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INTRODUCTION

Mark McDaniel

My father, "Dr. Mac," loved the army and Redstone Arsenal. My father was totally and completely dedicated to the army. He was once offered the job of Under Secretary of the Navy. He got on the plane and came home. He was an "army man." But then again, what else would you expect from a man who taught his children that the most admirable trait a person could possess was loyalty.

I have gone over this introduction with my sister, Bonnie, as she served as vice president in my father's company, and my little brother, Willy, who was my father's constant companion.

My father's story began on Friday, September 13, 1918. He was born in Marion County, Alabama. His parents, Ma Mac and Pa Mac, were very poor. Dad graduated first in his class in high school, but was not allowed to sit on the stage or give the valedictory address as he did not own a pair of shoes.

My father's feelings about life at this time can best be summarized in his own words:

"I begged for food and worked for everything I got. I was 16 then. In terms of Maslows hierarchy of needs, I was at number one. I was hungry."

Dad walked from Twin, Alabama, in Marion County, to Berry College in Rome, Georgia. Martha Berry started Berry College so the poor people in the Appalachian Mountain region would have a college to attend. Each student was assigned a job. Dad's job was shoveling coal.

After graduating summa cum laude and valedictorian with a degree in math and physics, Dad came home to Marion County. His first day home, Pa Mac told him to hook the mules up and start plowing. Instead of hooking the mules, Dad started walking to Birmingham. He did not spend one night at home after being gone for three years. Dad always said he didn't go to college to learn a better way to hook up the mules.

In Birmingham, Dad drove a coal truck for his cousin Elmer McDaniel, until he started teaching school in LaFayette, Georgia. One day Dad read about jobs at a place near Huntsville, Alabama. In February, 1942, he came to Huntsville. He was 6 foot 5 inches tall and weighed 135 pounds.



Dad's first job at the Arsenal was putting a material on shoes which would keep the shoes from absorbing mustard gas. When he retired in 1977, he was a GS 18 and Technical Director of the United States Army Missile Research and Development Command.

Some of the most memorable stories my father liked to tell centered around the time he was the Technical Director for Dr. Wernher Von Braun. This was right before Dr. Von Braun went to NASA from the army. My father considered Dr. Von Braun the most charismatic manager he ever worked with. Dad often told us how he would sneak a chocolate bar into meetings with Dr. Von Braun, as the meeting would go into the early morning hours many times. No one was allowed to leave the meeting until the problem was solved.

Dad often stated that the two people most responsible for the Arsenal's growth and hence Huntsville's were Congressman Bob Jones and Milton Cummings.

I think from listening to Dad, that he respected Milton Cummings more than any other person. My dad came to know many powerful people in his life, from presidents to other heads of state, but no one had as much influence on him as Milton Cummings. As a child I remember Mr. Cummings coming to our house many times with a congressman or a senator to talk about getting more money for the Arsenal.

One of Dad's favorite stories was about the time he was trying to get money to build the McMorrow Laboratory. He kept being told that there just was not enough money. Dad, as he did so many times, called Congressman Jones and Milton Cummings. They went to Washington. Milton Cummings called Bobby Kennedy and said, "We need to see Jack (President Kennedy) in the morning. He owes me a few favors." The next morning President Kennedy called Mr. Cummings at the hotel and told him a meeting wasn't necessary, that the Arsenal would get the money for the lab.

As stated previously, the number one quality my Dad looked for in a man was loyalty. Dad always said when a person died, he would be real lucky to count those loyal to him on one hand. He always wanted the people he worked for to count him as one of those. You never heard Dad make any off-color remark about his boss.

Dad was very goal oriented. He would point his finger off into the distance, and remark, "Always set your sights way ahead. Shoot for the stars."

He would be quick to remind you to think positive. The thing he hated most was pouters. He always said a person that complains all the time is simply lazy. They complain because they don't want to work. He had little tolerance with a person who said he was depressed. My father was a leader. He often stated that the person in charge should never expect those that work under him to do something the boss is not willing to do himself. In this regard, he told me once that one of his supergrades, when he first came to work for Dad, asked what his working hours were. Dad told him, "If I call you in the morning and you're not there, you're late. If I call you in the afternoon and you're not there, you left early." Dad said that was leadership.

Dad was a can-do person, an action person. If he was told to get a job done, he never asked how, he did it! He, in turn, expected those that worked for him to be action people.

My dad was quick to see leadership characteristics in people. My father was introduced to Congressman Bud Cramer in the early eighties, when the Congressman was District Attorney. They talked for a while. After Mr. Cramer left, Dad told me that he reminded him of Congressman Bob Jones and that with his leadership characteristics, Mr. Cramer would be a very successful person. Dad was obviously right.

Another person that was very close to my father was General Omar Bradley. My father respected General Bradley very much. After Dad's retirement from the Arsenal, he spent a lot of time with General Bradley.

I had the opportunity to spend some time with General Bradley and my father when Dad lived in Los Angeles. Dad gave a party in honor of General Bradley and invited, among others, Karl Malden and Frank McCarthy. As you may recall, Karl Malden played General Bradley in the movie "Patton." General McCarthy was the producer of the movie.



To hear General Bradley tell about D-Day and the Battle of the Bulge will always be in my memory. It was interesting to hear him describe General George Patton. There were many, many stories and I could sit for hours and just listen to General Bradley as he told them.

On one occasion, after my father retired from the Arsenal, the job of Under Secretary of Defense came open.

General Bradley encouraged Dad to go after the position. I thought it humorous when General Bradley told Dad he would recommend him to the President. He said, "The President still pays attention to an old man like me some time." Keep in mind, this was a five star general talking.

The one thing I will always remember about people like my dad, General Bradley, Bob Jones, Milton Cummings, and Bud Cramer is that they never forget their roots. They never but never try to impress people by being something other than an ordinary person that has been blessed by God.

Two days before my father died, we had a long talk. He said that you could no longer live by one of his favorite sayings, "He who fights by rigid rules will lose." He said that in today's business environment you need a lawyer with you every time you take a step. He said that when this country was started men could go out and do their jobs because they weren't handcuffed by so many rules and regulations.

This introduction would not be complete without saying that the fire, motivation, and, to a great degree, the strength of Dad came from my mother, Helen, who, according to Dad, was the best motivator he had ever seen.

If Dad were writing this introduction, he would want to thank all those army and civilian personnel that made his life so successful and rewarding.

CHAPTER I: The Beginning

John L. McDaniel

The beginning of my thought process regarding an active involvement in war work started in a room in the high school at LaFayette, Georgia, on October 16, 1940. As a high school teacher, I was involved in registering individuals for the peacetime draft. The old gentleman that I was assisting was nervous and constantly pulled at the straps of his overalls as he tried his best to remember dates, places, and events that were required to complete this form. In order to reduce the tension, I pulled the wastepaper basket over near the desk and cut myself a chew of Apple chewing tobacco. I then handed him the knife and the plug. He cut himself a large plug and instantly became more relaxed as he began to chew. The next question was, "How many children do you have at home?" to which he answered, "seven." I looked him straight in the eye for about a minute as we each chewed on our plugs of tobacco. His face then took on a more pleasant look as he searched for the wastepaper basket. He then said, "You know, a year away from home in the military wouldn't be too bad." This was my first encounter of a one-on-one, broken field running situation with respect to war work. There would be many more. Some I would handle well. Some I would handle poorly, and some I could not handle at all.

As I completed the form for the gentleman and shook his hand, it suddenly occurred to me that I too was about to become personally involved in this peacetime draft, but I did not have the family to leave. My thoughts concerning going to war did not, at that instant, coincide with that of the gentleman with seven children. At this point, I began formulating a plan concerning my personal situation in the face of the peacetime draft. I decided to get into defense work. From my station in life as a North Georgia high school science teacher, at a salary of \$70 per month, it was obvious to me that I did not have an option to plan and then

try to make circumstances fit those plans. One tries in life to make plans fit the circumstances. I think the difference between success and failure in life depends upon one's ability, or lack of it, to do just that.

I began collecting data on which to make my decision regarding how to get in defense work from three sources: the Chattanooga Newspaper, the barber shop, and the Sunday morning coffee at the local drug store. My break came from a small advertisement in the Chattanooga Newspaper, "Wanted, Chemical Plant Operators, Huntsville Arsenal, Alabama." I filled out the necessary papers at the post office in Chattanooga, Tennessee, and was notified that I had received a civil service appointment at Huntsville Arsenal, Alabama, with a reporting date of February 26, 1942.

I paused on the top of Monte Sano Mountain on the afternoon of February 24, 1942, to look down on the beehive of activity that I was to enter. There appeared to be a great deal of activity to which there was very little order. I stopped at the Yarbrough Hotel to inquire about a room and found that there were no vacancies. The same situation was found at the Twickenham Hotel and the Russel Erskine Hotel. I was told that the workers could find a bed on Clinton Street. I found a bed for one dollar a night at a large building that was full of triple decker bunks. I was counseled to watch my wallet when I went to sleep since there were a lot a strangers in town. This was particularly important to me since I had \$21 in my wallet. Having selected my bunk, I drove down Clinton Street, past the creamery, to the filling station and barber shop. Here Mr. Malone, the barber, gave me a quick update on Huntsville. The Central Cafe was a good place to eat, if you could afford the price, and the bootlegger was located at a motel on the Athens Highway. Having this essential information, I inquired as to how I could get to the Arsenal. At the mention of the Arsenal, Mr. Malone refused to talk since, according to him, it was a great secret as to the location of the Arsenal. I decided that I would follow the traffic; and if

the place was secret, someone would stop me — this happened.

On February 26, 1942, I became the 344th person hired at Huntsville Arsenal. My job was to work in a plant that manufactured mustard gas. To do this work, it would be necessary for me to wear clothes impregnated with a substance to prevent the mustard gas fumes from coming in contact with the skin. The long-johns underwear were thick with the substance, as were the socks, coveralls, shoes, and hat. I have scars today on my wrists where I was careless in joining the underwear sleeves and the gloves. A gas mask completed the uniform. Sensitive skin was not a particular advantage, since the showers used kerosene to remove any mustard gas or vapor contamination from the body.

Six mustard manufacturing plants were constructed at Huntsville Arsenal. Two chlorine plants, each generating 45 tons of liquid chlorine every 24 hours for use in making mustard gas, were located nearby. Each mustard manufacturing plant consisted of a sulfur monochloride building, a building which generated ethylene from pure grain alcohol, and a mustard reactor building. Each plant produced 40 tons of Levinstein H mustard every 24 hours. The output of the manufacturing plants was piped to the filling plants and was loaded into 105-MM M60 shells, M70 bombs, M47A2 bombs, and the Navy bomb, MK42.

I received my training in the manufacture and loading of mustard gas at Edgewood Arsenal in Maryland. This training consisted of working with individuals who had kept the plant in standby for many years. I was assigned to the midnight shift and received at least one shift training on each of the major operations. All work was done with a gas mask on; this caused a severe problem around daylight each morning, as the whiskers grew out along the edge of the mask. It became very easy to identify a mustard worker when seen on the street, from the distinct imprint of the gas mask on his face. I kept telling myself there were worse places to be than on a mustard reactor at Edgewood Arsenal — Hell came to mind.

The per diem during my stay at Edgewood Arsenal was \$6 a day. After paying for room and board, there was very little money left to spend for personal items or at the bootleggers. It is an old story that one way of keeping people out of trouble is to deny them the means for getting into it. During this period, personnel who could not afford to buy a Freedom Bond could buy Freedom Stamps until the value of the stamps was sufficient to trade for a bond. I was fortunate to have accumulated nine dollars worth of Freedom Stamps prior to my trip. I traded in these stamps for money to use for food and other essentials.

So, after three months of training, I was qualified to manufacture mustard gas and to supervise others in the operation. Evidence of my qualifications was obvious; eye irritations that reduced my vision to a fraction of normal, throat irritations that produced dry cough that kept me awake at night, and large blisters or second degree burns on each wrist. I am at this point doing very little broken field running, since my goal is to get through the line in one piece. I had started my new career very cheerful and confident, but now in only a few months, I had become very sober and quiet. Things were not turning out as I had expected. Nearby things did not appear as they had from Chattanooga when I had first decided to enter war work.

Upon returning to Huntsville Arsenal, I was made the foreman of an operation using the filling line, that had previously been used for filling 105-MM shells, to fill M47A2 bombs. This setup was very poor. With fatigue and forgetfulness often present, it was not long until some operators tried to drop two charges into one bomb. This dumped several gallons of mustard gas on the floor and thoroughly contaminated the conveyor rolls and adjacent equipment. Since the equipment and concrete floors were very difficult to decontaminate, the situation went from bad to worse despite all the safety devices we installed on the equipment. Consequently, the entire operation became contaminated to the point that it was always "hot." Many employees suffered from severe cases of eye and throat

irritations. Due to the three-shift, seven-days-a-week operation, many of the employees worked themselves so strenuously that a number had to be hospitalized for general debility and eye and respiratory irritations. This operation resulted in the beginning of my contacts with Brigadier General Rollo C. Ditto, the commander of Huntsville Arsenal. I recall him as being easy-going and gregarious with an uncomplicated, pragmatic management style. He asked me if there was anything right about what I was doing. Before I could answer him, he told me to eliminate all the things that were right about the operation and work on what I had left. He asked me if I had any education and I told him I had a college degree. He peered at me closely through the fogged glasses of his gas mask, turned, and walked briskly away. I decided that his actions gave me the authority to close my line for cleanup — this I did.

Following the experiences in the mustard loading and filling plants, it was discovered that the bottom parts of both my lungs were badly scarred. I was given a job in charge of the refrigeration for all the chemical operations on the Arsenal. The new job would keep me out in the open more; however, at the same time, it would subject me to different types of chemical poisons.

Lewisite was produced in four plants located on the Arsenal. Lewisite was an agent for the destruction of both internal and external tissues. A chief ingredient for use in the manufacture of Lewisite was arsenic trichloride. This plant produced around 30 tons a day, but could not meet the demands of the Lewisite plant.

Phosgene was manufactured in one plant which produced better than 40 tons a day. This gas had the very pleasant odor of freshly cut hay. In addition to the gas manufacturing plant, white phosphorus was loaded into M15 hand grenades, and M46, M47A1 and M47A3 100-pound bombs; white smoke was loaded into M4A2 pots for screening combat operations and M20 rifle grenades; tear gas was loaded into M6CN-DM grenades; and, four

different types of incendiary oil munitions were produced during the same period at Huntsville Arsenal. One of the most interesting operations was the production of colored smoke grenades. The dye used in the grenades colored the workers' clothing and stained the skin. It was not uncommon to see people of rainbow hues walking around Huntsville. Due to the health hazard associated with working in colored smoke, the workers were paid one grade higher. Fires were numerous, as many as 11 in two hours being recorded when yellow grenades were being made.

During these early days, I had learned some very valuable lessons in broken field running from a culture made up of hard-working, hard-drinking, and hard-living people. The Huntsville Arsenal reached its peak of 3,707 employees in May 1944, with 90% civilians and 10% military. Of the work force, 9% were unskilled, 48% semi-skilled, 18% skilled, and 25% administrative or graded employees. A representative sample recorded in September 1944 showed 26% white female, 11% colored female, 52% white male, and 11% colored male. For a long time, the Arsenal maintained a working ratio of white and colored employees almost equal to the population ratio.

Of all the problems which I faced as a supervisor, those pertaining to personnel were the most interesting and the most severe. These problems related to the shortage of skills, the lack of trained managers, the generally poor physical capabilities of the workers available, the converting of agricultural personnel into industrial operators and supervisors, frequent changes of personnel, and transportation difficulties that resulted in absenteeism.

My first experience in recruiting was in hiring a secretary for my operation. A very healthy looking lady from Union Grove showed up about 9:00 a.m. for the interview. I asked her why she was late and she told me that when she went out to milk the cows one of them was delivering a calf and she had to help the cow along. Her past experience consisted of picking cotton, working at a

saw mill, and doing general housework for her parents. I inquired of her about her qualifications to be a secretary, and she told me that she learned how to type in high school and had kept books for a used car dealer in Arab. Arab is a small town around thirty miles south of Huntsville. These qualifications seemed more than adequate for my requirements, so I hired her. The first person I recruited turned out to be one of the best people I ever hired, and she remained with me until I left for the Navy. From the beginning, she showed a strong determination and perseverance in carrying through our simple ideas toward the objectives we had in mind. I remember today a quotation from Mark Twain that she quoted during a particular tough time one day, "Always do right, this will gratify some people and astonish the rest." Her creative writing ability was called to task one night when an operator from the mustard plant showed up in the office. He was obviously in some slight pain and periodically pulled at his sex organs. He told me that he had failed to secure his pant legs properly around his ankles, and the mustard fumes had caused his sex organs to turn red. This was complicated by the fact that he had been married only one week. I asked my secretary to write a letter for me to sign to his new bride explaining the situation:

Dear Mrs. Jones:

Do not expect sexual intercourse for a few days. Your husband got mustard gas on the private parts of his body.

The lack of trained supervisors exhibited itself in the lack of people who understood the basic techniques of management, but it was never a problem in finding people who had the strength of character to become supervisors. We say a man has character if he sticks to his convictions, whether they derive from his own opinions, or someone else's; whether they represent principles, attitudes, sudden insights or any other mental force. Such firmness cannot show itself, of course, if a man keeps changing his mind.

The workers in this particular culture demanded consistency and fairness. They had no criteria of fair treatment other than the fact that everyone should be treated the same. Due to the lack of formal training on the part of the supervisors, their actions could never be based on anything firmer than instinct, a sensing of the truth. Most of the supervisors worked under the general principle of — “If it is not right, do not do it. If it is not true, do not say it.”

The handling of intoxicated personnel, while they were performing hazardous operations, was a particularly challenging part of the job of the supervisor. Ethylene, for use in making mustard gas, was made from pure grain alcohol and each of the six plants had approximately 20,000 gallons in underground tanks adjacent to the building. Lewisite used pure grain alcohol as a coolant for the reactors and each of the six plants had approximately 100,000 gallons in above ground tanks. The alcohol was delivered to the Arsenal in trainloads of tank cars. Since Huntsville and Madison County were “dry,” it did not take the workers long to find out that the Arsenal had a large supply of 200 proof moonshine. A number of ingenious methods were devised by the workers for drawing the alcohol from the tanks; and before long, each worker had a coke bottle of alcohol in his locker. By this time I had some supervisors working for me and I gave it the usual book solution. I instructed my supervisors to have the workers remove the alcohol from their lockers, and stop drinking on the job. The problem did not go away when I found that the coke bottles of alcohol had been moved from the lockers of the workers to the lockers of the supervisors. This was my first exposure to the meaning of an expression from about 100 A.D., “*Sed quis custodiet ipses custodes?*” (But who shall watch the watchmen?)

A series of lectures, photographers taking pictures of workers drawing alcohol from the tanks adjacent to the buildings, and an increase in disciplinary actions for those drinking on the job soon proved the maxim that trouble never travels alone. The high sheriff of Madison County

came to the Arsenal to report that large quantities of moonshine whiskey was being made on the Arsenal and was being sold in town. An inspection revealed that a variety of novel ideas were being used in removing the pure grain alcohol from the Arsenal in thermos bottles, milk bottles, and in kegs. The technique easiest to locate was the cases in which the workers drained the water from their car radiators, then filled the radiators with alcohol. The military police would allow the traffic to move very slowly out the main gate on Rideout Road. Other military police would simply walk along beside the cars and sniff out those with boiling radiators. The problem continued to grow because after entering the Navy, I was visited by an FBI agent at Great Lakes, Illinois. He was investigating the loss of a tank from the Arsenal that contained 10,000 gallons of alcohol.



The major administrative problems that plagued the Arsenal throughout its operation were the organizational structure and the lack of leadership on the part of the military. These two problems prevented broken field running on the part of the civilian supervisors, since most of the time was spent in beating your head against an inflexible line of military. The organization at Huntsville Arsenal differed basically from that of the other three chemical warfare arsenals (Edgewood, Pine Bluff, and Rocky Mountain), which were organized on the basis of separating operations according to mission, each mission being self-supporting with service elements so located that they could support the most missions.

The military officials at the Arsenal during this time believed that the ultimate in organization could not be accomplished at Huntsville Arsenal because qualified civilians capable of directing and assuming responsibility for the accomplishment of major objectives were not available. In view of the apparent scarcity of managerial personnel, the Commanding Officer felt that a very close personal control by the Commander was necessary for satisfactory administration. The policy was established to treat many situations individually, instead of formulating overall policies and requiring that these policies be administered at lower echelons. I learned very little about management during this period, since the retention of decisions made at higher echelons, even on minor matters, prevented me from getting the necessary experience that would eventually have enabled me to accept the responsibility that should have been delegated to me. The attitude of the military made the job of supervisor extremely difficult since the hands-on attitude of the military paralyzed the initiative of the workers. An expression often heard from the workers was, "I have to wait for the Captain to tell me how to screw it up." The basic lesson I learned from butting my head against this line was the importance of giving your subordinates room to operate, to make honest mistakes, and to learn through experience. I learned the importance of eliminating "nit-picking." I learned that the final authority

on what is done rests with the individual who actually does the work.

At about the turn of the century, Sir Josiah Stamp of the British Inland Revenue Department said, "The government is very keen on amassing statistics, they collect them, add them, raise them to the nth power, take the cube root, and prepare wonderful charts. But you must never forget that every one of these figures comes in the first instance from the village watchman, who puts down what he damn pleases."

I have no doubt but that the senior military personnel at Huntsville Arsenal were men of character; however, it appeared that after a while this strength of character degenerated into obstinacy. This obstinacy was not an intellectual defect, rather it seemed to come from reluctance to admit that they were wrong. The obstinacy appeared to be a fault of temperament. Some of the officers would bring very keen brains to the formidable problems, and seemed to possess the courage to accept serious responsibilities; but when faced with a difficult situation, they seemed to find themselves unable to reach a timely decision. A common expression heard by the senior civilians during this period was, "We are always raped, but never loved."

A wide variety of techniques was tried in an effort to improve the morale of the mismanaged personnel. An innovation of the post exchange was the cultivation of a truck garden — products from which were used in the cafeteria. Another venture was a pig raising project. The post exchange owned ninety hogs, fed mostly by swill from kitchens. The pigs were to provide pork for the cafeterias. A farmer was employed to care for the hogs and tend to the "victory garden." Operative during 1943 and the spring of 1944, the farm was discontinued in May 1944 as being too costly. The loss on it amounted to \$576.13.

Upon my return from the Navy to Huntsville Arsenal, I sought out the personnel office and found that it

was located in the basement of Building 111, the headquarters of the Huntsville Arsenal. I was told that the Arsenal was being closed down and that I was no longer needed. However, after some discussion, I was given a job as a supervisor in a demilitarization operation. The job here was to remove the poison gases and the high explosives from the shells and bombs, and recover whatever materials, such as magnesium, that was available. This operation lasted until March 17, 1949, when the Arsenal was put up for sale. At this point, I transferred to Redstone Arsenal, an ordnance installation located adjacent to Huntsville Arsenal. Redstone Arsenal had the responsibility to fill the burster tubes of the chemically filled shells and bombs from Huntsville Arsenal with explosive materials such as TNT. During 1948, the Office Chief of Ordnance decided to designate an arsenal to research and development in the field of rocketry. On June 1, 1949, the Ordnance Department reactivated Redstone Arsenal to carry out this mission. The Redstone Arsenal also took over the real estate of the deactivated Huntsville Arsenal, giving the new arsenal a combined area of 40,000 acres. During 1949, the government contracted with the Rohm and Hass Company and the Thiokol Chemical Corporation to do research on rocket propellants. Both companies moved on the Arsenal.

With the arrival of a complement of officers and 120 former German Scientists from Fort Bliss, Texas, in April 1950, to join the approximately 1,200 personnel already on board, Redstone Arsenal entered the missile era.





Pictured above is Redstone Park as it was in 1943. On the right the Mercury-Redstone Launch as the first manned sub-orbital spaceflight lifts off in May of 1961. Aboard was Commander Alan B. Shepard. At bottom are the remains of one of the railway cars used to transport Redstone Arsenal workers to and from Redstone Park.

MERCURY-REDSTONE LAUNCH

