. ^{Houdiere} ~~Houdiere~~ has received most of the credit for that, but there is some debate going on among present day historians whether he was a media creation or whether he really did it. That is why I have the question mark there. I am not trying to say who did it; I am saying these are the names you generally ~~see~~ associated with that. Obviously, Lawrence of Arabia is associated with guerrilla tactics.

What I am going to do now is run out the infiltration tactics and the guerrilla tactics and compare them at the end to see if they ^{are} ~~have~~ the same process. First, the infiltration tactics; here is the way it works. It led off with a brief but intense artillery

bombardment. Now if you recall those earlier things--they would maybe bombard an area for 3 or 4 days, or maybe a week at a time. Then the infantry men would try to struggle through all that chewed-up ground. This is different. They only have 1 hour, a couple of

hours, ~~or in some cases,~~ no pre-registering--a rolling barrage ~~will~~ *the* ~~infantry will~~ go right ~~out~~ *in* behind the rolling barrage.

D. That is the only way to do it.

B. Here is the way it worked then. An assault by these teams--they called them "~~Storm~~ *Storm* Troops." They were storm troopers, but they were given very different kinds of instructions, to find the gaps, the voids. In other words, find points of least resistance to break through and just keep on going. Don't worry about flanks. Just keep pouring through. If you see a hard point, just duck around it. Just like water, fluidity. Right?

D. Right.

B. "In order to avoid opposition, pour into or infiltrate any gaps that can be found, ignore their flank." This was the order given to them. And the follow-up teams--they were called ~~Comp Grouping~~ *Kampfgruppen* eventually equipped with machine guns and mortars. The field engineers would mop up isolated strong points, but not when the people were still being funneled in. They would cut the enemy off, isolate him, and then the field engineers would mop him up. But

not a strong point that could be fed or reinforced from the rear-- to break those down, the reserves would be fed from the rear to enlarge the gaps and breaches along paths of least resistance and what they would feed were the things that were succeeding. In other words, pump up those gaps and breaches, feed in the reserves to those spearheads, those fingers, or those stillets that were moving forward--not to the ones that were being held up. In other words, the idea being to reinforce success; don't try to redeem failure. Success oriented adventure! This was the idea, "Try to achieve a tactical breakthrough in order to gain the opportunity to apply the strongest form of attack--envelopment!

D. And hope not to be enveloped.

B. Now, what would be the results? Immediate success. ^{Wo!} Why? Because Ludendorff was the old school. Even when he came up with a new idea, ^{from} he tended to revert ^{back} to fact. ~~After he started having successes, he began to revert some of his ideas to hard points.~~ So rather than trying to support success, he was trying to redeem failure again. At that time, logistics were not really flexible enough to support both penetration and exploitation of a breakthrough for a couple of reasons. One, they did not have the right kind of transportation. They had horse carts and all that kind of stuff, but they did not have many infantry, or motors. Secondly, the battlefields were all chewed up making it difficult to cross them. The other thing,

communications are very important because without them how can you identify who is succeeding and who is not. If there is going to be a guy back there to reinforce those channels to succeed, he most certainly will have to have feedback--who is making out and who is not. I am talking about the commander in the rear now; he has to receive that kind of information so that he can pump the reserves or so he can allocate the reserves up the right channel or up the right breach. Well, because they did not have the right kind of communications, their strategy started to give way, the armies were beginning to get mixed up. You see, the commander has to receive the information, otherwise he does not know whether he is supporting success or failure. That is the point. Another thing used very infrequently is elastic defense. It was originally developed by the Germans. P^ketain [Fr Gen Henri Philippe] read some of their pamphlets and used their techniques against them.

- D. You have not mentioned withdrawing when the offensive move obviously is failing.
- B. Well, that is what happened. The elastic defense when the French pulled their people back--and P^ketain did. So when the Germans threw in artillery barrage in, there was nobody there. He was able to get behind the German artillery barrage before they could bring up their guns, then he had his reserves hit the German flanks before they were able to get artillery support. P^ketain got the idea from

the Germans. The Germans had that before the _____ (noise in room blocked out word). So in a sense the Germans had also perfected a defense against that kind of an offense, and they used it later on against the Allies when the Allies were going against them--the elastic defense.

Let's look at guerrilla warfare. Lawrence very early recognized that the support of the population had to be gained. In fact, here is his quote, "Must arrange the minds of friend, foe, and neutral alike." He also said, "Must get inside their minds." Isn't that interesting? These quotes were in his book, Seven Pillars of Wisdom.

D. Yes. I have read it.

B. Then he says, "It must be an idea thing invulnerable and not front or back ~~flitting~~ ^{flowing} about like a gas." Isn't that interesting? Obviously he was talking about fluidity of action. He uses "gas" in the same sense that Sun Tzu used "water" or "fluid." Tactics should be "tip and run," he never used "hit and run." Tip--even a more delicate. . .

D. I noticed that.

B. I wondered where that came from. I saw where Liddell Hart used it and finally when I read Seven Pillars of Wisdom, I knew where he got it. Tactics should be "tip and run"--not pushes but strokes, to

use the smallest force in the quickest time at the furthest place. Putting it all together, this is what he is talking about. Should the war be a detraction, avoiding contact and presenting a threat everywhere, using mobility and fluidity in action and the environmental background--in this case, the vast unknown desert--as the basis for it. That is, never affording a target and never being on the defensive except by accident and error. Now some regular military people become upset with that statement. They say, "b-s." I say, "Wait a minute. You have to look at it in his mind. He defines defense differently. It's relative ^{to} whether you have initiative or you do not have initiative. He does not care if he floats back 100 miles as long as he is doing it on his terms and smacks you later on. The fact that you lose ground is not necessarily defensive."

- D. Space for time.
- B. Yes, so you have to think in their terms, in the way that they think--not only use the desert but use the population blendings. In other words, you melt into the woodwork, which can either be the population, the environment (in terms of terrain, weather, or whatever it may be). That is the main thing, be inconspicuous. It was their idea. Collapse the regime, and he met with success. After you are finished, then you get this kind of an impression. The fact that your infiltration tactics--a la Ludendorff--seem to be similar in nature to the irregular guerrilla tactics--a la Lawrence.

Why? Because both use fluidity of action cohesion. The small units will concentrate strength against weakness. Now here is the interesting thing. Remember what I said about the impression of how Saxe's, ~~Broghe's~~ ^{Burnett's}, and Guibert's ideas could be used? Lawrence in his book, Seven Pillars of Wisdom, compared the ideas of Saxe's and Guibert's against those of Clausewitz'. I do not remember the exact words of Lawrence's, but he made the comment that the works of Clausewitz' were much more logical; his works seemed much more powerful than those of Saxe's and Guibert's. But Lawrence continued to say, in actual application, the ideas of Saxe's and Guibert's proved to be the better ones. So, guess whose ideas Lawrence used? Saxe's and Guibert's! Isn't that an interesting observation?

D. That's all he had.

B. He had both, but he found that one worked better than the other. Lawrence concluded that Clausewitz' theory just did not make it; his theory was just not as good. If one looks at Clausewitz' theory from an academic point of view--Lawrence was a scholar, you remember, from Cambridge--his method seemed more superior than those belonging to Saxe and Guibert. However, in terms of application, Saxe's and Guibert's were superior--and after all, isn't application the name of the game here? The point being, if we talk about Lawrence applying Saxe's and Guibert's ideas, we have then connected up, at least, Lawrence's guerrilla tactics

with regular warfare. Remember, I told you I was going to do that-- by his own words and by his own book.

Let's move on. We are up to major advances between World War I and World War II. Here is what happened. Fuller [British Maj Gen J.F.C.] watched that German infiltration tactic of 1918 going against him; he watched the panic, the confusion and disorder caused in the British lines. Of course, as a military man, Fuller thought it was magnificent that anybody could do such a thing as that. Looking at it from a detached viewpoint, he thought, "Now, if I take those same ideas that Ludendorff [German Gen Erich von] and marry them up with a tank or armored cars, a mechanization, it would be even more dramatic." What Fuller was talking about was lightning warfare, or Blitzkrieg. Fuller had the first idea in 1918 or 1919, the initial germinating idea--like he wrote the initial pamphlets on how you want to run armor.

D. Nobody listened to him.

B. Nobody listened to him. He had an acid tongue. In fact, he was fired, forced to retire. They just would not listen to him. However, Heinz Guderian [a German officer in World War I] who was a signal's officer, understood the value of communication. Note those kinds of things in there. He read some of Fuller's pamphlets

and became very interested in them, he expanded upon them, and he became known as the author of the Blitzkreig--Tactical Blitzkreig. Germany used this strategy against Poland, Britain, France, et cetera. So, Guderian was the first to implement it. In general, here was the result: Blitzkreig generates a breakthrough by piercing a region 1 to 2 kilometers wide at two or three points in a narrow front, very narrow--like stillets going through--but using armor, motorized infantry and follow-on infantry supported by tactical aircraft. That is from a tactical standpoint. On the other hand, we see guerrilla warfare; Mao Tse-tung, who was facing Chiang Kai-shek and the Japanese, came up with the idea of guerrilla warfare in order to try and draw them down. He used a lot of the ideas of Sun Tzu. Mao Tse-tung quotes Sun Tzu extensively. In fact, a lot of his words in his book on guerrilla warfare come directly from Sun Tzu.

- D. He disagreed a lot also.
- B. Yes, I know, but he also used a lot of Sun Tzu's ideas. As a result of using those ideas, we found out there is a connection between Sun Tzu and Mao Tse-tung, which connects regular warfare with guerrilla warfare. We also see a lot of Sun Tzu's, Saxe's, and Bourcet's ideas are similar. So why do we have this ^{arbitrary} ~~high~~ arbitrativ distinction between guerrilla and regular warfare. Adolf Hitler, well, he looked at it in terms of a total war, as indicated here.

Fuller and Guderian were looking at it from more of a tactical viewpoint. Hitler took Guderian's notion and these Blitzkreig notions and expanded them in the strategic arena. As I said before, Hitler looked at it from a total warfare viewpoint. Blitzkreig from both an ~~inter~~-strategic and tactical level. In other words, not only just attacking the armies, but the political, economic, and social bodies as well--prior to any military contact. When you read Hitler's words, it is easy to compare them to Sun Tsu. When I read them, I was amazed and said, "He must have read Sun Tsu." The point I am trying to make--even though this started out to be tactical, it evolved into a total war.

- D. Mao Tse-tung, but not so much Hitler. Mao was interested in all the . . .
- B. So was Hitler. Didn't Hitler take Czechoslovakia without firing a shot? Didn't he take Austria without firing a shot? In fact, his words were, "I want to beat all these guys without ever having to fight." The point being, whether you are talking about any kind of warfare, it is all based upon the idea of infiltration, at all levels--diplomatic, political, strategic, tactical, et cetera. They try to shatter the moral fiber of a nation. "They talked about these kinds of things," you inform them and they say, "Fine." Here is their purpose--to force capitulation when combined with external, political, economic, and military pressure. In other

words, they have created internal dissension and external pressures in order to collapse the nation without fighting. This is what took place in Czechoslovakia and Austria, this is what the Germans did. The other thing is, if they are unable to accomplish their result this way and have to fight, they try to minimize the resistance of a weakened foe for the military blows that will follow.

Let's look at both of these. In a strategical sense, they tend to be somewhat like us and in a tactical sense they seem to . . . Here's the German Blitzkreig. They were very interested in what was going on. They had tremendous reconnaissance, intelligence, reconnoiter, et cetera, in order to find out the other guy's disposition, strengths, weaknesses, et cetera. After having discerned their needed information, then they would decide where they were going to strike. When the target was pinpointed, then they may or may not lead off with a brief, but intense preliminary bombardment of artillery in the rear. Now Guderian in a lot of cases did not want to do this, but you have to understand Guderian was a minority in the general staff. (Very few of the Germans were really blitz oriented, mostly the British and French generals were knowledgeable enough to put this theory to good use.) So then they would negotiate, arbitrate, and gradually agree on some kind of artillery bombardment. I find that very strange. It sounds a lot like us. Now after they had assembled the armored reconnaissance

team, they would lead these armored columns unexpectedly out of a region, advancing rapidly. Now the reason for this is that the reconnoitering was already done and they knew that the people did not know where they would be coming from, so they just blew through-- strength against weakness. So, what are they doing all the time? Trying to find their way through paths of least resistance. In the meantime, they are radioing information back to the follow-on team.

D. You always have the stuff to back up all that stuff though. You must have the corps behind you to be able to do all that.

B. Oh, yes, I know. But they did it. I am going to tell you about it in a minute. Did you know that we outnumbered them in 1940 when they did that to us? I will tell you about that--the so-called "human wave." The Germans did that more on a shoestring than we did. Okay, these guys would provide the people with information. They would come through and rip open breaches and gaps--armor, mechanized infantry, assault, field engineers, and other specialists they would need. They would wrench it open (sound). Then behind them would be the breakthrough power, relatively independent, very fast-moving armored light tanks, armored cars, even motorcycles (sound). They would open the gap and start pumping through (sound), led by their reconnaissance. Speed! This is the big thing. Everything must move as fast as possible. No matter what decision

their opponents made, they would always be one step ahead of them. The opponent would try to set defenses up, but it was too late, they were already blowing by. They would blow through the country following the adversary's line of least resistance. The objective is envelopment-- to destroy command and lines of communication, to try and break his line of communication, his sinews, so he cannot function as an organic being. Now come the motorized or foot infantry. They start coming up to widen the breaches and gaps and secure the captured terrain against counterattack or prepare for the encirclement. It is an articulated operation, you actually see it that way. Once they make the break, you see the reconnaissance teams out there, other bodies back here, and the main body back here. They were not grouped together. Sometimes the reconnaissance teams were 100 miles out. The motorcycles were at the French Coast looking over England and the other guys were 100 miles back. They had already arrived; five guys in the town on motorbikes, and they took the town. The French could not figure out what hit them; four armored cars? They kicked off on May 10, 1940, and on May 20, they were at Abbeville-at-the-sea. Rommel [Field Marshall Erwin] was looking out at England in 10 days! Here is the idea; first, there must be initial surprise. By being inconspicuous and moving at a very fast tempo, you will possess the fluidity of action, the quick concentration and shift of field attack. In other words, hit a hard point and then ricochet off of it, but always slicing forward until that

breakthrough is made and then go (sound)! The French and British were still trying to set up their defenses as the Germans went by. So they said, "Well, we will set the defenses up back there," But it was too late for "back there" too. We are talking here about observation-decision-action events, where whole commands literally came apart. You should read J.F.C. Fuller's book, "The Diary from a British Intelligence Officer." He begins with May 10, 1940, the first day when everything is very calm. He describes the second day also as being quite calm. However, on the third day a little nervousness sets in and by the fifth day, the men are going bananas. You can just see it, the whole system is having a nervous breakdown." Now, for your information, the Germans when they went through there had 136 divisions, the Allies had 156 divisions; the Germans had roughly 2500-2700 tanks, depending on whose estimate you believe, and the Allies had about 4200 tanks. The only real advantage the Germans had was in the air. And, yet, it was all over in a 10-day period.

- D. All those things you say, all that confusion and everything is right.
- B. Now, let me show you how it really works. Here is what happens-- they go through a front and they start zig-zagging forward. That is called the _____, the center effort of each one of those going forward. They have what they call the "off-rolling" where the other teams go through and the other ones roll out

laterally, not only are the ones moving forward going strength against weakness, the ones moving laterally are going strength against weakness too. You see? A lateral roll-out has the same character as a forward roll-out. So it is just like a huge grinding machine going through, and the important things are these roll-outs. What exactly are they doing? They are severing communication, artillery support, and everything else. So everybody starts throwing their hands up and they clean out the whole town.

D. Except for your logistics.

B. No, they are receiving their logistics up there. They did it beautifully. It was the adversary's logistics that were cut off.

D. I am thinking of using it . . .

B. Wait a minute. I understand that, but do you see how it works? It is a very rapid action, very quick. Now, since you are going strength against weakness, how do they know when the next thrust is going to come. If they put somebody there, they ricochet off and hook in a different direction. They say, "Well, now we will move over here." (Sound) So they not only get the initial surprise, but also a surprise followed by surprise followed by surprise. In a sense then, what they are really trying to do is avoid battles; in a formal sense that is. Since they are always going for weakness, the adversary is always getting ready for a battle which never

occurs. There are just encounters and engagements, a series of encounters and engagements. It is getting like Genghis Khan, right?

D. Sure is.

B. Isn't it beautiful? They do it at every level. Not only are the companies going forward like this, the battalions are going forward like this, the regiments are going forward like this, and the divisions are going forward like this. In other words, all are on even grounds. So you have columns inside of columns, inside of columns, inside of columns, et cetera. Not only are the companies going like this laterally but battalions, regiments and divisions are also. So, you have these roll-outs, one inside the other--but note what is happening here. You have flying columns here and you also have _____. So then you have flying columns, one inside the other, you have _____, one inside the other, just grinding up the whole front. An uneven advance, flanks everywhere. You see it, here it is. These guys go out even further ricocheting off until finally at some predetermined point when they have created a big encirclement, they hook it together in a circle and the rest are taken at the local level. They also could lay out little paths here because the armored reconnaissance is going ahead. If an area is found where they cannot get through (like a dead end), then they back off and hook back in again. They are radioing

information back all the time. They have this articulated advance going. Then after they get encircled, they all squeeze in together and everybody says, "No bull shit." At some point, they start shattering that front; it looks like a windowpane shattering. This is the way the book describes it. It could be true. In fact, I probably overstated my case a little bit here because once the breakthrough has been made pretty far, unless bad roads are encountered, things will tend to smooth out. Of course, if they throw reserves in, you might still have to hook, but it would tend to smooth out a little bit. But these are very nice, understand what I am saying?

Summing everything up then, that is a typical encounter. Here we are talking about the creation of Blitzkreig. Guderian took the ideas of envelopment at Cannae, Hannibal's idea of the flying columns which were used by the Mongols, as well as the ideas of Napoleon and the ideas of infiltration by Ludendorff, plus some ideas of tank attack, and then added his own ideas. After synthesizing the whole thing, it became Blitzkreig. Instead of a broad front attack, he used a narrow front attack, a very narrow one--local superiority. He came up with the idea of an armored Recce, not only a Recce but a Recce that can fight. Another big thing that the Germans insisted on was "commanders forward," so they could see what was happening and be able to make

decisions on the spot. High commanders would go into combat. They would be right out there with the Recce guys and all that instead of sitting back in villas with cigars in their mouths. Did you know that he [] resigned his commission halfway through the advance in France because the general told him to stop for 24 hours.

D. Hitler told him.

B. Yes, Hitler sent the message down to France. He went back and said, "I resign." Of course, no one can disobey Hitler. So von Rundstedt [Ger Field Marshal Karl R.] sent the order to some other field marshal and said, "Okay, the order still stands. However, we will let you proceed in an armored reconnaissance." He said, "What is that?" The replay was, "Whatever it has to be." So he took all three divisions and moved right back out again. What I am trying to say is that the was insubordinate--armored commanders are all insubordinate, ours and theirs. Once they start to move, they do not want to receive a lot of instruction. In fact, they tend to turn the radios off. A guy once told me, "That was a good sign. It means they are making a lot of progress and do not want to talk a lot." Army generals--you will know when they need help because they are going to scream like wounded eagles.

Extensive communication--obviously because you have all these commanders forward who need to relay information back, all the

way back. This cross talk is constant and necessary in order for their forces to hook through the paths of least resistance. But all these things that are happening are interesting--envelopments inside of envelopments, columns inside of columns. And all of these things that are happening are a part of what we call a _____--hooking forward and rolling out. A very interesting concept.

- D. What happens then when the enemy decides to go ahead and make their own couple of encirclements and get your force in a smaller encirclement?
- B. The Germans had figured that out. Let me come to that in just a minute. Here is what they regard as the key to success--an initial surprise coupled with a fast tempo, a fluidity of action, and a cohesion of armored teams to permit repeated and rapidly shifting concentration of strength against weakness. Now here is the result of that key to success--doubt, uncertainty, panic, chaos. Now the Germans believed in a decentralized command and this was very important. Their lower level commanders had the freedom to exploit opportunities as they presented themselves; not having to wait for instructions. As soon as they saw opportunity, they went--because if they waited too long the adversary could develop strength in there. So, whenever the opportunity was there, they hummed through. They hummed one right at the enemy. Don't

give them time to prepare. So in that sense, the Germans did not have very tight plans; they had very loosely-woven plans. They would even talk about their loosely-woven plans. Most people think the German general staff was very rigid. In some sense it was, however, in the military sense it went with very loosely-woven plans. They allowed the guy to exploit his own independence of action-- this makes a good leader in their minds. As a matter of fact, that is a good point to discuss because in some sense, if you look at the Germans and compare them against the United States, you will find out politically they tend to be more rigid than we are. However, militarily, the Germans are more flexible than we are; we are the more rigid. They seem to be more rigid politically. I find that an interesting comparison. It comes through when you start to read about the history of warfare and begin to analyze it.

Then they talk about superior mobile communication. Once again the idea of trying to maintain their cohesion so the guys in the rear know when to funnel in the final echelon reserves or whatever the case may be. Only essential logistics support the speed and shifts among routes of advance.

Now let's talk about the modern guerrilla campaign. Here it is; big ideas to gain the support of the population! Here is the kind of thing--they want to capitalize on corruption, real or imagined, on an unwanted presence of the existing regime. They want to

organize and maintain mass popular support through militant political programs. The basic idea of what they are really trying to do-- in one sense they have a blitz, in another sense, an abstract sense, they are trying to drive a wedge between the populations and the institutions that are supposed to support, or represent, those populations. So they eventually gain the support of the population. The idea being if they support the population, then the institutions will obviously do what? Crumble! How do they do it? As indicated here, they begin to set up their military and all of the various organizations inconspicuously so that they do not arouse the regime's intelligence and security apparatus. Then, of course, they play this game even at the tactical level: to get inside, infiltrate the military as well as the political organizations to uncover the regime's strengths and its weaknesses. Maybe at this point, they begin the game in a military sense where tiny vans go out and start gathering arms, supplies, and all that kind of stuff. They will hit-and-run against lines of communication in order to get these arms and supplies. Any time they see any strength, guess what? They blend right into the woodwork; they melt right into the environment. That is why you see all these tanks charge through the countryside and get nothing--a big drive for nothing. See what I am saying?

D. Yes.

Then the regime gets all horned off because of the guerrillas' actions, and they are forced to take some harsh reprisal action against the population. And what does that do? It alienates the population from the regime; it actually drives the population closer to the guerrillas, which is what the guerrillas want. Now they are getting more population support and they begin leaning on the population for recruits and other kinds of support. They have larger vans going against larger government concentration. Now the guerrillas can begin pulling off ambushes, sneak attacks, infiltrating against supply columns, controls, strong points, et cetera. As they continue to build up, they can now go conventional force action, on their terms--strength against weakness. Sounds kind of familiar, doesn't it?

- D. Yes. Well, it is familiar, really.
- B. Once again, here is the idea: defeat the existing regime, like politically challenging your right and their ability to govern by using such things as stealth, fast tempo, cohesion, et cetera. The idea being to destroy the will or capacity to resist--like a massive nervous breakdown. What happened to the Vietnamese regime when the North Vietnamese leaped off? Remember? They did not even fight! They just threw their guns away and walked into Saigon. Huh? Highly psychological. Key to success and to gaining the support of the population, both psychological and physical. I have an

array of things we have to do here. I might have left a couple of them out. Once again, try to demonstrate our government weakness. The big thing here is environmental background, using this as a basis for their inconspicuousness or stealth or whatever you want to call it and finally, of course, their sanctuaries (their bases for resting and recuperating).

Now let's take all of that and look at the results, the successful results: Poland, 1939; France, 1940; Balkans, 1941; Russia, at least until the winter of 1941; North Africa, 1941-42; Russia, summer of 1942, in the Caucasus; Russia, February and March, 1943, that's Manstein's [German Field Marshal von] achievement. The advance through France, Allies, 1944; Manchuria, the Russians against the Quantung Army, 1945; Middle East, the Israelis against the Arabs, 1967; Middle East, Israelis against the Arabs, 1973.

Unsuccessful: Russia--interesting case here. Why was it unsuccessful? What happened? They froze up; they could not move. They lost their mobility during the fall and winter of 1942. The principal reason for this is they divided their force; they started moving against Stalingrad. You see, strength against strength. They frittered away their reserves; they washed them out. North Africa, 1942; the principal reason there is Rommel had his supplies all cut off by the British. In other words, he lost his wherewithal. Russia, summer of 1943, battle of Kursk . . .

D. Where was his internal tactics here?

B. He just had all of his wherewithal drained away. He was a good tactician.

D. He is a very good case for what you are saying.

B. Yes, that is right. But then during the battle of Kursk in Russia (summer of 1943), the Germans sent weakness in against strength. They were going against more Russians than what they had anticipated when they began the campaign. Local superiority! The Russians were laying in the weeds; the Germans knew it and they still executed the attack. You know what happened? They lost badly. From then on, they lost the rest of their battles. From the summer of 1943 on, the Russians kept on driving them back into Germany. So, what I am trying to point out, even the people who tend to develop these new methods start violating their own dictums. In that sense, there were some very painful consequences. Okay, then Ardennes, 1944-1945; immediate success initially, but then they did not have the wherewithal in order to continue on with the attack. That is interesting in a sense because in 1940, guess where the Germans came out of? The Ardennes! So guess what? They came out of the Ardennes and did it to us again! We did not think they would come out of there again because of the forest and also the roads were bad. The French and the British did not think

so in 1940 either. Apparently, we are not fast learners.

D. There is a good example. It was no longer working because they did not have . . .

B. It did work initially. But they did not have the air power or wherewithal. However, when you figure what they were up against and the kind of force they had, they did a magnificent job. It almost worked.

D. They never had enough to back them up though.

B. I agree. But don't forget that they had a two-front from that standpoint. They tried to defend themselves against Russia and the troops spread along the western border. They were really hurting.

D. What you are saying makes a lot of sense, but here is a case without the corps, without the stuff behind them. Again, you keep . . .

B. I am not knocking it. No, I agree. That is what I said. They did not have the wherewithal. That is what I am taking about. I said wherewithal.

D. Oh.

B. Sufficient backup to push on through, that is what I am talking

about when I say wherewithal. Just like Rommel had the right ideas, but he did not have the wherewithal in North Africa after the British cut his supply lines.

D. They had the confusion you are talking about.

B. No, they created the confusion but they couldn't extend it far enough, and the Allies recovered because the Germans did not have their wherewithal to exploit as much as they wanted to. In other words, the Allies cut off their supply line so Rommel was unable to keep funneling troops in there--using your term.

Okay, here are the guerrilla results. American Colonies, 1775-1781; Spain against Napoleon, Russia against Napoleon. Germany, now here is an interesting one: Lethi Warbach, a Prussian Lieutenant Colonel, with a few thousand German officers and a lot of natives held off 250,000 to 300,000 British soldiers and 30 generals. And as I understand it, Lethi Warbach was a Lieutenant Colonel when the war started in 1914 and the Germans never did promote him. He was still a Lieutenant Colonel when the war ended and he surrendered.

Arabia--of course, Lawrence [T.E. (of Arabia)]; China, Mao Tse-tung; Russia, Partisans; Yugoslovia, the Partisans; Indo-China, Ho Chi Minh [Former President of North Vietnam]; Algeria, Bengella; Cuba, Castro [Fidel]; South Vietnam, of course, Ho Chi Minh. Here we fought the Red Coats; here we behave like the Red Coats.

Unsuccessful results: Philippines, the Insurrection; South Africa, that is the Boer War, second half. The Boers turned to guerrilla action and did very well. Actually, I might be unfair to them. Maybe I should not give them an unsuccessful mark, in fact they realized a lot of their objectives. They forced the British to give them the kind of things they wanted. They actually went to the armistice table and damn near got everything they wanted. So I might be unfair by labeling their war as being unsuccessful. I tell people that it is just hard to categorize many of these conflicts. I could be accused of being unfair, and I would agree with that. The Greeks, 1944 to 1949--the reason why they lost is Tito [Josip Broz, Former Yugoslav President of the Council of Ministers] would not provide them sanctuary anymore because he did not want to have Stalin [Russian Communist Leader Joseph] on one side and Stalinists on the other. The Greeks were Stalinists, so he dried up their sanctuary. Of course, Magsaysay was in the Philippines here, and Templer and Johnson were here. Note that they were very concerned not to isolate the population. They took extreme care in that sense.

Okay, the question now kind of surfaces. (Long pause.) Now what I am talking about here is a lower level of distinction, both organizational and environmental, you know, where you become more and more inconspicuous. Whether you are talking about it from an

organizational viewpoint, an environmental viewpoint, or whatever-- it is very difficult to observe a procedure or to see what is going on.

- D. You get less inconspicuous--the dichotomy here between 100 and centralized control. Number two. You must be able to allow that person to decentralize if he wants to at that point.
- B. Beautiful. I am going to come down with that explicitly. That is exactly right. You are right on. Okay, that is the point I am trying to bring up here. Then if you want to collapse this into a convenient way--the words we have been using? In other words, get inside of the adversary--observation, decision, action of mind, space, time frame, work--in whatever way you want to proceed.
- D. Has to be done from the central corps.
- B. Hold off. You are preempting me. I am going to come to that. All that I am trying to do now is establish the thing. You are trying to get me to talk about something I don't want to talk about yet. I am just holding you off because I am going to show you what I am talking about here. All I am trying to do now is just in a very general sense answer that question, that is all I am trying to do.

Now, why or what was the result? Here is the kind of result we

are talking about because such activity does this. We recognize this all the time. And this was recognized by Sun Tzu in 400 B.C. and more recently by Fuller in 1918 when he watched that little Ludendorff offensive. So really the point I am trying to make-- why we have it very nicely generalized here, maybe it is a little more conveniently expressed--it has been known for awhile. (Laughter.) It is sort of embarrassing in a way when I put that . . .

(End of Tape 3, Side 2)

- D. You are going to lose the circle, especially when it is highly developed in that area. We want to start talking about that.
- B. Well, I will discuss that when I come down to the end here. Okay?
- D. Yes.
- B. I am trying to develop a central theme here. Now are you ready to go?
- D. Yes.
- B. Now we are going to answer one of the things I held you off on earlier. You know, what kind occurs here. Let's look at this to get a feel for it. How can we defend? Well, here, in some sense, the strength of a blitz can also in some sense be their weakness. Remember we are talking a very fast tempo, and we want to keep things going fast. On the other hand, we want to be able to shift.

In other words, always try to put strength against weakness, which implies the idea of shifting gears. It is very difficult though to shift gears and have a fast tempo and also maintain cohesion because it takes a lot of coordination. The point that I am trying to make, the key point, is--there is a difficulty associated with that. I do not mean it cannot be done but that you have to stay on top of it all the time in order to make it work. With that in mind, why don't we take a leaf out of the guerrilla's notebook. Now most people when they start talking about the blitz, they want to run a kind of (sound) with everybody blowing the other out of the way. You don't have to react in that way. Rather than going and trying to annihilate them, why not try to break up their cohesion instead. Hit them at certain points to try and fragment the blitz a little bit. Do you follow what I am trying to say?

D. Yes.

B. The guerrillas--do you know how they ambushed the supply columns, how they hit the strong points? Well, the thing we are going to do here is take a leaf out of the guerrilla handbook but with some difference. Instead of being equipped like guerrillas, we are going to be equipped like a regular army but we are going to use some of the guerrilla's ideas. So in that sense then, the way we can hit them is--first of all, if we do not know where they are going to come

from, or have to start out on the defensive because of political policies, or whatever the case may be, we certainly must have an outpost in order to receive some kind of an advanced warning--some kind of control. Once it starts going, we can start shoving in the armored reconnaissance teams. Now they will be working with their armies and they will try and do two things: (1) to determine both direction and strength, that thrust, because the commanders in the rear have to know that and know how they are going to allocate their people and their support, and (2) at the same time, while they are doing that, the armor reconnaissance is also going to start harassing them--hitting them and delaying action. You know, hit them, back away, hit them somewhere else and back away again--the hit-and-run attack. One of the ideas to erode part of that cohesion is try to begin the process of draining away that momentum of the blitz attack. Then, of course, the high speed mobile anti-tank is brought in followed by the infantry and armored team. They are moved into stable defense positions. Don't forget now, the enemy will be coming into your territory and you have the advantage. So you can stack your people much more cleverly than they can. They are coming to you, so you can be a little bit inconspicuous. Stealth (sound)--so when they come, bang them! Also when you are doing this, they are not going to do it from a static viewpoint; it takes mobility. So they come out and make a timely hit into the flank of an armored column and then they try to

send people out to go after them to adjust, they will draw back instead of trying to stay there. Then when they draw back, you have somebody from another direction cut them in the other flank. See what I am saying?

D. Yes.

B. Just like air-to-air. That is what I am trying to tell you, What is going to happen with that cohesion when you start doing that kind of stuff? Instead of the mass charge of tanks, you are going to start breaking up the cohesion. Then, when you run these counter-attacks, they are going to be very sudden and sharp, but short. And when they start trying to resist, you back out and hook them from a different direction. That is what the guerrillas do. Then the Belisarius technique, the deep counter stroke, where you stroke them even when they are moving forward. Get the reserves, go down a flank, envelop them from the rear. Which is another way of saying it is a blitz in the opposite direction--and you launch it even before they stop their own forward movement. In fact, it is even better. Manstein, in 1943, did that very nicely. The Russians came at him, and he even opened a corridor for them so that they would come through very rapidly. Boy! they came steaming right toward his headquarters. Then (sound) he captured all kinds of troops and recovered Kharkov [city in Russia]. In fact, it opened up their whole front, and they had nothing behind it. The only

reason that the Russians were saved there was that the rains set in and the mud showed up, which made them immobile. But they had nothing. They had them all under the funnel; cut them all off. What I am trying to tell you is a defensive-offensive is a nice counter stroke because what happens is--a guy throws his whole punch in and there is nothing left. You cut him off and it is your turn to roll.

(Interruption)

So then, you come down--here is your idea. What is so different from everything we have discussed? We are beginning to see the same kind of words beginning to do what? Emerge over and over and over again! What is so different about that from what we have said? Not much is it. Now it does put a lot of pressure on the defensive team. You must have good commanders and all that kind of stuff in order to play the game. But the results are even greater because now the guys have cut them off and there is nothing behind. A good example, one guy said, "Let's assume that we had actually countered that Ardennes offensive of the Germans and cut in behind them and hooked off that Ardennes failure where they could not get out, back out of the sack. Hell, it would only have been a bus ride to Berlin." You know what I mean--bought a ticket, boarded a bus and rode it all the way! We did not really fight that battle very well. We still do not understand the blitz. The day before

yesterday I briefed an Army three-star general, and he agreed with me. I have the Army's latest book, FM 100-5, Operations, July 1976.

I read it and realized they still do not understand the blitz.

They are a little closer but they still do not quite understand it. The Normandy Beachhead thing was a disaster. There, we were just outnumbered. In exploitation days, we had the manifestation of the blitz.

Summing all this up then, we have the pattern for a successful operation--goal, plan, action, support, and command. Obviously, there has to be a goal to work toward; a plan is needed to realize the goal; action is needed to unfold the plan; support is needed in order to do the action; and command is needed to mesh the whole thing into a unit. Then putting all of this together is nothing more than a summary of everything we have been talking about.

(Long pause.) Now I am going to discuss the thing you were talking about earlier--remember I said I would show you later. Under command, you have a problem and you have a dichotomy. If you say decentralize command, everything is thought of in terms of decentralization, or centralization. What I am saying is--looking at it in somewhat of a distinct sense--decentralize in a tactical sense so that the lower level commanders are permitted to take advantage of a situation as it presents itself. On the other hand, these kinds of things really should be from a centralized viewpoint. I am talking about your policy, your sketching of flexible plans,

your allocation of resources to where they should go, and also to shift the overall center of action, in that sense.

- D. To relate to the lower commands the importance of what they each are doing and why they need to be where they are or why it would not make a big difference to the overall operation if they disengaged. But the decentralization is the most important part of it. You are doing the same thing on the ground, right? You are trying to get that guy whether it is an offensive or defensive battle; you want to have all the options and not just make one thrust.
- B. That is right. Note the words. See I was very careful. Look what I did here. I not only provide the basis for decentralization-- that is why I try to separate it. It is hard to say what is strategic and what is tactical because they blur across one another, as you well know. I am talking about tactical in terms of lower level here. Note that I talk about "sketch flexible plans." I do not say finalize. I am talking about having loose plans but yet with some substance. You really need to have your plans in some kind of framework in order for them to unfold in a certain way. However, they cannot be too tight, otherwise it would be impossible to use this strategy I am talking about. You see if the plans are too tight, then a guy has no freedom of action in order to exploit opportunities. So what I am trying to do is get that distinction there so it makes a workable kind of a scheme.

D. Are they teaching that kind of thing now?

B. I don't know. I briefed General Hollingsworth the day before yesterday. He liked it and said, "That makes sense. That is right on." Then he gave me some vignettes of what happened in Europe and some other cases. In fact, he said, "This presents a marvelous presentation of my work, but I want one improvement from you on this." I said, "What is that?" The General said, "Put a box around that 'action' and make sure they understand it." He was right. He recognized what I have been talking about--everything else depends upon this right here. This is the driving mechanism!

D. That surprises me. I am glad to hear that because I thought it would be just the opposite.

B. No. He said, "That is important. You should put a box around it. Make sure they get the message." I told him, "To some extent I have already done that. Wait until you see my next chart." And he said, "But I still wish you would do that." I said, "I will. I have not had the chance to do it yet." You see what I have done here, Instead of talking about the so-called principles of war, notice I am very careful, I call it a "Pattern for Successful Operations." I do not look at it in terms--principles are kind of things in themselves. I like to look at things in terms of patterns or frameworks--the way you operate. Just like if you want to do a decentralization within a pattern or framework for

centralization. I tend to think that way and it does give you the flexibility, the fluidity, to take those opportunities. I do not want this thing to restrict somebody. If it does that, then it is not worth a damn. Yet, on the other hand, I do not want it to be inconsistent either. If it is too loose, then it will have no meaning. Obviously, after you look at this--and General Hollingsworth saw it, I saw it, and you have already detected it--this action thing tends to be rather paramount. It is like the driver. It is like the superstar and the other things kind of revolve around it.

D. The command makes the action.

B. That is right.

D. The action doesn't make the command, so the command is more important. That guy in the tank . . .

B. I recognize that. The command is the most important thing. The commander glues it all together. Everybody asks, "Why did you put the command at the top." I said, "First of all, you have a goal, you have a plan, you have an action, you have to have the support, and above all the command to glue the whole thing together. The commander glues it all together to make it happen. He has to glue that operation together, to synthesize it, to make everything unfold.

- D. It is the guy's head in the airplane that is making the determining factor.
- B. I said I was very careful. The command has to glue everything mentioned above together. The commander is the gluer. He is always worrying about this, and this, plus himself.
- D. The actor is what I am saying, not the action--the actor, the guy in the airplane who is fighting another airplane. It is his head.
- B. Sure. But look what I am talking about--observe, decide, and act. The reason I put it here is because Army guys think in terms of move, shift, concentrate, and disperse. I do not care which way you think of it. That is why I put a parenthesis here. But this is the action that is taking place. These people are responsible for this action, obviously.
- D. But not if it is going to be the AWACS [Airborne Warning and Control System] making all the decisions.
- B. Whoa, now your--that is beautiful. Your right on! That is beautiful! We are going to come to that later. What you just said always comes up; it comes up after I go through this page. Eventually the guy will say, "What about AWACS? A couple of them want B-1's." The point I am trying to bring out here is when the General said, "Put a box around it." In some sense, I have done that. Let's illuminate a point on the previous page. Here is the key. The

ability to observe, decide, and act inconspicuously and more quickly, or if you want to put it the other way--they are equivalent statements is what I am trying to say. This then permits you these opportunities; I call them opportunities. (Hollingsworth liked that.) Then with this, you can do everything. See?

D. Yes. The guy though? I mean, the guy?

B. But I wanted to put that in there. The extraordinary commander, not just a commander, but an extraordinary commander. That is what I am thinking about--Chang and Chee. Let the commander be the Chee and the other side guy be the Chang.

D. That is also the reward.

B. Yes. You see what I have done? I am still going to put a box around here as the General recommended. However, in a sense, I did it because I took that and said, "Here we go." Pressing on, what have we done then? Now do you understand what I am talking about when I talk about assymetric fast transient--going strength on weakness. Right? We are trying to do it quicker. I do not care if you are talking about observations, decisions, actions, moves, shifts, concentration--aren't those assymetric fast transients? So isn't that the basis for tactics and strategy? Note what I did here. I have tactics before strategy? That was not accidental; that was deliberate. The reason being is

your strategy is very dependent upon your tactics. You can have strategy but if you do not have the right tactics, the plan will not unfold. So, your strategy is very dependent upon your tactics. If you are very clever in tactics, then you will have strategic options you otherwise would not have.

- D. The whole thing is going to go to hell in a handbasket if you do not have a good objective.
- B. That is right, but that gives you the possibility. So that is why I say it in that sense. Now, coming back to your thing, here is what I have not done yet--but what are the obvious implications of this? After you go through this thing, the one thing you will want to be is a little bit more inconspicuous. Don't do some obvious things. As long as you are more inconspicuous, you will be a little bit quicker. You are going to unravel the other guy. And that is the whole point, assuming you use it. If you do not use it, it doesn't make any difference. So you want to be more inconspicuous and quicker. What you are actually doing is inhibiting the other guy's ability to observe, decide, and act--or in a relative sense, in proving you are relative to him. I do not care how you want to talk about it--getting into his framework by doing this. If we look at it from an operations, acquisitions, and support viewpoint, then it suggests a couple of examples which I told General Hollingsworth about. I said to him, "You had

better have the right kind of officers to lead, because you could have a disaster. In other words, if you are going to put guys out there who are going to make these tactical or lower level decisions, you cannot have them be cocktail and pussy circuit officers. The lower level commanders must be good. They must be guys who understand, who can take advantage of the freedom of action and deliver the goods--produce the results. So I asked the General this question, "Do you think our promotion system is producing that kind of officer?" He did not even hesitate, he said, "Of course not. That is the problem. We have to turn that thing around; it is a disaster." He did not even hesitate. You know, I put them in a box right there. I did it deliberately. He said, "Of course not." I am really sore about that. Those are the kinds of guys we need.

D. But the only thing that turns that around is war.

B. He recognized that and he made that point. The fact that when you have war, the pressure builds up--in some sense, you cannot tolerate these other kinds of guys. So you tend to become a little more rational or more reasonable, or maybe more real world in making the decisions you make. Now in acquisition--if you are talking about things being more inconspicuous--I am going to give an example in terms of operations because I am going to probe this in detail. An example in acquisition: We are talking about things being more

inconspicuous and quicker in order to get inside the other guy's framework. Do we make decisions on that basis regarding tanks, airplanes, et cetera? Of course we don't. We should think in these terms, this kind of a framework, because when I think of this, I think of certain airplanes that are very big and very slow. They are not inconspicuous and they are not very quick. It seems kind of counterproductive to the things we are talking about here. We are going to see some of that coming out of the AIMVAL/ACEVAL tests. You well know about the tests out there. You probably have already heard of some of this stuff.

D. I have heard about it.

B. Now, the F-5 is not that outstanding of an airplane in terms of doing whooferdils and dandorees, but it is kind of hard to observe and it does cause little problems for the big airplanes--the F-14 and F-15.

D. Is the state of the art in radar going to change that?

B. Well, you see that is the usual argument that technologists use, "Well, we are going to give you a better radar." They have said that for 15 years. I don't want to say too much because it might be classified. You can spoof and defeat the radar not necessarily by having an EW here; but just by certain kinds of maneuvers. If you have a couple of airplanes and they start criss-crossing each

other, the radar loses lock-on--it cannot sort.

- D. Why do the guys who work for you do a good job?
- B. Why do the guys who work for me do a good job? Part of it is that I am kind of concerned about whom I pick, but that doesn't necessarily mean they are going to do a good job. After they are on board, I give them a lot of responsibility.
- D. You give them responsibility. You give them a broad policy guidance, right?
- B. Here is what I do. I play that game. I will allocate resources, help them out, formulate the policies, sketch an overall plan but leave them lots of room to maneuver so that they can put things together--just general guidance. I tell them, "How you do it is your own thing."
- D. Why does a 4-star general think he has the best damn brains? He doesn't. There is a better brain sitting around there. Everybody had his own thing going.
- B. Let's say you are going to be at a very high level--maybe an Army group commander or a Corps commander or some Air Force commander. There is no way you can know what is going on everywhere. If you start worrying about details, you will become ineffective in terms of stitching the overall pattern together. And you have to

stitch the pattern together. So you have to develop some kind of a rhythm or modus operandi, or whatever you want to call it, so that you have these other guys playing their roles and you are using their synthesized information to make the whole organism function in a very effective manner.

- D. Yes, but it is functioning out there. You are taking the inputs and finding the best way to move it around. You are not doing the functioning from the top. All you will do is impede it if you try to do that.
- B. But that is one of the problems. If we go out--like your comment about AWACS--we will go back to that. AWACS by itself, in some sense, doesn't bother me. In another sense, it really causes me extreme heartburn and pain. If we use it as a device just to identify penetrators, to determine where they are coming from, so that the commander can use the information to decide whether to send out fighter aircraft or some kind of interception technique to stop them, then that is fine. But if you start using a device to tell the pilots what to do and everybody else what to do, then the guys have no freedom of action and we are right back to the same kind of problems we were talking about earlier. These guys would be unable to exploit any opportunities which may open up. Now they are talking about giving platoons and battalions beacons to know where they are. You have probably heard that; AWACS and some

kind of other stuff. I don't know if it was AWACS, but certain things. Now, by having a platoon or battalion out there with beacons by itself does not bother me, but the fact that you actually can do that does. It is just like the railroads that could transport all that ammunition in the 19th century. We have kind of a parallel thing here. The commander back at the rear says, "Now that we can do all of this, why should I let the guy up front make those decisions. I know where he is. I will tell him what to do." Do you understand the psychology I am giving you?

D. Yes, sir.

B. By itself, the AWACS is not so bad. It is when you begin to examine the ways these devices can unfold that makes them disturbing. Like the guy can say, "Hell, I know where all those guys are. I can keep track of them, so why not tell each guy where to go." Yet he really doesn't know. Oh, he may know where the platoon or the battalion is but he really doesn't have an understanding of some of the more subtle problems that the commander or the people out there at the battalion or platoon are beginning to witness. So, he is going to say, "Hey, Platoon, you go take that hill." One of the guys in the Platoon says, "I wish you would not have us do that." The commander responds, "Bull shit, I am the commander. Go do it!" Well, after a few platoons and battalions are wiped out, you know what they will do with those beacons. (Laughter.) They will smash

them. That is my point. I am trying to drive it home in that sense--centralize versus decentralize. Now that doesn't mean you should not have centralized control. But centralized control-- I am trying to lay it out in the sense that I am talking about it here--yet permit the guys in the lower level--well, that doesn't mean necessarily that you cannot have the beacons. What scares me is that once you have beacons, what does that lead to? The fact that you have a blip on a goddamn plastic board somewhere, an electronic board somewhere, and all of a sudden you think you know more than you do. That is the point I am trying to tell you. And now because you are all of a sudden smart due to the electronic board, you are equipped to make some very appropriate decisions. Dangerous! This is one of the arguments I got into over at ARPA [Advance Research Project Agency]. They got mad at me because, you see, they are behind all of this stuff. I said, "They are going to smash all of those things." The ARPA guys said, "That's unfair." They started hollering at me. I said, "Wait a minute. I am not against those in principle. I am against what they may lead to." The guy who was in charge of ARPA really started to chew me up. I said, "Listen to what I have to say. You missed the whole point. Did I say that I was against centralized control? Did I really say that?" He said, "No," I said, "What I am concerned about is that we are going to try to apply centralized control down to such a low level that the guy will think he has adequate information when actually he doesn't, and

he is going to cause some catastrophies and disasters just because he thinks he has those beacons out there--he 'thinks' he has enough information when in actuality he doesn't and he gets into trouble. That is the problem." The ARPA guy said, "What are you going to do, throw those away?" I said, "No, you do not have to do that if you can get the people to react. It can be used at the local level where they have sensors and that kind of stuff to analyze the information; to use the information there at that local level would be beneficial. But to relay the information back to the White House or this building or that building so they can tell a platoon what to do would be disasterous. That is my whole point. Don't misconstrue my point. What bothers me is every time I look at this, I see where they want to get this information back to the Pentagon and the White House--and they are going to do that. Now that is what disturbs me because I do not believe it is going to work.

- D. You are 100 percent right.
- B. I said, "That is the issue I am coming down hard on. I am trying to draw that distinction." And the minute I finish saying that, everybody says that I am against this and that. Listen to me carefully, I am not necessarily against this and that. I am against certain aspects of this and that, I will tell you that for sure. I am drawing those distinctions.

So back to your AWACS. If they are going to use it on that basis, then I do not like it. What I would like to do is rip out all of that equipment and use it only as a basis for incoming strikes instead of trying to use it as the device to inform a battlefield commander on what action he should take. That is what I am trying to tell you. I am going full circle back to that point.

D. You are right.

B. So, back to the last chart here. You get implications as to why we have not done that obviously. I am just giving you some speculations and things off the top of the cuff that should be sorted out, and we are going to try to do that.

Okay, what are the implications? I am not even sure how I am going to approach that question yet, like I did not know how I was going to approach this. Guys ask, "How are you going to do it?" I say, "I do not know." I cannot even answer that question. I have some ideas and I have made some notes, but after I drive down there I may change because, you see, there may be a better way of doing things. One idea that is obvious now is that of operations, support, and acquisition.

D. There is too damn much to carp on in that part. There are too many things that everybody is a damn expert on, according to history. When you try to prove a point, there are too many other places

that shoot holes all through that damn thing. It is; "This part in the beginning, this part in the middle, and that part at the end"--these are facts your mind should know to present arguments, but to try and lay it out and build that point through like that--well, everybody is going to start shooting holes at it. And before they really know, before they really understand it, they will have forgotten all about it. They will argue like hell because they have a closed mind by the time you get to the end.

- B. No, actually I have received many different reactions. Probably because the listeners have had so many different experiences. Oh, yes, I have gotten some of the reaction you are talking about--like yesterday, for example, the ARPA guys responded in that manner. In fact, that was the first time I received such reaction, and I was surprised by it. You kind of speculate the areas where you are going to have some difficult points because of the various backgrounds of the listeners, their experiences, et cetera. And I find out that I get surprised many times. Now, I thought the Army would become tense when I went down to the history part of the presentation--but the first and last parts I was sure they would buy off on. Well, the Army loved the history part of it. Hollingsworth said, "That's beautiful." Some of the other guys suggested that the first part actually be taken out; the part you liked. Now, I am not knocking it, I am just saying that I have received many different reactions. Some people like it all, some

people say, "Make it shorter," or "Throw out that first part, just talk about the history." Other people say, "Well, maybe it is not necessary to include all that stuff about the war in there."

I respond with, "Well, I originally did not want to put it in, but so many people suggested that it be included that I went ahead and did it." Remember? I told you I really did not want to go through that--it really was not my whole idea.

- D. You had to do it to reinforce your own mind.
- B. Yes, I had to reinforce my own mind to show people that we, indeed, saw these things coming out.
- D. You are picking out everything as you go through all that history to reinforce your thinking. But there is a whole lot more to it.
- B. I was convinced that I was right. I was convinced that my theory made sense because I had researched history, science, and all that stuff, plus I was very familiar with air-to-air combat. When it comes to air-to-air, I really know that game. But this seemed right for air-to-ground too, particularly when I used to look at the external manifestations of the blitz. But I felt I had better look at that more carefully, so I went back in history and came forward to see what happened. That is why I spent a lot of time on it. I wish I had not done it in one sense; but on the other hand, I am glad I did because I have a much deeper appreciation for

history. Instead of thinking it as a battle with everybody charging one another and a lot of bodies flying around, I can see now there are some very different distinctions. Like one of the big distinctions you have in war, particularly in armies, is the idea of fire and maneuver. You have heard of that--or fire and move. Now in some sense, you get the argument where some people believe that one is the handmaid and one is the servant of the other; like maneuver may be the servant of fire, or fire may be the servant of maneuver. What I am trying to say is, some people say you maneuver in order to fire. The issue is to fire; you just get into position to blow everybody away. The other people say, "No, that is wrong." Both flavors are very strong. The argument comes, "No, you really want to use fire as a basis for maneuver."

- D. But your part brings that up perfectly. You do both. It just depends upon the situation. Do you have flexibility? Can you hit that thing and get the hell out and maneuver? Or do you fire and then get the hell out of there?
- B. My theory is more the fire in order to maneuver. My study leans more that way, in the sense that I use the fire part to wedge them out so I can put the shock on them by moving very quickly against them. It tends to lean more in that direction.
- D. You are just telling me you go into the hard part and then get the hell out of there to maneuver and fire in a weaker spot.

- B. But what I am talking about is that people maneuver in order to fire and blow people away. My fire is to open things up so that I can get the opportunity to maneuver even though I may fire again. In other words, I am trying to put the shock on him by always having things happen very fast. So, my plan would lean more in the direction of fire in order to maneuver. I understand what you are saying. I can see it either way; however, when you start talking about maneuvering to fire, most people will move their trucks or artillery so they can blow everybody away. It is an attrition game, but the Germans did it differently. They used the fire in order to open everything up so that they could go like hell and occupy the opponent's command structures--communication lines and support areas, et cetera--and then they would just hold. That was the idea of the blitz. It tended to be a fire drill in order to maneuver.
- D. Well, you can just back away from them. While he is doing one, the other guy is doing the other.
- B. Then you come back to the point and you say, "Right." So if that is the case, where is the argument resolved? Where it finally resolves! You want to be a little bit more inconspicuous and a little bit quicker regardless of which one you are using. You see where we just went? Just through those arguments you and I went through here.

- D. And allow the guy who is down there with his five tanks to make that decision.
- B. Yes, that is right. But you must have the right kind of commanders. There is a danger here, but it is a recognized danger--you have to have good commanders! If you do not have good ones, you keep firing them until you do.
- D. But we will never do it in a peacetime service.
- B. No, I agree. Well, I do not know if you thought that was all worthwhile or not.
- D. I thought it was outstanding.
- B. There are a lot of thoughts here and I am trying to collapse a whole lot of history into a very short paper, and yet capture the essence of it. I had to condense so much of it, which caused me a lot of problems, just because I did not want the briefing to be this long. I am still condensing it.
- D. Well, we are damned near to the point where the guy was over Hanoi in his F-4 and the Secretary of Defense writes from the Pentagon and asks, "Mr. President, should he drop it?" If nothing else, you have to go back the other way.
- B. Yes. Now that I have briefed you on this, let us go back to the issue we were talking about. (You can take this paper with you.)

Let's go back to the issue we were talking about--fighter pilots. Remember, I said it was related? Now, you have one guy--in a sense what is the guy doing? He is really trying to be able to do what? To get on top of the situation! He is able to accomplish this only because of his mind, his coordination, his physical being, and the way he perceives things. He is trying to do something more inconspicuously and quickly than the other guy--in a competitive sense, but in a sense where he will receive a reward for being the best. In other words, it is dependent upon what he can do--that challenge!

D. That relates directly back again to the question, why does a guy simply do a good job?

B. So you have this one guy over here in a competitive situation. This one guy can be more subtle or inconspicuous than the other guy, and also a little bit more guile in a time sensitive situation. He has put himself in a position where he is able to take more appropriate action--because he is more decisive and quicker than his opponent. So you are back to that kind of inconspicuousness and quickness, where you want to be--no absolute value. As long as you are more inconspicuous and quicker than the other guy, you can cave him in.

D. I really like that a lot. It really makes a lot of sense.

- B. When you really come down to it, the whole thing is tied into your abilities to observe, decide, and act. Some guys may be stronger than others in one of the three. Some guys may say, "Which one is stronger?" I say, "Well, now I do not really know," (Laughter.) Every time we do something like that, one guy wants to put more emphasis on a certain category. I will tell him, "That is a very dangerous thing to do, trying to emphasize one more than the other." It is necessary, you see, to keep the abilities, observe, decide, and act, grouped together, because each one--for instance, your actions are dependent upon your observations and decisions; your decisions are dependent upon your previous action; what you are observing now, et cetera. So, I kind of see them as a trinity or a trio. It is difficult to make a decision independent of the action. You see the problem I have with that. Maybe if I think it through more in the future, I might come up with a better answer. I do not have the tendency to want to separate the three at this point. The idea of doing so gives me an uncomfortable feeling--just knowing that when I observe something, I think about it, and then I take action. I just do not feel right when I go to that separation scheme.
- D. John Boyd, you are an exciting guy. You really are! You have a real nice head there.

B. So I do think--but I am not sure--this works in there, and I think it is related back to the things we were talking about earlier, No matter how I brief this--I have been criticized a number of times. I do not know how to present this thing anymore. I tried to anticipate, "Should I emphasize this, go quick here, slow down there." So what I tend to do now is go with the guy's pace, try to establish a rapport, and if he doesn't like it, then I speed it up. If he likes it, then I will slow it down. If questions are asked, I spend more time on presenting it--because I have read that stuff and I am pretty much up on it. The briefing is now just a matter of, "I can talk a little bit more or I can talk a little bit less, or I can hurry it up a bit faster." Of course, when you are speaking to a large group, it is more difficult. Then you get into a big skunk fight because different people want one thing emphasized more than another. You see that as you go through the presentation. (Laughter.) It is very funny--very interesting.

D. If one army is being run (controlled and commanded) by a centralized authority, the other army is being controlled by a bunch of people down there who are making their own decisions, then the capability to get inside the other person's zone has to be a lot easier.

B. If you get a guy who is very rigid, a centralized controlled army--a good example there would be the Israelis versus the Arabs.

D. Because what you have done is give them a certain space which is very narrow.

B. Think of the Israelis; they are probably a good example. It is interesting that the Israelis instead of adopting the approach of the United States--or the Russian or British approaches (the Russians want a mass approach)--they adopted a German approach, you know, the Blitzkreig. The Israelis decided to go with the Guderian approach--they are blitzers. You say, "I wonder why they did that?" But when you look at it, you see why. The Germans adopted it for the same reason--well, maybe the Germans did it for a more prestigious reason, but basically for the same reason. Think of Germany there in Central Europe with adversaries on both sides of them--the Russians on one side, the French and British on the other side. So they really could not afford to get into what they regarded as a war of attrition, although there were times when they managed to get into such a battle because of dumb decisions made after they became involved. But from an ideal viewpoint, they tried to use the Guderian approach. They recognized the fact that they could not fight in all perimeters at once, so they made quick slices, went back, hosed that guy and went over and hit the other guy. They hit the Poles, then came back and hit the French and the British, then came back and hit the Russians, et cetera. They were not fighting on all of those fronts at once until the very end of the war, after everybody organized against them and squeezed them in. But think about it as it begins to unfold. Think about the Israeli operation--what did the Israelis do?

Instead of trying to fight everybody equally, they did the same thing as the Germans. They would go and (sound) use one part just to kind of hold people lightly while they would run around very quickly to get their score, then they would ram them back across the interior lines and go over and hose the other guy--using blitz techniques.

- D. With great plans, right? Super plans! And the individual people at the local level implemented them, they were allowed to.
- B. The Israelis are very proud of the fact that they can start an operation right in the middle of an operation, with it all being replanned at the local level. They will say, "This is not working. Let's do it this way." Then they will sit down right on the spot, out in the battlefield, to change their strategy. They will say, "Okay, now we will do this. Does everybody understand? Are you sure you have it right?" (Sound.) That is flexibility; that is adaptability. Because when that is happening, the other guy thinks he has you figured out; however, in the meantime, you have changed the name of the game. Therefore, what is that going to permit you to do? Even with given equipment and that, it allows you to get inside the other guy's observation - decision - action. Do you see what I am saying? You get right inside the other guy--you can work more inconspicuously, you can work more quickly.

- D. What makes a war plan work? The plan itself or the people who believe in the plan?
- B. You know there is a famous statement by Moltke [Field-Marshal Count H. von]--I don't know whether it is true or not, but I guess it is--"Any plan that was carefully laid out before a war is no longer valid the day the battle begins." You have heard that statement before. Moltke made it around 1870 or something like that. He said, "German plans are very nice until after the first couple of days of operation, then they do not seem to correlate anymore." That is why the Germans keep talking about "loosely" conceived plans--very loosely woven--flexible. Just like the Israelis do. Whereas the French tend to have very rigid plans with the end result being a catastrophe many times, just because they feel the original plan is the best. In fact, they had the so-called FR Princi Paul instead of the Schver Punct. Whereas the Germans tended to keep moving forward along a certain line, instead of ducking in a very rigid order thereby blowing their own people away. Then they would roll out the same way. The interesting thing is when you go back and look at the blitz. Whether you talk about the infiltration techniques, the guerrilla techniques, or the blitz--they are all infiltration. The only difference is the blitz is a mechanized infiltration.

(End Tape 4, Side 1)

D. With a huge preponderance of power, you can be dumb.

B. You can afford it.

D. You can sit there and blow it over.

B. Yes, but are we in that kind of position today? We used to be. We could afford to be dumb maybe 15 or 20 years ago, however, we are really not in that kind of position now.

D. That is why we can afford to have the universal pilot.

B. Yes. Another interesting thing that comes out of having read through all this history--the hours of researching, thinking, cross-thinking, recorrelating and cross-correlating--makes you stop and wonder about, and even begin to suspect, some of your own events. I am trying to keep things honest in my mind, and still the theme really comes through. It keeps beating me, hitting me in the mind all the time. That at least up through World War II-- I am not sure that this is true today, but at least up through that period, maybe shortly thereafter-- So having read all these books, I think to myself, "I get this thing that keeps pounding me in the head." I examine it independently from other thoughts. Finally, I say, "It seems to me the thing that keeps banging me about the ears is that the British seem to be the best strategic guys--in a strategic sense--thinking through the strategies of 'how to win a

war, and how to hose the other guy' from all aspects." That came through very clearly, particularly when reading Bodyguard of Lies, but in many other books as well. You said you are reading that book now, so you might keep track of that.

The other thing that came through was, in a tactical or an operational sense, the Germans looked far superior to everybody else. Everybody else seemed to be straggling behind in some form or fashion. It also helps us discover why the British tended to beat the Germans. The British would, strategically, outgain the Germans at the higher level. The Germans did pretty well at the lower level; however, they were being beat at the higher level, so they fell apart. Do you see what I am saying?

Okay, then you have the Russians. Where do they fit in? Well, up to the time of World War II they seemed to provide the cannon fodder. That is why I said it is not necessarily true today. Then you say, "Well, geez, what about the United States? What did we do?" Well, we had the strategy, we had the tactics or the operations, we had the Russians as a counterpart and what did we do? We provided the material. We were the ones interested in widgets, gadgets.

- D. We were producing in numbers, too.
- B. The material, wasn't that what. . .
- D. We used to be able to do that.

- B. Wasn't that our big function in World War II? We provided the material. So the point is that we found out that that was a successful way to operate. So we said, "What the hell, that is the way it is. We know how to win wars that way, so we are going to continue doing it that way." I said, "Yes, but what if the environment or the people you are dealing with no longer give you the superiority because now your opponent also has the same material, plus he might be a little bit more clever in other areas. Just because it worked back then does not mean that it is going to work next year. That outcome was based upon the fact that we could out-produce; we could literally bury people in material! When he showed up with one tank, we were there with ten. When he showed up with one airplane, we showed up with ten; with one truck, we were there with ten."
- D. As long as the Russians keep working their kind of training where a guy gets out of a state course where he is taught to be rigid in his flying, we are going to beat the hell out of them.
- B. Okay, in the air, they tend to be very rigid and we are very flexible. We continue to beat them to the ground. In some things, they are rigid-- I mean, I don't know whether they are more rigid or if we are more rigid, or what the case is--but we do not see the disparity between flexibility or rigidity that we see in the air. We seem to be a lot more flexible. In other words, we can make those in-place decisions because of the way we train our people.

B. I have not read Moltke's book in detail but I have read some excerpts from it. His writings point out that he really did not like to spend a lot of time engaging people. He kind of liked to look the situation over. So the inference is, he really wanted to get those good observations, he wanted to get that quick action, and then he wanted to get the hell out of there so that he could do it all over again somewhere else. If the situation happened to look bad, he would say, "Why go in there? I am not going to gain anything from it," which was another manifestation of his to insure strength on weakness. That was the name of the game he always tried to play, strength on weakness. He always tried to move very quickly to be sure that the situation remained in his favor. He talks about his "hit-and-run" or the "quick-slash" attack. So we are coming back to that quickness, deception, inconspicuousness. . .

D. and decision.

B. Or the best wording is, "Get inside his abilities to observe, decide, and act--the observation, decision, action framework.

D. That is exactly right. But the opponent never sees you, even though you are completely inside of him.

B. Yes, but what if he does see you.

D. If you look at all three--even if he sees you--well, let's say he sees you but your observations tend to be quicker and you do it

better. Your observation will tend to be clearer than his because of the canopy, or like the thing I was telling you about earlier, and also because of your training. When you see the situation unfold you will make quicker decisions due to your training, which means your actions will also be quicker. What happens then? The situation relative to the other guy tends to improve for you. Pretend we are comparing ourselves against another environment. All right, we start out with a given situation and at least, in our definition, the situation continues to converge toward improvement--it gets better. We either shoot the guy down or we drive him into the ground and, of course, depart the area or whatever the immediate goal might be. We might have different goals depending upon the situation or force them to break off a bomb run, or whatever the case may be. In that case then, you are getting convergence on a favorable situation. In other words, you are getting the kind of feedback you want--positive feedback, or whatever it may be. On the other hand, the other guy is going like hell, everything is going wrong for him. No matter what he does, it keeps going negative; he tries to adjust but he keeps going more negative. So then in a sense, what he is really doing--he thinks he sees you but in realism he is not seeing you. He is seeing you in an imaginary sense because he is always one frame-of-reference behind. That is the point I was trying to make. So when you look at it in that sense--in a way you are folding him right back into his own

system. So he is really only talking to himself but he doesn't realize it.

- D. Does folding him into the system mean the same thing as breaking his system down?
- B. If you fold him back into his system, then he is really using his own system to do his things, yes. Because what happens is, if you tried to take any actions or do any work within a closed system the entropy goes up, and when the entropy goes up, the organization breaks down. So that is a fair statement. You have heard of the word ENTROPY. It is nothing more than a measure of disorder or confusion of your equilibrium. If you have a closed system and you try to do work or take action in it, your entropy increases. In other words, your disorder, or your organization, tends to break down. It tends to become more ambiguous.
- D. I told you what the ace Bill Hovde [Col William J.] said on the phone last night about the toughest encounter he ever had. I thought it was going to be a big gaggle, and it was when he got into a turning battle with a ME-109 [Messerschmitt] and he couldn't beat him. The greatest time he ever had was when he broke off and the ME-109 broke off. They could not get within each other's space; they just couldn't. So they just stayed in that same place.
- B. Yes, you told me about that. So, that is very nice. You want to

be able to do those things but you also must have the desire--you like to be the winner. You have to have this challenge for the unknown. In other words, be adaptable--have a situation and be able to get on top of it.

- D. You have the ability--but first of all you must have the desire.
- B. Oh, you have to have the desire, it is like the hunter instinct.
- D. You want to go out and test them.
- B. And so, in that sense, a guy like Hartmann or a guy like Bong [Maj Richard I.] and some of these other good American aces--I could name others from other countries--they kind of knew they were going to win anyway. Maybe not in the beginning, but they built up that certain confidence and they had the desire. So all they were doing was keeping score. But they went in there and thought they were going to get shot down all the time. I cannot believe that they did not have a nervous breakdown after awhile; you know, it had to work on their system. Have you ever seen inadequate people? People who are always passive and afraid, and when they do something they always tend to back away after they try it. This reinforces your comment about, "You have to give that guy his first success to be sure he doesn't get into that passive mode." You have probably noticed it yourself. Sometimes things go wrong and if it does it a couple of times, you may want to try to avoid that situation.

D. I notice it every day of my life. Everybody has his space. Sometimes you are comfortable, sometimes you are not comfortable. Just like I was with a hero general the other day who was very intelligent but who did not like fighters. He made me feel very uncomfortable. "This is nonsense," I thought. My space was so strong then because of what I was doing and what I knew. I could walk my space into anywhere because I was playing fighter pilot. I was gunning someone else down. I had the ammunition and the understanding, and they did not have it. I was testing myself against them--I did not walk into those places unless I had my guns. It was exciting. It was goddamn exciting! But it was not exciting to my boss who went home to bed.

B. No! (Laughter.)

D. It was very unexciting to him. He didn't like it. In fact, he had a few drinks and went to bed with heartburn. That's right.

B. Well, I like to test myself. I will be very honest, I have enjoyed testing myself. I have tried to do it in different fields and I have paid the price. There are some areas I am not so good in because of that. I do not want to talk about them--but, you know, there are some things in life that my wife wishes I could do. I will tell her, "I cannot do that. I am working on something else." I have found out, also, that when you go through this

process and you want to be very active and dynamic in some things, you have to set up another static part of your life where you can be a little bit static--you know, use one to offset the other. Because if you have everything going dynamic around you, you will be ready for the booby hatch pretty fast. And if I tried to be in the cocktail and pussy circuit--be active in this and that--boy! my eyeballs would be rolling back quickly. So, I think people have to do that if they have different desires, which may cause a little bit of conflict. Now my wife knows I am very good at some of this stuff, but she gets a little irritated because when I get home I tend to let things unwind. I like to do things a little differently because I have had that motor going like hell. When I was base commander over there in Thailand and got up out of bed every morning--it was so bad over there when they gave me that base--it was the first time in my life I thought, "I really have a tough job here." That was the first time in my life when I did not have total confidence. I thought, "I may run into trouble this time. I must get on top of this," I got up every morning and gave myself a pep talk in front of the mirror for about 15 minutes or a half hour. I would come out of there with track shoes on, coming out of those damn quarters heading for my office. It turned out to have worked very nicely, but it was a tough thing. I worked hard. A lot of things were going wrong, and I had to keep on top of everything because I took the base over when it was going

crazy. The base had gone through seven base commanders in something like 2 years, or 18 months. None of them went home with honors. They either were fired or they went home half nuts or disgraced. I was the first guy in 2 years who went home not having a pink slip, or bad slip, in his file.

D. I did not mean to take your whole day.

B. Oh, I enjoyed it.

D. I think it is really super that you spent the time. I sure as hell enjoyed it.

B. I enjoyed it. I met with a challenge. I have not really been what you would call a "yes" man. When I was younger I was, but as time went along I changed. I guess in a sense when I was younger, a first lieutenant and captain, I wanted to get promoted and make general and Chief of Staff, like everybody else. Then when I became a major, I witnessed a change in myself, even as a captain. I began to realize that it was more important to be able to contribute and do a good job. I recognized that I might have to make some decisions that could hurt me, from a promotion viewpoint. But I thought, "If I start worrying about that, I won't be effective. So I will just have to make those decisions and not think about it."

D. If you didn't consciously make that decision sometime, you would

never had done it. You cannot have it in back of your mind all the time.

B. Yes, because otherwise you start compromising the things you want to do. I just said, "I cannot think about it." I refused to think about it. That is all I did.

D. It sure does leave you in a secure place--not having to keep thinking about it all the time, having made a decision.

B. Oh, yes. I made the decision and, you know, I paid the price. Some people think--I have thought about it. . .

D. Yes, the price is success. I mean, the result for the price is tremendous success.

B. Let me show you something here (showing a paper). Those are some of the thoughts. I don't know if you have even seen things laid out like that before. It is kind of different, isn't it? I will show you a couple of things.

D. You have a good head. Is that your latest article.

B. I will let you read this abstract. Why don't you take time and read it for a few minutes.

(Pause.)

- D. Observe reality on our own terms--the whole kicker is on your own terms, of what you observe. I sure would like to have a copy of this.
- B. I am probably going to have to mail you one. This is the last copy I have.
- D. Would you?
- B. Yes. Let me take you through this. It is very subtle. Even physicists have trouble with this. They have to read it three times. Let me get a paper and pencil here. What I have basically done--these ideas that I have collapsed into these 12 pages, very condensed; I started having these ideas back in 1960 when I was doing my Aerial Attack Study. What happened was after I wrote that study and started to show it to people, I was very severely criticized; not because of what I had written but because they did not believe that I had done it myself.
- D. You were back in the Fighter Weapons Center.
- B. The people in the Fighter Weapons Center knew that I had done it because they saw me working on it. They saw me dictating, and they knew my lesson plans and what I was doing. I am talking about outsiders not believing I had done it. They said, "One guy could not do that." I said, "Of course one guy can do it." But they still

would not believe me. So I said, "Why don't you go down and talk to some of those damn people who watched me do it. They are my co-workers and they know." They just would not believe that I could put all of those ideas down and make them fit together like that. So that is when I began to realize that I was unique. That is when ~~Scrad~~ told me, "You have to understand, John, you have a capability." I never knew that before. I said, "One thing that bothers me is that maybe I will never have another success again--maybe this paper I wrote is a flash in the pan." I said, "If I can understand how I did it, then maybe I can always repeat it over and over again." You know, use different themes as my nature changes. I thought about that in 1960. I tried to understand the way I thought so that the process inside itself could do better later on. So I started thinking. I became all confused. In the meantime I went to Nellis--excuse me--and then went down to Eglin and wrote my "Energy Maneuverability" paper. When I first went down there I was working with some other guys writing a computer program. And because we wanted to get an optimization model which demands some very specialized mathematics, we called in a consultant from Lockheed--in fact, it was a \$1 a day contractor. We tried to sign a big contract but everybody got skunked. Then everybody said, "Let's have no contract." "You want a verbal, 'Okay, what I think' and 'What do you think?'" Bull shit! We are never going to get this thing going. I don't give a _ _ _ _ ! We have a job to do."

So finally Lockheed said, "We do not care if you do not want to sign a contract, we have to. So that is what happened. The people who worked for me said, "Let's forget the goddamn thing, We cannot sign a contract. Both the government and Lockheed lawyers got into a skunk fight. Finally, the Lockheed management called and said, "If you guys won't say anything, we won't say anything, and we will just send the guy out there. It would cost us both a lot of money to get the lawyers together to draw up the contract, and we are not going to get what we want. What is expected is clear, it just won't be on paper and signed by the Air Force and by our management. Neither side is going to be hanged. So let's tear up everything and just let Boyd do the work." Isn't that strange.

- D. That is beautiful. It is beautiful that it can happen.
- B. So we had the Lockheed guy come down to Eglin. He was given a security clearance and stuff. I said, "Here is what you have to do. You have to read my stuff on. . ." I gave him the Aerial Attack Study. I said to him, "We are going to use some of your ideas." I started talking and I could see that he could understand what I was talking about from a mathematical viewpoint. "In the meantime," I said, "give me your stuff. I am going on leave for a week, and I am just going to read your stuff until I understand it." He said, "Well, I am going down to a motel on the beach and read your stuff." Here is the way we worked it. He was in one place

and Tom and I were on leave--otherwise we would have become involved in everyday work--and we would have lost our thoughts. So we all took leave. The other guy was on the beach reading our stuff, and Tom and I were trying to get up to speed in what he had done so that we would all be able to communicate with each other. The trouble was, we were not communicating. In a couple of days we said, "We are way out." I knew I had a bright guy here. Then Tom and I went back and said, "Are you ready? We think we understand for the most part what you are saying. It is a delicate mathematics. At least now, maybe we are in the same ballpark." You see, we had to get in the same ballpark. So then we started going over it and I thought, "Fine, now we can work together." I said, "Here is the idea we have in mind. Here is the way we kind of see" He says, "I got it. You can lay it out for me." It took awhile before we could even talk to one another. Isn't that amazing? We had to go through that process before we could get a layout in the computer. In the meantime, what happened was, when he was reading it one day--we had been working on the computer programmer for about 2 weeks trying to get some feed bugs out of it. Oh, we had a few problems, but it was working and things were beginning to come together. We sought conversions; the program was beginning to work--so one day I said, "Let's goof off." We went down to a local place and had lunch and beer. We were both tired. He said, "You know, something interests me. I have read your work on the Aerial Attack and I have listened to you talk,

and I do not know how to tell you this but everything you do, even though they are in different fields, seems to be done the same way-- it is a pattern you go through. I see it but I do not know what it is." I had previously thought I saw the same thing. It did look like I was doing everything the same way. I had wished I knew what it was. I had spent hours reading my own work, and I was able to discern a pattern--but I did not know what the pattern was. An impression of a pattern was there, or at least a glimmer, but I did not know where it went. Then when he said that, I couldn't believe it; my very own thoughts. "So! a pattern is there," and I had talked myself into believing that I was wasting a lot of effort, that I was bull shitting myself, in trying to discover the method I used repeatedly. When he said that though, knowing that I was going to process this thing--don't forget, I thought about analysis in 1964-1965, 4 or 5 years later. So I told him what I had just come acrossed and he said, "I think you are right. I can see it too." (He mentioned it first. I never told him though.) So then I came up and started to work trade-offs on the F-15.

- D. He could not help you out at all?
- B. No, he could not help me. He could not understand it. He is dead now; he died a few years ago. Then I went through that process again, sometime around 1969-1970. I noticed that I was seeing the same thing when I was going through the trade-offs that I had

observed with Maximum Maneuverability (not talking into mike)--but more advanced. So again, I started thinking about this. Gradually, by 1971, I started to see things come together in my mind; I began to see the pattern. By 1972, I had it almost figured out. I had to figure out how to bring it together. Then I went over there in September, I remember I made my break (mike not being used--cannot hear)

So I went and relaxed and said, "Don't worry about it. Don't get upset. We are all having the same problem. Just take off, go into town, go swimming. We are not making any headway.