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George Schecter Interview (MORS)

Schecter, George

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George had a long and varied career. He was well educated in physics and mathematics, and in a long career applied them to a wide array of difficult technical problems. He was a problem solver. He did not think of himself in terms of operations research, but he had all the requisite attitudes and qualities. He was typical of the founding generation of operations researchers: smart, broadly educated, curious, articulate, data driven, experimentally minded, and focused on the operational needs of the users. He was industrious, inventive, and modest, with a keen sense of humor. He was a pleasure to know and to have as a professional associate. He sacrificed much for his career and his country, losing an eye in the course of early experiments with recoilless weapons, but he never complained. He was truly one of the Greatest Generation.

The last years of his professional life he kept alive the dim flame of urban warfare in an era when the military foolishly claimed that we would never do that again. He studied the development of modern urban sprawl, developing categories of urban terrain and appropriate concepts, doctrine, tactics, techniques, and procedures. He influenced Dr. Wilbur Payne, FS, then in Army Training and Doctrine Command (TRADOC), to instigate a joint urban warfare modeling effort with our ABCA Allies (America, Britain, Canada, Australia), which kept some modest analytical effort continuing in the Army analytical community despite official indifference.

The Gulf War in 1990–1991 brought about changed attitudes. There was some urban fighting in northern Saudi Arabia and fear that we might have to fight through Kuwait City and other urban areas further north in Iraq. Official interest revived, and by the time of Operation Iraqi Freedom in 2003 urban warfare had been reintegrated within the Army under the revised name of Military Operations in Urban Terrain (MOUT).

I attended a readiness briefing in early 2003 in the Army’s Operations Center prior to the onset of Operation Iraqi Freedom, which, among other things, itemized equipment needs in support of urban warfare. I recall battleaxes, battering rams, grappling hooks and lines, wrecking bars, and scaling ladders. This could have been William the Conqueror’s shopping list. It certainly was part of George Schecter’s legacy.
PERSONAL MEMORIES OF MY FATHER, GEORGE SCHECTER

by Ellen Schecter

Reading this document is like hearing my father’s voice from another room. Words he often used, and lived by, stick out of the conversation like raisins in a cookie: 
gumption, professional, initiative, a sense of purpose.

He always patiently explained complex ideas to me, from the Pythagorean Theorem to Kepler’s Music of the Spheres. He showed me with pencil on paper how his pet name for me—Nelle—was a palindrome: my name spelled backward. I can still watch him make an orange and apple orbit the lamp over our kitchen table to illustrate how Earth and Venus circle the sun. “I wish I had nine hands,” he joked, “so I could show you how all the planets in the Solar System circle the sun.” Pluto was considered a planet then.

And just as he always reached higher professionally, he always encouraged me to do the same. At 14, when I wanted to be a nurse, he said, “Why not a doctor? And work in a hospital, see how you like it.” As a Candy Striper, I wept every night, discovering medicine wasn’t for me. But when I won a national contest with a poem, I decided to be a writer. “Good choice,” he said, and gave me a silver pencil on a chain. I still have it. His encouragement helped forge my career. And I still write almost every day of my life.

High-Speed Motion Pictures

One of my earliest memories is watching high-speed motion pictures of a drop of cream falling into a cup of black coffee. My father and his colleagues would hang a sheet over the large window in our living room. My father let me watch if I’m quiet.

Then we watch one drop of cream splash into a cup of coffee over and over. And every time the drop falls, a white crown springs up out of the coffee: a queen’s crown with too many beautiful white spikes to count—each with a white pearl at the tip. The points reach ever higher—then fall back into the coffee. Then the film flaps, and the projector makes a boring white eye on our wall.

The men got very excited, but I couldn’t understand anything they said. I have no idea what they were investigating—I still don’t. But we watched it again and again. And when I had questions, my father answered all of them, including why a high-speed motion picture slows everything down, and why the crown looks almost the same every time, and why we can’t see it when it isn’t in the movie.

His Accident

You know the public story of the recoilless rifle explosion. How, in early 1944, it exploded as my father and a colleague were testing it in subzero conditions at the Frankford Arsenal. But there are stories behind that story: he didn’t wear his protective gear that day; shrapnel was embedded all over his upper body; his right eye was immediately destroyed. For weeks he was packed in sand bags at Wills Eye Hospital in Philadelphia in order to prevent damage to his left eye. My eight-months pregnant mother (with me) sat by his side to feed, read, cheer, and sing to him.

But the deeper meaning of this story is what happened after this: My father went back to work as soon as he could. Nothing stopped him from using his mind and going forward with his career.

I remember how it frightened me every time he disappeared into “the hospital.” What was a hospital? Will he ever come home? Each time, it felt as if the world changed from Technicolor to black-and-white.

There were dozens of surgeries, but he never stopped doing the work that engaged him so fully. He never said to me as a young child what his work meant to him; he simply picked himself off and went on doing it. Those actions spoke so clearly to me that many years later, when I was diagnosed with a chronic neurological disease, I followed his model: I refused to give up my work, and even though I was unable to continue my career writing children’s television—the deadlines were too taxing—to this day I work nearly every day, writing book after book. My father was my role model: he demonstrated the crucial importance of gumption, professionalism, initiative, and maintaining a sense of purpose.
The Military-Industrial Complex

In the sixties, I felt torn over my father’s continued creation of war materiel and my fervent antiwar stance. The Vietnam War hit me hard: my adorable high school boyfriend was killed, and so was my roommate’s fiancé. I knew my dad had a very tender conscience and suffered over all the casualties, but we never discussed these conflicts directly.

When I told my parents I planned to go to the 1967 March on the Pentagon, knowing my dad was a frequent visitor, my mother warned, “If you go, you’ll jeopardize your father’s job and high-level security clearance.”

“I’d like to march,” I told my dad, “but I don’t want you to suffer for my convictions.”

“Ellen, you have to follow your conscience,” he said. “Your right to march against this terrible war is guaranteed by the First Amendment. If your protest means I’ll be punished, then I shouldn’t work for Uncle Sam.” He kissed my forehead. “Go, sweetheart. Don’t be muzzled by fear. I wish I could march myself.”

I took him at his word and hugged him for his generosity.

And—I marched. For both of us.

OPERATIONS RESEARCH ORAL HISTORY PROJECT INTERVIEW OF MR. GEORGE SCHECTER, FS

Mr. George Schecter was on the Military Operations Research Society (MORS) Board of Directors from 1973 to 1977. He was elected a MORS Fellow of the Society (FS) in 1992. Mr. Schecter was a program director at the Battelle Institute and a former official of the Army’s Frankford Arsenal in Philadelphia. Mr. Gene Visco, FS, and Dr. Jim Williams conducted the interview in Arlington, Virginia, on May 15, 1992.

Mr. Schecter passed away on July 23, 1992.

George Schecter: Shall I just go ahead and answer these questions?

Jim Williams: Please.

George Schecter: I was born in 1917 and raised in Philadelphia, Pennsylvania. I was educated at Temple University and got a bachelor’s degree in physics. I have to tell you right at the beginning that I don’t think I was ever identified as an operations researcher or an operations analyst formally, and that may be true of a lot of people.

I was very much influenced by my brother, five years older than myself. He got into the physics curriculum and I followed. He preceded me by five years and we went to the same undergraduate school. He got his PhD from the Massachusetts Institute of Technology (MIT). One of the most important courses I ever took was a one-semester course in logic, and I really believe this has a lot to do with how I became interested in operations research (OR) and operations analysis (OA). An interesting incident was that I went to the library one day while I was taking this logic course. I took out a book that had not been taken out since my brother last took it out. [Laughter] There was a lot of resentment, at least at the very beginning. Our contact was practically nil at that time. He was up in Boston going to MIT, so it wasn’t his influence that drove me to the book.

Jim Williams: When did you first start working for the Army?

George Schecter: 1941, right out of school.

Jim Williams: Who was that with at that time?

George Schecter: It was the Frankford Arsenal Pittman-Dunn Laboratories in Philadelphia.

Gene Visco: How did you get recruited? You graduated from —

George Schecter: I didn’t actually graduate at that time, but I had to get a job and I went to night school and graduated a year or so later. I applied to many places, including industry. This place just appealed to me; actually, the place didn’t appeal, the people appealed to me. Dr. William J. “Bill” Kroeger and Dr. Herschel Smith interviewed me. I was a young snip and I could just feel something very important there.

Gene Visco: And World War II was just starting.

George Schecter: Yes, in 1941.

Jim Williams: Did these people manifest an excitement to work?

George Schecter: Absolutely. It did instill excitement and it was contagious. One of the things I would have liked some time to do is look at the way the Army functions now and
compare it with the way we did things and see if we can’t recover some of that. We were absolutely productivity driven. We didn’t call it that; we just wanted to do a good job and generally did a good job.

I spent at least the first third of my professional career in hardware research and development (R&D). When I matured after a few years, I started to ask the question, where do the requirements come from? Who says it should be this long, this big, this many pounds, this velocity and so forth?

I remember enjoying being that kind of a maverick in our community of engineers and developers. In fact, I was sort of a nuisance at times because I tried to find the origins of those requirements. Some years later I realized that I had to talk to the user, the guy who was going to use this piece of equipment, whatever it was. At that time there was a wall between the developer and the user. In order to talk to the user you had to go all the way up to general officer level and all the way down again, and I thought that was dumb. So I made direct contact with the user when I was developing a piece of equipment.

I felt a need to have that linkage to the user because otherwise I couldn’t get the answer to where did the requirements originate. So I started to break rules to make these contacts. In fact, I have to tell you proudly, they wrote local regulations to prevent me from making that contact.

I think what’s important is that we’re drifting back in that direction. In fact, that’s one of the things that Walt Hollis mentioned to me yesterday afternoon. I talked to him about the new science and technology (S&T) strategy. He said one of his objections is the way it’s being organized and managed. It tends to further separate particularly tech base work from the user, and we agree that’s very bad.

In those early years, one of the most important things to me was the recoilless rifle that I had a hand in developing. It was not totally original. It was really borrowed from the Germans. We captured a German recoilless gun and we just made it a lot better, like cut the weight, and got much greater range and much greater performance.

Jim Williams: Was that a 57 millimeter?

George Schecter: 57 was the original one, but also 75, 90, 105, 106. In fact, the 90 millimeter recoilless gun is a good example. Just like any system, and particularly in any gun, it’s very simple to be able to say if you add an inch to the tube length you get a little additional velocity and it will cost you a little additional weight. Of course, that has a declining payoff, but still there’s payoff.

I remember clearly going down to the 82nd Airborne Division and elbowing my way into the Commanding General’s (CG’s) office, and showing him a mockup of what we were developing, and explaining to him this tradeoff and asking him where he wanted it. Are you willing to pay a couple more inches for 10 more feet per second and a little additional hit probability? I got a very sensible answer. He took me out into the field. He had men jumping out of airplanes, parachuting down. You could see that length was a very important feature to them, a very important simple mechanical feature. I got some pretty good answers and I really felt good about having done it that way.

Gene Visco: Who was the CG?

George Schecter: The CG was a man with a lisp. [Editor’s note: George probably referred to General Matthew Ridgeway who was CG of the 82nd Airborne Division from June 26, 1942 to August 27, 1944.] I remember sitting in his office and briefing him and his people and having a discussion and I remember him saying, “Okay, Mr. Schecter, now we’re going to go out and jump.” [Laughter] For an instant, I thought he meant me. Quite a shock.

Gene Visco: Did you get overseas during World War II?

George Schecter: During World War II, not at all.

Gene Visco: You were working principally with officers and military?

George Schecter: Yes, at Fort Benning, Georgia and Fort Sill, Oklahoma and the 82nd Airborne Division at Fort Bragg, North Carolina.

Jim Williams: Did you find that the customers were generally receptive?

George Schecter: Oh, they were receptive. They were grateful. They were so removed from this by the bureaucratic process that they were extremely receptive, although there was danger to that. If you talked to a major, he had
a particular characteristic that was important to him. You had to be careful not to be driven by one guy’s opinion. That was a hazard. In fact, that’s the hazard against which the regulations were intended to operate. So you had to be careful. You had to be sure that you went back and did the arithmetic, sent it back, got it okayed, but looked at the whole. To me that was the origin of what I would call OR—simple tradeoff of physical characteristics, performance characteristics, and operational characteristics.

Although these tradeoffs seem extremely simple to us now, it was practically unknown that they were negotiable. The user would write a requirement and that became gospel, and that requirement was probably written by a couple of captains and majors sitting around a table and coming up with their best notions. They had no way to do the tradeoff or to even know that a tradeoff existed. That was a very exciting thing for me. Just to know that you could do it was really exciting.

After a few years, I became responsible for all the R&D for the recoilless weapons and I also concurrently became responsible for the development of all aircrew escape systems. In World War II, somebody shot down a German Stuka dive bomber and sent us some paraphernalia that was attached to the seat. This thing looked like a gun. It turned out to be a pilot ejection seat, a gun that shoots the pilot out of the airplane. And that’s how it came to us.

Jim Williams: Was that also with the Pittman-Dunn Laboratories?
George Schecter: Yes.
Jim Williams: So you were doing a range of things?
George Schecter: Yes. I happened to get both of those responsibilities after a time. I got the notion that we were very successful in saving aircrews. We had a scoreboard up on the wall, and every time we saved a life we put a mark on it. Then during Vietnam, helicopter pilots were getting knocked down. So I decided we ought to try to do something about that. We bootlegged some money and we developed what we called an L-shaped trajectory. You can’t eject the pilot up through the copter blades. You can’t even knock the blades off and then eject him up. It’s just too hazardous and you lose stability.

So we decided to eject him sideways, horizontally, and then propel him upward with a rocket. The rule of the game was that in an aircraft of any kind either on the deck, or one inch above the ground, we must be able to save the crew. There has to be enough clearance from the ground to open the chute and come down safely. We developed this system and we used it on a piece of iron and it worked.

Later, I went to see an Army officer in the Pentagon who had just come back from Vietnam. He was involved in the analysis of helicopter casualties and he just seemed like the right guy to talk to. I described this ejection system to him and he discouraged me. First of all, it would add a lot of weight and a lot of cost. I tried to use the argument about the mothers and wives of these damaged or destroyed men are just as important as the Air Force and Army aviation people. But the way he discouraged me was to say he did an analysis of helicopter casualties in terms of the flight profile of the helicopter pilot as a function of changes in the air defense systems. He was able to show me that the casualty rate remained constant even when anti-aircraft systems improved.

What he said to me was that by some mechanism he didn’t quite understand, except just the pooling of experience of pilots in their engagements, they kept the casualty level pretty darn constant over large changes in air defense system capabilities. They simply learned either to use greater standoff distances or in some way different flight profiles, and they kept that casualty rate at about 2 or 3 percent, pretty constant over big changes in the air defense. That was a revelation to me.

Gene Visco: So his point was that adding this complicated process would not have a significant—
George Schecter: You’re right, Gene, the cost and the weight—it would not be a simple, easy system to put on. So that never happened. It never was adopted.
Gene Visco: One of the things that’s always been confusing to me is the Army arsenal system that we have. We had, what, a half a dozen of them or so?
George Schecter: About that.
Gene Visco: And each one had a specific arena.
George Schecter: Pittman-Dunn Laboratories had a strange combination. It had small caliber guns. It had artillery ammunition and it had fire control for tanks and fire control for artillery. It had a very prolific gang of people. We also were developers of the variable time (VT) fuze.

I was a lucky guy to be in a place like that with such a variety of things going on. I was also very lucky to have bosses that were superb. They were technically great. They were three dimensional, human, and I was a lucky man.

Jim Williams: Who were some of those folks?

George Schecter: Dr. Bill Kroeger was my boss. He was a good physicist, a good engineer, a good country-style manager. OR didn't mean a thing to him, except he did it all the time. He just did it. Dr. Herschel Smith, who was Bill's boss, was the top civilian scientist, the same kind of man, with all those wonderful characteristics. They raised me.

Gene Visco: What were some of the other arsenals?

George Schecter: There was Rock Island Arsenal, which is mostly artillery systems, recuperator systems, gun systems, mounts, and recoil mechanisms. There was Watervliet Arsenal, which was gun tube design and fabrication.

Jim Williams: That was in New York?

George Schecter: Yes, near Albany. They developed this heat treatment system that was unknown in the rest of the world. They have these deep pits where they can do heat treatment. They developed some exceptional heat treating facilities for early gun systems.

The Watervliet Arsenal designed and developed the gun tubes themselves. They maximized strength and minimized weight for the function that the gun tube performed.

Then there was Springfield Armory, the small arms system people up in Springfield, Massachusetts.

Gene Visco: An armory and an arsenal, not much difference apparently?

George Schecter: No, I think not. Redstone was an arsenal.

Gene Visco: What were they doing in those days?

George Schecter: Mostly rockets.

Gene Visco: It sounds like the arsenals had to relate to one another because if Rock Island was designing recoil systems and mechanisms, and the guys in Watervliet are making the tubes, and you guys were working propulsion, you somehow had to get together.

George Schecter: Oh, yes. We did talk to each other. I can remember many visits that I made to Rock Island and to Springfield, not much to Redstone. They were sort of competitors. They were coming in with rockets, where we knew— [Laughter] rockets were a passing fancy.

But we talked to each other. Picatinny was a major arsenal.

Gene Visco: What were they doing?

George Schecter: They had responsibility for all warheads, and they had the responsibility for artillery ammunition systems. They also had a responsibility for mines and demolitions even at that time. And, yes, we talked to each other. We sometimes fought with each other. That was a competition, sometimes fair, sometimes unfair, but we did. We had to talk to each other.

As a matter of fact, in about 1968 or 1969, they wanted to close out the small arms ammunition activity from Frankford. The thought was that since Springfield has the weapon, give them the ammunition so they have the whole system. That never happened.

There was somewhere between 15 and 20 years when I started into the OR/OA kind of thinking more systematically, more broadly.

Jim Williams: That would have been from 1941 into the early 1960s that you were primarily involved in the hardware development.

George Schecter: That's right.

Gene Visco: Can you touch on some other systems through the 1940s and 1950s that were the same thinking? You talked about the recoilless rifle.

George Schecter: There were about eight different recoilless rifles and each of them had the same kinds of tradeoffs.

I was involved in hardware development pretty heavily during that whole period. I was involved in aircrew escape system development during the second half of that period. I was involved, not as a leader, but as part of the team in the development of the first computer to be fielded by the Army. It was the Field Artillery Digital Automatic Computer (FADAC).

That was a successful project. It went in the field. It lived longer than it was ever anticipated.
to live in the field. But as soon as we standardized it and delivered it, we started to think of what else we could do with it. We decided to use the computer as a diagnostic system for automotive equipment, and we developed a thing call MAIDS, Multi-Purpose Automatic Inspection and Diagnostic System. The computer was a rarity, but still we wanted to think about what else we could do with this thing.

So we developed a system that with a harness of sensors you could put a tank or a jeep or some other vehicle with an internal combustion engine on it and run it without moving. You could operate this system and put these sensors at different locations, like a temperature sensor for the manifold and a pressure sensor for the cylinder, and so forth, a set of perhaps a dozen or more sensors and just run right to the end point. You would start the engine, run it for five or 10 minutes, the computer would do the accelerating and decelerating, and at the end point you would get a printed sheet that said, “You’re going to need rings in the fourth cylinder in about 10,000 miles if you’re not careful and you better check the starter mechanism.”

The interesting thing about this was the gumption to take something that was designed for a specific purpose, and apparently did well at that purpose in a new technology at that time, and look for other applications. I guess it’s to be expected, but it’s exciting.

We took the same computer and converted it into an inspection and diagnostic system for Army automotive equipment. It is not a test set because a test set tells you that if the value being measured is above or below a certain value, it’s out of the range and it’s no good. This was diagnostic. In other words, it could look at things within the range of acceptability and combine them logically and tell you that there may be something wrong, although no one element is out of the range of required performance. It was a very early application of that kind.

Jim Williams: What was the driving force to undertake finding additional uses?

George Schecter: It was the guy who headed the team that developed the system, Ray Brachman. I was just part of his team.

Jim Williams: Do you know what led him to think we ought to do something like this?

George Schecter: My recollection is there was a heck of a lot of excitement. It was the first digital computer ever fielded by the Army, and that was so exciting that Ray, with some help, but he was the driver, said there must be good things that we can do with this piece of technology. In fact, this embodiment of this piece of technology could do other things.

Jim Williams: Did that strike people as an odd notion?

George Schecter: Not the technical people in our organization, except some of the bureaucrats. It was that kind of place.

It was a successful project that could have been just let go, and we would have gotten medals for it as it was. It was not an externally imposed need. It was an initiative and I give Ray credit for that. It wasn’t driven by having to make a better return. It was an investment and that return was assured. It’s the environment of the place that allowed him to think that way. He was not a senior guy, but the management was of the nature that it didn’t pooh pooh these ideas, and people had to feel that, to even be able to think of it.

Anyway, it turned out to be very successful. It turned into a multimillion dollar development project, which was great from our standpoint, and it was successful for the Army. In fact, we ran an experiment with 18 tanks that were being brought out of the field for repairs and we split the sample into two: nine tanks and nine tanks. Nine tanks went through the shop through the regular assessment and repair system, and the other nine went through this new system. Something like 50 percent of the costs of the repairs were unnecessary. The carburetor coughed, you threw the thing in the ash can and put a new carburetor on. You didn’t replace the 10-cent spring that would have made it well again. My recollection is something like 50 percent of the repair costs were unnecessary. Now just imagine what your civilian shops are like. [Laughter]

Jim Williams: Did that result in changes in the maintenance and the logistics pipeline?

George Schecter: Oh, yes. It did that, and it was adopted, but it did more than that. At least in part it opened up the field of automatic inspection diagnostics, which became huge.
Years later, every complex system that was being developed also was developing an inspection and diagnostic system. Ray came up with the idea that we were wasting billions of dollars into the future by making each diagnostic inspection system unique to that system. The functions are the same. You have transducers and processors telling you something and they could be made modular and multi-applicable; but the industry killed it. It would cut out a big chunk of profit. I helped him to fight that fight, but we just couldn’t beat it.

Gene Visco: You mentioned extensive work primarily during World War II. Can you think of anything specifically through the Korean War period that was different because we increased the sizes? The Army also got into infantry rockets and antitank equipment.

George Schecter: Yes. One of the most important things we did was to make the subsequent models of the recoilless rifle fin-stabilized so that the rotation of the shaped-charge warhead would not degrade its penetration performance. That was around that period.

We made lots of marginal improvements. We improved steels. We made everything lighter. But that was a pretty fundamental difference to make this high-explosive antitank (HEAT) round fin-stabilized so that it has good penetration performance.

The reductions in weight and the increases in performance were 10 to 15 to 20 percent gains, so they were not radical. But when you went from a spinning shaped charge projectile to a fin-stabilized shaped charge projectile, that was doubling, tripling, or quadrupling penetration.

Gene Visco: When we first got involved in Korea, one of the principal antitank weapons was the 2.75 inch rocket which was totally ineffective, even against the older Russian tanks that the North Koreans were using.

George Schecter: We went to the Light Anti-tank Weapon (LAW) for the infantry weapon. But we did go to larger elements. I remember having a big fight that I lost with Huntsville Missile Command. We had a recoilless approach to the LAW requirement, and we had pretty good proof that the range, accuracy and penetration were superior to this LAW rocket. They won the fight on the grounds that there were so many tens of thousands of warheads in inventory for the LAW that they could deliver the LAW to the field at a much lower cost, and when it was all over the LAW rockets were trashed anyway. That’s a frustration.

Jim Williams: That wasn’t the 2.75 inch, was it?

George Schecter: I think it might have been 2.75 because these warheads were stocked from other uses, I think aircraft uses, and we knew they were ineffective. But we lost the argument.

Another thing that just occurred to me is about eight or nine years ago there were several ideas for the improvement of the tube-launched, optically-tracked, wire-guided (TOW) antitank missile. There were about seven major kinds of improvements that were technically feasible and we undertook to evaluate them comparatively, because the budget couldn’t afford to do all of them and the complexity might be too great to do all of them. The thing that we did to make it realistic was to look downstream at the likely time each of these would be fielded, and the likely interval of time that they would be in the field and what the composition of the enemy tank force would be in those intervals.

We looked at not just the sheer improvement in hit probability or kill probability, but against the mix of tank targets that they would have to deal with. It turned out very well. In addition to cost and performance, the contemporary threat was also very valuable for us to allocate the assets in time and quantity to do those TOW improvements. That may be a routine thing, but it struck me as a very practical way to do it. It was practical from the standpoint that you designed it for the best vehicle of its contemporary period.

Jim Williams: You worked for about 20 years in hardware development, and then into these other types of problems. What occasioned that transition? Was that an abrupt thing or did it occur slowly?

George Schecter: No, it was ramp up, ramp down, with very gradual ramps. It just happened. There was no turning point for me. I just got more and more involved. It was a very gradual process. I never really got out of the hardware business entirely.
Jim Williams: Did you stay in the same positions or were there organizational changes or transfers involved?

George Schecter: At Frankford I changed from a project engineer responsible for specific pieces of hardware, to a propellant-actuated devices mission manager. Then I got flipped over into an organization at the headquarters—the Plans and Analysis Directorate.

Gene Visco: This was in the 1960s?

George Schecter: Yes. If anything, that marked the switchover. It was the end of a long reign.

Jim Williams: Was there any particular person that was tied to that transition to the Plans and Analysis Directorate? Were you recruited?

George Schecter: There was a need for that organization to come into being at the headquarters, which is a recognition of the value of plans and analysis. The directorate was formed and my boss said, “We’re going to have to work with those guys. You better take it.” That was an upgrade.

Gene Visco: I became active in that period. There was a relatively widespread movement of creating planning and analysis groups of various types in a lot of Army installations.

George Schecter: Where do you place that in time?

Gene Visco: Somewhere in the middle 1950s. People began to think more of the way they managed the resources and the fact that you couldn’t do everything that needed to be done, and you needed some way to keep an eye on that. I’m not exactly sure what prompted it.

George Schecter: Most importantly, there was another pressure—the different laboratories themselves like the fire control laboratory, the ballistics laboratory, and the other laboratories were competing for dollars. You had to prove your case, and I think that the need to prove your case was part of that pressure. It may have been started by one of them and the others had to join.

Jim Williams: Did this Plans and Analysis Directorate act as a reviewer or a broker?

George Schecter: No, we were doers. We did studies. The labs did studies also. We collaborated. We were not adversarial. We completed studies of our own and we collaborated with labs on joint studies. We were sort of the Commanding Officer’s corporate future arm.

Jim Williams: At that point, then, you started to deal with problems, as far as hardware goes, in systems that went across the spectrum in the Army.

George Schecter: That’s right, but I had done that before, to some extent, also on a loan basis.

This is a jump to a different area. One day, my boss said, “You’ve written a lot of technical reports, and now I suggest that you divert yourself to how do we store and retrieve that information. The mountain of documents is growing. There’s a lot of work being done that’s repetitive and we don’t know it.” So he nudged me into the scientific and technical information storage and retrieval field. I spent about a seven- or eight-year excursion there.

In fact, I published a book. One day a friend of mine out at the Naval Postgraduate School, Jim Taylor, called me and said, “I’m fluent in Russian and I’m doing a study of how the Soviets developed databases and apply them to their decision processing. I’m reading this book on information retrieval and the only English words in it are your name. Explain yourself.” [Laughter] What happened is that they translated my book.

Jim Williams: Information Retrieval, is that the full title?

George Schecter: Yes, Information Retrieval.

Gene Visco: They didn’t give you any royalty for it, did they?

George Schecter: No. As a matter of fact on my wife’s insistence I looked it up. At the time they did it, we did not have an agreement with them, and I’m not really very flattered because they were translating everything, particularly in that field because it was a whole new field.

But anyway, it was a very interesting, very useful excursion. One of the things we did was to work with the people at the Walter Reed Army Institute of Research, and we decided that there surely is a need for a storage, search and retrieval system; no question. It will save a lot of talent, a lot of time and a lot of dollars.

A small team, including me and the Army Research Office in Washington, decided that of all the fields, chemistry is the best documented and the most symbolized field. So if we can’t
do information retrieval on that, then we better forget about the rest of the scientific fields. So we decided to go into chemistry. We worked with Walter Reed Army Institute of Research and we developed the Army’s chemical typewriter.

We found that there are about seven major chemistry information storage and retrieval systems in the world, and each uses a different way to find a substance and its properties. One of them uses the name of the compound. Another uses the formula of the compound. Another uses the non-scientific name of the compound, and so forth.

We decided that we better surpass all of those, and make a nonredundant, inexhaustible method for finding a compound. At that time there were something like 5,000 new compounds being developed per year. So it’s a growing mass of information.

We decided that the nonredundant inexhaustible way to do it is the molecular structure itself. So with Walter Reed we developed a typewriter that actually types the molecular structure.

This is an indication of how early this was. The storage medium at that time was a piece of punched paper tape coming out of the bottom of the typewriter. That was our best storage medium.

It was a very interesting process. First of all, we made a decision that if we didn’t get the chemistry professional community involved, we could develop the best system there is, and it would be a white elephant and gather dust. So we engaged the professional community and there was a lot of resistance. Each chemist in his little office had a three-by-five file that was his personal treasure, and it was hard to get them to relinquish that or to take steps toward relinquishing that.

But it succeeded. It took a lot of hard work and a lot of persuasion. But they are scientists, too, although with personalities, and they were given to understand the advantages to the country, to the field, and to them. It worked quite well.

This was sort of an excursion, I don’t know if you’d call that operational analysis or not. I think it is.

Gene Visco: Did that project continue and extend into other areas?

George Schecter: Yes, into IACs, Information Analysis Centers in the military, like SURVIAC (Survivability Vulnerability Information Analysis Center). We have a whole bunch of IACs. In fact, I was the first so-called STINFO (Scientific and Technical Information Officer) at Frankford Arsenal.

We decided to institutionalize it, and I was called “STINCO.” I was a pariah. But that system still is very much in operation.

Jim Williams: When was that?

George Schecter: That would have started in the middle 1960s. It was very exciting. There’s that boss of mine who had the perception to say, “There is a convergence. We have mountains of data, mountains of reports and now there’s a thing called a computer coming into being. Get in there and make it work.”

Jim Williams: Who was that?

George Schecter: Bill Kroeger, who was my boss. That’s the kind of perception or leadership that makes good things happen.

Gene Visco: You worked for him from the early 1940s up through the 1960s? Over 20 years?

George Schecter: Yes.

Gene Visco: Was it a warm relationship?

George Schecter: Oh, yes.

Jim Williams: By that time, had the terms “operations research” or “operations analysis” become attached to the work that you were doing or the positions that you were holding?

George Schecter: We did OR. We didn’t call it that, but we simply did it. I was always registered and known and identified as a physicist, never as an operations research analyst, right up to today.

There’s an issue raised in here about the relationship between the physical scientists and OR/OA. I guess it’s pretty well known that all of the early OR/OA people were scientists at one time or another, and the question is asked, “What is that relationship?” Well, it’s the fundamental scientific method and the logic that goes with science; if you’re awake it drives you toward asking these questions and not just asking them, but trying to answer them.

Jim Williams: Did you find that the people who were trained in the sciences and came from a pure science background viewed the problems in a different way from those people who have
come through the pipeline that’s now been formalized as OR? Is there a difference in perspective as a result of those different paths?

George Schecter: I don’t think I can identify any evidence of it. I think so and that may be my bias, but I’ve never looked at it carefully enough to answer that.

I was involved in another quite different thing around 1966 or 1967. The idea occurred to me that our techniques, our tactics, our force structures, our systems might be inappropriate for the threat they faced over there. I expanded that to other things like our Military Assistance Program in which we support third-world countries. I read a few things and found that at that time we seemed to be attempting to equip and change the structure of third-world military forces to be modeled after US military forces, and it just struck me as downright dumb.

I wrote a little white paper, two or three pages, that said, logically, what we ought to do is determine what their threat is, not what they say their threat is, but what the real threat to their security is, to try to determine what operational capabilities are needed to defend against that threat. Look at what instruments are needed to carry out those operations, look at what they have, look at what they lack. And then I threw another wrinkle in that said, let’s not give them a box of what they need. Let’s see if we can help them to build or provide what they need. The thought being that you don’t make the best allies by giving them boxes of stuff. You make the best allies by helping them to become self-sufficient and independent.

I put down a six-point idea of how to go about it. It took a year and finally, under Project Agile, Leonard Sullivan, Deputy Director, Southeast Asia Matters, Office of Director of Defense Research and Engineering (ODDR&E), in the middle of all his difficulties handling what was going on in Southeast Asia, he did give it a listen. In fact, we talked right through lunch, and with all that he had to handle I was surprised he said, “Okay. Let’s go. Let’s get started.” The first thing he did was to send me to Colombia, South America to look at the threat. What is the threat?

The reason I emphasize that is that nations, their leaders, and their military leaders tend to want super-sophisticated stuff that they can neither use nor maintain or defeat the enemy with, because it’s hot stuff. That’s not a very good reason to provide military assistance.

Rather than try to identify the whole threat, the US Government people there and our Military Advisory Assistance Group (MAAG), said we have a very particular problem in this valley. There is a highly organized, almost military force, that’s running things in that valley. They gang up on a ranch and have their way. There’s no way that that ranch can resist the overwhelming odds that they bring against them.

The US MAAG people were compiling lists. They showed me their lists. They were compiling lists of choppers, jeeps, mortars, machine guns, etc., to equip their forces in this area. Up to that point none of these things had an effect and they were simply doing more of the same.

This was not just me. This is a team of about four guys. The team was composed of people from various services, service organizations within the US, civilians and myself. At that time I was still with the Army at Frankford Arsenal.

We decided to look at this threat on site. But of course you can’t see the threat. All you can see is the terrain and the distribution of our police units and the ranches. One of the team members got the idea that we ought to equip these ranches with radio communications systems so that if ranch A is under attack, ranches B and C can call for help, or ranch A can call for help from B and C. And if you still can’t equalize against the odds, you can call other ranches. We suggested to make it compatible with the police forces so the police can be brought in. So in ever-widening rings you could bring in local police, national police, and the military.

The system was installed and it worked. These bandit forces were so highly organized that they had shoulder patches, uniforms and so forth. They were a quasimilitary force.

The Project Agile people were pretty happy with the result. Then they sent the same team over to Ethiopia. The problem there was the culture difference that we did not fully comprehend when we got there. Each morning we would deal with point one, which is “What’s the threat?” And there would be a lot of discussion and we wouldn’t really get a description of the real threat. Then they would lead us down
the path toward eight of these APCs (armored personnel carriers) and 12 of these tanks and two of these airplanes. And the next morning we would start again to discuss “What’s the threat?” and the process was repeated again and again.

So we used my idea. The culture was such that, a respondent might say “Yes,” but doesn’t mean “Yes” and we just didn’t recognize it. We decided to compromise our six-point sequence and go to something fairly simple. I went to our embassy and I went to their commercial bureau, and I went through a lot of lists that showed what their military imported and from whom they imported it.

I also went to their agriculture people and learned that they were making investments in certain areas. I found a convergence of canvas goods—and I found from the list that they import all of their military canvas goods, boots, tents, belts, knapsacks, whatever. I learned from their agriculture people that they were making substantial investments in their cotton agriculture and I also found from other commercial people that they were making investments in their textile industry.

The thought occurred to me that, let’s help them get over the hump by bringing some textile technologists over, see what the shortfall is between what their quality requirement is, what their production is, and how we can overcome that gap.

Several companies in the US were cooperative and sent people over. It took several years, but the project succeeded. We did the similar thing there with tire recapping. They had a very primitive tire recapping capability, and yet their military did not recap internally. They did it in some other country.

Again, we tried to define what the shortfall was and we were able to bring over some rubber tire technology people to help them close that gap. The whole notion of doing it this way was to have a confidence-building success.

Jim Williams: Within the nation?
George Schecter: Within the nation, within Ethiopia to gain their goodwill. I didn’t care how small the success was, we just needed to have a success that they would recognize as useful.

That took so long that I was out of it by the time anything happened. But it’s hard to believe this coincidence. About five years later I was on a plane going out to Rock Island, Illinois, and sat next to a fellow with whom I got into a conversation. I mentioned nothing about this project and he very excitedly told me he was returning to base from Ethiopia where he had been running the project that I had started. [Laughter] Can you believe that?

Jim Williams: This was a US fellow?
George Schecter: Yes. He was just coming back from being over there for years.

Jim Williams: Were both the Colombian and Ethiopian initiatives run under Project Agile?
George Schecter: They were both Project Agile. As a matter of fact, I wasn’t selecting anything. They were just handed to me.

The next country was Iran, and things got too violent and that was called off. But to me that would have been a prime example of the principle, namely, provide a lot of the most highly sophisticated weapons and get beaten by rocks and clubs. Is that a far-stretched conclusion?

A good example of my early work in OR was Military Operations in Built-Up Areas (MOBA). I became interested in that in the mid-1960s. It was a trivial, unrecognized, unwanted area for a long time. I started to look at the maps and had fairly good knowledge of our tactics and doctrine and systems, and it became clear to me that they were simply ignoring the fact that Europe is becoming wall-to-wall built-up areas. They did nothing in the way of design or requirements or testing that took that environment into account.

I guess you would call that OA. I struggled with that for 10 years to get it recognized.

Jim Williams: What level did you talk to people to get a sensitivity to that?
George Schecter: Gee, every level. At first I talked to people down in the ranks, to learn whether I was barking up the wrong tree or not, and then I just kept climbing up. I briefed people like the four-star boss of Army Training and Doctrine Command (TRADOC), at that time Bill DePuy (General William E. DePuy). We became friends.

Jim Williams: Did he seem to be responsive?
George Schecter: He became very responsive to it. The first thing that happened that started to institutionalize it was that the Defense
Advanced Research Projects Agency (DARPA) became interested and started a project to look into it. In fact, there was a guy up there, Lieutenant Colonel Ray Franklin, a Marine at DARPA at the time, and he was the project officer. In 1971, I bid on and won a contract to support that project.

As a matter of fact, Gene just reminded me that I initiated a MORS working group on MOBA. The importance of it to me is that I was challenging the tactics, doctrine, planning, force structuring, equipment requirements, testing, across the board. Because conducting military operations in a built-up area is a very different kind of an operation and things that work out in the plains just don’t work in a built-up area, and vice versa.

Anyway, DARPA became interested and initiated a project and that ran for about two-and-a-half to three years. It was during that period that I briefed General DePuy and lots of people, lots of general officers. It was a constant grind to get this accepted. Some of the old generals would say, “American ingenuity will take care of everything.” and I would say, “Nonsense!” [Laughter] But really, that’s a lot of the response I got. DePuy really was the guy who recognized it.

As a matter of fact, he rewrote FM 100-5 Operations of Army Forces in the Field. They asked me to help write the chapter on military operations in built-up areas. They were mean to me. They told me what they wanted and they stuck me in the Strawberry Banks Motel and said, “We want you back here at noon tomorrow with a chapter.” [Laughter] That was a good experience. I really got along very well with the officer community. I never spruced them; I was just straightforward with them.

Of course, that has now been institutionalized. I see it every day almost. I see requirements being prepared or published and the requirements say, “must be capable of operation and effective in built-up areas.”

Looking back at MOBA, the things that were lacking, in my opinion and that of many others, were not only in the tactics, techniques, organization, and system requirements, but also in training. It is a very strange environment in which to conduct combat operations, and one of the things that we battled for was to have a training facility that would be appropriate.

There was a German training facility. The Germans did it in a very simple way. They bought a town and turned it into a training facility. It’s a fact. But then we had one built in Berlin. It was called Doughboy City for a while, and it started with about eight or nine buildings and now has grown to something like 38 buildings. These are concrete shells with interior stairs and exterior windows and doors. I worked with the engineers and helped in the design of it. I wanted to be sure that, for example, there was a T-intersection somewhere in the plan, that there was an X-intersection somewhere in the plan, that there were some dead ends in the plan, that there were courtyards within building structured areas. That was my contribution to the overall design so that the whole range of tactical engagement conditions would be represented.

These buildings are from one to five stories high and they are pretty indestructible concrete. They did some very realistic training. They’d run cars into the village. They’d burn them. They’d pile them up as obstacles. They burned tires in the buildings to get some very realistic effects. It has been used for some time now to put all infantry units through as a part of their overall training. It’s not just for the Berlin Brigade.

Gene Visco: Is there a name that they use for that town?

George Schecter: It was called Doughboy City. In fact, I went there several times. They made me a coffee cup with the French, British, and US logos on it and they made me an honorary member of the brigade. I took the coffee mug home because I think it’s now a collectible.

Later, MOBA became Military Operations in Urban Terrain (MOUT).

Gene Visco: It’s always bothered me because I couldn’t quite imagine terrain being part of MOBA.

George Schecter: Yes, we thought very carefully when we decided on the name. A built-up area can be a road strip with a lot of buildings on either side.

Jim Williams: That acronym MOBA became MOUT?

George Schecter: Some general, I think it was General Donn Starry came in and changed it.
Gene Visco: That would have been in the middle 1970s.

George Schecter: That’s about when it was changed.

Jim Williams: Obviously you knew a lot about military tactics. How did you acquire your knowledge of tactics?

George Schecter: During the time when I was a civil servant, the system there was very good to me. They sent me to schools. They sent me to military schools. The courses were two-week, three-week, and four-week courses. And, of course, I did a lot of reading. In those courses, I sat side by side with officers and got the same material they got and that just familiarized me with what that was all about.

There’s another area that I was very much involved in for a while and that is countermeasure (CM) and counter-countermeasure (CCM) analysis. It seems to me like that is a combination of the application of science and the application of OA. I’ve done a number of them.

An example is better than a generality. I did the CM and CCM analysis of the sensor system for Project Sense and Destroy ARMor (SADARM), the artillery-launched munition that expels some number of bodies. Each body comes down on a little parachute, scans and senses and attacks armor. We had to do it from the standpoint of physics. What are the signatures? What are the sensors and processors? What are the likely CMs? There are some things as simple as smoke and dust and so forth.

We did a thorough job. We looked at the Soviet technology, their capability to develop and produce these various CMs against that sensor sitting up there. We invented for them a little box that you could put on the top of a Soviet tank that would simply swamp the sensor that was looking for my red tank. I used a term called “plausibility.” In fact in all of the CM and CCM reports that I’ve written, one of the things I put up front is “because a system can be countermeasured in the laboratory is not necessarily a reason not to develop that system.”

In this particular case we declared this CM, this little box, to be technically feasible, doable by the Soviets, but tactically implausible. Why? Because we recognized their doctrine of operational silence, and this radiation coming out of this box would broadcast their presence, plus the fact that it could become a beacon upon which some other sensor would attack that target.

It’s just common sense and simple logic that, “yes, this CM would work, but they ain’t going to use it” was our declaration. Another illustration of what I mean by OA.

Jim Williams: It sounds like what you’re talking about is a logical process. It’s a matter of looking at the problem, what would be the immediate response to that, but if you responded that way, then what came next and next.

Gene Visco: That’s why it’s CM and CCM.

Jim Williams: Is there a distinction between people who are trained in the sciences and their view of CMs?

George Schecter: I don’t think so. In fact, it could be the reverse. The guy who is really bent on developing a system is doing the best that he knows how to do it, and he’s concentrating on that and he has to be jarred into thinking of CMs.

In fact, the Army wrote a regulation that says you will. I don’t think that ability or inclination to look at it that way comes just from a scientific point of view—you apply the science to look at the other side of it, but it may be the reverse. I think CM and CCM is an operational analysis force requirement.

On the same subject, I did a very extensive CM and CCM analysis of mines. It was a way to make it graphically comprehensible and yet very exhaustive. I did it for the designers of mines. I’ll show you.

Mine CM and CCM was really a report that Picatinny wanted for their mine design people. What do you have to look for when you design a mine in the way of CMs and what can you do to toughen those CMs.

What I did was to visualize three columns. In the first column is a step-by-step set of the functions of a mine. I call it: “The Mine, This is Your Life!” It could start by getting kicked out of an airplane and drops or it gets kicked out of an artillery shell and drops. It impacts the ground. It’s supposed to do something when it impacts the ground. It senses the approach of a target, and so forth. I don’t need to go through all of them. You know that eventually it says, “Go bang, you’ve got a target.” Or a target never shows up, so after six hours or whatever time period it is, it blows itself up.
There is a complete functional description of every step that it goes through. In the second column is: "What does the environment do that is discouraging to each of those steps?" And, "What does an enemy do that is frustrating to each of those steps?" You can draw a line between one of the functions in column one and several counter-things that happen in column two.

Then you construct column three and it says: "Given that it’s raining, that’s the environment, or given that the mine wants to magnetically sense the presence of a tank target, what can you do about that?" How can the enemy counter each? Now from the second column from each of those CM things, you may have some number of CCMs hardening against that.

It was just a method that I had not seen, and it really worked very well. I made a very complex set of conditions easy to follow. A young engineer could look at this and find himself in his issue there.

Gene Visco: When was it?
Jim Williams: And the title of that study?
George Schecter: "Mine/Countermine/Better Mine." Oh, gee, I blush. [Laughter]

This reminds me of something else that I got pretty excited about, and it’s called the Tactical Deterrent Effects Model (Tactical Deterrent Effects Model; George Schecter, James C. Richards, and Henry A. Romberg). It got initiated from the standpoint of a mine, but I think it may be applicable to other things.

In other words, when you deploy a minefield in warfare, what it produces are some casualties, but also some behavior on the part of the enemy, and those are related in some uncertain way.

What I did was to construct a curve in which the ordinate is the value of the mission to be accomplished, and then on the other coordinate is the commander’s estimate of the remaining force requirement to accomplish the mission, his estimate.

You can have missions ranging in value from zero to one, where one means the world will end and the United States will die or the mission will not be accomplished. You have the full range, and then you have against that the remaining force in terms of a fraction, a percentage of the force remaining. So it’s one minus the casualties you can tolerate.

If you draw a line between one and the maximum value of the force requirement, just draw a straight line and call that risk-neutral and then a bowed concave down and a bowed concave up reaching the same points at both ends would be risk-averse and risk-seeking. [Editor’s note: A graph illustrating this concept is on page 433 of the MORS report Human Behavior and Performance as Essential Ingredients in Realistic Modeling of Combat, MORIMOC II, Volume 2, 1989, in a paper titled "Tactical Deterrent Effects Model" by Schecter, Richards and Romberg.]

The thing that pushed me toward it is, I ran across a study that had been done of military people, officers and enlisted, in which they determined their risk characteristics in a clinical environment. Outside of the military there’s a great deal of work on risk behavior, and the military work is pretty much like the other work that’s going on.

The important part is that there is a population distribution among risk-neutral, risk-averse, and risk-seeking. That’s pretty uncertain. There are different judgments as to what that population distribution is. But this clinical study arrived at some distribution among those three categories, and it just seemed to me that if you used that as a guide by which to estimate the breakoff of contact between the enemy and us and our minefield, you might get a handle on what affect the minefield is having other than casualty production.

I took an old model, a combat simulation, and superimposed this on it. We ran the simulation and it showed that, given that our forces were operating on some basis of casualties tolerable, if at the early part of the engagement there were fairly heavy casualties, the estimate pointed toward failure of the mission and the enemy broke off. We ran it past that point, and we found that if he had persisted he would have won.

It was pretty exciting, and I don’t know if anybody has done anything since, but it seemed like it would apply to mines and their effects, but it would apply to other things too.

Jim Williams: I’m curious how this particular project came about.

George Schecter: This occurred when I was out of the Army Civil Service, and I was with
a study group and simply talked to the people at Picatinny. I didn’t have to point out to them that mines have both effects. They do produce casualties, but they must have psychological effects or deterrent effects or suppression. They call it all kinds of words, but they had no numbers. So they were willing to put some funding into it and let me take a crack at it. The first time around I only produced the conceptual model, and then the second time I found data of those clinical experiments. I also found that Dorothy Clark at the Army Operations Research Office (ORO) had done a study of break points, and I picked that up and, by golly, there just seemed to be good agreement.

*Gene Visco*: What was the name of the organization that you went to?


That’s what was really exciting. Though when I looked at a lot of literature, I felt very lucky to have found the clinical studies of military people’s risk behavior. And then I found Dorothy Clark’s stuff and it just seemed to all fit together.

Another thing that I learned both from the Army studies, and from all of the other civilian studies, is that the risk characteristics of a guy stay with him regardless of whether he’s facing marriage or divorce or war. That doesn’t mean that he takes the same risks for different stakes, but if he’s risk-averse, he will be risk-averse in every situation. That’s what I got out of the literature. That is a characteristic of a person and, therefore, the distribution is a characteristic of a population.

*Gene Visco*: When did you first get involved in mine warfare? Was that after Frankford?

*George Schecter*: No, I don’t think so.

*Gene Visco*: The reason I’m asking the question is that you can’t jump into this sort of thinking about this logical structure construct. You need to have some fundamental knowledge of a mine before you can do that, I suspect.

*George Schecter*: You don’t need to know anything about a mine for it to be a method to represent a fairly complex set of conditions. Simply and easily comprehensible, I think.

*Jim Williams*: It sounds like a commonality to a lot of your work is essentially organization and representation. You’re looking at a complex situation, identifying key elements, and then figuring out some kind of a structure to represent those relationships.

“I’m wondering how that ties back to your background in physics, because one of the characteristics of physics is its reduction of a problem to its simplest components and then some representation of that.”

*George Schecter*: Well, usually a mathematical representation. My mathematics is not that advanced and I don’t think I ever did anything substantial in the way of a mathematical representation. So, that’s my confession. [Laughter]

I think that’s a fact and that’s why these are the things that excite me and make me feel productive. In other words, the attitude I take is if you can’t present it to a person who is going to make decisions about it, you’re losing the end point.

*Gene Visco*: So you looked for ways of visualizing the problem in a construct that allows people to look at it and say, “Yes, I think I understand the process.”

*George Schecter*: And I can do something about that. If you don’t have an effect, then to what avail?

*Jim Williams*: One of the things in common with different people in OR seems to be the desire to see an end result, to see a change in behavior.

*George Schecter*: Yes, I’m not sure the whole community feels that way. I’m sure some part revels in the elegance of the solution. That’s okay.

*Gene Visco*: You said you found data that described groups of people. Did you ever find any information to confirm this?

*George Schecter*: Yes. In fact, some years later, I came across work by Amos Tversky. He’s a prolific author and worked in the human risk behavior business. I remember turning over the pages of *Fortune* magazine and coming upon...
a graph just like mine. He didn’t copy mine, don’t misunderstand me; he dealt with civil matters, not military. But I found that to be pervasive in the whole field of risk behavior characterization.

Gene Visco: Utility theory is related to this, isn’t it?

George Schecter: I guess.

Gene Visco: I notice you have decision work by Howard Raiffa (Games and Decisions: Introduction and Critical Survey by Luce and Raiffa). He deals with this to some degree.

George Schecter: I guess he does. I’ve given copies of that book away by the dozens.

Gene Visco: When did you first hear the term “operations analysis”?

George Schecter: It could be when I joined MORS actively, maybe earlier.

Gene Visco: It might have occurred in part when you came across Dorothy Clark’s work.

George Schecter: Yes.

This DARPA contract that I won was in 1971. It was my first contract as a non-civil servant. Initially I was with Ketron, Incorporated when we won that contract. I was with them for five years. In fact, it seems to be five-year cycles. Five years Ketron, five years McLean Research in McLean, Virginia, and maybe I’ll do that at Battelle—about five years. It takes that long to catch on. This is a wonderful place to work, just great.

I was remembering a couple of things. One of the things I did 5, 6, 7 years ago was a comparative evaluation of various missile system improvements. We very recently did a thing on the importance of environmental effects on weapon performance for the Navy. Way back I did some human factors engineering work.

Jim Williams: You had mentioned you had made some notes about the profession of OR.

George Schecter: Yes. The question about how important was the idea of a profession in the early days of my career and why. I’m not thinking just about OR, but that’s one of the things that my bosses and colleagues endowed to me, that being professional was just about the best thing in the world, that it gave you a sense of purpose. It gave you a pleasure of accomplishment, excitement of accomplishment, excitement of being part of a community. It remained a very important aspect of my life.

Jim Williams: Did your bosses and the people you worked with define the community of professionals?

George Schecter: No. Professional, as defined by Webster, is something to which you devote your life, that simple a definition; and that you’re not an amateur, that you’re expected to do good, clean, healthy, productive work. It seems so simple. I think it’s something that’s not vanishing, but it’s less prevalent today.

Jim Williams: What they emphasized wasn’t any particular community, it was just the notion of high-quality work and a broad concept of service to the community.

George Schecter: Just that. Sure. It wasn’t done in a lecture forum. It wasn’t done in fancy language. It was done in very plain English. “Look, George, you have to get such and such done by Tuesday and report to the team. That’s your obligation.” It was a pleasure.

Jim Williams: But there wasn’t any particular discipline, for example, the fact that you were a physicist or you were an operations research person?

George Schecter: Not at all. There were, you might say, nonprofessional technicians who were required to do and behave the same way, and received it as an obligation that they were happy to have. It wasn’t an elitist thing at all. Everybody was part of the team.

Jim Williams: You talked about the different projects and the kind of problems that you worked on and the range of things over the years. It strikes me that there’s been a tremendous diversity. Your approach to things has been, for lack of a better word, eclectic.

George Schecter: Oh, I think eclectic is the spice of life. [Laughter] Variety is the spice of life. I enjoy variety and I seek these things out. Sometimes they seek me out. You only get one time around, do everything you can.

There’s a downside to that too and that is, I probably have not made any major contribution to developing or inventing a methodology, and maybe this is my substitute for that.

Jim Williams: It sounds like it’s been highly productive.

George Schecter: I feel that way.

Jim Williams: Looking at the kinds of work that you’ve done, is there a track there that folks can follow?
George Schecter: I think the important track for me, and maybe for some arm of the profession, is to be damned sure that you get a real-world result implemented. That’s a great satisfaction to me. I was just saying that maybe there’s a downside of that, and that is I probably have not developed a real improvement in OR methodology.

Jim Williams: Do you think those people who have made a name in improved methodology are in any sense more productive?

George Schecter: I think they’re more productive in that their methodology can be applied to many problems in most cases. Sure, that’s an extremely valuable thing. It just may be a thin spot in my capability.

Gene Visco: The notion of the guy who invents the shovel may never turn a spade full of earth, but a lot of spades full of earth get turned. Any one of those other spades-full may be worth the development of the shovel.

George Schecter: Sure.

Gene Visco: I wouldn’t decry the fact that neither one of us made a contribution to the tools for operations analysis, but in some ways we had other impacts.

George Schecter: I feel that way.

Gene Visco: You’ve come around full circle.

At the outset you were talking about contributing to things that were in fact implemented. The actions were taken, decisions were made, things were done, and things were built. You’ve come around to point that out as being one of the great satisfactions, seeing the implementation of the results. I’m with you that the analysis is not done until some action occurs.

George Schecter: Yes, that’s not in any sense to minimize the value of people who get results and people who develop better tools, not at all. The whole profession depends on that. That’s one of the things that I missed. I started out in hardware R&D and the big satisfaction was a product that went to the field, and that the soldiers used very effectively.

I slipped over into the OR area and I missed that end product satisfaction. Or the other way around, I was so used to the end product satisfaction that I went after it and that may explain this kind of eclecticism.

Jim Williams: One thing I’d like to ask as a follow-on to that. Are you an avid reader?

George Schecter: Yes, I read. I don’t know if avid, but I read quite a bit. I read a lot in the professional literature.
Jim Williams: Is that something you enjoy doing?

George Schecter: Yes. And I listen to people and I talk with people and I swap problems and ideas with people.

On this same project now, one of the other things that I looked into was Marion Bryson (another MORS Fellow), who did a series of suppression experiments out at the Combat Developments Experimentation Center (CDEC). This was a series of experiments done to try to get a handle on quantifying suppressive effects of firepower. Firepower does two kinds of things: it kills and it suppresses. To try to get a handle on that was analogous to noncasualty effects of mines. I looked at that pretty carefully and they did a good job. I just couldn’t see how to use it, so I went and looked elsewhere.

Jim Williams: Was there anything else?

George Schecter: I really can’t overemphasize the effect MORS had. I don’t know why I joined. I think there was a meeting at a very attractive place. [Laughter] When I started to attend those meetings and started to learn how systematically it can be done and how it was evolving and developing and burgeoning, I just got addicted. I didn’t miss a meeting for 20 years.

Jim Williams: What did MORS give you that you felt like you didn’t have before?

George Schecter: It gave me a notion of just how many methodologies there are around out there. It gave me a network for finding them. It gave me a network for discussing getting help.

I got seduced by MORS and then loved it, and I just got more and more interested. In fact, I became very active and I did everything. I was the chairman of this and chairman of that. I always presented a paper.

Jim Williams: I’d like to ask one more question. I see you have a picture from Alice in Wonderland—Through the Looking Glass on your wall, of the Mad Hatter at the tea party. Is there a specific connection with that?

George Schecter: Just that Alice in Wonderland has my favorite quote.

Jim Williams: “When I use a word it means just what I choose it to mean, neither more nor less.”

George Schecter: Just a whimsy.