

there. Again, I found the best of Engineering people to work with, and, once moved, I started working with an Engineer who arrived the same time as I had, Stan Bean, who transferred in from Region 5. He was an excellent and very supportive person and also allowed those who worked for him to be full staff people.

These 3+ years really topped off my career, as I was able to get changes in several areas of Fleet Management that had bothered me for years. The more significant ones were:

- (1) Improved vehicle deliveries to field units that saved many thousands of dollars each year for the Service and Department. (I received a large cash award for this effort for which we are still most grateful, although I still feel this is what I was hired for and was only my job to get done.)
- (2) Elimination and revision of outdated and unneeded requirements in the Driver/Operator programs. As chairman of a national workshop that made and brought about changes needed, I found this to be one of the most productive and effective groups I worked on.
- (3) A better working relationship with those in charge of equipment in USDA. When I arrived it was very difficult. I spent most of my time convincing them that the Forest Service had "nothing to hide" and that the Service was really in the Equipment Management business with ample reason and justification to do so. I felt good about the change before I left, thanks to the help from Dave Williams in the Forest Service and Frank Gearde in the Department.
- (4) The working relationship between the Washington Office and the Regional Equipment Engineers improved, although Regional autonomy still prevented us working as a totally coordinated team that operated together when working with GSA, the Department, or industry.
- (5) The first phase of a Service-wide Equipment Management self-study course was under way when I retired and completed in 1984. Another was to come, but I haven't seen it.
- (6) The setting up and start of a Service-wide Equipment Management Information System (EMIS) coordinated with the Departments, Fiscal Management, and the Regions. We received excellent help and leadership from Bill Ellison, Region 4 Regional Equipment Engineer, in this effort.
- (7) Participation in the design of a new small pickup in the industry. We were able to meet with design Engineers and Management people concerning improvements needed on most small pickups the Service was receiving. Some of these were ground clearance, seating, bed size, horsepower, electrical and braking systems, and suspensions.
- (8) Fleet Management PIT. I strongly felt that it was time to take a good look at the Washington Office and Regional Equipment Management effort and situation by an outside review or audit, if you wish. As the Chief was using them at the time, I felt the Productivity Improvement

Team (PIT) was a good way to do it. I was pleased when my recommendation to do this was approved by Chief and Staff. It was under way when I retired, and I feel the final results were helpful and timely.

Some of the People

I retired nearly on schedule. (Had to do this or liquidate some properties and other holdings in the West.) It was as planned and best for us after 39 summers and over 36 years of service. My career from a laborer on a Ranger District to Chief Equipment Engineer was "something else," and I always will be very proud and grateful to have been a Forest Service employee all those years. My time and career is owed to many people to whom I want to give credit and mention at this writing. First must be the folks who really did the work—the secretaries, clerks, mechanics, operators, drivers, fleet managers, and the specialists and engineers with whom I worked or worked for me. They all were of so much help and support as well as the backbone of the real "doing" part of our programs. Moreover, I was fortunate to be in times when we got the job done through many "giants" of their time in the Forest Service. Although there are too many to mention, I want to personally recognize a few. Without these people, I would never have made it to the ballpark, let alone get to first base!

- (1) Nolan J. "Noly" Winward, Road Foreman, Minidoka National Forest. He taught me most of what I know and can do with my hands, and made sure I didn't stray too far when so young.
- (2) Tom Mathews and Gene Briggs, Forest Supervisors, Minidoka National Forest. They hired me and made sure we had a job in spite of two "RIF's" and several layoffs. They cared for their workers!
- (3) Murt Hiatt (Region 4), Bud Waggoner (Region 6), and Jack Hamblet (Region 1), Equipment Engineers. Murt selected me "out of the pack" to be his specialist and gave the reins to do the whole job. Bud and I spent many days and weeks writing specs, ordering heavy equipment in the Washington Office, and rewriting handbooks, manuals, etc. He really knew the business and was much help and inspiration. Jack, the then "guru" of Equipment Management, gave us all a chance and valuable advice and counsel at every meeting.
- (4) Tom Van Meter, Chief of Operations, AR Standing Personnel Director; Erol Crary, Chief of Fiscal; and Horace Hedges, Safety Officer, all Region 4. These people guided me, warned me, kept me on the "straight and narrow," and taught me plenty in Equipment Management's direct relationship with all their fields. Horace Hedges (after he and I worked together on a large fire) actually recommended me for the Regional Driver Trainer position. I label them as "giants" of their time.
- (5) Floyd Iverson, Regional Forester, Region 4. He taught us what real multiple-use management and actions are all about. He kept track of, made sure, and followed up on everything. His guidance, direction, and leadership in safety, ethics, honesty, and care were and still are second to none.

- (6) Regional Engineers Jim Usher (Region 4), C.E. Remington (Region 6), and Dave Trask (Region 6). As a full member of his staff, Jim worked me the hardest, expected the most, and saw superior performance as regular duties. He was our Regional Engineer during the "Fabulous 1960's." Need I say more? "Rem," as we knew him, gave the most support and time of anyone to the Fleet Management effort. He led our group, kept us in line, made us work as a team, and most of all made sure of the results. Our greatest loss was when he transferred to BLM. Dave and I started together in Region 6 and learned about one another together. An excellent manager and person who stayed with me in help and support and tolerated my intolerance and impatience.
- (7) Phil Hirl, Assistant Regional Engineer, Region 6. The kind of an engineer an Equipment Manager wants and needs! Tremendous interest and help. He made my work easy in Region 6.
- (8) Tom Stockdale, Regional Equipment Engineer, Region 1. A top-notch person and engineer. This man received more out of college than a piece of paper. He knows his engineering and most of all is eager to do it. I am very proud of his success from college to Region 4, then Region 3, San Dimas, Region 6, and now a Regional Equipment Engineer. He is an example of what a person can do in the Service from college in so short a time.
- (9) Bob Strombom, Maintenance Engineer, Region 6. The "Professor," as we called him, was one of the best people I worked with to get problems solved and improved maintenance practices and equipment in the field. I learned so much from him in so short a time. Wish it could have continued.
- (10) Chuck Morgan (Region 6), Bill Martin (Region 6), and Gary Crawforth (Region 4), Regional Equipment Specialists. These men all worked for me, and I hope I worked *more* for them. They all have a tremendous amount of experience and know-how. All I had to do was tell them and guide them on what we "shouldn't" or "could not" get done in the outfit and then get out of their way! They all made my work and times in Regions 4 and 6 a lot of fun and success.
- (11) Mike Howlett, Chief Engineer; Stan Bean, assistant to him; and Ray Housley, Deputy Chief, Washington Office. I believe Mike and I understood one another from when we first met long ago. He gave me the chance in the Chief's Office. Only problem we had was a late start! Stan, my boss in the Washington Office, was another good Engineer to work with and for. A strong and ambitious manager who made us all a real part of his outfit. He was a big help in the field and on both sides of the Potomac! Ray was a real "down to earth" executive. He always paid attention to us and was tremendous support at the top, especially with Department people and situations.

There are dozens more that I'd like to mention that helped me so much. All one had to do with these folks was *watch, listen, and remember*; then doing the job was easy. I tried just that!

The greatest thing in my career is to have met these and all people in the Service. Someone said something about the Forest Service family. How true—and it is everlasting! I find them always there, even in retirement.

Finally, I see the Forest Service Engineering as the best anywhere. Its organization and service is a vital part of the total Forest Service effort and needs. From its beginning to date, Engineering in the Forest Service must be most proud and respected!

USDA Forest Service Engineering History

Bud Unruh

My career with the Forest Service began in 1944 and ended when I retired in 1983. I didn't start out with the Service to be an Engineer, Forester, or anything else. In 1944, during World War II, the Mt. Hood National Forest made a plea for summer help. I responded, and the work was so exciting to me that after the summer I never thought of working for any other outfit. Every summer from 1944 through 1950 was spent on the Mt. Hood doing whatever was needed, including fire suppression, recreation guard work, timber sale layout, cruising, and road location surveys, to name a few.

It was the engineering facets of all this that prompted me to pursue a bachelor of science degree in forest engineering. This I received from Oregon State University in 1951, and I was ready to really begin my career. The U.S. military had other ideas, however, and I spent 1951–1953 in the Army Engineers mostly as a construction platoon leader (Korean Campaign). Following the military assignment, my Forest Service Engineering career began in earnest and is summarized briefly below:

- (1) 1954–1957—District Engineering and Timber Management, Mt. Hood National Forest.
- (2) 1957–1959—Highway Engineer (Forest Engineer Assistant), Mt. Hood National Forest.
- (3) 1959–1963—Forest Engineer, Ochoco National Forest.
- (4) 1963–1974—Forest Engineer, Mt. Hood National Forest.
- (5) 1974–1975—Engineering Management, Washington Office.
- (6) 1975–1980—Chief Construction and Maintenance Engineer, Washington Office.
- (7) 1980–1983—Director of Engineering, Pacific Southwest Region (Region 5).

Those of us who were Engineers in the Forest Service during the 1940–1980 period had the best time imaginable to apply our skills. The National Forests in Region 6 (and others) experienced most of their development during that time. Engineers can take the credit for the conception, planning, design, construction controls, maintenance, and management of these developments. There was not only the need to apply engineering skills but also

the challenge of developing the necessary skills and organizations to cope with programs that grew by leaps and bounds.

Between 1945 and 1980, most Forests in Region 6 went from literally primitive transportation systems to full development to meet Forest Service management objectives. The Mt. Hood National Forest in the 1940's had a transportation system inventory typewritten on one or two pages, several hundred miles of roads at the most. By the end of the 1950's, the inventory was computerized and contained about 5,000 or 6,000 miles, most of which were still in the planned category. By 1970, about 3,000 or 4,000 miles had been built, mainly because of increased demands for wood following the war. Typical of program growth in Region 6, the Mt. Hood timber sale program increased from almost nothing annually to over 400 million board feet. The need for Engineering really became apparent during the 1950's as timber removal increased annual road construction needs from a few miles to about 200. Along with timber and road programs, others seemed to snowball as well. Housing and facility needs grew in proportion. More road access encouraged more public use of the Forests and, thus, expanded recreational facilities needed to be engineered.

These programs came so fast that the Engineers on hand were soon overwhelmed by the load. We were plagued by a drastic shortage of all types of Engineering personnel and had to improvise in many ways to get the job done. The few Engineers then on Forests themselves had a lot to learn about transportation planning, design, construction inspection, and maintenance. This need was partly satisfied by annual road design schools conducted by the Regional Engineer's staff. In the mid-1950's, the Mt. Hood had only four professional engineers. I was one of them and attended the Regional design school in 1955. This turned out to be an extremely valuable experience. In 1957, two of the four engineers went to Forest Engineer jobs—Jack Frost to the Wenatchee and Rob Keeney to the Ochoco. This left Forest Engineer Wilton Roberts and me with a winter road design program of over 100 miles.

While Engineers were scarce then, Foresters weren't. It seems strange looking back on it, but the Mt. Hood road design program in 1957 and 1958 was done almost entirely by Foresters. How? We held a centralized road design school on the Forest. Each of about 25 Foresters from Districts brought projects to the school. We walked through the process step by step and stayed in the same room for at least a month. The projects were then finished back on the Districts, and I spent most of the winter and spring working with them. Our results were far from perfect, but the jobs got done and were quite acceptable.

Thanks to a vigorous national recruiting effort, we soon began to acquire more Engineers, and the use of Foresters was phased out. One of the greatest benefits of the forester road design program later proved to be an enhanced understanding by future line officers of the service a strong Engineering staff could provide.

Development of the vast National Forest Transportation System didn't happen without many memorable engineering problems, challenges, and humorous episodes. Here are a few as I recall them.

A most significant event was creation of the computerized transportation system inventory on the National Forests in Region 6. In 1957, Regional Engineer Ray Grefe decided to compile a complete transportation plan and inventory of road development needs for program funding and future planning. Forest Engineers were directed to map all needed roads for future management of the Forests and enter essential information for each road in a new computerized inventory. To comply with that one simple request, the Mt. Hood (a fairly typical Region 6 Forest) changed from a system of about 600 miles to about 6,000 miles in 6 weeks on 1.25 million acres. Needless to say, this was all done in the office by the seat of our pants.

On the Mt. Hood, Ron Metcalf and I did this job with District Rangers. During the process, roads were sketched wherever needs could possibly be imagined. Regional Engineer instructions said, "Make the inventory as complete as possible; and a thorough review will follow at the Regional level." These instructions, coupled with the magnitude of the project, were just too much for Ron—imagine a thorough review of 4,000 to 6,000 miles on each of 18 Forests. Ron couldn't resist putting all of this to a test. When the Mt. Hood's maps and inventory were submitted, they included a two-lane timber access road, which took off at Timberline Lodge and contoured around Mt. Hood across snowfields and glaciers over the top (elevation 11,245 feet) and down the north side, about 15 miles in all.

The results of the Regional Engineer review were anxiously awaited in the spring. Much to Ron's dismay, the road wasn't contested, not even noticed. We all wondered at the time how this fly-by-night massive inventory project could be of any value. Crazy as it seemed at the time, it had many good payoffs in future years. First of all, it was an early indication of the huge transportation development needs to realize management goals. It also added emphasis to the policy that a road must be on the transportation system to be built, and thus served to eliminate many unplanned, undesigned, sub-standard flagline-type roads that were destined to cause migraine headaches later. It pointed out the need for a gigantic increase in Engineering personnel to cope with the planning, design, construction, and management of the system, as we suddenly realized how inadequate we were in numbers and skills.

This first supposedly complete plan and inventory was only the beginning, of course, and opened our eyes to the need for a huge on-the-ground effort to establish and verify more realistic transportation plans. A surprising thing to be realized by many of us during the next 20 or 30 years was that the first plan and inventory put together in a few weeks was not too awfully wild in terms of general facility patterns and overall needs.

One of the biggest pains Forest Engineers had to deal with during the rapid development of the road system was the prudent timber sale operator road concept. Most of the roads built were by timber sale purchasers (or their subcontractors) as a requirement of the sale contract. A purchaser could only be required to build a standard of road that a prudent operator would build to remove the timber from a given sale. The Forest Engineer was expected to plan and get built the ultimate standard road needed for National Forest management purposes. Needless to say, the two standards were rarely the same. The easy answer, of course, would have been to get a lot of appropriated funds and build the wanted road in advance of timber sales.

Once in a while, this actually happened, but need for the road system came so fast and was so costly that there was never enough money. The second best alternative was to enter into cooperative agreements with purchasers using some appropriated moneys to supplement the prudent operator standard costs. We spun our wheels a lot trying for these because of several reasons. The appropriated dollars had to be secured. The purchaser had to be agreeable. Two designs and cost estimates had to be prepared, only one of which would be used. The many complications resulted in many frustrating failures to achieve the desired objective. The least desirable alternative was to just require the purchaser to build the prudent operator standard road, and then at some future date at a higher overall cost rebuild to the needed standard.

I can recall few obstacles in the development of the National Forest Transportation System that created more challenges, frustrations, and satisfaction (at times) than coping with the prudent operator road concept. I must conclude, however, that Forest Service Engineers never failed to tackle these problems with a lot of imagination and ingenuity to get the right road the first time, and they very often were able to contrive ways of doing it under the "concept."

Engineers in Region 6 encountered many technical road design problems, too numerous to mention here; however, one of the most notable was dealing with unstable soils in steep terrain. One simple event really emphasized this problem. In the mid 1960's, Regional Forester Charlie Conaughton returned from a field trip over some Forest roads and wrote a brief new policy that said, "Hereafter, all roads in Region 6 will be designed and built so as to eliminate slips and slides." This soon became known throughout the Region as the "No Slips, No Slides Policy." Anyone who has ever worked with the soil conditions, terrain, and climate conditions in western Oregon and Washington knows how impossible this was. Careful study of aerial photos in these areas will point out slips and slides occurring naturally without any help from us Engineers. For a while, the new policy could hardly be mentioned without some jokes, as everyone knew that carrying it out to the letter was impossible. There was no doubt though about Charlie's intent, and we all looked on it as a license to do our absolute best. This new emphasis supported Engineers' wishes to do a more thorough job of investigation, testing, and design. Little did anyone guess at first what an impact it would have on our ability to do a quality job. Eventually, it helped us acquire specialists in geotechnical engineering and materials testing, and much needed equipment and facilities. Although slips and slides were never completely eliminated, the intent of the Regional Forester's policy was willingly carried out, and to the best of my knowledge, no one was ever called on the carpet for violating it.

Most engineering problems could always be solved in the field, on the design board, or at a conference table. One I can recall, however, took an act of Congress. A situation evolved over 30 years or so whereby two different contracts were necessary to build Forest Development Roads: the public works contract and the timber sale contract. Using the PWC, exactly the requirements wanted or needed to meet National Forest management objectives could be specified. Using the TSC, specifications were written so as to abide by the prudent operator road standard concept. The PWC specs were written by Forest Service Engineers and Administrative Services

people. The TSC "C" Provisions were coauthored by Forest Service and timber industry organizations representing the timber purchasers. Differences in the language and the requirements constantly caused problems of interpretation, training of inspectors, and uniformity of standards, to name a few.

Engineers often talked about a solution—namely, using one set of construction specifications for both contracts. Some may at times have even made a run at effecting a change. There was always strong opposition both outside and within the Forest Service organization, and no case made by Engineering alone was strong enough to buck the longstanding tradition. Finally, out of the blue sky came an opportunity in the National Forest Management Act of 1976. A brief clause in the act provided that small business timber purchasers could "turn back" required road construction to the Forest Service and that the Forest Service must build the "same road." Time limits were also specified that the Forest Service must meet. It became immediately apparent to Engineers, Contracting Specialists, and Timber Staff that two different sets of road construction specs would no longer do.

Simply agreeing among Forest Service staff groups on need for a change was not enough; it was only the beginning. I at the time was Construction and Maintenance Engineer in the Washington Office and took on the job of selling and coordinating the changeover. Chief John McGuire had to give his blessing and wasn't immediately convinced of the need. He was being leaned on hard by timber industry representatives who were protective of their longstanding participation and authorship in the timber sale specs. Finally, in spite of almost violent opposition, from outside timber groups and thanks to the strong support of Washington Office Directors Mike Howlett (Engineering), Dick Worthington (Timber Management), and Hayden Owens (Administrative Services), in the fall of 1976, the Chief said go.

Then the job had to be done in time for 1977 contracts. It was a massive undertaking but willingly accepted by the Washington Office and Regional Engineering Staffs as well as Administrative Services and Timber Management people. Many will remember participating in the January 1977 workshop in Albuquerque where the first draft was written. During the process, inputs on various drafts were invited from timber industry groups and were generously provided. The final product, *1977 Construction Specifications for National Forest Roads and Bridges*, came off the press in time for the 1977 season and proved to be just another example of what a dedicated Forest Service team could accomplish.

In the 1950's, when road development programs were ballooning, getting and training enough construction inspectors was impossible. Usually, those available were young and green and were pitted in the field against old grizzly purchaser representatives who had spent most of their lives in the woods. These inexperienced inspectors were often no match for some of the tactics employed by purchasers to get logs down the road. This was not always the case, however. Some of the early inspectors were switched from other Forest Service activities and, although new to road inspection, had the experience and grit to figure out how to deal with most any situation.

One such inspector was L.R. "Gil" Gilbert on the Mt. Hood National Forest. On one of his first road projects, the purchaser was building near the beginning and felling logs at the same time a mile or so up the road. A large

culvert pipe was to be installed and approved before any log haul. Gil was to be informed about the timing so he could be present during installation. Early one morning, Gil arrived at the site to find the culvert already installed. A quick look revealed a big sag in the middle from poor bedding and fill weight, and the job was grossly unacceptable. It just happened that the purchaser representative (Paul) was still there on a D-8 cat dozer doing some final surface grading. Gil was angry, to put it mildly, and the confrontation began.

When asked about the lack of advance notice and quick installation, Paul said, "We need logs! The pipe's in and it looks good to me. Some trucks are up above being loaded, and they're coming out today." Gil quite calmly responded, "Paul, we both know the pipe isn't right, and no logs can come over this road until it is." Paul's answer was, "I guess we disagree; we're hauling logs today." Without another word, Gil got in his Forest Service pickup as if to drive off. Instead, he pulled it crossways in the new road just below the pipe. He then got out and said, "Paul, any logs going down this road will have to go over this pickup truck." The D-8 dozer was still idling about 200 feet up the road. Paul didn't say a word; he got on it, put it in its highest gear, and headed straight for the pickup. Needless to say, Gil was sweating a bit, but as the D-8 got within a few feet of the Forest Service pickup, it spun 90 degrees to the right and Paul started digging out the new fill. This was an unfortunate happening, but a clear understanding was reached there on the ground in the beginning, and the rest of the project went much smoother.

Recollections of Forest Service Engineering—1945 to 1985

Dale (Jack) Frost

It was my privilege to serve the Forest Service over a period of 40 years. I can only echo "Major" Kelley and Hank LaFaver: "The Forest Service owes me nothing—I owe it much." After working as a student for the first 3 months, I knew that the Forest Service would be my career. Time has proven that decision to be a good one. The organization and culture and most of the problems have evolved over time, but the personnel, ethics, and esprit de corps have remained the very best.

I had many mentors over the course of my career and will honor just a few of them in the course of this short piece. Also, I must pay tribute to the engineers and technicians with whom we worked. Don Roper, the long-time Assistant Regional Engineer in Region 3, is one of those outstanding technical and management engineers. His reputation and competence made the job easier for all of the Regional Engineers that he served with.

It is a pleasure to recall the early and exciting days of my youth in Region 6 on the Mt. Hood Forest. I met Bud Unruh (later Region 5 Regional Engineer) during the first summer's work; then we were roommates at Oregon State. We worked together on many road and timber sales during our student years. We had the advantage of working for Rangers like Bus Carroll and Roy Bond, as well as Engineers Bill Shiley and Wilt Roberts. These folks gave us essential minimal training and instruction, but they expected us to ask questions, utilize our limited technical knowledge, and work hard. We learned early about delegation!

On one 5-month vacation from college (I ran out of money), I worked with Norm Gould and three others, to lay out and prepare over 70 million board feet of timber sales and locate and design the needed access roads. We began in the spring on skis and snowshoes in 3 feet to 6 feet of snow and ended in time to reenter for the fall term. These timber sales were established under much simpler contracts, laws, and regulations than now exist. The multi- and interdisciplinary input and review was minimal except for the Ranger and Timber staff. Even so, the work was technically sound and environmentally adequate. Today, the same job would be much better done but at many times the cost.

On one of my first jobs as a junior engineer after graduation, I was assigned to locate, design, and stake a new major access road on an emergency timber sale. This route was accessible to construction at only one point, the end of the existing road that dead-ended in the lower part of a canyon. The only work that had been accomplished for the road was a penciled location on a topographic map. The route was in a rugged and steep canyon along a

large stream. Upon first arriving at the job site on a Monday morning, my helper and I were met by the road contract construction crew, unloading three bulldozers. After some delay, we were able to establish 1,000 feet of clearing lines. The clearing work and pioneer road on this section kept the crew busy for the first 2 days. We found that a 60-foot bridge would have to be constructed about 200 feet beyond the end of the marked clearing. We were able to use the standard Region 6 log stringer bridge plan and thus eliminate extensive design time delay. The next day, we made further reconnaissance and found that two more log stringer bridges were required in the first 2 miles due to terrain and topography. We were able to do the 10 miles of location, design, and construction staking and keep ahead of the construction crew, primarily because of the need to construct the three bridges in the narrow canyon with only one point of access. The construction superintendent was convinced that I made them build the bridges to avoid the embarrassment of construction delay! With few Engineers and Foresters and an expanding timber sale program in those days, we were faced with many emergencies, not unlike those encountered in fighting a forest fire.

I was fortunate to become the Forest Engineer for the Wenatchee Forest in 1957. Ken Blair, a capable and crusty "mustang" was the Forest Supervisor. He attained the position through ability and experience. I was the first professionally trained Forest Engineer and initially had only a few engineering technicians on the staff. As was the case for many Forests at that time, the backbone of engineering was the Road Foreman/Superintendent. Magnus Bakke filled that position when I arrived and without a doubt was one of the most capable in the Service. Under Blair, and with Magnus' help, I survived. One of the first junior engineers we added to the staff was Magnus' son, Kjell. He went on to a significant career in Region 6.

It seems to me that in the late 1950's and the 1960's the public became more interested in the management of the National Forests, and we received a greater amount of criticism and informed questioning than ever before. In prior times, the public had more of an unquestioning trust of the professionals in the organization. It was difficult for some professionals and managers to accept public critique.

After my 4 years on the Wenatchee, the staff and work load had greatly expanded, and recruitment of professional engineers in Region 6 was evident. We now had one engineer for every four technicians.

In 1961, I was again fortunate to be moved and assigned to another great National Forest, the Wallowa-Whitman. After 1 year there, and with the advent of John Rogers becoming the Forest Supervisor, I decided that this would be the place that I would stay until I retired. I managed to remain there for 11 years.

During this period, there was great increase in the work load and an expansion in the number of personnel and in the number of professional disciplines employed. Recreation use was multiplying, and timber harvest was maximizing. The number of Engineers and Foresters was increasing. The Forest Engineer's position had become a manager/planner rather than a hands-on engineer.

This was a time of increasing attention to the environment by the Forest Service. It was also a most satisfying time for an engineer who enjoyed development and construction. I recall Jeff Sirmon remark that the 1960's and 1970's were the "glory years for the Forest Service." I agree!

I believe that the Multiple Use-Sustained Yield Act of 1960 had a positive effect upon the organization. It was of course written by our people, and whether they intended or not, it seemed to increase the organization's environmental awareness as well as formalize multiple use. One of the results in Region 6 during the mid-1960's was the establishment of the Multiple Use Survey Report (MUSR), a forerunner of later mandated environmental project surveys and reports. The MUSR was a positive tool for engineers, requiring interdisciplinary involvement in development and construction.

One of the most productive Region 6 studies that I was involved with was the 1971 Timber Purchaser Road Construction Audit. Ward Gano was the Regional Engineer, and under his leadership, this first in-depth review of the largest Region's timber purchaser road effort was initiated. It was an interdisciplinary effort, and Engineers were not just looking at themselves. There were many improvements made as a result of this effort, and it was a forerunner of later and better reviews. Ward Gano was an outstanding Regional Engineer; his competence and leadership are legendary!

The Engineers and technicians that served on the Wallowa-Whitman during the 1960's and early 1970's were also a credit to the Forest Service. Arlyn Beck is remembered as a trail and maintenance expert, Jim Adams left his mark as an engineering soils technician, and Rastus Fleetwood as Road Superintendent. Some of the Engineers who also left their imprint were Nick McDonough, Sid Nerdahl, and Dale Peterson.

The 1968 National Trails Act has some special significance to me because, shortly thereafter, the responsibility for trails was transferred to Recreation. Engineering had, in my opinion, done a great job with trails and trail management. My friends in management and Recreation have tried to explain the rationale for the change, but I still do not agree. The National Forest Trail System that now exists is a tribute to the leadership and efforts of Engineers and Engineering over the years.

I left the Wallowa-Whitman for a short stay in the Washington Office in 1972. Mike Howlett was a great teacher, as were Rich Weller and Strickland. Most of us had a reluctance to move to the Washington Office, but then, as now, it is invaluable experience for management in Engineering.

The 1969 Environmental Policy Act was significant, but it was not as traumatic for the Forest Service as for some other agencies who had not been as environmentally conscious. The effect upon Engineering was more time spent in planning, consultation, and analysis.

In 1973, I had the privilege to serve with Regional Engineer Cliff Miller in Region 4. Cliff's tremendous background, technical engineering competence, and ethics made him a good mentor.

The 1974 Forest and Rangeland Renewable Resources Planning Act (RPA) had a substantial impact upon the Forest Service in the 1980's, and this

impact is continuing. The long-range planning requirements seemed to cause a greater time impact upon the operation of the Service than any other event that I experienced during my career. The jury is still out on its effectiveness. The value of Engineering's prior efforts in transportation planning and analysis were evident when RPA was initiated in Region 3.

In 1977, I came to Region 3 to work for Regional Forester Gene Hassell, Deputy RF Cargill, and later Deputy RF Jim Overbay. I seemed to be blessed with superior folks to work with during my career! The Region's engineering was in excellent shape under the prior leadership of Walt Furen.

Engineers and technicians involved in construction in Region 3 during the 1970's and 1980's were well trained through the Service-wide Construction Certification Program. There is no question that this training and certification increased the competence of construction engineers and inspectors.

The information age, aided by demands of RPA, and a good decision by Forest Service management, established a Service-wide computer system and office automation in the early 1980's. FLIPS, as it was originally called, was a welcomed tool for most, but a traumatic change for some. Engineers were generally well prepared for office automation because of their training and Forest Service Engineering use of computers for design since the 1950's.

Region 6 Regional Engineer Dave Trask was appointed to the National Systems Management Review team headed by Regional Forester G. Hassell in 1983-84. The purpose was to advise the Chief about managing the implementation of the new computer system. I was privileged to participate in a work group of this Review, addressing employee readiness. The Forest Service and most certainly the Engineers entered the information age in good shape. The national engineering Road Design System (RDS) had gone through evolution since its inception in the late 1950's, and it, too, was undergoing major changes in the 1980's. I believe some of the significant modernizations were the incorporation of aerial photography/digitizing (DTIS) and interfacing with road design and the Local Interactive Digitizing and Editing System (LIDES) that allowed field offices to have small stand-alone computers with peripherals to do low-standard road design and logging system analysis.

In Region 3, Engineering was assigned the responsibility for radio and other means of communication. There was a need to improve conventional radio, reduce the cost of telephone service between field offices, and reduce the cost of sending computer data to the remote Supervisor and District Offices. The concept of this first Forest Service Regional microwave system was conceived, and it was constructed. The long-range cost savings and benefit to Region 3 are a tribute to Cal Van Ormman, Chuck Palletti, and Jerry Bowser.

During the efforts to reduce energy consumption during the late 1970's and the 1980's, we designed passive solar heating features where it was cost-effective in Region 3's new buildings. Most of these proved successful and will also yield long-term benefits.

Development funds for the transportation system, for buildings and improvements, and for other construction peaked in the 1980's, and the number of personnel in Engineering was reduced. A similar trend occurred Service-wide. Since retiring, I have observed the continued superior performance of the Forest Service and of Engineering in spite of more funding constraints in the late 1980's.

The Engineering folks, and others that we worked with in Region 3 and elsewhere, will long be in our memory.

My Career From 1949 to 1977

Charles Richard Weller

On June 13, 1949, I graduated from the University of Colorado with degrees in civil engineering and business administration. I needed a job to support my wife, two sons, and myself. During the university interviews, I had been offered one job—Koering Equipment in Milwaukee, Wisconsin. My wife said no. I had also applied, I thought, for a job with the Corps of Engineers (COE) and the Bureau of Reclamation (USBR), hoping for an appointment with the USBR. I received an offer to interview with the Forest Service of the Department of Agriculture. I had received nothing from the USBR or the COE.

On the appointed date, I was interviewed by Regional Engineer Carl Gould, Assistant Regional Engineer Minor Hucceby, and programmer A.P. Kyffin. After much discussion and ultimatums, I was hired and reported to work for the Forest Service on June 20, 1949, in Denver, Colorado.

My career with the Forest Service included assignments in Regions 2, 1, 10, 5, and 3 and in the Washington Office. I started with Region 2 in the Regional Office in a training assignment under Minor Hucceby. There were others that taught me the ropes.

I then went to the White River National Forest under Supervisor Jack Leighou, who gave me some of the best advice I ever received: "If you make a mistake, admit it, and you will have everyone helping you, but if you try to hide it or blame someone else, they will crucify you." I remember this even today, but especially during my Forest Service time. I was a man of action, and I know I made many mistakes. I hope in not more than 50 percent of my decisions.

In the Regional Office of Region 2, I was under the supervision of Marion Lamb. He allowed me to make mistakes of judgment as long as they didn't cost the Government money. He was a very tolerant and knowledgeable mentor.

In my detail to the Bug (bark beetles) job in Region 2, my supervisor was Burt Waldron, an assistant Ranger from Region 1. He taught me a very important lesson: "You do too much with your hands and not enough with your head." This was probably the best evaluation I ever received, because it allowed me to set my goal on an administrative career as suggested by Harry Langford, the Bridge Engineer of Region 2. He said, "Be an administrator, not a bridge designer, if you want to get ahead."

In my detail to the Bug job in Region 1, my supervisor was John Mead, Forest Engineer of the Kootenai. This experience taught me that there are many individual ground rules that require time and adjustment to learn.

In 1956, I transferred to Region 10 in Alaska. My supervisor was John Emerson, after the screening of my family by Regional Forester Art Greeley. This experience taught me that regardless of what you know about a subject, you had better study the situation and make judgments and decisions with proper consideration of the facts and consequences. John and I did well in my opinion, considering I knew nothing of the problems of Alaska before arriving. The situation changed drastically in Alaska. I made an appeal for help and they sent a new boss, G.E. Mitchell. This taught me that regardless of all the forward progress, there may be a snag that develops that requires retrenchment and redirection to maintain forward progress.

In 1958, I transferred to the Plumas National Forest in Region 5; my supervisor was Bill Peterson. The engineering workload on the Forest was so large that it could not be accomplished by seasonal forces. There was a backlog of road survey and design work, inadequate construction supervision, as well as a lack of inventories and condition surveys. This experience taught me that regardless of the situation, with proper thought, planning, and coordination, a satisfactory result can be developed with time, money, material, and trained personnel. On my first assignment to the Washington, D.C., Division of Engineering, my Supervisor was Ward Gano. In the Washington Office, there will always be monumental problems. At the outset, my problems were limited to Research laboratories. We built many laboratories. Ward Gano went to Region 6 as Regional Engineer. My supervisor was now A.P. Dean, Chief Engineer. This assignment taught me hard work. This was the Kennedy and Johnson era. We got a lot of high-level direction and many executive orders, including programs that had serious impacts and required immediate and positive decisions. During this period, the following were assigned at various times: Max Peterson, Don Turner, John Lamb, Herb Smallwood, Cliff Miller, Lou Hepfl, Oscar Hahn, and Harold Zornig. Max Peterson was assigned to the Division of Operation to conduct the "Engineering Skills Utilization Study," which was long overdue. Mr. Dean retired, and Jim Byrne took up the reins as Director of Engineering. During this era, the Forest Service built 47 Job Corps camps, 35 Research Laboratories, four complete tree nurseries, two firefighting centers, and the San Dimas Equipment Development Center, among other programs.

Mr. Byrne started his program to get proper recognition of the Engineering job in the Forest Service and to upgrade it accordingly.

In 1966, I was assigned as Regional Engineer to Region 3. My supervisor was Regional Forester Bill Hurst. This was a delightful assignment for about 2 weeks. For a presumed custodial Region, we had more problems develop than the Forest Service had in years: Spanish land grants and environmentalists. Through this assignment, I learned that many people are dishonest. Objectives are their main thrust; logic, reason, and honesty no longer prevail, but justice will win out in the long run, but it may be a long and rough road.

Before coming to Region 3, I had been advised that we had some serious personnel and morale problems. I thought about this for several months and wondered if there might be some way to bring about a happier and united Forest Service. We as a family were always gregarious and willing participants in Forest Service family events. After consulting with my top staff (Roper and Carnahan), we decided to have a get-together party at my home in Albuquerque. The occasion was to be during Jim Byrne's inspection of Region 3. In my opinion, it was a smashing success. Mrs. Carnahan/Roper/Weller and my mother-in-law, Opol Lofquist, provided wonderful hors d'oeuvres, drinks, and company. We invited over 150, and most of them came. They enjoyed and, I believe, had their faith restored in their fellow workers.

In 1971, I was reassigned to the Washington Office Division of Engineering as an Assistant Director under the supervision of Chief Engineer Mike Howlett. First of all, we had the best personnel in the Forest Service available at our beck and call. This is a beautiful position to be in most of the time. As I learned from Irwin Bosworth, "Always hire people smarter than you." I had reached the top of the pile.

We had the best 17 heads in the Forest Service, and I directed them as follows: "If any one of you ever catch me doing the job of someone else, kick me in the ass."

I never got kicked, but another situation arose from the Government stockpile. This was the environmental impact statement. No one asked for this assignment, and since I had these 17 hotshots that had specific and important tasks, I took it on myself for the Division of Engineering. It was boring, time consuming, nonessential, ineffective, costly, unnecessary 97 percent of the time, but required by law. From my description, you can summarize it as similar to butting your head into a stonewall.

After trying to guide this program in some direction other than just preparing reports, I concluded that C.R. Weller already had enough knots on his head, and it was time to retire. It was early, but I think it made everyone happier.

I would like to express a deep and sincere thanks to all of you who worked with me throughout the whole time. I know in my later years I lost my ability to be patient and argue. This may or may not be bad, depending on the circumstances. I believe we all must learn to listen to each other if we are all going to do our best or arrive at a correct and acceptable solution. Even as an Engineer, I have known for a long time that many problems have no perfect solution. Yet, I believe we should work together to get as close as possible without wasting too much time in defending positions.

I would like to recognize the other group in Engineering that has done so much to promote our position, well-being, and prestige. This is the general clerical staff of the Forest Service. It will be inadequate, but I remember these people helping me through my trials and tribulations: Margaret Fallon, Region 2; Leona Hoopingarner, White River; Vervian Hayes and Tiny Glass, Region 10; Bess Armstrong, Dorthea Bashor, and Grace Drew, Washington Office; Ruth Cowie, Bernie Baer, and Ann Bayless, Region 3; Ruth Kenestrick, Eve White, Margie Angel, and Gloria Wenzlaff, Washington

Office; Ruby Engstrom, Plumas; and Emma Kuretich, Region 5 Regional Office.

I realize that as professional employees we deliberately avoided heaping onto the professionals the awards available in the agency.

I would be remiss if I did not pass out a few accolades to some outstanding people who, in my opinion, caused me to be a more effective employee for the Forest Service:

- (1) Jim Reddick—Mr. Reddick was the highest paid road locator in the Forest Service and the best. In 1949, he was 62 years old and still a hard-working, efficient, well-respected taskmaster. He taught many of us in Region 2 to work hard accurately, efficiently, and economically. From him I learned, "We know what and how much we know of the requirements of a given job; when we are required to explore into the unknown, we should request assistance. There is really little excuse to foul up something because of ignorance or inexperience if there is knowledgeable advice available." I used this philosophy on all new and many older persons in the Engineering forces of the Forest Service. Mr. Reddick gave me confidence with cautions. I have thanked him many times.
- (2) George Danner—I was another inexperienced person when I was assigned to Alaska. We had a minimum staff. George kept me from making many embarrassing mistakes during my assignment in Alaska. George knew boats, buildings, drafting, and human kindness. I was never able to do right by George, but I want to thank him for his loyalty and guidance.
- (3) Paul Weaver—In Region 3, I had many problems that were required to be acted upon or agreed to by Foresters. By lucky circumstance, Paul was on my staff as the Chief of Trails and Signs. He did an outstanding job on these, as well as serving as my guinea pig on all Forester coordination problems. He was also an excellent instructor.
- (4) John Lamb—We were really in trouble with the Job Corps Camp Construction Program. Fortunately, John came onto the scene. I am convinced if we had not had John working long and unscheduled hours with private industry and O.E.O., we would have been unable to meet the congressional mandates. We had many heart-to-heart talks, and I really appreciate his tremendous individual effort that was required to conclude a successful program.

We spent 28 years with the Forest Service and really enjoyed the family, our success, and the various assignments and suffered with the failures and disappointments. It was a wonderful career. We worked, we played, we enjoyed, and we remember.

God bless you all, and keep up the good work.

A Version of History of Engineering in the Forest Service

Walt Furen

As I reflect on my time in the USDA Forest Service, the predominate truth keeps striking me. It is the people with whom I was privileged to work, play, study, toil, meet, argue, and achieve accomplishments that I consider the most significant. "My time" was June 1958 to September 1986, and over that period, I was blessed with challenging, interesting assignments and locations and the best available coworker "team." This I believe, and it has become to be more evident and meaningful to me as time has gone by.

What follows will be a review of several people with whom I was privileged to serve. Space and time, of course, won't permit naming or introducing to the many, many people I have had the pleasure of working with.

My first job with the Forest Service was as a Road Construction Inspector on the Fremont National Forest under my good friend Red Ketcham. I was hired by Red following a 1-year stint after college graduation with Phillips Petroleum Company in Bartlesville, Oklahoma. In those days, Uncle Sam didn't pay new employees first job travel expenses, so we loaded into a 1949 Mercury with family—son, 2-week-old daughter, mother-in-law, dog—and a U-Haul trailer and made our trek to Lakeview, Oregon. Indeed, many people along the way felt surely we were some of the original "Okies" with lamps and shades strapped on the outside of the U-Haul.

Red put me to work living at Finley Corral, working on the Fremont's Trunk Road, which got me out of town all week. I, of course, didn't know an "L" line from a "P" line and was secretly hoping all along that this little red-headed guy wasn't really the Forest Engineer. But alas, he was, and we became very close and dear friends. I came to respect this friend who had a very unique and positive way of training and supporting his people.

My second job site brought some new challenges and some more impressive coworkers, acquaintances, and bosses. I was promoted to the Forest Civil Engineer position on the Willamette National Forest in Eugene, Oregon. In those days, Civil Engineers were differentiated from the Area Highway Engineers of the Supervisor's Office. My responsibilities included bridges, dams, water and sewer systems, major culverts, retaining walls, and the like. The Willamette seemed to be a very different and very "big-time" Forest to me after the Fremont. Forest Engineer Ed Stout was a master at orienting me and helping me adjust, by being patient, instructing, and tolerating a "new kid on the block" and generally letting me grow into the job. Of course, there were also others on the Willamette who served as excellent and outstanding role models. Forest Supervisor Dave Gibney was stern, bright, energetic, and had considerable political acumen. He wasn't a bit afraid to

tell Regional Office Staff when and where they were wrong. On the same Staff was a young Forester, Rex Resler. He was the Deputy Forest Supervisor, and although he probably didn't realize it, he served as a role model for me as I attempted to grow in the job. Typically, we would construct or reconstruct three to six 200- to 300-foot-long, reinforced, concrete bridges per year, build a new Ranger Station office, residences, and barracks, and develop several administrative sites or recreation area water systems. There was much for me to learn, but alas, I was on the move again after only 1 year.

Next spot was Forest Engineer on the Umpqua National Forest, Roseburg, Oregon. If I had thought moving "up" to the Willamette was a big step for me, imagine my (secret) horror and fear of being asked to be Forest Engineer on this big, exciting, westside, timber-cutting Forest located on the North and South Umpqua Rivers. Roseburg proved a wonderful place to live and raise a family. Our working family included such friends as Roy Bond, who succeeded Vondis Miller as Forest Supervisor; Arvid Ellson, Timber Staff; Homer Oft, Fire Staff; and our Engineering Staff, which changed almost weekly but included Jack Crane, Harry Heislein, Buzz Stewart, Ernie Ellersick, Vern Dyck, Iva Schweppe, and many other very fine engineers and technicians, including a full complement of District Engineers with their own staffs.

Our Engineering challenges were impressive and offered considerable substance for gaining engineering experience. Several significant events came upon us during the 4 years I was privileged to serve on the Umpqua that, perhaps, changed my entire career. In chronological order, these were the Columbus Day windstorm "blowdown," which hit much of western Oregon timber Forests and occasioned a fast-track operation of road engineering to get out the downed timber—a significant part of the Forest harvest. That storm was one of the major blowdowns of recent memory.

Next came the infamous December 1964 floods, which hit all of western Oregon and northwestern California. The Umpqua was hit with the cycle of very heavy snows, followed by heavy rains and chinook winds resulting in over 100-year floods for the Umpqua River system. The damage was extensive and certainly Forest-wide, damaging roads, highways, culverts, bridges, campgrounds, residences, nursery "improvements," field research facilities, and on and on. I don't recall the figures, but damage on the Umpqua alone was in the millions of dollars, offering a considerable and accelerated work load in restoring access and other facilities. One of the most memorable losses for me personally was that we had just completed the Wright's Creek Bridge crossing the North Umpqua River upstream of the Steamboat Ranger Station. After considerable site studies and flood prognostications, I selected the bridge site. This was a very nice and pretty reinforced concrete cantilever bridge approximately 120 feet long. The bridge was completed in October, just 2 months prior to the December or "Christmas" 1964 floods, as they were called. The bridge was not to be! A polaroid photo showing the demise of the new bridge hung in the Forest Engineer's office for years. Someone even brought me a chunk of reinforced concrete for an oversized paperweight. Thanks, I needed that!

Well, time for the next big Umpqua challenge, and what a challenge it was. Remember LBJ and his "War on Poverty"? Well, in the throes of his War

on Poverty, we at Roseburg were selected to have one of his Job Corps centers, and it wasn't enough just to have a center, it had to be the first center (camp) built in the United States. Of course, I like to think that of the Forests that were candidates for Job Corps centers, such as the Umpqua, Suislaw, Gifford Pinchot, and Mt. Hood (were there others?), we were selected because the powers that be knew that our superior Engineering crew could get the job done. The site was Wolf Creek on the Glide Ranger District near Glide, Oregon, on Wolf Creek and indeed a raw site. We imported Jack Crane from Region 10 to be Contracting Officer's Representative (COR) of the effort of constructing an entire Job Corps center from scratch, including barracks, office, storage, gym, mess, gas, and oil, in addition to water, sewer, parking, roads, lights, fences, fire protection, and the entire gamut of a small self-contained rural community. Dick Pomeroy was selected among other good friends of mine, such as Norm Gould and Zane Smith, to be the Director of Wolf Creek. Well, without going into all of the details of planning, surveying, designing, staking, and constructing Wolf Creek for an early opening, you can imagine we had our hands full. Jack did an outstanding job as COR, as did the rest of the crew. Of course, the Forest didn't do it all. We had considerable help from Bruce Plath and the crew from the Regional Office. The experience gained by our entire crew was a once-in-a-lifetime occasion, and I believe all our careers profited. Best of all, perhaps some young man gained a meaningful new chance at "life" as a result of the Job Corps program and specifically the Wolf Creek Center. My hat is off to Dick Pomeroy and his staff for their patience, compassion, diligence, and skill at working with our engineering crews and the participants in the program.

The signs of change began to loom over me again. About the same time all these activities took place, there came a considerable windfall of timber access funds. There were several truck roads on the Umpqua that needed upgrading, such as Steamboat Road, Umpqua River Road, Little River Road, Layng Creek Road, and a number of roads on the Diamond Lake District (afraid I've forgotten the road numbers!). Also, these funds provided us the opportunity to construct new timber access on a Forest-wide basis. As a result of these major programs, Washington Office Director of Engineering Jim Byrne and his Chief Programming Engineer Verne Church traveled across much of Region 6 to see how and what we were doing with the road dollars. I heard a rumor that Jim Byrne was doing some traveling to look over some folks for possible Washington Office assignments.

In the spring of 1966, I was informed by Assistant Director of Engineering Ed Massie (one of my all-time favorite people) that I would be transferring and promoted to a GS-13 position in the Washington Office. Before leaving Region 6, I am obliged to acknowledge and thank some very good supporters and friends, such as Regional Engineer Ward Gano, a gentleman I greatly respect. Also, I appreciated my professional relationship with such friends as Chief of Facilities Engineering Bruce Plath, Chief of Roads and Trails Engineer Tom Utterback, Bud Waggoner (Fleet), Vic and Frank Flack (Maps and Signs), and many others. It was on to Washington, D.C.! Not knowing where to go, we arrived with our three children, Jerry, Laurie, and Mark, in Alexandria, Virginia, sort of bewildered, tired, and flabbergasted with the prices of meals and motels. We had not even inquired about the costs of housing. Needless to say, selling our house in Roseburg for approximately \$15,000 didn't quite measure up to the steep prices of houses in

the Washington, D.C., area. So we settled in a rental apartment complex in Annandale, Virginia. At the time, it was new and was called Americana Fairfax.

I was to become the first person to occupy the new position of Engineering Recruitment and Training Staff Engineer working directly under the then Staff Engineer for Engineering Operations, Mike Howlett. Mike's supervisor was Assistant Director Ed Massie who, serving with Clayton Seitz and Webb Kennedy as Assistant Directors and with Jim Byrne, provided the leadership to Engineering both at Washington and the national level. From what I considered to be a relatively short time in the Forest Service and a service period that I felt was somehow less than "worldly," I was terribly impressed with the brain power and contacts and influence of this "big four."

One of the more memorable and notable opportunities I had for job challenges was working with the Region 5 Regional Engineer on his effort called the 1963 Engineering Skills Study. This was an effort Max Peterson had begun while he was assigned to Washington Office Administration Management, which was aimed at gaining better understanding the Service's new and rapidly expanding Engineering organization. Key in this study was determining longevity rates and what keeps or drives away promising young engineers. This was a notable study that space does not allow a detailed discussion on but that, among other things, led to new Regional Engineering organizations, new training programs, and an effort that brought me to my first relationship with Sotero Muniz (then in Washington Office Personnel) working on the newly conceived and designed Service-wide Engineering Orientation Program. This was a carefully designed instructional program for new Forest Service Engineers, who would be brought to central locations and taught some of the history and heritage we are trying to capture here in this history effort. Also, the course was to teach current Forest Service jargon, laws, policies, sources and uses of funds, geography, past and present personalities, management objectives; to attempt to learn from each trainee what his or her own career objectives were; and to attempt to identify a means of assisting the new employees achieve these objectives. Early-day Engineers who assisted the Washington Office in this effort and in a trial pilot effort at the Continental Divide Training Center in Region 3 included Jeff Sirmon, Stan Bean, Don Loff, and Vic DeKalb. These national efforts were eventually discontinued, and Regions took what materials they wished and performed their own sessions.

Among my more successful recruits of this period was Bob Harris, currently Supervisor of the Lake Tahoe Basin. Of course, all of this sort of died when budgets began to bring personnel reductions. (Last of first Washington Office tour.) Many of the Washington Office Staff at the time were scattered far and wide, many became very close friends for the balance of my career and on to current times, and, sadly, some such as Oscar Hahn, Webb Kennedy, "Sugar" Cain, and Homer Cappleman are dead. And close and dear friends continue from those days: Ed Massie, Clayton Seitz, Dave Trask, Rod McDonald (later went to A.I.D.—Agency for International Development—and now retired, located in South Carolina), and John Lamb. Others I have lost touch with, such as Reg Pragnell, Dick Bradley, Herb Smallwood, Johnny Adams, Rex Cocroft, Ollie Broadway, and Adrian Pelzner. There are undoubtedly many more that deserve remembering, and,

hopefully, we will find them in some parts of this Forest Service Engineering history.

But aha, it was 1969 and another move was in the making. Region 5 Regional Engineer Max Peterson asked me to come join his San Francisco Staff as Assistant Regional Engineer for Construction and Maintenance. This offer was being made just as all Regions were responding to Jim Byrne's long- and hard-fought Engineering reorganization. This reorganization was to include, at Regional Offices, two or three (depending on the Region) Assistant Regional Engineers (ARE's), assisted by a staff of GS-13 technical specialists in such important fields as preconstruction and construction engineering, bridges, sanitation engineering, transportation planning, computer applications, training and recruitment, cadastral surveys, and geometronics, as well as materials and geotechnical engineering. I was to fill in behind John West in Region 5, who had just retired. Vic DeKalb was just on his way to the Washington Office and Red Ketcham just about to leave for Alaska as Regional Engineer.

We had begun to gain some new faces in the Regional Office. Phil Schultz was recruited from Region 4 to provide leadership in Construction Engineering, and in a few months John Pruitt arrived to serve as the Preconstruction Engineer under ARE Jon Kennedy. At that time, the Regional Office still had a construction contingent who were doing civil engineering duties on major projects on a Region-wide basis. Some of the names and personalities in that group who were under my charge were Walt Petersen (Buildings and Utilities), Connie Wong (Bridges), Raul Kahn (Roads and Bridges), Carl Johnson (Roads and Bridges) and Jim McCoy. As I recall, Schultz sort of ruled the roost over these folks with an iron fist like only he could do. He was conscientious and, in my view, more than paid his way with his management and construction know-how. Of course, the Region had many talents to assist in meeting objectives in this complex California society with complex objectives. Another staff person in C&M was Leonard Stern, of the Materials Engineering Laboratory, and his charges included such outstanding persons and friends as Ed Stuart, Ken Inouye, and many others whom space and time do not permit listing. Engineering office support persons Pat Moulton, Sue Rincon, and Jan Mumford were of significant assistance to me.

After these luminary staffers adequately trained yours truly, Max determined I should gain additional experience by handling another new ARE position for Programming and Technical Services. This change occurred when ARE Bill Kinworthy was transferred to the Washington Office. This job was to include the road programming activity, as well as Geometronics, Surveys, Fleet Management, Recruitment, Development and Training, Communications, and the Office Support Services Staff. It was during this time that I became intimately and (seemingly) inseparably associated with Chuck Paletti, our former Forest Engineer of San Bernardino and new Region 5 Programming Staff Engineer. Chuck and I were to spend the balance of our careers together in Region 3 and in the Washington Office.

Others with whom I had the good fortune and pleasure of working were Terry Gossard (Geometronics), Frank Winer (Fleet Management), Guy Wood (Communications), Jack Lowe (Transportation Planning), and George Olsen (Road Operations Staff Engineer). Several others I was pleased to associate

myself with but who were not in my shop at that time included my good and dear friend Harry Kevich; Walt Weaver (Environmental Engineer), John Grovesnor, and Bob Sandusky of the Architectural Unit. We had an excellent and responsive staff at the Regional Office, and I felt that all the Forest Engineers were outstanding and a great group to work with. Particularly memorable to me and those with whom I greatly admired and enjoyed working were Austin Thompson (Six Rivers), Bill Morgan (Tahoe), Ed Jereb (Klamath), Bruce Meinders (El Dorado), Dick Deleissegues (San Bernardino), Mike Rebar (Los Padres), Phil Hirl (Shasta-Trinity), Greg Margassun (Lassen and Plumas), and Jack Crane (from my Umpqua days) at the Stanislaus, to mention a few.

I remember one of the big programming challenges to Chuck Paletti and me was during a Christmas holiday period when we were on leave. The Nixon Administration had decided to rescind a big chunk of the Forest Service's road money. We really had to scramble to make some order out of all this and keep a semblance of the Timber Program going without a reduction in force. Timber Sale Supplementation was canceled in some situations, and planned road contracts were canceled.

I consider my Region 5 days to be very exciting times. There was certainly a lot going on all the time with the timber industry and the road problems, land instability on the north coast Forests, controversial projects like the G-O Road, getting under way on the Pacific Coast Trail all across California, and of course our "annual" 100-year floods, or earthquake "emergencies." During this time, Jack Denema was Regional Forester, followed by Doug Leisz. Max Peterson was to move to Region 8 as Deputy Regional Forester, and, happily, he was succeeded by my good friend Don Turner, whom I had been fortunate to meet and interview for a position on his Regional Office Staff in Milwaukee (Region 9), where he was Regional Engineer. I'll always remember the Regional Forester's Staff meeting where Max Peterson's transfer was being discussed; the Recreation Staff's "Slim" Davis commented that "Region 5's loss was Region 8's." Don Turner proved a real treat to work with, both as a person and as a leader. I came to respect and admire Don, and certainly enjoyed our many trips, inspections, reviews, meetings, and discussions together. A better storyteller I've never met, and with a remarkable memory and an excellent student of just good common sense and human nature. All in all, Region 5 was a very great working experience. Even though I suffered a family separation and divorce, I think of my California days as very exciting and positive and enjoyed my many scores of new friends.

I longed to be a Regional Engineer. When my friend Jeff Sirmon was to transfer from Regional Engineer in Region 1 to Deputy Regional Forester in Region 4, I felt that I may be candidate to fill in behind. Alas, I was advised by Don that I had, in fact, been the Regional Forester's first choice, but that Washington Office favored another friend of mine from Region 6 days, Bob Larse. So, it wasn't my time yet. In 1974, Homer Cappleman, Regional Engineer, Region 3, passed away from cancer, and once again, I cherished the thought of becoming Regional Engineer. In due time, I was notified by Don that I had indeed made the grade. I would be leaving California, and my two kids, Mark and Lauren, and be journeying to Albuquerque. January 1975, I began my stint as Region 3 Regional Engineer. Albuquerque was to prove to be a very good place for me, as I not only

enjoyed my new job immensely, I also came to the good fortune of getting acquainted and associated with wonderful colleagues at the Regional Office and on Forests in the very interesting domain of the Southwestern Region. In addition to these blessings, I was further graced by meeting my wife, Shirley, at a University of New Mexico night class. We became acquainted, dated, and married in St. John's Episcopal Cathedral on my birthday in 1976. This was September 25. Indeed, life had continued to smile abundantly on me.

During my time in Region 3, one of the newer pressures coming to face us was widespread criticism of Forest Service road standards. Much of this was as a result of misunderstandings of the "standards" by both our own people and those from without. I recall, by traveling about, I attempted to communicate the solution to this dilemma and that "we can build whatever road is necessary to do the job." It is clearly spelling out the "necessary" safety, environmental, and traffic factors that altogether comprise the road "standard." There need be no confusion. Well, I greatly appreciated the chance to travel to all the Forests in Arizona and New Mexico and learn a new Forest Service culture—at least new for me. Region 3 is indeed a different environment than Regions 6 and 5, and in my short time there, I became very fascinated by both the societal cultures and the Forest Service culture. Of course, I had many good tutors, such as Regional Forester Bill Hurst; followed by Gene Hassell; Deputy Regional Forester Bill Evans, who was to become Director of Range Management at the Washington Office and who was succeeded as Deputy by another acquaintance of mine from Region 5, Gary Cargill; and a complete contingent of very savvy and tough-minded Forest Supervisors and Forest Engineers. One of my great job satisfactions was having the privilege of working with Dan Roper, ARE, an extremely knowledgeable, selfless, dedicated, loyal, and overall bright Engineer and a good golf buddy. Of course, my good friend Chuck Paletti was also here with me, so together we managed the small but very capable Regional Office Engineering Staff. I was particularly impressed by the quality of the Region 3 Forest Engineers and Forest Engineering Staffs during my time here.

Well, as you would know, I'm not to linger in Region 3 very long! Shirley and I were just getting pretty well settled, and she, of course, was getting acquainted with the Forest Service way of life—me, once again with married life and still trying to learn what I could about the great Southwest and its National Forest resources and people, when in the spring of 1969 Jack Denema, Deputy Chief for Administration, telephoned Bill Hurst or Gene Hassell and invited me, for the second time in my career, to the Washington Office as one of the Assistant Directors of Engineering. The specific position was the one first held by Webb Kennedy, whom I had greatly admired in my first Washington Office stint. I was named Assistant Director for Consultations and Standards, which, since Webb Kennedy's retirement, had been filled by Rich Weller, former Regional Engineer of Region 3. Rich had retired and moved to Brownsville, Texas.

This was to prove a very rewarding and challenging assignment for me, as it was my job to manage the staff of "technical experts," GS-13 and GS-14 Engineers, whose jobs were to provide national policies, objectives, procedures, standards, and reviews for all of the Engineering work that takes place on a National Forest, research station, or project. This staff included

such persons as Bill Opfer, Environmental and Health Engineer; Vic Dekalb and later John Pruitt, Transportation Planning Engineer; Jim Wolfe, Dam Safety, followed by Sam Fischer, then Dick Hathaway; Bud Unruh, Construction Engineer, followed by Tim Rogan, then Chris Schwarzhoff; Willard Clementson, Transportation Operations, followed by Jerry Knaebel; Beryl Johnston, followed by Ken Tompkins, as Preconstruction Engineer; George Lippert, Facilities; John Lupis, Job Corps and Liaison with Human Resource Programs; Dave Badger, Road Maintenance; Jim Mandigo, Materials Engineering; Larry Bruesch, followed by Russ Rogler, Bridge Engineer; and Jerry Larsen, later Milford Jones, then Glenn Bergey, as Cadastral Surveyor. During this period, I was privileged to be assisted by a great number of office support staff who indeed were standouts, such as Ruth Kenestrick, Carol Funking, and Peg Daniels.

The position of Assistant Director for Consultations and Standards was a very challenging, fun, and rewarding assignment for me. I thoroughly enjoyed serving in this role under Mike Howlett. Mike gave me about all the "rope" I needed in working with the Regions, Chief, Deputies and Associate Deputies, other Washington Office Staff Directors, of course my peer Assistant Directors Stan Bean and Harold "Strick" Strickland, and my own staff. I always appreciated his confidence and trust in me and strove hard to maintain reason to keep this freedom of operation and job accomplishment creativity.

One of my most memorable assignments came early in my second Washington Office tour when I was nominated by Associate Deputy Chief Ray Housely to become a Congressional Fellow. This assignment took me to Capitol Hill for 6 months where I became oriented, sought a job in either House of Congress, and actually was a part of the Legislative process. I interviewed Denny Smith, a new Representative from Oregon, and Senator Hayakawa of California, whom I greatly admired and who was Chair of the Environment and Forestry Subcommittee of the Senate Agricultural Committee. The full committee was chaired by Jesse Helms during the first years of the Reagan Administration. I chose to do my work with the good Senator from California and was immediately assigned as Legislative Aide on forestry and environment-related work. Senator Sam Hayakawa introduced a bill that was intended to "free" for management some studied lands for multiple uses as a result of the National Forest Management Act. This bill also was a national attempt at delineating those areas that would become candidates for new wilderness areas. Eventually, the strategy became much clearer that an overall national scope bill such as Hayakawa's would not work, as each State wished to influence its own members of Congress to adjudicate wilderness on a State-by-State basis. However, working daily with the Senator, his Senate colleagues, the staffs, legislative drafting service, agencies, and lobbyist's for 6 months was a highlight period for me and one that I shall treasure all my days. With pride, I garnered some personal photos of "Sam" and me, and some of his own authored books were personally autographed for me.

Not long later, perhaps just before Reagan's second term, Director Howlett made plans for his own retirement after a long, distinguished career. After these many years and two stints at the Washington Office, I felt as though I had come to know "Mike" and his objectives and management style very well. In fact, I had become so confident in this that I was, not infrequently,

a self-appointed representative of Mike with other Washington Office staffs, such as Lands, Recreation, and Timber Management, and of course with Deputy Chiefs and Associate Deputy Chiefs for the National Forest System, Tom Helson, Ray Housely, and Gary Cargill. In any event, I, perhaps undeservedly so, began to believe I may be a likely and good candidate to be Mike's successor. After all, I had successfully sat in the succession of chairs from Project Engineer, Forest Engineer, Washington Office Staff Engineer, Assistant Regional Engineer, Washington Office Assistant Director of Engineering, and the first person to occupy the new position of Deputy Director of Engineering, and had served in three Regions. Who would be more qualified and better prepared for this cherished position? Alas! It was not to be. I later learned that I really wasn't even in the running, as my good friends Dave Trask and Sotero Muniz were the prime choices. Sotero Muniz, who as an earlier day Engineer from Region 4 and a good friend of mine from our earlier Washington Office days, and again as Region Fiver's together, became the favored and the selected new Director of Engineering in the Washington Office. Admittedly, biting my lip a little, I was determined to continue to be loyal to the outfit that I loved, which as a whole had been so good to me, and one to be loyal to Engineering and my friend Sotero and, once again, assumed the responsibility in places where I thought "my touch" was desired.

Sotero came to the Washington Office Engineering Staff in 1984 with some strong personal feelings that to keep peace with modern management, some changes in staffing, roles, duties, and functions of the Washington Office were not only necessary but perhaps overdue. Quite naturally, I suppose, I reasoned this is why neither Stan Bean nor I were selected as the new Director. Because the politics of it was that "they," whoever "they" are, wanted new blood—an outsider. Sotero tackled the job as he has always tackled jobs—with much vigor, study, deliberateness, thoroughness, and an extreme desire to be professional and fair to all involved. All the above attributes, and many others of Sotero, I greatly admire and will always continue to do so. Sotero appointed me as his Deputy Director, the first such position in modern times Engineering at the Washington Office level. He referred to me as his alter-ego and certainly treated me in this manner. Well, this was in 1984, and I was beginning to see the horizon of 55 with 30 years of service.

It seems about this time we were feeling several pressures. The competition for the Federal dollar was getting greater with Graham-Rudman and other public issues, as well as a seemingly greater questioning by Congress and the public in regards to timber sales, roads, and some of the Forest Service management objectives. There were many, even within the Service, who were loudly and effectively questioning such activities. This constant questioning and inquiries by congressional committees, GAO, USDA Secretary's Office, and OIG on road standards, costs, density, location, engineering organizations, and national environmental advocacy groups had begun to change the role of Engineering in the Forest Service. Certainly, this was true for the Washington Office as our staff was spending less time on "engineering" of roads and facilities or Engineering leadership and more time on explaining, justifying, briefing, testifying or preparing testimony, and describing the Forest Service Road Program and its rationale, basis, and costs. By this time, we also had two full-time road program people—Chuck Paletti and John Holt—who were doing nothing but budgeting, programming, developing

“what-if” scenarios for Senate and House committees, and responding to allegations about an overbuilt, unneeded, and excessively costly road system to all of the foregoing parties. It seemed many of the traditional rewarding features of a Washington Office Engineering assignment were going awry, as we were finding ourselves in a defensive posture.

I had long felt that I would not wish to be a hanger-on and that I would elect to leave when my energy and interest in the job began to wane. I, as always, took great pride and enjoyment in wearing the hat of Deputy, and took its responsibilities seriously. I had wished to live up to what I had regarded as the exemplary high personal and professional standards of Sotero and did my best to do so. Sotero, who was now serving his third stint in the Washington Office, would be named as successor to the retiring Regional Forester of Region 3, Gene Hassell. I, at this point, once again vigorously pursued the unreachd goal of being Director and was appointed Acting Director for the period of 9 months away from a selection decision. During this period, I did much self-questioning, futuring, and “what-ifying” should I “win” the job, how long would I want it—and should I lose, what kind of loser would I be and how much longer would my job energy and interest continue.

I, perhaps even subconsciously, began to consider alternatives, and finally, it was done. One day, Deputy Chief of the National Forest System, Lamar Beasley, summoned me to his office to advise that at long last a decision had been made and that it was a “close, tough” one! My good friend of many years and coworker of early Washington Office days, Sterling Wilcox, was to become the new Director. Sterling and I had worked for years together on task forces, for road operations, maintenance and construction, engineering certification, Pacific Crest Trail activities and business, and of course in the recent years with me at the Washington Office and he as Regional Engineer of Region 4. We knew each other well, liked and trusted one another, so I could feel confident in a good new Director relationship. I had, in the meantime, begun to cultivate relationships with the American Public Works Association and others, should I decide I was “running out of gas.” Well at 30 years’ service and 56 years of age, it occurred to me there may well be “life outside the Forest Service,” too. Perhaps I should discover how I may like it and what I may accomplish in it. Of course, none of these personal deliberations were done in the absence of the counsel, discussion, suggestion, advice, and loving assistance of my wife Shirley. After many weeks running into a few months, we decided to move on. Once the decision is made, one doesn’t look back.

As this treatise opened, I was treasuring my memories, my many friends and coworkers, and contributions to the Forest Service, to our natural resources, and to our country. As I stop now, these treasures are not in the least diminished. By now the brief time has passed since September 1986, and I have had a very positive and rewarding, although brief, stint with my good friends at the American Public Works Association as Governmental Liaison Officer in their Washington, D.C., office, and now as I am finishing these notes I am employed as a Construction Inspector for the Labor Compliance Section of Sacramento County Public Works Department, Sacramento, California.

All that I may have achieved during my 30-year career with the Forest Service, and all that I became, was only possible due to the many coworkers, subordinates, and superiors, several of whom I have reflected upon in these notes. I tip my hat to all of them and the unnamed ones as well, and extend my deepest thanks and personal regards to each of them.

My Memoirs on the Way to Transportation Planning

Vic DeKalb

This describes my career from 1951 to 1981. It focuses on changes in Forest Service management and Engineering during that time. The period covered four important changes. One is the change from handling problems on a local level to handling them on an Area or Regional level—that is, moving to Area and Regional planning as a guide to local planning. Two, a change from a focus on serving timber production and, to a minor extent, fire prevention and control, to the multiple-use concept, with beginnings of heavy recreation considerations. Three, the emphasis on producing high-quality water for this Nation. Four, the increase in the use of information and because of the development of computer systems. My various assignments seemed to place me where these changes were major considerations.

In 1949, I graduated with a combined forestry and civil engineering degree. About 1974, I got an MBA. In 1950 and 1951, I worked for the Iowa State Highway Commission and the Bureau of Reclamation in 1951.

My first job in the Forest Service began with a bang. I worked on a project for the Pacific Southwest Forest and Range Experiment Station, in which we studied the effects of an atomic bomb on a forest in terms of protection and/or damage to military personnel and materials within the forest. In the spring of 1952, when they made a TV broadcast of an atomic bomb at Yucca Flat, I was there. We had trees, fuels, and similar items set up near ground zero to test the effects of such a blast. During the year, we had studied trees, their wind resistance, and how they would bend in heavy loads in California and the Carolinas. In northern California, we stood trees on the back of a truck and ran them down the road to measure wind forces. This was done at daybreak in the summertime. Several cars veered wildly around this "moving tree," and we presumed that someone from a local bar thought he drank too much.

In the fall of 1952, I became a Junior Forester on the Modoc National Forest in northern California. During the winter and on showshoes, we pruned trees. In the spring, I was the foreman of a 10-member tree planting crew from San Quentin prison. Of course, outstanding work was done by all. At that time, the Regional Office convinced me that my best career would be back in Engineering, and I went to the Sierra National Forest in central California. At the time, the Sierra was probably one of the most multiple-use Forests in the United States. All of the water was used for irrigation, water use in southern California, and to produce power for southern California. Timber was sold from the Forest, and recreation was heavy in all possible areas. People came from both San Francisco and the Los Angeles area. The Forest was located between two National Parks—the

Yosemite to the north and the Sequoia to the south. In addition, it included on the highest Sierras and had an existing wilderness. This was the country John Muir used to tramp in his search for beauty and solitude. There were only two Engineers on the Forest—the Forest Engineer and me, his assistant. My primary work was to locate and estimate roads for the Timber Sale Program. Relative to my work at that time, I will come forward to 1977 for a moment and talk about the design of roads.

In 1977, I listened to two young Forest Engineers give a paper at an International Low-Volume Roads Conference, they discussed a new method of designing roads in the field. They were quite enthusiastic about time that could be saved and the fact that the roads could be made to fit the topography much better than in an “office” design. They should have been with me when I was approving and designing roads all by myself (and occasionally with one assistant) in 1952 and 1953. When it comes to locating roads all by yourself, you tie a flag at eye level, then you walk ahead and shoot your abney level back on it. All goes well, except you have to be careful not to have an accident, because no one knows where you are. In those days, road designers carried a set of tables that showed the amount of excavation for a prescribed center line cut and cross slope in a “balanced” design. Using these tables, I usually located the road center line using a balanced cross-section design. However, when we crossed a drainage, I spent many an hour balancing the cut and fill for that particular piece of road at the site, trying various locations until I obtained such a balance. Around 1954, it got better when I had a survey crew and several part-time students from the university for office design. Then I would spend Monday and Friday in the office and Tuesday, Wednesday, and Thursday in the field. The process went like this: while I was gone, the students would plot cross sections, profiles, and calculate excavation of the proposed roads. On Friday and Monday, I would look over their plotting and calculations and adjust the alignment and grade to get a balanced design. Then, I’d leave them to their work to go out to assign work to the survey crew, check operator-constructed roads, and locate more road on the ground. For the next several years, we annually got 20 to 30 miles of road designed and estimates made for timber sale contracts. In those days, timber sale contracts had road specifications that were approximately two pages long. Of course, very few stakes were set for toe of fill or top of cut. Rather, the operator followed center line stakes that stated how much cut was to be made at center line if he had any stakes at all. Sometimes he just followed the flag line.

During this time, I also had some beautiful trips in the high country, in the John Muir Wilderness, where the State Fish and Game Department and the Forest Service built small dams for fish protection; I also first gained experience in fighting large forest fires. The Engineering Department always got the job of providing service at the camps.

There was some slight friction between Timber people and Engineers, so I was not surprised when I heard a Timber person tell me that Engineers did a poor job of designing culverts. He said that a set of culverts we had designed and installed had gone flat when the first logging trucks went over them. Either he didn’t know what a pipe arch looked like, or he was pulling my leg.

One of the last projects that I had on the Sierra Forest was to locate and design about 7 miles of road in the usual rough terrain. This was the first time we had contracted such a project to a consultant. In fact, the Pacific Southwest Region was just starting this kind of program. In those days, most consultants worked on flat lands in California, and after watching the crew work for about 1 week, I found that I had to locate the road myself and give weekly instructions to the crew. The road was designed and built 30 years later, I found myself working in the same area on a consultant project with the Pacific Gas and Electric Company and enjoying an easy drive over my great location job.

In August 1957, I became Forest Engineer and Fire Control Officer for the Inyo National Forest, which was just over the mountain to the east from the Sierra National Forest. It had heavy recreation use from the Los Angeles area. This was another part of John Muir's "gentle" wilderness. In this area, the Forest Service was already showing deep concern for the appearance of the woods. The Forest Supervisor required backblading of all skid trails. Most of my work involved trails, campgrounds, and ski areas. An interesting problem with this Forest was that, previous to my time, the Forest had given all of its roads to the county to maintain. The small county was glad to get these roads in order to show more miles to the State for a larger apportionment of money. However, the county did not maintain the Forest Service roads. So, in spite of the fact that the Regional Office was pushing for Forests to transfer roads to the county, I was in the position of trying to get roads back so that they could be maintained for Forest Service use. We were short-handed in Engineering, so the Forest Supervisor acted as my rodman in making building site surveys.

Another interesting problem was that almost all the water in that part of the county was allocated to Los Angeles by State water right laws and by a 1925 statute of the U.S. Government. Some of the streams had been completely dried up by Los Angeles water requirements. People in the West often referred to the Los Angeles development work in that area as the water wars, because the local farmers and ranchers actually blew up some of the Los Angeles aquaducts to show their displeasure.

In the summer of 1958, a Forest Engineer friend from the San Bernardino National Forest, his assistant, and I rode into the backcountry of the Inyo and caught our limit of trout, which we had for breakfast, then caught another limit to take out. On that trip, my friend, Max Peterson, killed two rattlesnakes. A couple of months later, I was offered a job as Forest Engineer on the San Bernardino National Forest so Max could go on to bigger and better things. In those days, as now, southern California was a political area with lots of clout. The local government was strongly interested in having the Forest Service project watersheds and provide recreation. Local governments spent billions of dollars fighting about water rights. The only public interest groups that appeared at Congress for the Forest Service appropriation hearings were the timber industry and the Los Angeles Area Watershed Fire Council. Recreation and environmental needs did not appear at the national level until around 1966. However, it should be noted that the local Sierra Club chapter reviewed our logging plans on the ground from 1958 on. Forest Service Engineering went back a long way in that part of the country. There were some excellent Forest Service Engineers in the late 1930's primarily involved in flood control projects. As I watched new

Forest Service research in the design of cross-drainage dips in 1970 and 1971, I remembered reports I had read of a dip design, which was developed in the late 1930's and was an outstanding design. Again, the circle turns, and we reinvent the wheel. Another interesting research project of the late 1930's was an effort to determine the maximum grade for trails used for firefighting. It was concluded that, to keep a firefighter fresh as he walked along a trail, the grade should be no steeper than 12 percent.

From 1958 to about 1963 and later, Forest Engineering people who passed through the crucible of southern California politics and flood engineering went on to more influential positions with the Forest Service. On the Angeles, Mike Howlett* was Forest Engineer, and Bill Kenworthy and Dickie Deleissegues worked for him. On the San Bernardino National Forest, Forest Engineers passed through the Forest in the following order: Max Peterson, Vic DeKalb, Chuck Paletti, and Dickie Deleissegues. In about 1978, a San Bernardino Forest Party Chief visited Washington, and he got to see all four former bosses in a single day. I should also mention that a young, talkative Civil Engineer, Sterling Wilcox, was at the San Dimas Equipment Development Center. Other southern Forest Service Engineers who went on. One was Tony Dean, who was Supervisor of the Cleveland National Forest. Cliff Miller was there in the late 1950's.

At the end of this era, about 1966, public interest in southern California began to change from an effort to develop all areas of the Forest Service to protect some areas. About 1960, a strong push came from the developers to open up the San Geronio Wilderness on the San Bernardino National Forest for skiing. This was logical because of the minimum travel time required to reach the area from populated regions. One way to counter this development push was to designate other locations where skiing might be considered. The Forest Service then set up an area, Mineral King, on the Sequoia National Forest for consideration. Ten years later, Mineral King became a great battle area between preservationists and developers. Both Mineral King and the San Geronio are now Wilderness Areas.

During that time, I worked with California State Highway engineers to design a highway from San Bernardino to Lake Arrowhead that would not show heavy scars to the Valley population. These were the days of Lady Bird Johnson, who thought engineers were insensitive. It was also the time of the State laws that required highway engineers to build a minimum cost highway. In spite of State regulations, the State highway engineers, with Forest Service influence, were able to design this highway with a considerable number of half bridges that reduced cuts to a minimum. This was one of the first such designs in the United States.

On the San Bernardino National Forest, the addition of new specialties became real. Our first Landscape Architect reported. I spent many days with him, laying out roads for recreation sites. He was black, and we found there were only certain parts of town where he was permitted to live. In those days, when he and several white people tried to eat in San Francisco

* Names are given for Engineers that are fairly well known throughout the Forest Service. Most were in the Forest Service in the era 1950 to 1990.

establishments, we were often turned away. The "city that knows how" had a lot to learn.

On that National Forest, a Forest Engineer was considered a full member of the staff. When multiple-use plans became a requirement, we all sat down with the Rangers and developed the best multiple-use program for the Forest. This provided considerable learning and experience for developing Forest Plans in the 1980's. Transportation planning took up much of my time for the next 15 years.

During the summer of 1958, Mike Howlett, Max Peterson, and other Engineers and fire management people met in Arcadia, California, and developed criteria for a road transportation system to handle large fire problems. Several levels of roads standards were developed—from a road that would permit passage of lo-boys carrying tractors to a very primitive road that would allow only small four-wheel drive vehicles to get to a fire. This was an outstanding effort. The criteria developed were far ahead of the time. In fact, I don't think an analysis of transportation needs and resulting criteria has ever been officially required for fire control in the Forest Service. This concept is different than the usual concept in which fire control planners use existing routes rather than determining the best locations for fire control and protection. During my career in the Forest Service, the primary purpose for transportation planning was to serve timber and, to some extent, recreation.

By the time I left the San Bernardino National Forest, I had made four transportation plans—two of them on the San Bernardino. The last one was an interesting comparison with the Angeles National Forest just to the west. The San Bernardino laid out a transportation plan based on the premise that we would use the existing capabilities of fire trucks, aircraft, and other attack techniques. The Angeles had more optimism under Bill Kinworthy and designed a plan that assumed that fire attack techniques and all-terrain vehicles would be improved during the next 10 to 20 years. When the two plans were compared for about the same area with the same fire problems, the San Bernardino had about 2,000 miles of proposed road and the Angeles had about 600 miles proposed for the final system. A group meeting was held under the direction of the Regional Engineer, and neither side would back down, so the 1965 transportation plans for these two Forests were as different as day and night. During that San Bernardino transportation planning process, the planning group developed a template for a fire that had passed the first burning period and would need heavy influx of crews. We felt crews would be trucked to the perimeter of the fire about 4 a.m., in as fresh a condition as possible. With the template, we developed a criteria for how often the perimeter of the fire should be reached by road. So, the future transportation system showed a network of roads in the front country that would serve this requirement.

While on the San Bernardino, I heard numerous stories about the "engineer" who preceded Max Peterson. This person had worked his way up in the 1940's from Road Foreman to Forest Engineer. A typical story is that he was standing with a Regional Office Engineer looking across a rather deep canyon, and they were talking about putting a telephone line across the canyon. The Forest Engineer said, "Well, I know it's a long distance, so I'll increase the size of the telephone line up to 23 gauge, if I have to, to make it big enough to cross the canyon."

In February 1966, I left the Forest in the hands of Forest Engineer Chuck Paletti and his assistant, Sam Fischer, and moved to the San Francisco Regional Office. During my time there, we had three 100-year frequency floods. The first, in 1965-1966, was in northern California. The second, around 1968, was in central California, and around 1969 a third one occurred throughout southern California. So, much of the work of those years was related to determining the millions of dollars worth of damage and to developing programs to alleviate such damage. By 1969, Regional Engineer Max Peterson had to bring in a special project manager to coordinate the flood damage repairs.

In 1968, Max Peterson, Walt Furen, Red Ketchum, and I began meeting with Dave Trask in the Washington Office to establish a special transportation system planning group that would use newly developed techniques in network analysis and transport decisionmaking and apply such techniques to Forest Service situations using computers. This project was set up under the direction of Region 5 and located in Berkeley, California. Primary work was to be done by three universities. The University of California was to develop network analysis programs; San Jose State University was to determine traffic monitoring needs and analysis and develop a process for this work; and Stanford University was to assist in developing transport decision-making processes. In addition to development, the project was to receive about two Engineers a year from the Forest Service field offices to learn applications. They were to stay 2 years—the first to get a master's degree in transportation planning, and the second to work on special projects for the unit. Conrad Mandt was the project leader for the first 3 years. He had used network analysis in planning the Six Rivers National Forest transportation system in 1965 and 1966. This was probably the first time that such an analysis had been used on Forest Service systems. Conrad and the University of California developed network analysis programs for shortest paths in cost and time. This system was then used by fire researchers in developing the first computerized programs for determining initial attack decisions.

In 1968 and 1969, I was primarily involved in reorganizing Region 5's Engineering Staff from a facility-oriented division to a functional-oriented division. That's when the old title—"Chief of Roads and Trails"—disappeared from the Region 5 organization. The functional orientation of Engineering Staffs has continued to this time.

In 1969 and 1970, I was in Missoula, Montana, as the last Roads and Trails Chief for that Region. I spent considerable time with Regional Engineer Cliff Miller in the reorganization of that Engineering Staff to the functional concept.

Those were the days when the question of temporary versus permanent roads was a hot subject. By then, Regional Office staff in Timber Management and Engineering felt that most roads on a Forest should be permanent, though some would be "put to bed" between periods of use. The Timber Staff Officer and I visited every Forest in the Northern Region to train Engineers and timber officers in planning a system that could handle "put to bed" roads. Since Forest Engineers are a stubborn lot, I'm not sure that we made much headway. Rangers also felt that they should change all planning for their Districts when they moved in as the new Ranger. I asked to see the Transportation Plan of a new Ranger in Montana one day, and he had to

go to the closed files in the attic because he felt it was not usable as related to his own concept.

By 1969, Landscape Planners had appeared on many National Forests and in Regional Offices. In addition, more systematic planning was beginning to be used. And lastly, most of the Forest Service road design processes included hard copy design and survey. Many Forest Engineers in the Northern Region felt that if the road wasn't designed by hard copy, it had to be a temporary road. I think we fought a losing battle in trying to change that attitude. However, the electronic age was upon us, and I got into transportation planning with a vengeance.

From 1971 to 1974, I managed the national transportation system planning project in Berkeley. As mentioned, the project developed processes for network analysis and similar computer programs. In addition, there were four to six Engineers working on specific projects throughout the Forest Service using this analysis.

As a result of this heavy emphasis on developing transportation planning processes, the Forest Service today has several transportation planners in each Region and does considerable network analysis at the Forest level to assure an efficient and economic transportation system. The development of the systems concept by Forest Service Engineers provided the ability to understand transportation planning as it related to county, State, and national governments—that is, the wider network. It also provided the ability to work with Land Management Planning processes when they came into being about 1977.

All of the specific projects evaluated and analyzed by the project showed at least 10 percent less road needs than the same project previously analyzed by hand methods. Some projects that were useful included an analysis of Prince of Wales Island in Alaska. This reduced a proposed road system by about 10 percent and the bays needed for log dumps by at least 25 percent. An analysis of the Black Hills National Forest's existing and proposed road systems reduced the number of miles in the proposed system by 10 percent. These project analysis efforts deleted enough road mileage from networks planned for construction to pay for the Transportation System Planning Project several times over. The spinoffs and increased interest in network analysis had a further effect on transportation system expenditures. For instance, on the Lolo National Forest, a bridge was washed out. The Forest Transportation Planner applied a network analysis to the area and found that the bridge could be left off the system with better transport efficiency than expending the hundreds of thousands of dollars needed to replace it.

By now, the computerized systems developed by the Transportation Planning Project have, for the most part, been replaced. This is partially due to the evolution of the learning process needed to develop practical models in system analysis. In 1968, leaders in the transportation planning field and most other areas that used models in simulation felt that one could put everything in a model. Transportation planning models were no exception. Even though the planning project tried to keep variables at a minimum, early network analysis programs were often too complicated for good analysis. In addition, mathematical solutions using concepts such as linear programming needed considerable more development. More interaction with

the designer was also required to properly fit field conditions. The second evolution has been in the ability of smaller computers to handle complicated data. Now, network analysis for many Forest Service problems can be—and is—done on Forest computers.

During 1973 through 1978, annual 2-week schools were held to teach processes to Forest and Regional Engineering planners.

This paragraph is to recognize the movers of transportation system analysis in the Forest Service, who early recognized that system analysis and the use of computers were feasible and started a project at an early date. This included Max Peterson, Mike Howlett, Dave Trask, Red Ketchum, Don Turner, Bob Lars, and many others. Also, Regional Engineering Staff and Forest Engineering planners initiated applications in the field and provided suggestions for change. This field help was invaluable.

In 1974, I moved to the Washington Office to act as head of Transportation System Planning for the Forest Service. I followed distinguished predecessors—Dave Trask and Bob Larse. During that period came the great conversion from planning that was generally left to the Forest Supervisor and considered local conditions, to planning that recognized nationwide conditions and considered a much wider range of factors. The age of the environmentalist had arrived.

The big problem for Engineering and Timber Management was to secure a recognition of the economics of alternative actions studied for managing a Forest. The high level of importance assigned to Recreation, Fish and Wildlife, certain parts of Watershed Management, and similar resources ran up against the problem of how to evaluate their worth. It appeared to me that a lot of the suggested analysis did not consider cost. Thanks to John Sessions of the Timber Management group, we were able to develop regulations for Forest Planning that recognized economics. This did not come without long and at times acrimonious discussions with Land Management Planning and other resource staffs. The concept of network analysis, the costing of travel time, and the selection of the appropriate interest to be charged required long discussion sessions.

There was also a need to integrate long-range planning with programming and budgeting. Systems developed by the Berkeley Management Sciences Staff seemed to do a better job in some of these areas than systems proposed by the Washington Office. I suggest that the effort to learn how to combine computer system analysis with management decisionmaking judgment will continue for many years. It would be fun to be part of the developmental group that continues to fine tune the Forest Service's excellent planning, programming, and budgeting process. I think that my job as a Washington Office specialist was to make it easier for someone on a Forest to do the job by developing procedures that would be practical and by reducing political pressures on Engineering decisions.

About 1978, the Transportation Analysis Group in Berkeley was disbanded, some of the work was given to the Berkeley Management Sciences Staff. Other work was moved over to the Engineering Computer Operations Staff in the Washington Office. Regions varied in their application of computerized network analysis, road travel simulation, and similar analytical

procedures. The inclusion of transportation costs and effects in environmental impact analysis has also been very spotty. However, I would say that transportation planning has come a long way in the Forest Service since 1968 and has enhanced the ability of the Forest Service to coordinate with national and Regional planning systems to improve the efficiency of transportation and reduce impact and costs.

This concludes some of the highlights of my life in the Forest Service. Having been heavily involved in change and explosions, I believe it's one of the best times to have been around.

As previously mentioned, I began my career by watching an atomic bomb explode and continued by being involved in the following things: the development of a road system providing access to much of Forest Service lands and, thereby, increasing multiple-use as envisioned by Gifford Pinchot and others; the complete transfer of Forest Service decisionmaking from handling very local problems to the consideration of nationwide problems at all levels; the computerization of analysis and information manipulation with a high-speed transfer of information throughout the Forest Service; and the integration of a number of specialists who were not there in 1951. At that time, the professional group essentially consisted of 80 percent Foresters and 20 percent Engineers. Since then, we have added Landscape Architects, Archeologists, Systems Analysts, Computer Specialists, Public Opinion Analysts, and many other specialists. This is for the best in order to provide service to the public. I have seen a closure of the circle in road standards: a rather minimum road through the Forest, then a rather high-standard road, and now a reduction back to the minimum road, which lays much more lightly on the land.

I think a quote from Beryl Johnston is appropriate here with relation to Washington Office experiences and rapid changes. One day following a particularly frustrating meeting related to political things and environmental requirements, Beryl said, "This is sure ridiculous, but it's constructive," or something like that.

Reminiscences of a Forest Service Engineer

Don Turner

My entry upon a Forest Service career was an accident—fortuitous for me, but others may not feel that way about it. Requiring 8 years to complete my college work because of a 4-year sojourn in the Army Air Corps during World War II, I finally graduated from Iowa State University with a degree in mining engineering in 1948. I worked for 1 year for a tunnel construction company and found that I hated working underground, so I went to work as an assistant county engineer in Iowa. As soon as I had the necessary experience, I took the registration examinations and obtained my license as a Civil Engineer. By mid-summer of 1951, I had become disenchanted with the petty politics involved in county engineering, so I sought an appointment with the Bureau of Public Roads (BPR), now the Federal Highway Administration. An amazing thing occurred—I received a telegram, from the Region 5 Forest Service Personnel Officer, offering me an appointment as a GS-9 Highway Engineer at the Redding Work Center. I reported at Redding, California, in January of 1952, after learning from a BPR friend who had once been detailed to the Forest Service that it was an organization that had never had reduction-in-force and that he thought it would be interesting work.

The Redding Work Center was a brand new organization and was just getting under way. Its mission was to provide road location and design work for Forests with major projects but inadequate personnel to handle the work—sort of an in-house engineering contractor. The concept was the brainchild of Jim Byrne, who was then Region 5 Regional Engineer. His experience with the Guayule (sic) project during World War II had instilled in him a high degree of confidence in centralized organizations made up of highly skilled specialists—a confidence he held throughout his career but which he had difficulty selling to the rest of the outfit, given the Forest Service philosophy of decentralization. There were about 30 of us originally assigned to the work center. It was headed by Ted Schubert, an experienced Forest Service Engineer. Three new engineers had been hired. Besides me, there were Hayward Taylor and Carlos Guerra. Many of you know Hayward, as he retired from the position of Assistant Director of Engineering in the Washington Office. Carlos Guerra was from Puerto Rico, and we had quite a time orienting him, as he had only worked in the metric system. He had difficulty making the transition to feet and miles. Carlos later resigned, went back to college, and became a dentist. The rest of the crew consisted of about seven Engineering technicians, grades GS-5 through GS-9, and 20 newly hired GS-5 Foresters. Neither they nor we ever fully understood the rationale behind assigning them to an organization that purported to be an expert highway engineering outfit. The simple fact of the matter was that the Region had road funds and, thereby, could pay their salaries. I



Don Turner in 1952.

know they were disappointed at their first assignment, but they were good men and acquitted themselves well. Some of those Foresters went on to illustrious careers as such (not in Engineering). Roy Feuchter was one who, I believe, became Director of Recreation in the Washington Office.

Immediately after I arrived, a training session was held at a field location at Elk Creek on the Mendocino National Forest. It lasted for 6 weeks and covered reconnaissance methods, free location, and field staking using balanced section field tables, as well as the more precise methods of highway engineering. It's a good thing that we had that training session because, as a "flatlander" from Iowa, I had never heard of an Abney Level, let alone proximate methods of engineering.

After the training session, we moved en masse to the Eel River Ranger Station on the Mendocino. The assignment was to reconnoiter a route for a main road to develop the timber in the Middle Fork of the Eel River drainage—an area of about 100,000 acres. There were no accurate topographic maps of the area, but we had recent aerial photography. Don Jackson was the Region's Surveys and Maps Chief, and he developed what he termed "form-line" maps using a KEK stereoscopic plotter. They looked like topographic maps and portrayed the shape of the terrain, but you couldn't rely on the accuracy of the contour intervals, as there were few benchmarks to use as controls. Even so, you could lay out potential routes to check out on the ground. A location to reach a certain saddle on a ridge that the "form-line" map indicated would be 7 percent might turn out to be 6 1/2 or 7 1/2 percent, but that was a minor consideration. Those "form-line" maps were wonderful tools, and a graphic demonstration of what could be done with some basic resources and ingenuity.



Don Turner, Glen Lycan, and Jack Ewing on the Mendocino National Forest in 1956.

From the Mendocino, we all moved to the Hayfork District on the Trinity National Forest. The project was to locate, design, and begin construction (the Region had a force-account construction crew) of a main haul road into the South Fork of the Hayfork drainage. The Trinity wanted to develop a 150-million-board-foot timber sale which, at that time, would be the largest sale ever made in Region 5.

Ted Schubert divided us into three crews. He and Carlos Guerra did the reconnaissance. He placed me in charge of the surveys, and Hayward Taylor ran the office and turned out the design. We started in May, and by the middle of June we had enough designed and staked for the construction crew to get started. By the time I left in September, we had completed reconnaissance for about 15 miles and design and construction staking on about 7 miles. The construction crew completed about 5 miles before they moved in November.

At that time, the Forest Service had letter standards for roads. For example, an "E" standard was 12 feet wide with turnouts, "EE" was 14 feet wide with turnouts, "D" standard was 16 feet wide with turnouts, "DD" was 20 feet wide with turnouts, and a "C" was two lanes 24 feet wide. Our project was supposed to be a "DD" standard. The Region's Roads and Trails Chief was R.E. "Buck" Lane. He was an exacting taskmaster and had some rigidly fixed ideas. He brooked no disagreement. He considered it stupid to make "through-cuts" through ridges. He visited our project in mid-summer and directed us to "day-light" all of the through-cuts. When we did that, we had so much additional earthwork to use in the fills that we had a two-lane road with a few dangerous narrow spots!

A few years later, I took Tony Dean over that road, and he asked what standard it was supposed to be. I told him it was "DD." He said, "This confirms what I've always suspected; in Region 5, a "DD" is two "D"s side by side."



Multiplate pipe arch installed to replace timber bridge, with Jim McCoy standing on pipe, Trinity National Forest, 1954.

At that time, all of the Forests in Region 5 were short of Engineering personnel, so they coveted the people of our work center. The pressure from the Forest Supervisors was too much for Jim Byrne to withstand, and in September 1952, I was assigned as Forest Engineer (GS-9) of the Trinity National Forest. I had been in the Forest Service for a total of 9 months! During the next few months, all of the men of the work center were re-assigned, and the Redding Work Center ceased to exist—except on paper.

Some perspective on the constricted grade structure in effect in the Forest Service at that time is probably in order. The Forest Supervisors were GS-12's. On smaller Forests, they were GS-11's. When I went to the Trinity, I became the fourth staff member. Three of us were GS-9's, the Timber Staff member was a GS-11, our Supervisor was a GS-12, two of our Rangers were GS-9's, and two were GS-7's.

When I arrived in Weaverville, the Headquarters for the Trinity, I found that Engineering consisted of two people—me and a maintenance superintendent. The Timber Staff member, Norm Dole, took me around and showed me the timber sales already under way. They all had roads under construction to a "flag line," which had been located by the District's people. It was immediately apparent that they would be deficient of drainage, and I convinced Norm that my first priority should be to stake the culvert locations and specify the culvert sizes. So that first autumn, with the help of Ranger District people, we staked drainage locations. Then, Norm and I made plans for the following year. Our Forest Supervisor, who shall be nameless, was a nonentity who abstained from any decisionmaking, so Norm and I could make all the necessary plans and decisions. For 1953, we decided that we would stake the cut-points and the inlets and outlets of the drainage



Top and bottom: Timber access road constructed on the Trinity National Forest, 1953.

structures. I was able to get an outstanding Engineering Technician, Larry Knudsen, from the Redding Work Center. Early in the spring, another engineer, Jim McCoy, was hired for me by the Regional Office. We hired a lot of college kids for the summer and fielded two survey parties. In order to catch up with everything that needed to be done to get ahead of the timber sales, we surveyed during the day, drew up plans that night, and set construction stakes the next day. At that time, the Trinity was just emerging from a custodial status to a resource development mode. There were very few roads—as I recall, perhaps 300 miles on the whole Forest. So, we were anxious to develop primary access to all of the major drainages. The Forest had an allowable timber harvest of about 150-million board feet, but we were only harvesting about 40 or 50 million board feet.

In 1953, some of the timber sales were coming to a close, so final inspections were in order. Ted Schlapfer (later Regional Forester of Region 6) was Assistant Ranger on the Hayfork District and accompanied me on the inspection of a road constructed by a logger named Hollenbeck. Hollenbeck had given us a hard time all summer over culvert installations. He objected to the installation of every one of them and spent a lot of time sitting on a stump lecturing me about how I was causing him to go bankrupt, so I was determined to subject each culvert to close scrutiny. When we stopped the car at the first culvert and I got out and climbed down the embankment to look into the pipe, Hollenbeck acted as if he had apoplexy. He threw his hat down in the middle of the road and started jumping up and down on it, cursing us, the Forest Service in general, and the fates that had dealt him the cruel blow of a “dumb little SOB of an Engineer named Turner.” Suffice it to say that you couldn’t see through the culvert. It appeared there was a 10-foot length at the inlet, a 10-foot length at the outlet end, but nothing but earth in the center. When Hollenbeck calmed down and I asked him what he called that kind of installation, he said it was a “phantom culvert.” It only looked like one if you didn’t try to see through it. That episode provided me with an insight into the mentality and temperament of logging men that stood me in good stead throughout my entire career.

At Dave Trask’s retirement party a couple of years ago, Ted Schlapfer reminded me of our experience with Hollenbeck. We enjoyed a good laugh together, and Ted told me that he had profited from the same insight concerning timber men.

In 1954, the Office of Management and Budget (OMB) decreed that each Forest Service Region was to make a consolidation of National Forests. Region 5 proposed to merge the Cleveland and the Angeles. This caused such a furor on the part of the congressional delegations from San Diego and Los Angeles that the Region had to regroup. (There were a lot of congressmen from the two metropolitan areas.) So on July 1, the beginning of a new fiscal year, the Trinity was merged with the Shasta, and headquarters of the Shasta-Trinity was moved to Redding. There was a furor in Weaverville (population 500) and Mt. Shasta (population 2,000) but no one with any political clout. The planning for the merger was done in secret with no advanced publicity, and the consolidation was effected over a single weekend. By the time anyone could object, it was an accomplished fact.

Each staff man and Ranger from the two Forests was given a 1-hour interview with Paul Stathem, the new Forest Supervisor. During my interview, I

reviewed the transportation planning we had done, the timber roads we had under way, the organization we had developed, and advanced the view that we could profit from an interim organization with two engineers—one to handle the timber access roads and the other to handle everything else. Paul agreed, but we couldn't have two Forest Engineers, so he conferred with Jim Byrne, and they decided to promote me to the vacant GS-11 position as head of the Redding Work Center and to detail me full time to the Shasta-Trinity National Forests—such detail to last 1 year.

Now I want to digress from a sequential type narrative and discuss some of the people who influenced my thinking and my development. I believe it will be interesting and informative to review their attitudes and philosophies. Before the Forest consolidation, Jim Byrne called me into the Regional Office to propose that I take on an experiment in photogrammetric road engineering. Most people considered it impossible in heavily timbered areas. I don't know whether Jim thought I was too young and naive to object or whether he truly believed in the possibilities. The point is, he was interested in innovation, and he wanted me to be, too. Clair Arneson came out to the Trinity from the Chief's Office to help us conduct the experiment, and from him I learned of the Alexandria Photogrammetry Center—a whole organization devoted to technological development. I learned further that Tony Dean endorsed our experiment, and that even the Chief knew about it. Apparently, we had top leadership committed to the quest for excellence, willing to experiment and to innovate to make the Forest Service a viable organization. When you have been used to dealing with the technicians at the Ranger District level, who tended not to think beyond tomorrow, such insight into our leadership was startling, heartwarming, and instilled a pride in the Forest Service that I hadn't felt before. I am proud of the fact that over the next 2 to 3 years, guided by Clair Arneson, we developed a successful methodology of photogrammetric road engineering, but I am even more proud of the encouragement of Tony Dean and Jim Byrne that made it possible.

I have purposely refrained from describing the photogrammetry experiments, because I understand that Jim McCoy intends to cover the subject.

I do want to tell you a little bit about Charlie Young. Charlie was loaned to the Forest Service from a consulting engineering firm circa 1923. He stayed until his retirement in 1960. Almost all of his career he struggled against the petty thinkers of the outfit, and it seemed that the petty thinkers always controlled his purse strings. Charlie never wavered in his commitment to excellence. He was a brilliant Engineer, and his list of achievements is truly impressive. He developed the first balanced section field tables. He developed a correlation between soil types and physical properties for engineering purposes. He developed methods of slope stabilization in decomposed granite soils, the berm outlet drainage structures, and a lot of other things that I don't know about. The remarkable thing is that he did this without much encouragement. I know that Jim Byrne and Tony Dean both appreciated Charlie and encouraged him, but Charlie was under "Buck" Lane's immediate direction, and Buck didn't understand the first thing about what Charlie was doing. Charlie had established a soils and materials laboratory at Arcadia, and Buck always underfunded it, so if you needed Charlie's assistance on the Forest, you had to pay his salary and per diem. I was once in the Regional Office on some business, and Buck had just

returned from a trip to Arcadia. Buck said, "That Charlie Young has got a bunch of guys pounding dirt into iron jugs and sticking a needle into them. Why the hell would they do a dumb thing like that?" When Buck retired about 1956, he was replaced by Clayton Seitz, who was as supportive of Charlie's work as Buck was not, and Charlie finally got the recognition and financial support that he deserved. But, then, Clayton knew what proctor density was!

Back to the Shasta-Trinity. At the end of the 1-year interim organization, I was appointed Forest Engineer of the Shasta-Trinity in September 1955. I got the job by default. Jim Usher had been selected, because he had distinguished himself as Forest Engineer on the Eldorado National Forest. However, before he could report for duty, Tony Dean offered him a position in the Washington Office that he could hardly refuse, as it would lead to an opportunity to possibly get a Regional Engineer's job.

With strong support from Paul Stathem, I was able to make some rapid strides in improving the caliber of our Road Engineering. First, we enunciated a policy of "no timber sales without a complete set of road plans." This was a bold move at the time, and a distinct departure from the norm. Many timber sales had been made with nothing more than a reconnaissance "flag line." In order to implement such a policy without delaying the sales program, we had to beef up our staff. Within a year, we were able to field 5 survey parties. It soon became apparent that quality construction could not be obtained from timber purchasers just by providing a Plan and Profile and construction stakes. We were in a position of providing only occasional construction inspection. The timber purchasers were not skilled road builders, so even the ones who were conscientious made many mistakes—sometimes costly ones.

We had a number of Fire Control Technicians on the Forest who were between 45 and 50 years old. The intense physical effort involved in their work had taken its toll. There was no provision in those days for early retirement for firefighters, so we gave them some intensive training and converted them to construction inspectors. We had a few force-account construction projects each year—mainly replacing timber bridges with multi-plate pipe culverts. The converted construction inspectors worked with these crews and quickly learned proper methods for culvert installation. Since poor culvert installations were a primary fault of the timber purchasers, the ex-firefighters developed into competent inspectors. We also had a few experienced construction men who were assigned to inspection work. So by 1957, we were beginning to get quality results in our road construction.

With the encouragement of Regional Engineer Webb Kennedy and Forest Supervisor Stathem, we augmented our staffing at every opportunity. Spence Ward, an excellent technician with the Bureau of Reclamation, came in one day to see if we had any jobs. He had been working on canal projects down the Sacramento Valley and, as the work progressed, he got farther and farther from his home base in Redding. We arranged for his transfer to the Forest Service, and he provided us with quality work and retired from the Shasta-Trinity about 3 years ago (1985 or 1986). One day, an engineer who had been a project superintendent of a southern California contractor came in to inquire about possible employment. He had had a minor heart attack, and his doctor told him he should get out of the pressure job he was in.

We quickly hired him on a temporary appointment while we awaited the processing of appointment papers for full-time employment. Carl Johnson became one of the best Contracting Officer Representatives the Forest Service ever had for large construction jobs. We used him on a large contract road project and later on the building construction at the Redding Smoke-jumper Base, Fire Cache, and Equipment Depot. After I left the Region, he was COR for construction of the Riverside Research Laboratory and on many large road and bridge projects in Region 5. He retired about 1973. I visited Carl at his home in Arizona in February 1987 and was pleased to find him alert and spry, even though he is now in his 80's. We had a great time telling each other how good we were in the old days!

In the late 1950's, it was next to impossible to recruit professional engineers into the Forest Service in California. The State agencies had annual starting salaries about \$1,500 higher than ours. At a Forest Engineers meeting about 1958, I advanced the view that we might be more successful if we recruited at midwestern universities where salaries were more in line with ours. Guess who got to go on a recruiting trip to Kansas, Nebraska, Iowa, and North and South Dakota? I got three engineers on my first trip, but none came directly to work for me.

Jerry Wooten came to work on another Forest in Region 5, as did John Walker. They both did well and became Forest Engineers in a few years. Chuck Hendricks went to Region 4, became a Forest Engineer, and later became a Line Officer. The last I knew he was Forest Supervisor of the Shawnee. Unfortunately, John Walker died when he was only about 30 years old. Jerry worked for me later in the Region 5 Regional Office. Jerry retired this year (1989) after a distinguished career. The most distinct recollection I have of the trip came later, when I submitted my expense account. I had arrived in Fargo, North Dakota, in the evening and took a taxi to the hotel. The next morning I took a taxi to the university, interviewed all day, then took a taxi to the airport. A taxi fare in those days was about 60 cents, and you tipped the driver a dime, so my total transportation cost was about \$3. Per diem then was \$9 a day, and actual costs were more like \$12, so I wanted to retrieve everything I could. The Regional Fiscal Agent bounced my account with a note saying that, in Fargo, I should have taken a city bus. I sent it back with a note that said Fargo doesn't have a city bus. The Fiscal Agent bounced it again with a note that if Fargo was too small to have city buses, I should have walked. At that stage, I complained to Paul Stathem who called the Regional Forester and complained loudly about our stingy Fiscal Agent. I finally got my taxi fares.

We had some highly intelligent engineering aids on the Shasta-Trinity, who I felt were capable of going to college and getting engineering degrees, so we embarked on a program to encourage them to do so. We employed them full time during the summer months and part time on design work during the school year. Some of the most promising were reluctant to embark on this program, so I called them in and told them we were short on funds, and I would have to lay them off in the fall, but that we had enough money to pay them for part-time work in the winter. It wasn't true, but they didn't know that, so they went to college. By the time they found out the truth, they had their degrees, so they forgave me—at least I think they did. Several of them had good productive Forest Service careers—Bruce Pewitt,

who recently retired as Deputy Supervisor of the Klamath after having been Forest Engineer of the Inyo and the Nez Perce; Larry Homberger, who is presently Forest Engineer of the Los Padres; Dick Tatman who is presently Forest Engineer of the Lassen; and Glendon McDuffy, who I believe is on the Umpqua in Region 6.

Paul Stathem was a wonderful supervisor to work for if you had his confidence. He supported your programs and your people and defended you, even when you were wrong. If you didn't have his confidence, you thought him a martinet—because he made life miserable. Many considered him a bully and a boor, but I found that he had a deep commitment to his people and a heart as big as all outdoors. When I had worked for him for about 3 years, he asked me about my career goals. I allowed as how it would be nice to be a Forest Supervisor. He said, "Listen carefully. You are a good engineer, but you've got as much chance of becoming a Forest Supervisor as I have of becoming Pope. You might get to be a Regional Engineer someday, but that's it." Alas, I was born 20 years too soon. In the Forest Service today, I might get to be a Forest Supervisor, but then I wouldn't get to be a Regional Engineer, in all probability, and that would be too bad. Because the 12 years I spent as a Regional Engineer were the most rewarding years of my career.

During the 5 years I was Forest Engineer on the Shasta-Trinity, we completed many projects, which I will enumerate in a general way. For 3 years running, we had million-dollar road projects with appropriated funds; we built about 60 miles of roads each year by timber purchasers; we replaced about 80 timber bridges with new structures; and we built a dozen new recreation sites on the reservoirs (Shasta Lake and Trinity), including boat launching ramps, developed water systems, flush toilets, etc.; so our work branched out from just roads and trails. We built about 30 new residences, 2 offices, and a whole new ranger station. Before I left, we had completed construction of the mess hall and dormitories for the smokejumper base, an aircraft hangar, aerial tanker loading facilities, and work was under way on construction of the zone equipment repair shop. By the time I left in 1960, the Forest was approaching its allowable timber harvest of around 200 million board feet. The Bureau of Reclamation constructed Trinity Dam, and they financed about \$2 million of developments to replace roads, campgrounds, and buildings that were to be inundated. So it was a period of intense development. It goes without saying that we couldn't have done all the projects without quality people.

We developed a quality organization. Around 1957, I was promoted to GS-12—one of the first half-dozen GS-12 Forest Engineers in the country. That promotion enabled me to design an organization with three GS-11 assistants. Glen Lycan came to me from the Mendocino National Forest and headed up our road preliminary engineering work. He stayed there for the remainder of his career, became a GS-12 when everyone was promoted a notch, and can best be characterized as a hard-working professional who didn't tolerate poor work. John Daniel came to us from the Soil Conservation Service and headed up our preliminary engineering for all work other than roads. He became Forest Engineer when I left the Forest. Our third assistant was Carl Johnson. I have already told you about him. He handled all construction supervision. Jim McCoy was with me for 2 years before the Forest consolidation and for 2 to 3 years after. He was too good a man

to hang on to and left us to become Assistant Forest Engineer on the Tahoe National Forest. He is going to tell you his own story in his own way, so I will only mention that we developed considerable confidence in each other and a deep and abiding friendship that persists to this day.

When I became Forest Engineer of the Shasta-Trinity, Webb Kennedy, Regional Engineer, told me not to put any roots down because they were looking for someone more qualified to handle the job! With that sort of "no confidence" vote, I bought the cheapest tract house we could find, and my family suffered the indignity of living there for 5 years. I recently paid twice as much for a new car as we paid for that house. It wasn't a luxury car either. I learned two important lessons from the experience. First, never give negative counseling to a subordinate. Even if you have reservations about his or her abilities, keep mum and do your best to be supportive. More often than not, they will measure up in ways that will make you proud. Second, with every subsequent transfer, I bought a better house than I thought we could afford. I owed it to my family.

In order to fill out the organization we needed on the Forest, we developed everyone we could find who showed potential, including several women who became the mainstays in our drafting room. Our Administrative Officer was of the opinion that we could use them as draftsmen while keeping them in a GS-2 clerical appointment. There was a separate pay scale for engineering aides, because they were in short supply and they were paid about 50 percent more than clerks in the same GS grade. I insisted that they be given engineering aide appointments. It seemed only proper that if they could do the work, they deserved the pay. About 16 years later, after I had become Regional Engineer in Region 5, my wife, my daughter, and I took a week-end trip back to Weaverville for nostalgic reasons. While having dinner in the Gables, Weaverville's only supper club, we were approached by a nice looking lady who asked if I was Don Turner. I had to confess that I was. She sat with us for quite a while and visited with us, and she told my daughter about how I had insisted on paying her the engineering aide salary when she worked for us as a draftsman. My daughter stared at me in amazement. Apparently, I had supported an element of "women's lib" before the term had even been coined. Apparently, I was more than the disciplinarian that she had known at home.

I wish I could remember the names of all those dedicated men and women who worked for us as aides and technicians, so I could tell you about them in more detail. Unfortunately, generalities will have to suffice. There can be no question that we could not have succeeded without them. I can only say that I admired them greatly, and I always did my best to be as loyal to them as they were to me.

In January 1960, I was offered a promotion to GS-13 as Assistant Regional Engineer in Alaska. This was a stunning development. I had figured that I might be offered a Regional Office job someday, but it was always "someday," and it surely wasn't Alaska. Paul Stathem wasn't much help. All he would say was, "You'd better consider it carefully." So I did. We had some spirited family discussions and decided to chance it.

In March, I flew to Juneau. I left my wife and kids in Redding to finish the school year, to sell the house, and to pack and ship the household

goods. When I look at what I just wrote, I wonder what I did to deserve such a family (all-suffering).

Alaska was something else. We had a total road program of about \$800,000. I had been used to about \$2 million per year on the Shasta-Trinity. I couldn't believe I had been promoted to an assistant position of such a reduced program. I soon learned there were plenty of challenges nonetheless.

Our Regional Engineer was Guy (Mitch) Mitchell. Pete Hanson was Regional Forester. I replaced Cliff Miller, who left for a job in the Washington Office. From him, I inherited an ambitious transportation plan. He had mapped out a potential main-haul road for every large timbered island in the Southeast Alaskan Archipelago (a dozen or more huge islands and hundreds of small ones). Our highways were the ocean and our roads were to get the logs to a landing at salt water where they could be rafted and towed to the mills with tug boats. It was an interesting concept. Travel was by boat or plane, towns were few and far apart, and the climate was atrocious. It was cold and rainy almost constantly. There are parts of Southeast Alaska where the annual rainfall exceeds 250 inches, and it exceeds 100 inches almost everywhere. When I had been there about 2 weeks, I asked someone when summer came. He replied, "I don't know, I've only been here a year, and I missed it last year—I was shaving at the time."

The challenges were logistics and climate. How to get work crews to project sites, house and supply them, and keep them tolerably warm and dry. We never fully met these challenges. The choices were to wear wool clothing under a rainsuit so that your perspiration built up to where you couldn't stand your own BO, or you could wear wool clothing without a rain suit and be constantly cold and wet. Everyone wore rubber boots, some even wore hip boots. Loren Adkins, Forest Engineer on the North Tongass, always wore short ones, and I asked him why. He said he had tried short ones, knee length, and hip boots, and no matter which he wore, he always stepped into a bog hole that was deeper than his boots, so he wore short ones so that he would be more careful where he walked. Sensible advice that I took to heart, and I only wore short boots.

There was a Regional Engineers meeting in June in Portland, Oregon, which I was allowed to attend with Mitch. This was a godsend as my wife's father lived there, and I could meet Doris and the kids there and then we could drive up the Alaska highway together. The reason this was a godsend was that in going to Juneau in March, I had used up all the transfer-of-station allowances that I was entitled to. Doris and the two kids, on the other hand, were entitled to per diem and mileage on the car. Doris got a full per diem of \$9 and each child got \$4.50. We got 7 cents per mile for the car. So we were able to make the trip with only about \$100 of unreimbursed expense. Moving cost allowances were not very munificent in those days. Doris and the kids delighted in reminding me, at each meal, that I was eating on their per diem money.

Mitch was about 65, and he had announced his plans to retire that year, so it was a severe shock to learn in late June that he had liver cancer and would only live about 6 weeks. His son came to Juneau and took him to



Southeast Alaska timber road, 1961.

Seattle to the University Hospital. It was after he left that Regional Forester Hanson gathered us together and told us the sad news. I had only known Mitch for about 4 months, but he had a profound effect on me. He was a good supervisor. He had patience and good humor, and he was a good teacher who had quickly indoctrinated me into the Alaska Region. He got



Timber road in Alaska, 1960.

me around the Region to meet all of the people and to learn all of the problems. Maybe he suspected that he hadn't much time. When he left, Pete Hanson designated me Acting Regional Engineer.

Our Regional Office was in the old Federal building that, with the coming of statehood, also housed the Governor and his staff and the State Legislature, so there wasn't room for Engineering, too—even though we only totaled about 25 people. We were housed in a rental office about 8 blocks from the rest of the Regional Office. A couple of weeks after I became "Acting," Mr. Hanson showed up one morning, about 8:30, in the usual Juneau rainstorm. He stood in front of my desk, dripping all over the floor, reached in under his slicker, and pulled out a couple of sheets he had torn from a *Sunset Magazine*, threw them on my desk and said, "I want you to design some A-frame cabins just like that to build for the moosehunters to use at Yakutat." I knew the Yakutat could only be serviced by small aircraft. After glancing at the beautiful pictures from the magazine, the premise seemed preposterous. So I said, "Mr. Hanson, that doesn't look like a very practical design for Yakutat." He stared at me steely-eyed for a full minute and then he said, "Listen. I didn't come down here in a driving rain to listen to a snot-nosed young engineer tell me what's practical. I want you to design some A-frames, and I want them to look exactly like that." So I gulped and said alright. I then took the photos to our architect and said, "Mr. Hanson wants us to design some A-frame cabins that look like this for the moosehunters to use at Yakutat." Our Architect, George Danner, looked at the photos and allowed as how it didn't look like a very practical concept for Yakutat. I said, "Listen, goddamn it," then I calmed down and explained to George what Pete Hanson had said to me, so he gave it the old college try. I wish I could report that those A-frames were a resounding success. In order to be transported to Yakutat, they had to be built in modules no more than 2 feet, 9 inches by 5 feet, 6 inches and couldn't weigh more than 200 pounds. When they were bolted together they looked great, but we were never able to get them to stop leaking. From this, I learned that not all engineering decisions are going to be made on the basis of sound analysis, reason, and logic. Thank goodness, the other two Regional Foresters I later worked for both respected analysis, reason, and logic, so I was never again subjected to such a demeaning experience.

The Washington Office had recruited a new young engineer from Texas Tech named Jack Crane. We knew nothing of him other than that he was due to arrive on the ferry from Haines at about 9 p.m. on a date in July, and that he was married and had a small son. It is a long, long trip from Texas to Juneau, and the ferry docked at Tee Harbor about 16 miles north of town, so we figured it would be nice to be there to greet them. Doris and I went to Tee Harbor and greeted them and invited them to our house to relax and get acquainted. We had arranged for them to stay in a small two-room apartment that the North Tongass had down on the waterfront. I asked them what they would like to drink and Jack said, "Whatever you are having," so I gave them each a bourbon and ginger ale. Twenty years later, when Jack was being transferred from the Forest Engineer position on the Stanislaus to the Regional Office in Albuquerque, Doris and I went to Jack and Darlene's going away party. Imagine my surprise and chagrin when Jack told all of the well-wishers that he and Darlene had never imbibed an alcoholic beverage until they arrived in Juneau and Don Turner gave them bourbon and ginger ale. If either of them had later become an alcoholic, I

would be truly ashamed, but they didn't. Jack has had a good career and is now Assistant Regional Engineer in Albuquerque—another young man I am proud to have been associated with.

A few years prior to my transfer to Alaska, the Region had made two monster timber sales—in the *billions* of board feet. They were both to last for 50 years. Such large sales were made in order to induce the capital expenditure necessary to develop a pulp industry in Southeast Alaska. When I arrived there, large pulp mills had been constructed near Ketchikan and Sitka, and timber sales contracts provided that the purchaser engineer the roads and obtain Forest Service approval prior to construction. In most cases, that had consisted of a route portrayed on a vertical aerial photograph with a grease pencil, and okayed by the District Ranger. No effort at true engineering was being made. Provision for appropriate drainage structures was completely lacking. Loren Adkins was Forest Engineer of the North Tongass, and for some time he had been predicting that we were going to experience severe damage, but he had difficulty in getting anyone to take him seriously. Finally, he did the unforgivable. He bypassed his Forest Supervisor and told Dick Wilke and me of his concerns. (By the time this turn of events developed, Dick had arrived and had taken over as Regional Engineer.) Loren convinced us of the seriousness of his concern, so Wilke prevailed upon the Forest Supervisor, "Army" Armstrong, to at least go and look at the situation on the ground, and assess the seriousness of Loren's assertions.

The Region had several large diesel-powered boats, dubbed "Rangers." They were about 50 feet long, and equipped with good bunks and a good galley, so up to six or eight people could travel in relative comfort. It was arranged that several of us would take the Ranger II and go to the logging site on Baranof Island to appraise the situation, as that was the area that Loren was most concerned about. After work on a Monday evening in August, we departed Juneau on the Ranger II. The party consisted of Forest Supervisor Armstrong, Forest Engineer Adkins, Forest Timber Staff Officer Jack Bennett, and myself. We left Juneau in a light mist. By 9 p.m. it was raining hard. By midnight, it was a full-blown gale. The skipper roused us out of our bunks, told us to dress and to put on our life preservers, and said he was going to try to put us into a protected cove and wait out the storm. The rain was coming down in torrents. About 5 a.m. the storm abated, and we proceeded on our way. We were supposed to meet the Sitka District Ranger at the logger's landing at 8 a.m., but we didn't get there until about 10 o'clock. By then the storm had completely blown itself out, and it was a beautiful sunny day.

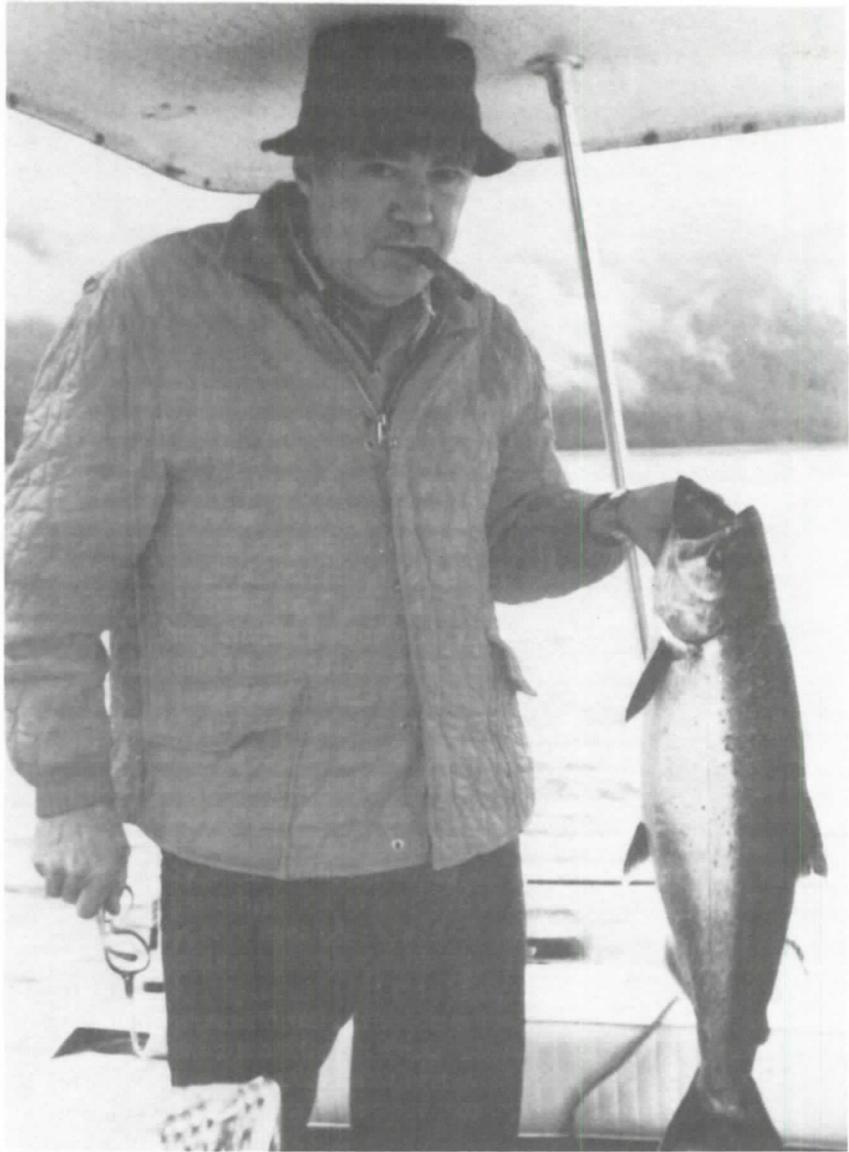
We started walking up the logging road that ran alongside a medium-sized stream. It was immediately apparent that some of Loren Adkins' concerns were warranted, as the stream was very muddy and was running bank-full. When we had walked about a quarter of a mile, we came to a section where the roadway had completely washed away. The washed out section was about a quarter of a mile long. We were able to scramble up the slope and get around the washout. In the next half mile, we came upon four or five more washouts, ranging from 100 to 300 feet in length. Everyone's face fell. We became very quiet. The scope of the disaster was sinking in. Finally, we came to the stream crossing and found that the log-stringer bridge had completely washed away. There was no trace of it to be seen.



Performance award ceremony in Region 10 circa 1965. Left to right: Pete Hanson (Regional Forester), "Army" Armstrong (Supervisor of the North Tongass), unknown staff officer of the North Tongass, Architect George Danner, and Regional Engineer Dick Wilke.

We could go no further—we didn't need to. From that point we could see another half mile of the road, and what was left of it looked just as bad as what we had traversed to there. We trudged back to the Ranger II in complete silence, each of us alone with his thoughts. I don't know what the others felt, but my emotions were akin to grief. Loren Adkins' direst predictions had come true in one night.

When we got back to the Ranger II, Army Armstrong asked the District Ranger to accompany us on the trip back to Juneau so he could be a party to our decisions on what we would do to avert any further catastrophes such as we had just observed. The first hour on the boat, we took turns expressing our outrage at what we had seen. After we had all gotten it out of our systems, we settled down to exploring what to do about it. We reviewed the timber sale contract and particularly how we could interpret the provisions that the purchaser would "engineer" the roads. We decided that we couldn't prescribe "how" they would be engineered, but we could prescribe the extent of the information they would have to submit for Forest Service approval. We decided that we could insist on balanced quantities. We decided we could require them to show the depth of cuts and the height of fills, proposed cut-slope ratios and calculations as to the size of drainage



Dick Wilke, the first year after retirement, summer of 1980.

structures, and that they specify where the drainage structures would be installed. We didn't think we could require that they submit complete Plan and Profile sheets and Mass diagrams, but that we could require that they submit the self-same information in some form. We decided that the Forest should assign a full-time engineer to the Sitka Ranger District, to see that the construction was properly executed. The engineering data submitted by the purchaser was to be approved by Loren Adkins, and there would be an annual review and reappraisal by us (the same team making these decisions).



Dick Wilke with Don and Doris Turner, 1963.

Finally, since we anticipated a strenuous objection by the purchaser, we decided that Supervisor Armstrong should ask for an audience with Regional Forester Hanson, so we could apprise him of our findings and solicit his agreement and support. Hanson not only agreed with our proposal but decided the same provisions should be put into effect on the South Tongass Forest with respect to the large Ketchikan timber sale. The objections we anticipated from the purchaser of the Sitka sale never came about, but the Ketchikan sale purchaser was irate and came to Juneau to complain. Pete Hanson treated him to the same disdain and nastiness he had shown me over the Yakutat "A" frames, and the poor man silently stole away. I decided that having a Regional Forester who could be nasty was not all bad—it just depended on who was on the receiving end.

A serious problem we faced in Alaska was a paucity of hydrologic data. Deciding on the size of drainage openings for culverts and bridges was largely a matter of judgment. Having a Regional Engineer with a strong background in hydrology really paid dividends. Dick Wilke showed me how to divide the Region into zones of like hydrologic characteristics, how to differentiate within zones to compensate for orographic effect, and how to take what hydrologic data was available and deduce statistically the probable 25-year frequency storm intensity. Then he showed me how to measure and profile a stream, determine flow velocities, compute a roughness coefficient for the stream and, from a cross section to the flood plain, compute a flow volume. It was two systems that we could use to cross-check each other—that is, the statistical 25-year storm and the evidence of flow volume that could be observed and measured onsite. I gained a lot of respect for Dick Wilke from this. He wasn't as knowledgeable about highway engineering as you would like, but he sure knew hydraulics and hydrology. Also, I was experienced in highway work, and he was supposed to rely on me to carry the ball in that field. Together we made a good team, and we were able to



Dick Wilke was the Regional Engineer in Region 10 from 1960 to 1969 and in Region 2 from 1971 to 1979.

train the Region's Engineers in rational methods of drainage size computations.

It is hard to know just how to characterize Dick Wilke. There are too many contradictions. He was extremely sarcastic, yet, when you got to know him, you learned that he sincerely cared about his people. He was intolerant of laziness, sloppy work, and timidity, and also stupidity. But he was lavish in his praise of a job well-done. He expected you to work hard, accurately, and productively. In short, he expected you to conduct yourself

as a professional should, and to strive for excellence as a professional should. Many people disliked him because of his sarcasm. I dealt with that early in our relationship by telling him that I disliked being belittled and that, if he persisted, I would seek other employment. He never was sarcastic toward me again. We became good friends then, and remained so until Dick's untimely death. I only worked for him for 2 years, but I learned a lot.

Loren Adkins was one of the most innovative and inventive people I've ever known. He took an ordinary pressure gauge and recalibrated it to feet and tenths of feet of head of water. Then he attached a long rubber tube to it, filled it with water, and fastened a cloth tape to the tube. Two people could take accurate cross-section measurements with it without the necessity of brushing out a line of site. One person stood at the survey line and read slope distance on the tape, while the other person went down the slope and called out elevation differences that he read off the gauge. Then they would reverse roles, and the guy with the pressure gauge would stand at the survey line while the other one carried the hose and tape up the slope and called out slope distances. Whoever was at the survey line recorded the notes. Two men could produce more work than the usual four- or five-man survey party. Loren was a good professional engineer and a good Forest Engineer, but I often thought that the Forest Service could have utilized his talents to better effect at one of the equipment development centers.

George Danner was our architect. He was a gifted architect but didn't have a degree. He had gone to the University of Washington for a couple of years, but it was interrupted by World War II. He was native to Alaska and knew the region better than anyone else we had. He was multitalented, too. He was a good surveyor, as well as architect and draftsman. Further, he was a congenial person who was a joy to have around. Every 6 months, Dick Wilke would try to get him converted to a professional status so he could promote him. Every 6 months, personnel management would turn it down, so Wilke would give George a \$2,000 performance award. George never got promoted, but he always got an extra \$4,000 a year. He was still underpaid. When Doris and I go to Alaska to visit, George takes us out salmon fishing on his boat. It was paid for with the performance awards Wilke gave him. I think Wilke would like that.

When I had been in Region 10 for 2 years, Tony Dean offered me a transfer (no promotion) to the Chief's Office in the Roads and Trails Branch. I turned it down for two reasons. First, I had worked mostly on roads my whole career and thought I would benefit from a change. Second, we loved Alaska—my family and I just loved everything about it. The beauty, the friendly people, the frontier spirit, exploring the interisland waterways with our boat, the salmon and halibut fishing, just everything—except the climate. After we got used to the climate, we forgot what it was like to have sunshine.

About 2 weeks after I turned down Tony's job offer, he showed up in my office unannounced and asked me to go to lunch. Over lunch he asked me how long I planned to work for the Forest Service. I told him about 20 more years. He said I must really like Alaska to want to stay there that long. I gulped. Then he said that they figured that I could possibly be a candidate for a Regional Engineer position, but they never gave that job to

anyone who hadn't worked in the Washington Office, and he only offered a position in his office to someone once. I got the message. He asked me why I had turned the job down. I told him that I had only worked on roads and that if I had to move to the Washington Office without a promotion, I thought it would enhance my career to work for a time in some other specialty. He said he would consider the possibilities. The next day, he went back to D.C. I asked Wilke about Tony's visit, and he said that Tony had visited briefly with him and with Regional Forester Hanson, but Tony's reason for coming to Juneau was to talk to me. I couldn't believe it. I was impressed and flattered, but I was a little frightened, too.

About 2 weeks later, I received a job offer to be Chief Architect in the Civil Engineering Branch in Tony's office. I was stunned. I had asked for the opportunity to work in another specialty, but architecture seemed like more of a change in direction than I had anticipated. I accepted, of course. Tony had responded to what I had told him. There was a potential stumbling block. I would have to show that I was qualified to be classified as an architectural engineer. I wrote up everything that I had done concerning buildings. It was mostly the things we worked on while on the Shasta-Trinity: planning for and constructing a new ranger station, acting as liaison with GSA in obtaining a rental office for the Forest HQ, and working with the planning team for the airbase and smokejumper base and acting as COR for the building designs that were contracted to a consulting firm. It was considered enough, and personnel placed me in the position.

The move to Washington, D.C., was a traumatic one for my family. They envisioned living in a place similar to central Manhattan. Doris cried all the way on the airplane. The stewardesses looked at me as if I were an ogre. I could only hope that they thought there had been a death in the family. The anxiety was only slightly alleviated when we found a nice home in a quiet area in Arlington, Virginia. It was at least a year before we all decided that we liked living there.

It took awhile to adjust to working in the Chief's Office. When you are on a Forest, you can look for assistance from the Regional Office when you need help, and, at the Regional Office, you can seek help from the Chief's Office, but when you get to the Chief's Office, you are it. You can confer with your colleagues, but you soon learn that they are only a little smarter than you are.

There was a lot more happening in the Service-wide building program than I realized when I accepted the position. About 10 research laboratories had been recently completed and many more were in various stages of planning. There were a number of Forest Supervisor's Offices and Visitor Centers in the works. All buildings costing over \$100,000 required Chief's Office approval, so all of these building projects were to be reviewed and approved by me.

Rich Weller was our Branch Chief, and he had been through the process, so I had plenty of good guidance. He had some very strong feelings about what should and should not be included in research labs and quickly conveyed them to me. His views didn't always jibe with the desires of the Research folks, so I had to act as a mediator now and then. GSA handled the contracts with consulting architects for design of the research buildings.

Our job was to provide them help in selecting the architect and in reviewing the plans. To properly represent the Forest Service in all of these steps, I had to have a close working relationship with our research people. My liaison person in research was "Zig" Zasada. One of the biggest challenges that Zig and I had to face was helping the Station people prepare a good, complete narrative prospectus. There seems to be an innate tendency in people, when they think about what they want in a building, to grab a piece of butcher paper and start drawing floor plans. There seems to be an aversion to stating what's needed in a clear, concise, written statement. So Zig and I did a lot of traveling, questioning, hand-holding, and cajoling to come up with decent project proposals. I am short and stocky, and so is Zig, and when we arrived at a research station we would often overhear someone mutter, "Oh, no, here come the gold dust again."

Another challenge we faced was researchers' desires that were bigger than their pocketbooks. A proposed lab at Auburn, Alabama, was to do research on erosion rates on frozen soil subjected to rain just above the freezing point. They wanted a tower plumbed to deliver water at 32.5 °F, from a height great enough that the raindrops would reach terminal velocity, with the air temperature at 32 °F, along with apparatus to retrieve and weigh the water and the soil that eroded from their samples. Such a tower had to be at least 40 feet high. When I asked them how much deviation from the desired temperatures they could tolerate, they said they couldn't tolerate any. When I told them it was nearly impossible to maintain a column of air 40 feet high at exactly 32 °F, with no difference in temperature between the ceiling and the floor, they didn't believe me. So, I learned a lot about how to persuade people to moderate their needs. If I have made this sound as if I was unsympathetic to the need of researchers to perform their experiments under rigidly controlled conditions that could be exactly replicated from sample to sample, I assure you that I did understand—it's just that I knew there was no chance that we could get enough money from Congress to do what they wanted. The proposed budget for their laboratory was about \$200,000, and the tower they wanted would probably cost over \$1 million—and even then it would not satisfy their criteria perfectly.

About the time I arrived in Washington, D.C., Max Peterson moved from a position in our branch to become Director of Administrative Management. Max was instrumental in setting up a "junior staff committee," who would brief the Chief on concerns that we underlings were struggling with. One of the significant problems at that time was that our physical plant was falling apart, and there was no program to do anything about it. Most of our offices, residences, and shops at the Ranger District and Supervisor's Office level had been constructed during the CCC program and were approaching the end of their useful lives. The Regions did what they could, but they weren't financed to make much headway against the needs. I prepared some data on the number of dwellings, offices, and repair shops needed and an estimate of the cost. I don't recall how many millions of dollars that represented, but it was a significant amount of money. With the wholehearted support of the rest of the junior staff, I made the presentation to the Chief. Chief Cliff listened attentively. When I concluded, he agreed that I was probably right, but our timing was unfortunate. He had just completed presenting a 5-year budget to Congress, and he couldn't afford the loss of Congress' confidence if he went back for more money. I understood, but it was a bitter pill. As I travel these days, I see a lot of new Ranger offices

and dwellings, so somebody who followed me was more successful than I was, and I am thankful that they were.

About 18 months after I went to D.C., Tony Dean retired. We were sad to see him go, but we knew that Jim Byrne would be a good Director of Engineering. Tony Dean epitomized what is really meant by the term "gentleman." Tony is a gentle man. He also epitomized what a good supervisor should be. He is a good listener, even when the person talking is spouting inanities. He never interrupts except to ask you to clarify a point. He has gentle ways of reminding you to do what you know should be done. I suppose he knew how to "chew someone out," but you couldn't prove it by me. As a result, a mild statement of disappointment from Tony hurt as much as a stinging rebuke would from someone else. Without an explicit direction from Tony, he conveyed to us that he expected excellence. I never understood how he did that. Tony truly cared about us and our families. When he found out that my daughter had a high school science fair project being exhibited at the Smithsonian, he took the entire Engineering Staff over to see it. From time to time, he would invite a few of us, never more than three or four, to go to the Cosmos Club after work for a drink. A couple of times a year, he would invite you and your wife to join him and Alice for dinner at the Cosmos Club. It was always just a foursome, never a



Tony Dean holding up his new binoculars at his retirement party. M.M. "Red" Nelson is standing behind him, Ed Cliff is above his left hand, and Don Turner is seated far left.

large group. The result was that you had a chance to interact with him on an intimate basis, rather than having to compete, as in a large party. Occasionally, he and Alice would invite you to dinner and bridge. Alice was as gracious as Tony, so it was with considerable sadness that I learned Alice had passed away last year. I am going to repeat myself, so there can be no doubt about how I feel. Tony is a gentle man. Under his guidance, Engineering grew, matured, and gained stature and respect.

The summer of my second year as architect, Rich Weller thought we should develop a paper on the considerations involved in planning and designing research laboratories. It would entail a lot of travel—nothing new, because the first year on the job, I had been in DC less than half the time. But I didn't want to spend the entire summer away from my family, so I asked for permission to do it by personal auto, so I could take them with me. It was granted, and in a 5-week period, I visited 15 labs and interviewed about 90 scientists. They were structured interviews, that is, I asked exactly the same questions of every scientist. The objective was to learn all of the features of their labs that worked well, all the features that didn't, and why, the features that were a waste of money because they weren't used, and the features that were lacking, and a statement as to how their work had suffered because of the lack. It took me about 2 weeks to correlate all the information and prepare the paper.

About the time I finished, the Job Corps program descended upon us. In a very brief period, working with the Department of the Interior and the Department of Labor, we had to develop standards for Conservation Centers. This involved myriad details, such as space for sleeping quarters, entertainment, water and sanitation, bathing facilities, mess halls, air ventilation in all buildings, administrative offices, and classrooms, etc. In order to arrive at appropriate standards, we had to research a lot of sources of information, such as building codes, electrical and sanitation, etc., and the classroom needs could only be arrived at through interviews with educators. It became apparent that the deadline couldn't be met without someone to help. The other departments didn't have architects or engineers to assign to the work and it became apparent that all of this staff work would need to be done by the Forest Service. Rich Weller knew of a bright young engineer in the Regional Office in Albuquerque who he thought would be a valuable addition to our group. Time was of the essence. I flew to Albuquerque, met with John Lamb at his home on a Saturday evening, and convinced him that it was in his best interest to accept our position, and flew back on Sunday. John was scheduled to do some ski lift inspections for the Region, which he felt obligated to complete, so it was another full week before he reported to the Chief's Office. He was excellent help and we got the standards together within the prescribed time limit—as I recall, about 6 weeks. We had to defend them against the Interior and Labor people. The Labor people had envisioned tent camps! We had good back-up material for all of our standards, so we prevailed. Once the standards were agreed upon, the job was to convey them to the Regions and get them started on the planning and design. John Lamb turned out to be very persuasive, as well as bright and energetic, so he was a valuable asset in this work as well.

Mal Arthur, Regional Engineer, Region 9, retired at the end of 1964. About the middle of January, Jim Byrne told me that Chief and Staff had selected me to be the new Regional Engineer. We were to meet with Chief Cliff at

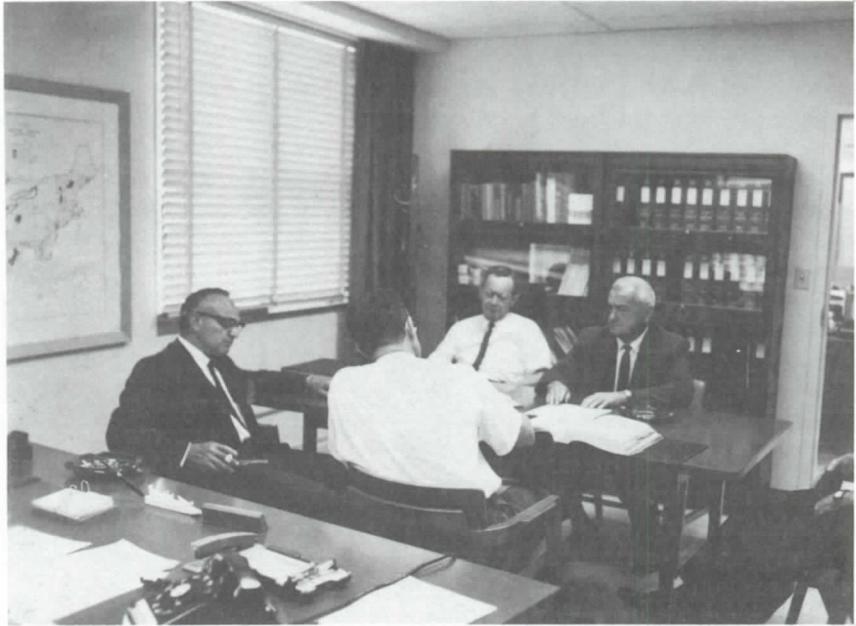
10 a.m. I was admonished to act surprised, since the Chief wanted to convey the good news himself. The gratitude that I expressed to the Chief for the trust and confidence they had in me was sincere. Then came the period of interminable waiting. The position was considered "sensitive," as I would be a member of the International Boundary Commission with Canada (the Superior National Forest abuts on Canada) and I would have to pass a security investigation conducted by the FBI. The wait for clearance went on and on, and I was ribbed unmercifully. They took great delight in imagining all manner of criminal activity in my past. I got a note from Paul Stathem advising me that I could forget about whatever job I was being considered for because he had told the FBI the truth about me. Around the middle of February, I asked Jim Byrne what he thought I should do about selling our house. He advised me to put it on the market since it was hard to sell houses in the winter—all military transfers take place in the summer. We listed the house, and it was sold in 3 days. The people had the money and wanted to move in right away. We placed most of our household goods in storage and moved into an apartment, because Doris and the children were going to stay until the end of the school year.

There was a Forest Engineers Meeting in Region 9 about February 20, and Jim Byrne told me I should attend. It was held at a resort a few miles west of Milwaukee. Regional Forester George James drove me out to the meeting, so we had a chance to get acquainted and to determine whether we would be compatible. It was an awkward situation at the meeting—I couldn't tell them I was to be their new Regional Engineer, yet I wanted to convey some of my attitudes, management philosophies, etc.

Finally, around March 1st, the appointment was confirmed. The long delay had come about because there was an engineer named Don Turner in the Rural Electrification Administration, and the FBI had spent a month investigating him before discovering their mistake.

The first thing I did when I got to Milwaukee was to call my Branch Chiefs in for a conference. They were Herb Hinsch, Assistant Regional Engineer; Paul Zimmerman, Roads and Trails; Nels Orne, Other Civil Works; and Ray Fassett, Surveys and Maps. I told them I didn't know much about Region 9 and would need their help in getting oriented and becoming conversant with the problems, challenges, and programs. I asked them to brief me, starting with their most immediate and pressing concerns. There was a long, awkward, embarrassing silence. Finally, Herb told me that this was the first time in 18 years that they had been asked what they thought about anything. Apparently, Mal Arthur had run such a tightly controlled organization that they only took directions and weren't allowed to think for themselves. I was dismayed. They were embarrassed and obviously distressed. To ease the situation, I asked them to go back to their offices, think about what I had asked them to do, and be prepared to brief me in 3 days. I conferred with the Regional Forester about what had happened. He assured me he thought I had done the only thing I could do under the circumstances and asked me to let him know what happened when they came back to brief me.

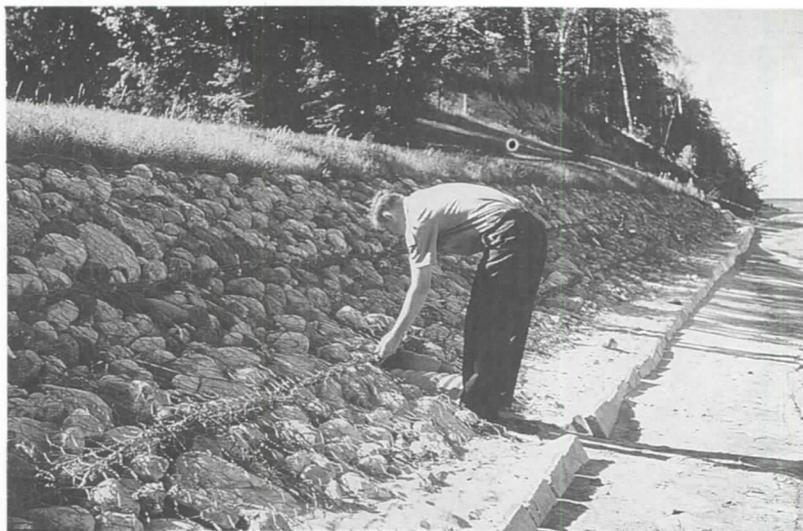
We had about 70 people in Engineering who would be under my direction, so the next thing I wanted to do was to make the rounds, get acquainted with everyone, and find out how they felt about their jobs. I started out in the road design drafting room, visiting briefly with each person. I had only



The Regional Office in Milwaukee. Left to right: Don Turner, Harold Sipperly (with back to camera), Nels Orne, and Herb Hinsch.



Don Turner presenting employee awards at 1969 Engineering picnic in Milwaukee.



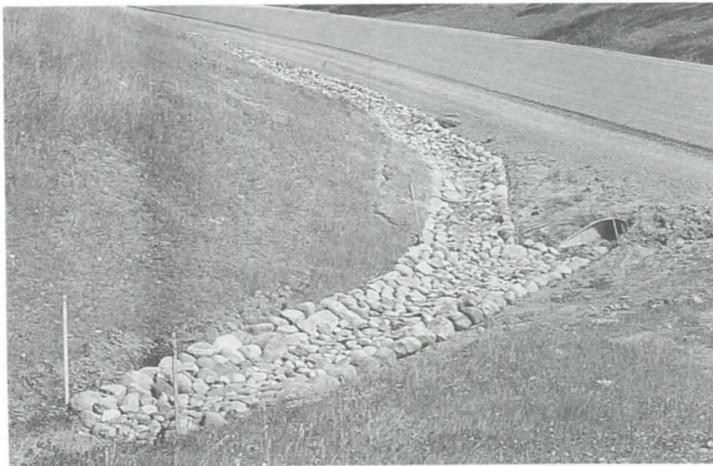
Gabion revetment installed to combat lake shore erosion, Chippewa National Forest, 1968.

talked to about three people when my secretary, Shirley Ainsworth, came and called me back to my office. She asked me what I was doing, and I told her I was trying to get acquainted. She told me that I had everyone scared to death, thinking I was looking for reasons to get rid of them. Mr. Arthur had kept himself aloof and only said "good morning" to her and the Branch Chiefs. I was stunned. I had started out with the best intentions, and it was completely misconstrued. She told me to proceed slowly. I sat in my office wondering how I could "screw up" next.

After 3 days, the Branch Chiefs came to brief me. They were extremely capable and had used the 3 days to good advantage. To say they had done a good staff job would be an understatement. They fed me so much information, I had difficulty assimilating all of it. We were on our way—no more expecting me to tell them every move to make.

Not long after, the Hiawatha National Forest asked me to come up for a couple of days to go over some problems. There was a train that left at 4:30 p.m., which arrived in Escanaba around 10 p.m. As I was leaving the office, Shirley said, "I hope you have a . . .," and clapped her hand over her mouth. I asked her what she was going to say and she said, "a good time." She said, "I once said that to Mr. Arthur and he said, "Humph, I'm not going on this trip to have a good time." I told her it was okay to wish me well; I intended to try and make it an enjoyable experience.

This is probably more than enough dwelling on the difference between my management style and Mal Arthur's. When we go into a new job, we always have to build upon the strengths of our predecessors, and Mal Arthur



Cobble paving, Sylvania North, Ottawa National Forest, August 27, 1969.



Seal coat, Sylvania North, Ottawa National Forest, August 27, 1969.

left me a strong organization with many good characteristics. He valued the same things that I value—professional competence, striving for excellence, hard work, and commitment to the organization. Our employees knew that, and they were committed to try to deliver. That was the heritage that Mal Arthur left me, and I was grateful. It would have been a much more difficult position for me to step into if we had people who were lazy, satisfied with sloppy workmanship, or uncommitted to the organization and its goals. In a relatively short period of time, our people learned that I really did want them to feel at ease and free to tell me what they thought and felt.

It was a busy time. We had to build 10 Job Corps Conservation Centers, which was a heavy new work load superimposed upon our normal program. Within a year or so, Region 7 was dissolved and Region 9 picked up four of the Forests from that—White Mountain, Green Mountain, Allegheny, and Monongahela, and three more Job Corps Centers.

There were a lot of challenges associated with assimilating the four added Forests, not the least of which was dealing with trepidations of the people on those Forests about becoming part of another Region. We did our best to alleviate their fears. Regional Forester George James made certain that we did so.

Two of our bright young Engineers volunteered to become Job Corps Directors. We had an interview panel in our Regional Office (of which I was a member) that screened the applicants. We OK'd both the engineer applicants, so John Lupis and Homer Chappel went off to DC to be interviewed by the final selection panel. John Lupis was selected, but Homer wasn't. We were shocked, because we thought they were both well qualified. When our Regional Personnel Officer inquired as to the reason that Homer was not selected, he was told that it was because Homer wore white socks! I guess it never occurred to them that maybe Homer was allergic to the dye in colored socks. I became good friends with Homer (and we are still very good friends), but he never confided the extent of his disappointment over not being selected as a Center Director. Not too long after, we were able to place him as Forest Engineer of the Hiawatha National Forest, so perhaps whatever blow to his ego he felt from not being selected was eased by our trust in him and by immersing himself in his new job.

Many of our Forest Engineers were "oldtimers" approaching retirement, and several retired over a 2- or 3-year period. I am pleased and proud that the men we selected to replace them have acquitted themselves so well. The names of those who immediately come to mind include Homer Chappel; Stan Bean; Milford Jones; Russ Rogler; and John Lupis, who became Forest Engineer of the Allegheny after a year or so as a Job Corps Director.

As I traveled about Region 9 during my first summer, a problem cropped up repeatedly. The Forests disclaimed any responsibility for serious shortcomings in their road projects. It seems that they felt no proprietorship in their own projects. All road designs were being performed in the Regional Office. Forests weren't allowed to make change orders without the Regional Office's approval. When problems arose, the Forest people blamed it on poor design by the Regional Office and the Regional Office people blamed it on poor surveys or lack of information provided by the Forests. It was a perfect system for both sides to avoid any accountability. There wasn't any

place for the "buck" to stop! As it was my natural inclination to want our Forests to be staffed with capable people who could handle all phases of the work, with the Regional Office setting standards, inspecting, and holding the Forest people accountable, I decided (with the Regional Forester's endorsement) to delegate the road design authority to the Forests. We were to phase out the design capability at the Regional Office over a 12-month period. Unfortunately, this was a bigger and more drastic change than Paul Zimmerman was able to gracefully adapt to, and he decided to retire at the end of 1965. I felt badly that Paul and I were at odds philosophically, and I knew that I would miss Paul's expert abilities and his mature judgment, but I felt that I must do as I proposed. I don't believe there was any personal animosity on Paul's part—he just felt I was changing things too much and too fast.

The slate of candidates to replace Zimmerman contained the names of outstanding people, including Walt Furen, Forest Engineer of the Umpqua, George Scherrer, Forest Engineer of the Nez Perce, and Floyd Curfman, who was Paul Zimmerman's assistant. There wasn't anything in their qualifications that allowed me to give the nod to any one of them over the others. I was very uncomfortable at the idea of selecting one at random, so our Personnel Officer, Thurman Trosper, suggested that we invite them to come to Milwaukee to be interviewed. This was considered an experimental technique, so we had to get Chief's Office approval. Trosper got approval on the conditions that we prepare an evaluation of the technique after the interviews and that we obtain a written statement from each of the candidates discussing how they felt about being interviewed. The interview panel consisted of Trosper, Paul St. Amant, who was our Timber Management Assistant Regional Forester, and me. We prepared a list of questions in advance so that each candidate was asked the same questions, and we prepared a rating sheet so we would have a comparative rating for each question. We ended up selecting George Scherrer, but there was very little difference to use in making the decision. Jim Byrne felt nonselection of Walt Furen and/or Floyd Curfman constituted a black mark against those two men, so I wrote him a long personal letter pointing out that he shouldn't look at it that way and urging him to be fair in considering them for other jobs. When I promoted Floyd a short time later to a newly created Branch Chief job in water and sanitation, Jim Byrne knew that I was sincere, and not too much later he promoted Walt Furen to a position in the Chief's Office. I don't know whether our interview experiment proved anything or not. The candidates were so outstanding that I could have placed their names in a hat and drawn one out, and it would have been a good choice.

With the four Forests from Region 7, we inherited some challenges. The Army Corps of Engineers constructed a dam on the Allegheny and financed a number of facilities associated with the new reservoir, including a visitor center, several campgrounds, and roads to replace those that were inundated. As the reservoir started to fill and the adjacent soils became saturated, that part of the world began to unravel. The Corps experienced all manner of problems and spent millions pumping grout into the fractured rock formations under their dam. We experienced some severe slipouts of our roadways. The site for the visitor center turned out to be a waste dump for clearing debris and excess excavation from a highway construction project. It was all unconsolidated material. Nels Orne redesigned the building to set on concrete pontoons instead of the usual spread footings, the theory being

that it would float on the "lousy" soil. The Forest didn't seem able to organize to cope adequately with all of the problems it was experiencing. John Lupis had demonstrated good administrative abilities as a Job Corps Center Director, so we transferred him to the Allegheny to take over as Forest Engineer. The results weren't instantaneous, but he got the situation under control and got the projects back on track. We had the dubious distinction of the biggest contract change orders the Forest Service had ever experienced. One road project had about \$1 million in change orders, if my memory serves correctly. The visitor center building migrated downslope toward the reservoir, but Nels Orne's pontoons performed as expected, and the building stayed level and usable, although we had to put a big loop in the waterline into the building. We forgot about conventional type flush toilets and installed recirculating type chemical ones such as those used on aircraft. Nels Orne's pontoon foundations became the holding tanks.

I believe it was in 1968 that George Scherrer made an Engineering Functional Inspection of the Allegheny. I joined in for a couple of days at the end of the inspection. As we commiserated with each other over all of the problems, someone in the group advanced the theory that because the Corps of Engineers had moved an Indian burial ground, the old Indian chief, "Complanter," who died in 1836, had placed a curse on the area, and on engineers. We joked that maybe an engineer would need to be sacrificed to appease Complanter's spirit, so that he would remove the curse.

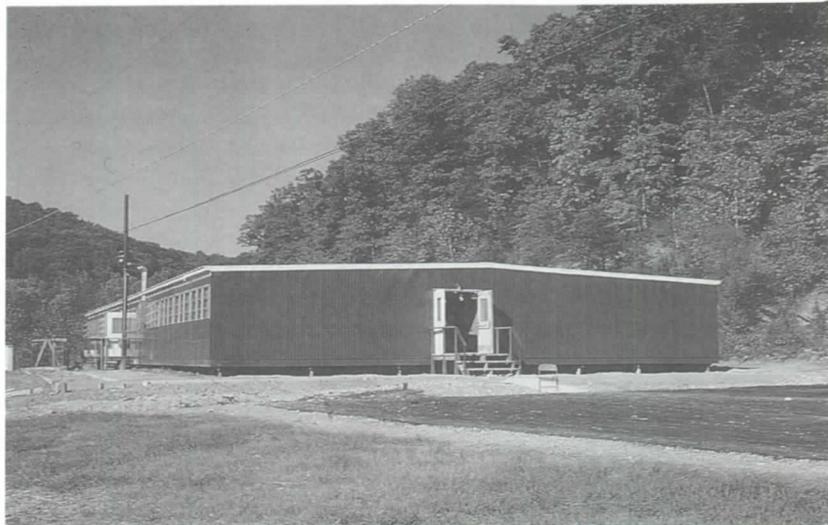
At a Forest Supervisor's meeting in 1969, Ralph Freeman, Supervisor of the Allegheny, presented me with a huge scroll—so large it is in two sheets—outlining the history and proposing that I become the "chosen one" to be sacrificed to see if Complanter would remove the curse. It was prepared by John Lupis and approved and presented by Freeman. It was a huge success for everyone but me. All of the Forest Supervisors thought it was hilarious, and indeed it was.

That scroll was too big to frame and hang on my wall (about 48 inches by 60 inches), so George Scherrer had it photo-reduced and framed for me, and it now hangs on the wall in my den. It is one of my prized possessions for the following reasons: (1) it shows that they recognized that I didn't take myself so seriously that I wouldn't appreciate the humor of the situation; and (2) there must have been a certain amount of affection for me for them to go to such lengths to prepare such an elaborate joke.

Somehow, we got all of the Job Corps Conservation Centers completed. I believe all of them opened on time except the one on the Green Mountain National Forest, which was about 6 months late. Severe problems developed as a consequence of engineering and constructing them in such haste, as well as from unforeseen situations. We neglected to adequately consider the background of the enrollees, so we were plagued by such items as plugged sewage lines, doors that came off their hinges, lockers that broke, etc. It wasn't vandalism, per se, it was just that these young men from inner city ghettos had never experienced pride of ownership. They had to be taught to appreciate their surroundings. In fact, they had to be taught many things that most of us take for granted, including personal hygiene. Many of them had to be taught how to brush their teeth, for example. Many had never had a bed of their own, nor sheets on their bed.



Installing the sewage treatment plant, Branchville Job Corps Center, Wayne-Hoosier National Forests, 1965.



Branchville Job Corps Center classroom building, which was typical of prefab construction in 1965.

A serious shortcoming in the program was that no provision had been made for vocational education, and we had to augment the facilities to provide welding shops, carpentry shops, automotive repair shops, etc. Gradually, we corrected the shortcomings. About the time that we got the physical plant working as intended, and the centers educators were experiencing some success with the enrollees, the program was scrapped and came to an end. Many of us were devastated. Such a noble experiment in "social engineering," with such hopes for the rescue of young people who were without hope, to be given the axe just when there was every indication of success, saddened us in the extreme.

In the late 1960's, we were experiencing some really severe problems on the Monongahela in West Virginia. It became evident that we would have to move a Forest Engineer there who could organize and resolve the situation. We had a bright, hard-working Forest Engineer on the Chequamegon, Milford Jones, who I thought could handle it. The problem was that Milford didn't want to make the move. I asked him to come to Milwaukee to talk to me about it. I applied some really heavy pressure, and he reluctantly agreed. I found out from my staff that Milford really resented the way I had coerced him. He went on to become Regional Engineer in Alaska and then in Region 9 and now is Deputy Director in the Chief's Office, so my judgment has been vindicated. I hope that Milford's career has been so rewarding that he has forgiven me the heavy-handed way that I treated him.

About the end of 1969, Webb Kennedy retired from the position of Assistant Director of Engineering for Consultation and Standards, and I was offered the job. I was reluctant to move back to the DC area again without a promotion. This time M.M. "Red" Nelson, Deputy Chief for National Forest Administration, came to see me in Milwaukee. He explained that they expected Jim Byrne to retire in a year or two, and they needed three viable candidates for his replacement or the Civil Service Commission could force the Forest Service to accept an individual from outside the Service.

I reported back to the Chief's Office in March 1970. I was only there about 14 months, and my principal memory is of meetings, meetings, and more meetings. I had a staff of outstandingly capable individuals including Dave Trask, Sterling Wilcox, Larry Bruesch, Reg Pragnell, and Homer Cappelman, to name just a few.

During the short time I was there, we worked on three items of significance: Service-wide road construction specifications, the National Scenic Trail System, and a system for handling solid wastes on the Forests (response to the recently enacted environmental protection act).

The Service-wide road construction specifications had to be worked out in concert with the timber industry in order to have universal acceptance. The industry, being fragmented as it is with several trade associations, was represented by a committee of about 30 people. The Forest Service was represented by Homer Hixon, Director of Timber Management, and me, assisted by Dave Trask and Sterling Wilcox. Sterling did all the work.

At each meeting with the industry committee, we would hammer out mutually acceptable language. Sterling recorded everything, and it fell upon him to revise the specs to conform to what had been agreed to. After one

meeting, Dave Trask remarked that we had experienced the usual score, "Christians 0, Lions 30." Homer Hixon maintained that we weren't compromising, we were merely refining the wording and gaining acceptance. Dave, Sterling, and I didn't suffer from the same delusions as Homer. We had a number of meetings—not only in DC, but at various field locations. The industry had a few individuals who were knowledgeable and reasonable, but they also had a number who weren't. One, Faye Stewart, was a vice president of a large lumber company in Oregon and was particularly hard to take. He was stubborn, brash, and uncouth, and if he wasn't ignorant, he was the best imitation that I have ever known. Faye tried to dominate the proceedings at every meeting. Usually, we let him talk himself out, everyone would chuckle at his inane remarks, and we would go on from there. At one meeting in San Francisco, I said something that so enraged him, that he jumped up, leaned across the table, and began spouting profanities, including the F word—several times. Sterling was so startled that he gave a lurch and spilled all of his pencils. I think he thought that Stewart was going to attack me, and Sterling was trying to get out of the way. While Sterling retrieved his pencils, Faye wound down and then there was a tense period of silence while everyone waited to see how I would react. Finally, I turned to Sterling and said, "It's all right, you don't have to record Faye's remarks in the minutes." That brought down the house and relieved the tension. When the committee met with us at Garden Grove, Oregon, we had an evening dinner session and several of the Region 6 Forest Supervisors joined us. Faye tackled one of the Supervisors in a debate and was so enchanted with himself that he said, "Now that the turd is in your pocket, what are you going to do?" The Forest Supervisor calmly replied, "I guess I'll just have to get you out of my pocket, Faye."

We didn't get the Service-wide specs completed before I left to become Regional Engineer in California, but I was asked to attend two or three more of the meetings. Finally, everybody sort of got tired of haggling over every word, and we were down to the last meeting. By then, Bud Unruh was handling it from the Chief's Office. The industry had designated a small group of five or six to represent them, and I was asked to represent the Chief at the last meeting. When the industry people found out that nobody of greater importance than me would represent the Forest Service, they went down to the Chief's Office (the meeting was in D.C.) to complain. The Chief told them I was representing him, and that was that. We finally had a set of Service-wide road construction specifications.

Implementation of the system of National Scenic Trails also involved a large number of meetings. Dick Droege, Associate Deputy Chief, personally participated in this. The Forest Service was the lead Agency for the Pacific Crest Trail. There was a large advisory committee of citizens (30 to 40), representing virtually every segment of the public. The items we thrashed out included the trail standards, the location (many people were surprised that the trail was not an accomplished fact), and a distinctive symbol or logo.

Standards for the trail were never a bone of contention. Most everyone agreed that established Forest Service standards were adequate.

Location of the trail was more difficult to resolve. There were sizable segments along the route where the trail followed logging roads, and a few

places where it was along major highways. The Forests involved in these prepared maps showing their proposed relocations. They did a good job, and it was not a real problem. One concern to everyone was that of river crossings. The mountain chain along the Pacific is not an unbroken crest nor a continuous unbroken chain of mountains, and a large number of river crossings are necessary. The solution revolved around using existing highway bridges or constructing new bridges for trail use only. I'm not certain that this question has been completely resolved to this day. A similar item of concern was crossing major highways. The ideal solution would be to construct bridges over the highways. Here again, I'm not certain that this problem has yet been adequately resolved.

Surprisingly, some of the most spirited discussions with the advisory committee developed over adopting a distinctive symbol or logo. Reg Pragnell, a landscape architect, handled signs in my organization. He prepared a number of proposals, most of them incorporating a representation of a mountain crest. There is a very active trail users group in Oregon who had a symbol incorporating a pine tree. They were well represented in the advisory committee. They held out for their pine tree, whereas a large group favored the mountain crest. Reg resolved the problem by coming up with a symbol that incorporated both—a large mountain in the background with a pine tree in the foreground. I consider it an outstanding example of a case where compromise resulted in a better answer than would have been obtained if either faction had prevailed.

How to meet the evolving standards for handling solid wastes in an acceptable manner at the Forest level was a potential dilemma. On a Forest, there are a large number of collection sites and, in the past, there had also been a large number of disposal sites. Nobody questioned the need for something better than the open dumps that were the prevailing system. Most of those dumps were pretty obnoxious in addition to being unsanitary. The proposed standard for landfills called for compacting and covering the waste with earth on the day the waste was deposited. We knew we would not be able to afford many sites on a Forest or the equipment needed to compact and cover the waste. The small communities on the Forests faced the same problem, so cooperation with them would be essential as most of them would want to place their landfill on National Forest land. What we needed was a system for analyzing an area to determine an optimum number of disposal sites that was interrelated with optimum hauling distances, waste generation sites and waste volumes, and locations of potential suitable landfills. We established a study team to come up with the answers. I don't recall everyone, but the team included Jeff Sirmon, Dave Trask, and Mal Kirby. Mal was a systems analyst with a special studies group at the Pacific Southwest Research Station. We asked him to join the group because of his expertise in developing computer programs to handle complex sets of variables. I was to act as mentor and advisor.

At one of our first meetings to organize the team and chart its course, I startled and dismayed Mal by proposing a timetable to come up with a usable analytical system. He had never been asked to develop a computer program to meet a deadline, and he was skeptical about being able to do it. The deadline I proposed was very ambitious—about 6 to 8 months.

A system was developed, and the team met my deadline. Jeff Sirmon presented it to Chief and Staff. It was far from perfect, but it was workable. The Forest Service is now handling solid wastes in an acceptable manner, and it hasn't bankrupted the Service, so I guess it was okay.

When Jim Byrne retired early in 1971, Droege asked what assignment I would want if I was not selected as the Director of Engineering. I told him I would like to go back to being a Regional Engineer of a western Region. He asked if I would be willing to stay in the Chief's Office in the Assistant Director job. I said no, since the only reason I had accepted the assignment was to be in the running for the top job. The timing worked out perfectly. Max Peterson was selected to be Deputy Regional Forester of Region 8, so the Regional Engineer job in California was open, and I got it instead. My staff thought I would be devastated. I would be less than honest if I said that I wasn't disappointed, but I wasn't devastated. I knew that the Regional Engineer job in a big busy Region like California would be a challenge, and nothing could be gained by crying the blues, so I was able to move to the new assignment with enthusiasm.

When I arrived in California, my three assistants, Bill Kinworthy, Walt Furen, and Jon Kennedy spent a whole day briefing me on all their problems and frustrations. In fact, toward the end of the day, I was becoming discouraged by all that they were telling me, and I asked them to meet with me again the next day to brief me on the good things being done in the Region as well as some ideas on how to resolve their frustrating problems. They did this very thoroughly, and it formed the basis for our work program for a year or so.

We had an outstanding staff in Region 5—about 20 GS-13 specialists and another 20 or so professional engineer assistants. They were hard-working self-starters, so I figured I'd have to run pretty fast to stay ahead of them if I was to be their leader.

Shortly after I arrived in San Francisco, I called a family meeting to let everyone know what was important to me and where I stood on things. One of the things I told them was that none of us had made the Forest Service our career in order to make a lot of money, so we must really love our work, because life was too short to spend it doing work that wasn't enjoyable and rewarding in ways other than money. Then, I told them that I considered it one of my primary responsibilities to help them make their jobs fun. A couple of years later at a social function, the wife of one of our Branch Chiefs cornered me and said, "You don't look crazy." I said that I hoped I wasn't. I asked her why she made that remark, and she told me that her husband came home from that first family meeting and said, "God help us, we've got a crazy *kook* for a Regional Engineer who thinks he can help us make our jobs fun." I asked her, how she felt about it then—2 years later, and she said he thought maybe I was going to succeed.

Not too long after I got to San Francisco, Phil Hirl, Forest Engineer on the Shasta-Trinity, came to see me. I asked him what he had in mind, and he told me he just wanted to see what a living legend looked like. I thought, "Oh-oh, Stathem's probably making unfair comparisons." It turned out that that was exactly what was bothering Phil, so I called Stathem and told him that I thought he was being very unfair to Phil. He wanted to know why I

thought that, so I told him that it bothered Phil to have his work compared to what I had done on the Forest a dozen or more years earlier. I reminded Paul that it was a different situation, with different kinds of problems, and that comparisons were unwarranted. I think Paul eased off on Phil. I talked to Paul about it another time, and he said he was proud of me and liked to brag about our past association. I told him I was pleased, but maybe he should consider the impact on present employees before he bragged so much. At any rate, Stathem retired in about a year and was replaced by Dick Pfilf. Phil Hirl got along with him very well, and a couple of years later was promoted to an Assistant Regional Engineer position in Portland.

Phil Hirl and his assistants called on me (about 1972) to present an argument for funding for a new bridge over the Sacramento River at Sims. I didn't tell them that I was inclined to approve it, as I had tried to get funding for a new bridge there every year from 1956 to 1960 when I was on the Forest. It was a masterful presentation, with charts and other visual aids, data on potential timber harvest, etc. Of course, I approved it. When the new bridge was completed in 1974, the Forest wanted to know if they could keep the old suspension bridge for use as a pedestrian bridge for fishermen. I recalled that I had read in Ray Huber's memoirs that it was built by him as the first major construction project completed by the Civilian Conservation Corps (CCC) in the 1930's. I got out the Engineering History and refreshed my memory. I told the Forest that I thought we should dedicate the old bridge to Ray Huber and the men of the CCC who had built it. The people on the Forest agreed, and we started planning a ceremony. After Ray Huber retired, he had built a nice retirement home at Applegate, California, in the foothills of the Sierra Nevadas, about 50 miles east of Sacramento. I wrote to Ray and proposed that we get together for a 2-day show me trip on the Shasta, as we had built some interesting structures that I thought he would enjoy seeing. Ray responded that he would love to make such a trip, but his eyes were very bad and he could no longer drive. He was about 80 years old then. I wrote back and told him I would drive to Applegate and pick him up.

I wrote to Tony Dean, told him what we were up to, and asked him to join us if he could. I also asked him not to contact Ray, as we wanted the dedication ceremony to be a surprise. We contacted all of the people we could find who were contemporaries of Ray's and invited them to the ceremony. I told Regional Forester Doug Leisz what we were going to do and he was enthusiastic.

To avoid any raised eyebrows on the part of the fiscal people, I took my personal automobile and didn't claim any mileage, besides, that way, I could take Doris with me. We went to Auburn the evening before the ceremony and stayed at a motel. We picked Ray up at his home about 8 a.m. and headed for Redding. Ray turned out to be a delightful conversationalist, and before we knew it, we were at the Forest Headquarters. When Ray saw that Tony Dean was there, he was flabbergasted. By the time we reached the bridge site and he saw about 40 people gathered there, he knew something was up. When he saw that it was all old friends of his, he was just about beside himself. We had a nice brief ceremony and gave Ray his plaque, and then we let him visit with his friends and bask in the glow of all of the warm feelings that pervaded the air. Doris and I had dinner with Ray and Tony Dean and then went to Tom and Carol Pestotnik's house and visited



Shasta-Trinity Forest Engineer Tom Pestotnik presenting dedication plaque to Ray Huber, 1975 or 1976.

the evening away. Actually, mostly we let Tony and Ray reminisce. It was fascinating and delightful. The next day, we took Ray back to his home. Those were two of the nicest days that Doris and I ever experienced.

We have known Tom and Carol Pestotnik since about 1963. Tom was hired directly from college to work at the Photogrammetry Center and was detailed to me and others in the Division of Engineering from time to time, so he could be exposed to more than just photogrammetry work. We hit it off and became friends. Our paths crisscrossed a number of times, and when we got Tom as Forest Engineer of the Shasta-Trinity, I couldn't have been more pleased. Someday, Tom will be writing his memoirs, as I am doing now. When that time comes, I think you will be fascinated.

About 2 weeks after our Sims Bridge dedication, I received a phone call from a reporter for the *Sacramento Bee* newspaper. He wanted to know why we did it, and I explained that it was simply a nice thing to do for an old man who had devoted his life to public service. He wanted to know what was in it for me. I told him there wasn't anything in it except warm feelings. He persisted and wouldn't take what I told him. Talk about a mean-spirited individual. I finally became irate and hung up on him. He called back and told me he intended to investigate me and find out the real reason why I did it. I hung up on him again. Apparently, he finally believed me, because he did a nice story about Ray Huber for the Sunday supplement. I have never fully trusted reporters, and that man certainly didn't do anything to dispel my mistrust.



Ray Huber with plaque dedicating the "Old" Sims Bridge to him and the men of the CCC. First major project built by the CCC.



Don Turner with Ray Huber at dedication of "Old" Sims Bridge.

By now, you may have noticed that I haven't quoted any statistics about how many miles of roads we built, the number of bridges and buildings we constructed, major projects undertaken, etc. There are a couple of reasons for this. First, I don't remember the statistics and would have to do a lot of research to get accurate figures. Second, although such statistics are probably significant to a true history, they are available somewhere in the official records, and I think it is more interesting and informative to write about the people who executed the programs.

We had two men in our staff who stood out as being exceptional. It was such a strong staff that you had to be extraordinarily good to warrant being considered exceptional. John Pruitt was one who merited that designation. His work was so good that it was noticeable, and, in a group where everyone turned out good work, that was hard to do. John left us to become an Assistant Regional Engineer at Ogden. I hated to see him go, but how could I, in good conscience, impede his progress? It is no accident that John is now Regional Engineer in Albuquerque.

Beryl Johnston did such outstanding studies that you couldn't help noticing him. As I recall, he was a GS-12 substaff man when I first arrived in San Francisco. He had never been a Forest Engineer and wanted that experience. He was asked to an interview for a Forest Engineer position in Region 6 and came to see me before leaving for the interview. Beryl thought that Region 6 had its own favorite candidate and that the interview would be a meaningless exercise. He had convinced himself that he had no chance to be selected. I told him that with that kind of negative attitude, he could guarantee his nonselection and that he should go to the interview assuming that, if he showed a positive attitude, he would have as good a chance as anyone. It worked, and Beryl was selected. Again, it is no accident that he is now Regional Engineer of Region 1.

A sidelight. George Olson was another of our outstanding staff men. He wanted to go into a line position and was selected as a Deputy Forest Supervisor of the Shasta-Trinity. He went on to become Supervisor of the Targhee National Forest, later Supervisor in North Carolina, and I believe he is now Director of Recreation and Lands in Region 4. There are folks who would prefer that George had pursued his career in Engineering, but who is to judge what is best for George and for the Service? I would wager that George's career has been a rewarding one and that he has no regrets about leaving Engineering.

A year or so after I went to San Francisco, Bill Kinworthy was offered a position in the Chief's Office, and from there he went on to be Regional Engineer in Alaska. He is retired now, so I assume he will be writing his own story for this publication.

When Bill Kinworthy left, we moved Walt Furen over to the Construction and Maintenance position, as we felt it would enhance his experience. Stan Bean came to us (from the Chief's Office) to the Assistant Regional Engineer position that Walt had held (Operations). In 1975, Walt was offered the Regional Engineer position in Albuquerque, and I had to again say goodbye to a valued assistant. Walt, too, is now retired, so I assume he will be writing his story to be included in the history of Engineering.

When Walt left, we promoted Phil Schultz to the Assistant position. He and I weren't compatible, and we both became unhappy over our relationship. It would serve no useful purpose to describe our differences and would be a disservice to Phil's memory. About 1976, Phil asked me to arrange for an early retirement for him, and I did so. Phil was a dedicated employee, and, in spite of our differences, I was saddened to learn he had died of cancer a few years after he retired.

A long time ago, Clayton Seitz told me that he intended to retire when he was young enough to have some active years left to enjoy doing some other things. That stuck in my memory and, when I moved to San Francisco, Doris and I talked it over and decided that we would do the same thing. So, by the time that Regional Forester Doug Leisz and I had our first career counseling session, I only had 6 years to go to be eligible for retirement. I told Doug that I had moved three times without a promotion, that I thought that demonstrated my dedication, that I didn't aspire to any other position, and I would like to stay where I was. I also told him I would continue to work hard and be the best Regional Engineer that I could be. Doug accepted that and told me that he would honor my wishes.

When we moved to California, I took up winemaking as a hobby, and that was so much fun that I got carried away and bought some land and started a vineyard. I know that mentioning that isn't germane to a history of Engineering, but it is part of our planning for retirement, which is pertinent to my story. Maybe someday, I will write a different set of memoirs for the California Association of Winegrape Growers. But, I digress!

Our annual Regional Engineer meetings were a wonderful opportunity to pick up pointers from each other on how to handle different kinds of problems. After hours, in hotel rooms over a highball, I learned a lot from my colleagues. I never worked closely with Jim Usher, but I found in him a kindred spirit, and I borrowed two techniques from him that I think are excellent. At his Forest Engineer meetings, he always set aside the last afternoon for a private, closed-door session with the Forest Engineers. None of Jim's Regional Office staff were allowed to attend. The Forest Engineers were encouraged to tell him anything they wanted him to know, particularly things they might be reluctant to bring up with Jim's staff present. In turn, Jim pledged to keep everything confidential. I adopted the same technique, and it paid wonderful dividends. I found out which of my staff were really helpful to the Forests and which ones weren't, and I found out which Forest Engineers were having problems with their Forest Supervisors or with their own staffs. These were items I could help resolve. There was a further benefit. It fostered the feeling that, together, we were a Regional Engineering team.

The other technique of Jim's that I adopted was that of asking a Forest Engineer from another Forest to be a member of my inspection team when I made a General Functional Inspection. I expected them to be fully participating members of the team, to help develop recommendations, and to help write the report. The Forest Engineers learned a lot from each other, and this technique also helped develop the team concept.



Ward Gano and Don Turner during brunch at the Turners the day after Don's retirement party.

From Ward Gano, I learned the value of approaching a decision in a thoughtful, deliberate way. I never learned to do it, but I learned the value of it. So, I developed a technique of my own to force myself to be more deliberate and less rash in decisionmaking. I designated a member of my staff, whose duty it was to jerk me up short when I was about to make a snap judgment. Further, I gave a written guarantee that there would be no reprisals for following the instruction to force me to think things through more carefully. Only the one who was designated to stop me short, and I knew of the arrangement, so the other staff was often surprised and shocked when he would tell me off. I'm sure they wondered why I let him be so impertinent!

By the middle of 1977, I was becoming more and more engrossed with our vineyard. Enough so that I felt there was a danger that I would neglect my responsibilities to the Forest Service. I also felt that I should let people know that I intended to retire in June 1978. I talked this over with Doug Leisz and told him I didn't want to become a lame duck, so to speak. He said that he thought that the fact that I recognized the possibility also meant that I would guard against it happening. He also thought it was OK for me to let people know of my plan to retire. I told Doug that I wanted him to call me on the carpet if he saw any sign of me shirking my duties. He assured me that he would do so, in spades.

We had a committee planning a Forest Engineers' meeting for November 1977. I told them it would be my last Forest Engineers' meeting, and I would like to have a dinner at which my staff could come as well as the Forest Engineers. So they set up the meeting in Concord (a suburb of San

Francisco). The week before the meeting, George Scherrer told me that over a hundred were signed up for the dinner and that Dick Wilke was coming from Denver. That week, Dick Worthington, Regional Forester in Region 6, called on me at the office and told me that he was sorry that he wouldn't be able to attend. When a couple of other Regional Engineers phoned me to say they were tied up and just couldn't make it to the dinner, you would have to be pretty dumb not to know that something other than the usual dinner was in the works. At the meeting were several Forest Engineers from other Regions—more than the usual one or two. Also, they were ones who had also been Forest Engineers in my Region. As we got ready to go to the dinner, I told Doris I thought that something special was being planned, and she got very nervous. I told her not to worry, I didn't think it would be bad. So, the "surprise party" for me really wasn't a surprise, but it was as heartwarming as if it had been. I expected to really get "roasted," and a few tried, but it was a pretty kindhearted sort of roasting. They presented me with two stainless steel barrels for my white wine-making, some textbooks on wine, and a map of the Region they had all signed beside their Forest. Ted Zealley from the Cleveland gave me a picture of a goat that he said represented the fact that no matter how they tried, they hadn't been able to "get my goat." Dick Silberberger presented me with the "pièce de résistance"—an old mountain transit, polished until the brass shone like gold, in a plexiglass case. The inscription on a brass plaque on the case reads:

DON TURNER
REGIONAL ENGINEER
"With Deepest Respect and Affection"
FOREST ENGINEERS
NOVEMBER 1977

I don't suppose it will surprise you to learn that I was overcome with emotion.

The Sierra Forest had about a dozen "Army Mules"—a small flatbed vehicle with 4-wheel drive, driven by a small 2-cylinder engine that they had obtained surplus from the Marine Corps. The Forest Supervisor had outlawed them because there had been too many accidents with them, and they were going to be "surplused" again. I told Duray Dalley, Forest Engineer of the Sierra, that if there was a legal way for me to buy one, I wanted one, as it looked like an ideal utility vehicle for our vineyard. He assured me he would work it out with the administrative officer. As the time approached for retirement, I hadn't heard anything from Duray, so I figured I was out of luck.

When I was about to retire, they asked me what sort of party I wanted. I told them I didn't need a party, that I was still basking in the glow from my "surprise party" of the November before. When Doris found out what I had said, she was more than a little angry with me. She let me know in no uncertain terms that she wanted a party, that she had gone along with all of the moves and all of the trials of being a Forest Service wife and of living with me, so tell the staff that she wanted a party. So I asked the staff to plan a party, and that it was to be Doris' party. It was held about 3 weeks after my actual retirement. There were quite a few people from out of town, so we invited them to come to the house the day after the party for



Duray Dalley presenting Doris Turner the plaque to go on her "Army Mule."

brunch. By and large, they made it Doris' party. They presented her with a portable radio, which I had told them she wanted, and 26 long-stemmed roses—one for every year she had put up with me and the Forest Service. They couldn't resist ribbing me, of course. Marian Leisz made a wreath of grape leaves that they used to "crown" me with. Even I thought that was hilarious. The next day at the brunch, Duray Dalley gave Doris her Army Mule, along with a routed redwood plaque to mount on it.

I have reached the end of my story, so now disclaimers are in order. I can't vouch for the accuracy of the dates in this tale, but everything I have written is true as best I can recall. I haven't tried to write a history, per se, because I wouldn't know how. I suppose that it is a history of sorts, because history is about people as well as events. I have concentrated on writing about people, because it is through people that we got the work done. I believe there is a symbiosis that takes place when talented people with common goals interact, so the results from their efforts become exponential rather than merely additive. I have known and associated with a large number of remarkably talented people. I would like to believe that I was a positive force in their careers.

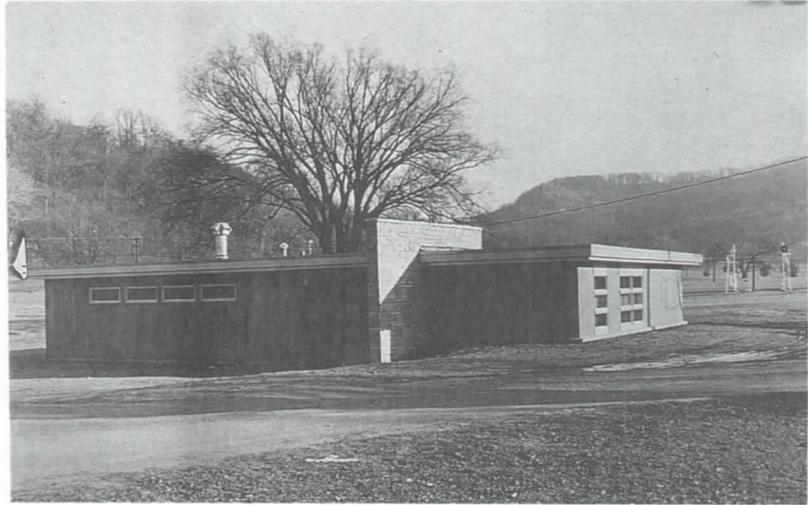
Finally, a lot of people deserve mention and recognition whose names I haven't mentioned. To those people, I apologize. I intend no slight. There are at least a hundred of you, and my story has already grown too long. To all who read this, my best wishes and sincere hope that your careers will be as rewarding as mine.



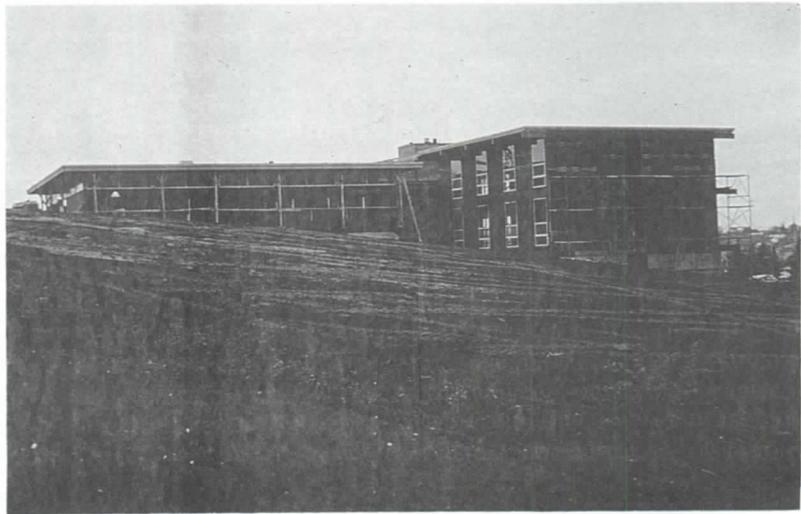
Don Turner's "crown" of grape leaves presented by Marian Liesz (Regional Forester Doug's wife).



Forestry Sciences Laboratory, Research Triangle, North Carolina, October 1962.



Exterior view of the La Crosse Laboratory.



Moscow, Idaho, Laboratory, November 1962.



*Grand Rapids Laboratory—greenhouse, headhouse,
shop, and garage.*

History of Engineering in the Forest Service

Jim McCoy

My service was from August 23, 1953, to February 26, 1982, plus military time of 5 years, which gave me a total of 34 years of Government service.

I started with the Forest Service at the San Francisco Regional Office. I was interviewed by Vern Eaton, who told me I would be assigned to the Redding Work Center in Redding, California. Vern also said that they needed a lot of help in the northern part of the State. I arrived at the Center and was told I would catch a stage to Weaverville, California. I thought, "I am really in the back woods if I have to catch a stagecoach to get to my new assignment." It turned out to be a bus, not a stagecoach drawn by horses.

I arrived on the Trinity National Forest in Weaverville and reported to Don Turner, who was the Forest Engineer and my first boss. Don and I became friends and remain friends today. I'd been on the Forest for a few days when Don said, "I'll send you out with a survey crew to get a feel for what we are doing out there." We got to the field, and I looked around for the transit and survey equipment. All we had was a cloth tape and survey stakes. I watched the crew as they dropped rocks off the cloth tape and drove the stakes into the ground. I thought to myself Vern Eaton was right; these people do need help up here. It turned out that we put some slope stakes in the ground and built a road from the type of surveying that I had observed.

In 1954, I worked on a road location designed by photogrammetric methods that were developed by Clair Arneson of the Washington Office and Don Jackson of the Regional Office. The project consisted of using aerial photographs and identifying picture points, then locating the center line from the aerial photographs. Don Turner and I were instructors on this project. In fact, we laid out the project and had people from Region 5 and other Regions attend the training session.

The photographs on pages 640, 641, 642, 643, and 644 explain the procedure.

Engineers had to fight fires as well as do engineering work, and after I'd been with the Forest Service for a short time, I was sent to a fire called Saddle Camp. There were five of us, carrying shovels, who were dropped off at about 4 o'clock in the morning. With a whole mountain on fire, hiking along the trail toward the fire, I thought, "How are we supposed to put that fire out with shovels?" At this point in my career, I had received no fire training. I hadn't even seen *Red Skies Over Montana* starring

Richard Widmark, but the shovels came in handy. We used them to cook the T-bone steaks that were air dropped to us.

In 1955, I transferred to the Shasta-Trinity National Forests in Redding, where my assignment was Resident Engineer on the Hitz Mountain Road construction contract. The road name was later changed to Gilman Road in honor of Shasta Lake District Ranger Jack Gilman. Building roads by contract was a drastic change in Region 5 policy. Prior to the first formal construction contract, all roads and bridges were built by Regional force account crews called the Regional Road Construction Crew and Regional Bridge Construction Crews.

In 1958, I had the opportunity to work on an experimental road design using computers. The computer program was borrowed from the Bureau of Public Roads. Nick Strong of the San Francisco Regional Office was in charge of the project. In comparison with today's program, it was a bit primitive. However, it did eliminate the tedious chore of plotting and planimetry cross sections to determine end-areas and calculate cubic yards of turning-in areas.

In March 1959, I transferred to the Tahoe National Forest in Nevada City, California, as an Assistant Forest Engineer. Most of the timber access roads were built using flags tied on trees and bushes. A timber industry person would call us on Monday afternoon and advise us they wanted to build some roads on Tuesday morning. We'd rush out to the project area and start tying colored ribbons to the trees with some bulldozers about 100 yards behind us. As I remember, we had four or five people in the survey and design group, and the annual surveying and design budget was approximately \$50,000 per year.

Fourteen months later, the budget had increased to \$150,000 per year. I was Assistant Forest Engineer on the Plumas National Forest from June 1960 to September 1965. During my 5 years on the Plumas, I spent as much time fighting forest fires as I did doing engineering work. During this time, I was Service Chief for one of the Regional fire teams and fought fires from southern California to Montana. I also fought fires in Idaho, Arizona, Nevada, and New Mexico. The Plumas Engineering Group surveyed, designed, and built approximately 300 miles of timber access roads per year. To accomplish this work, we became heavy users of photogrammetry procedures and computers.

In fact, many of the design personnel on the Plumas were outstanding in their use of the computer program for road design. Jim Mattiazzi, who was a Design Engineer, transferred to the Regional Office as a computer specialist. Several months later, Cliff Reichard went to the Regional Office computer group.

In September 1965, I transferred to the Regional Office Transportation Construction Branch. We dealt with the Region's contract construction programs and worked mostly with personnel from Administrative Services.

From 1965 to 1969, I spent more time on the Six Rivers National Forest than any other place in the Region. It seemed like on every odd year

the Six Rivers would have a disastrous flood. Also, the famous Gasquet-Orleans Road was under construction, which I called Austin's Autobahn because every time we built a new section, it got straighter and wider. The work load from the floods and the Gasquet-Orleans Road got so bad that Austin Tompson, the Forest Engineer, and I were doing the plan-in-hand inspection by moonlight at 1 o'clock in the morning.

In 1966 and 1967, with the participation of most of the Region 5 road construction inspectors, I began putting together a Regional Inspector Certification Program that later became a Service-wide program.

In 1967, I was detailed to Region 9 to assist with the development of their inspector training program. The most memorable part of that detail was attending a Green Bay Packers football game with Don and Doris Turner. All the local people were wearing basic winter clothes and had put their feet in brown paper bags to keep warm. However, being from California, I had on electric socks, long johns, a leather sheepskin air force bomber suit, and sheepskin gloves and still almost froze to death.

In 1971, I was detailed to Washington, D.C., to work with Sterling Wilcox and assist with the writing of Construction Inspector Handbook for Timber Road Construction. As I recall, Sterling worked our tails off.

In 1972, I transferred 50 feet down the hall to a new job called Employee Career Development Training and Recruitment of Engineers. I remained in this job until 1978. During this period, I interviewed and recruited over 200 engineers. In fact, the first engineer I recruited, Larry Groover, took over that position after I retired.

The Engineering Certification Program continued to expand and improve. Dan Reed and I worked many times with other Regions, writing and developing job performance requirements for the program. Dan Reed wrote a computer program that identified all certified construction inspectors and their area of expertise. Geneva Timmons, the sections management assistant, tracked all paperwork generated by the program, such as tests, letters, and certificates. While in this job, I had the chore of doing Organization Systems and Analysis, which usually resulted in reduction of positions and consolidation of units. This led to a 5-month detail with Administrative Management to determine the feasibility of consolidating specific National Forests. As far as I know, none were consolidated.

In July 1978, I transferred back to the construction section. During this period, I was involved with various projects in the San Francisco Bay area—the Combined Federal Campaign, the Renewable Resources Planning Act 1980 update; and the Steering Committee for the Development of Transportation Analysts.

I retired from the Forest Service in February 1982.



September 1954 photogrammetry training session. Front row (left to right): Jack Ewing, Harold Meyers, John West, Don Turner. Back row: Jim McCoy, Glen Lycan, Knowles, Bill Pryor, Sharpe, Ted Schubert, Vern Eaton, Clair Arneson, Ted Davison.



First step in field location procedure. Here, Ted Schubert and Don Jackson identify the reference point on the ground using both the enlarged photograph and the stereo pair.



Second step. Lycan, with staff compass, runs out the tie from the reference point to curve point.



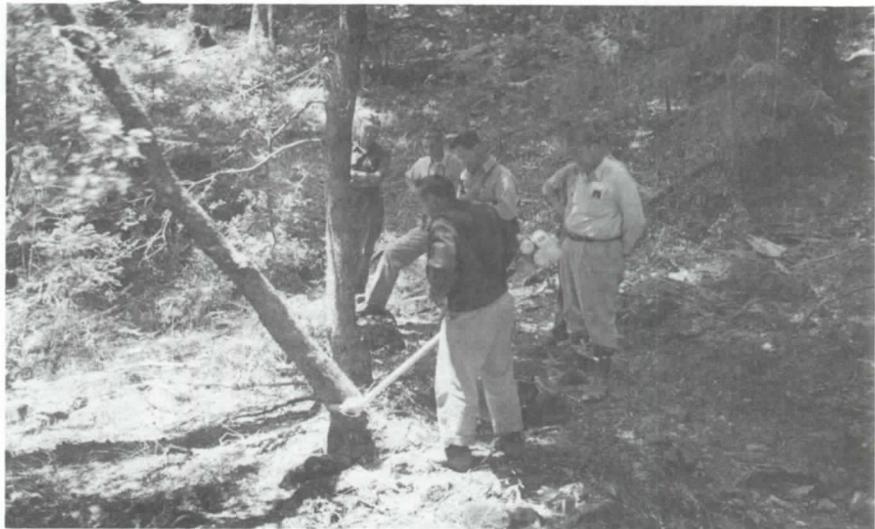
Third step. Pratley and Davison check validity of reference point by checking elevation difference between reference and curve points.



Lycan, Bartell, Schubert, Davison, Pratley, West, and Turner run in the line between curve points and then find new reference point to repeat the procedure.



Lycan, Turner, R. Leavitt, Pryor, Bartell, Pratley, and Davison (in background) illustrate the extreme versatility of the method. Any desired degree of accuracy may be obtained. Surveys requiring a high degree of accuracy can be run by transit, true bearings obtained from solaris or polaris observation, bearing checks from solaris at any desired interval along the line.



Davison, Pratley, Bartell, Pryor, Turner, Schubert, and Jackson (screened by Pryor) illustrate the use of a brush saw in felling an 8-inch oak tree.



Pryor demonstrates for Pratley, Schubert, Lycan, Turner, Bartell, and Davison the use of a stereo pair on the ground to obtain a full picture without the use of a mirror stereoscope.



Homeward bound at the end of the day.



Final product of any route survey is the finished road. This is a view of finished portion of Bramlot #1N06 on the Trinity.

History of Engineering in the Forest Service

Arvo Kujala

Introduction

My employment with the Forest Service differed somewhat from that of most of my Engineering coworkers in that I did not start my Government service until nearly 15 years after college graduation. I spent 4 years working for private industry, 8 1/2 years in municipal engineering, plus a 26-month hitch in the U.S. Navy before joining the Forest Service. This broad-based experience provided several benefits; however, the need to become quickly familiar with endless regulations, policies, and Forest Service "jargon" was somewhat of an obstacle early in my career.

Some of the highlights of engineering activities with which I was associated, listed in chronological order, follow.

Region 2 Regional Office, September 1956 to May 1958

During the mid-1950's, the Engineering work load was increasing at an accelerated rate, and Region 2 was expanding its organization accordingly. Upon employment, I was assigned to the Regional Office, and my first work assignment was to do road reconnaissance, system analysis, and preliminary cost estimating of various transportation system alternatives that Regional Engineer Henry Shank had suggested for a proposed large pulpwood timber sale on the White River National Forest. The objective was to salvage the tremendous volumes of standing dead Engelmann spruce timber in the Flat-tops area by offering a long-term contract of sufficient volume to justify the construction of a pulp mill in the area.

Because there was an urgency to complete the field reconnaissance before the area was snowed in, I spent only 2 days at the Regional Office (getting a driver's license from Mr. Chandler, picking up a GSA Jeep, etc.) before heading out to the field. Because this was my first experience with Federal employment, the Administrative Officer of the Division of Engineering, Glen Austin, prepared for me a five-page handwritten condensation of the relevant Forest Service regulations and policies. As Glen put it, "This may keep you out of jail." (What a comforting thought!) Fortunately for me, Glen's notes were in layman's language, so I was able to live by them for several months with no significant problems.

One of Mr. Shank's suggested transportation alternatives included a long cable system to lower timber from the top of a steep Flat-tops escarpment to the river valley below, from which point the timber would be transported by flume to a proposed mill site several miles downstream. This proposal, I am quite sure, would have been the first use of a large-scale cable system in Region 2. Also (though I don't recall the volume of timber offered), this sale was by far the largest (Chief's) sale in Region 2 to that date.

However, the high bidder on this sale defaulted on the contract before any work was begun on the sale. So much for history—which wasn't!

During my short tour of duty in the Regional Office, I was assigned several other jobs. One was to draw up plans and specifications to provide more restroom facilities at the Manitou Springs training center to be undertaken by contract. The project went quite well except for one minor detail. I had failed to specify the height at which the urinal was to be installed. I suspect that the plumber was either 6 feet, 5 inches tall or had a warped sense of humor because the urinal was hung about 4 inches higher than normal! (If I were an artist, I would send a sketch of one of us short fellows contemplating use of this facility!) That, I think, was the first of my two mistakes during my work with the Forest Service.

San Juan National Forest, May 1958 to July 1967

At the time of my transfer to the San Juan, "Buzz" Carroll was replacing Gordon Gray as the Forest Supervisor. At this time, the number of Engineers in Region 2 was still quite small, and each Forest Engineer (except on the San Juan) was responsible for the engineering work on at least two Forests. The Engineering organization on the San Juan consisted of the Forest Engineer, GS-11, one GS-7 Assistant Engineer, one GS-5 Technician, and a Construction & Maintenance Foreman in charge of several equipment operators and maintenance workers.

The work load was heavy to timber access and timber purchaser roads. By necessity, standards of survey were quite low, using compass and chain, except on roads involving right-of-way acquisition or those that were to be constructed by contract. The surveys were done with temporary help during the field season until the mid-1960's, when we began contracting out some of the work to A&E firms.

In the early 1950's, a road program was initiated to provide access to large unroaded areas of timber where heavy spruce beetle infestations were evident. Most of these roads were constructed by contract and funded entirely by FR&T-appropriated funds. However, because funding was too limited to build all the needed access roads on a timely schedule, the Region and Forest undertook an expanded timber sale program, which included individual sales of over 100 million board feet. These large sales were then able to better support the cost of building the needed access roads as well as the specified roads within the sale area. This program also attracted new timber purchasers to the Forest, which provided the needed increase in milling capacity by building two new sawmills, one located between Cortez and Dolores and the other at Pagosa Springs.

In the early 1960's, the Job Corps program was begun and a new JCC center was built by contract near Pagosa Springs, Colorado. Centers were also established at Boxelder on the Black Hills National Forest and at Pine Ridge in Nebraska.

In addition to the usual functions assigned to the Forest Engineer, Buzz Carroll designated me as the Forest Safety Officer. During my visits to the various Ranger Districts, I, on occasion, would review the records and correspondence of recent accidents. One memo on the Dolores District struck my funny bone (after my earlier experiences learning to cope with Forest

Service lingo). This was a handwritten speed-memo from Ranger Bert Roberts to the local doctor who was a close acquaintance of Bert's. It read:

8-11-58

Dr. Smith:

Please fill out the back of this form CA-2 & return to me. I believe your bill should be sent to the B.E.C. along w/ Forms R2-128, CA-20 & S-69.

A Form S-69 is enclosed for your use. I believe you have the R2-128 & CA-20.

/s/Bert

Dear Bert:

*Have filled out PDQ c ZX & will B at ___ / ___ should you boienk - ZZZTT!
pfftt!*

/s/ S.

Obviously Bert and "S." had developed a good communication system!

I will remember this period as "the good old days," when a vast majority of time was spent in the field, minimum time was required for paper work, and one gained a sense of accomplishment from seeing needed projects being completed in the field. During these 9 years, I received only two congressional inquiries, and each was resolved simply with a short letter to the Congressman explaining our program. This certainly was not the situation in later years on the Black Hills National Forest, where local residents often expressed their concerns directly to the congressional delegation without first inquiring at the District or Forest level for pertinent information.

Black Hills National Forest, July 1967 to June 1980

General Situation

In 1967, access to a large portion of the Black Hills, generally referred to as the Limestone Plateau, was very inadequate, in spite of the fact that primitive roads existed in nearly every square-mile section of the Hills. Efforts to control the heavy beetle infestations through the years had not solved the beetle problem. When sales were offered in this more remote area, no timber purchasers would bid, due to the excessive haul costs. Therefore, beginning in the early 1960's, emphasis was placed on building adequate access roads into the area. This effort continued for over 10 years before satisfactory access was achieved.

Timber purchasers then began buying sales, harvest volumes increased, and the miles of specified roads built also increased significantly. This increased activity drew increased public awareness and concern. Considerable opposition came from certain individuals who felt their favorite hunting, fishing, and recreation areas were being invaded. Congressional inquiries and involvement was a common occurrence. The general public feeling seemed to

be that harvest of timber was needed to manage the Forest and to combat the beetle, but this was to be done with temporary roads!

The enactment of the National Environmental Policy Act in 1969 required greater effort by the Forest Service to get public input on all planning.

Transportation System Planning

The above situation increased the urgency of developing well-documented Forest-wide transportation plans. Stan Versaw was assigned the job of Forest Transportation System Planner and developed a new plan utilizing the planning concepts then being formulated by the Berkeley Transportation Planning Team. This plan was continually updated as more detailed data and new computer models became available.

A Timber Sale and Road Program Activity Review (by Dave Hessel and Lou Hepfl in December 1976) led to the virtual end of temporary road construction in Region 2 and an additional large increase in specified road construction.

Transportation planning was further refined in 1978 using the compartment planning concept, which progressed simultaneously with development of the new Forest Plan. To manage and harvest the steeper slopes in the northern Hills, cable logging systems were incorporated into the compartment plans by North Zone Transportation System Planner Roy Dschaak under the guidance of North Zone Engineer Al Buerger. The first sale using cable logging was sold in 1985, and six additional cable logging sales have been sold since then.

The tremendous increase in the timber road activity is documented in the Statement of Obligations report that shows \$1,046,700 obligated in fiscal year 1978 compared with \$509,400 in fiscal year 1975. This activity has now stabilized at approximately \$1,375,000 in fiscal year 1988.

Work Load

With the ever-expanding work load, efforts were continually being made to stretch available manpower and funds. The results of these efforts included such items as (1) using "quickie" aerial photos and maps for right-of-way plats, (2) purchasing two HP 150's in 1986 to do virtually all road design, and (3) using more A&E contracts for road survey and design and especially for landline location surveys. The greatest percentage-wise increase in work load has been the landline location program, on which \$13,700 was obligated in fiscal year 1975 compared with \$180,800 in fiscal year 1978 and \$624,600 in fiscal year 1988.

This increase in "normal" work load was further magnified by the 1975 flood, which caused over \$1 million in damage to Forest roads and facilities and by the major flood of 1972 wherein 238 lives were lost (mostly in and near Rapid City, South Dakota) and resulted in some \$165 million in total damage.

Organization

From 1968 to 1972, there was a considerable "in-house" difference of opinion as to whether a centralized or decentralized organization could most efficiently handle the Engineering work load. The flood of 1972, with most

of the damage located in the northeast portion of the Forest, helped decide the issue; the Forest was divided into two zones and some of the engineering technicians were assigned to the more remote Districts to reduce travel.

I extend my thanks for being invited to participate in the history update. This gave me the opportunity to reflect on the many enjoyable times I had during my career with the Forest Service.

P.S.: I can't recall what my second mistake was!

Flood of '72 turned face and future of Rapid City upside down

Ken Bender
City Editor

A normally bubbling and beautiful creek turned monster one summer night in 1972, turning both the face and future of Rapid City upside down in a matter of hours.

Up to 15 inches of rain fell in parts of the Black Hills, dumping into watersheds and causing the worst flash flood in recorded history in western South Dakota.

Flooding creeks in Sturgis, Keystone and Box Elder caused considerable damage in those communities, but Rapid Creek cut the biggest swath of death and destruction on its path to and through Rapid City.

Here are some statistics about the Black Hills Flood of June 9, 1972:

- It killed 228 people, including five whose bodies were never found; and injured 3,057, of whom 118 were hospitalized.

- It destroyed 770 stick-built and 565 mobile homes, and 5,000 automobiles.

- It caused some \$165 million in total damage to commercial and residential property, including \$35.1 million residential and \$30.9 million commercial damage in Rapid City.

- And once the water receded and the dust settled, the flood was the catalyst for a massive relocation, rebuilding and urban renewal program in Rapid City that lasted for years.

The driving rain started during the warm, humid afternoon of Friday, June 9, and didn't let up. A flash flood warning for the Northern Hills was issued at 6:15 p.m., and warnings for Rapid and Box Elder creeks at 8 p.m.

Rapid Creek became a torrent, smashing through the old earthen dam at Canyon Lake about 10:45 p.m., shoving homes off their foundations, uprooting trees, and sweeping people helplessly downstream.

Police, firemen and private citizens were heroes that night, helping others escape the raging water. But many people did not heed the warnings, and were trapped in or near the many homes that lined the creek in 1972.

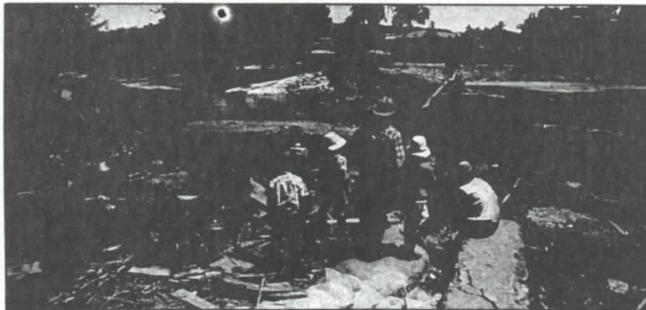
"Some of the finest homes of those years were along Rapid Creek, especially on the west side," recalls Chuck Hoffman, a local Realtor. "If a person had a lot fronting on the creek, he had a valuable piece of property. And some people pretty prominent in Rapid City had homes along there."

The rain finally let up, shortly before midnight, but high water continued for several hours.

It later was determined that thunderstorms that passed over the eastern slopes of the Black Hills on June 9 were fed by an unusually huge mass of moist air. The storm dropped an estimated 143 billion gallons of water in six hours, totaling more than 10 inches over 60 square miles. That was enough water to fill Pactola Reservoir to record height seven times.

On Saturday morning, June 10, Rapid City looked like a battleground. Houses were sitting in the middle of Jackson Boulevard, cars were perched in trees, dead trout lay on lawns blocks from the creek. And mangled human bodies were scattered along the creek's path through the city and beyond.

There was no electricity or natural gas service. The city water treatment plant was out of commission until the following Thursday. Telephone circuits were overloaded and service disrupted. People turned on transis-



The old earthen Canyon Lake Dam was washed away before 11 p.m. the night of the 1972 flood. Rescue workers (above left) checked everywhere for signs of life — or bodies — after the flood. Raging waters scattered mobile homes (above right) like Dominoes. (File photos)

tor radios to learn what had happened.

Help came quickly. Some 1,800 National Guard troops were in Rapid City for their annual exercises. After helping rescue people the night of the flood, Guard personnel did anything necessary in days to come, from building temporary bridges to digging graves.

An Emergency Operations Center was established in

the Pennington County Courthouse. It included a missing persons office. School buildings were opened for refugees, kitchens were set up around town, and drinking water was trucked in from other communities.

President Nixon declared western South Dakota a major disaster area June 10, and federal recovery aid soon followed. Gov. Richard Kneip came to Rapid City

and offered state help. Red Cross, Salvation Army and Mennonite Disaster Teams arrived. More than 50 morticians from South Dakota and other states came to help prepare the bodies for burial.

The flood was a major news story for days, attracting dozens of newspaper and television reporters from all over the country, even several from London. Many wrote their stories in spare corners in the Rapid City Journal newsroom.

One concern in the tourist-dependent Black Hills was that summer travelers would stay away, thinking the entire area had been devastated. State tourism officials began a media blitz, emphasizing that only a small part of the Hills had been damaged.

Rapid City Mayor Don Barnett was interviewed for 17 minutes on NBC's Today Show. He both described the flood and urged tourists to come to western South Dakota.

A \$10,000 check from Homestake Mining Co. was the start of the Rapid City Area Disaster Foundation, which eventually gathered \$1.4 million in donations for flood victims.

In the weeks after the flood, the Department of Housing and Urban Development brought in hundreds of mobile homes for temporary housing, and gave the city \$300,000 to write a recovery program.

In October 1972 the federal government gave Rapid City \$48 million in urban renewal money to rebuild and relocate homes. One-percent Small Business Administration loans helped people finance their new dwellings.

Because Rapid Creek had a periodic history of flooding, the city bought nearly 1,000 acres along the creek and established a flood plain, to be free of homes and commercial buildings so future flood waters wouldn't do as much damage. Some existing large structures or groups of buildings, such as Baken Park, Hubbard Milling Co., Black Hills Packing Co. and Central States Fairground, were allowed to remain.

Ironically, the tragic 1972 flood also proved to be an economic boon to this area.

"It had some immediate consequences," said Leonard Swanson, now retired, but Rapid City's public works director in 1972 and one of the major figures in the flood recovery. "There was a recession around the country at that time, but in Rapid City we didn't have one. We were spending federal money and rebuilding houses, and our economy was helped overall."

As the old structures were cleared away, a miles-long beautiful park gradually was created through the middle of Rapid City. A stronger Canyon Lake dam was built and the modified lake refilled.

A youth baseball/softball complex, tennis and outdoor racquetball courts, horseshoe pits, picnic shelters and flower gardens were added to the enlarged Sioux Park. Storybook Island children's park, destroyed in the flood, was moved and rebuilt. A concrete bike and running path now winds its way through Rapid City.

Rushmore Plaza Civic Center was built just outside the flood plain's north boundary.

"The green way through town is a tremendous asset to Rapid City," said Swanson.

"It was inevitable that we would have this flood," said Swanson. "So if we wouldn't have had this flood then, the shadow would still be hanging over us."

"We could have built up more in the flood way, and lost more lives. So this flood way means it's not going to happen again. We may have another flood, but it will be a lot safer now."



When Regional Forester Craig Rupp arrived by plane in Custer Friday, local foresters, tongue in cheek, demonstrated their accelerated energy-saving effort by meeting him with a stagecoach which transported his party to the Black Hills Electric hospitality room where a land management planning session was held. The stagecoach made five miles per hour on the five-mile trip with Roy Miller of JR Bar ranch holding the reins.

Recently, the Regional Forester passed along an energy-saving mandate to local units of the Forest Service because a previously-stipulated 10 percent reduction in gasoline use was not being met. With Rupp in the stagecoach are his secretary, Lynn Mulholland; deputy regional foresters William McCrum and Larry Hanson; and land management planning director David Anderson, all of the Denver, Colo. regional office.

(CHRONICLE photo)

FS announces fuel conservation

Fuel conservation measures have been announced by Black Hills National Forest Supervisor, James R. Mathers.

The conservation program is being conducted to comply with President Carter's direction to reduce fuel consumption by 10 percent during the fiscal year ending Sept. 30, 1980.

Mathers said plans are being made to have some summer crews live in the field, instead of driving to and from work sites each day. He said four-day work weeks (10-hour days) also are being planned to reduce fuel use.

Other conservation measures in-

clude sharply curtailing training sessions and meetings, both internal and interagency. The forest also will seek contracts to purchase gasohol instead of gasoline for its vehicles.

Mathers said the forest has initiated a program of replacing standard-size pickup trucks and sedans with compact-size vehicles. Twenty-eight compacts will be purchased during the next 17 months to replace standard-size vehicles. The new vehicles are expected to get substantially better mileage per gallon than the ones they replace.

Highlights of My Forest Service Career

George R. Scherrer

Playing Tricks on the Warden

In the mid-1950's, I ran a three-man road survey crew on the Ottawa in the Upper Peninsula of Michigan. We worked throughout the winter using snowshoes from November to March. The three of us—Don Lappala, Joe Kapusta, and myself—got in pretty good shape as we snowshoed at least 5 miles every day. There was also a young game warden by the name of Bob Compeau who was a friend of mine and who kept pretty close watch of things around Iron River. He saw this snowshoe trail going off into the woods toward some beaver ponds before the trapping season opened and took off hoping to catch the villains. He didn't realize it was our crew and we were doing reconnaissance for a road location. The last place we would locate a road would be near a beaver pond. He spent the whole day following our tracks and never did figure out what we were up to. I saw him a few days later, and the matter came up while discussing other things. He was greatly relieved to know the truth but requested we tell him when we did such things in the future. He probably hiked 10 miles that day, and when you are not conditioned for it, you can be in lots of pain the next day.

Gwynn Camp

In the summer of 1961, we had a survey crew living in house trailers at a place called Gwynn Camp on the Gila National Forest. Dow Bond was the chief of party and had been on the Gila just a few months. He was a big man, about twice the size of anyone else around, and very good natured. I believe he played tackle for his college football team.

I was the Forest Engineer at the time and enjoyed getting out to see the crew once or twice a month. Of course, we spent the evenings playing poker and drinking a few beers. The nearest town was over 30 miles away with nothing when you got there. The students hired for the summer invariably dropped out of the game early since they didn't have the capital to hang in. But Dow and I would last until midnight before hitting the sack. Trouble was Dow had a problem getting up at 6:00 the next morning when he stayed up too late, and he was too polite to ask me to stop playing cards.

So this one morning when Dow didn't show up at the cook trailer at the usual time, I told the crew to let him sleep in since he probably wasn't feeling well. They went off to work, and I tagged along with them. About noon, Dow showed up and later drew me aside and asked me to be sure to wake him up the next morning as he was very embarrassed to be late when he was suppose to be the crew leader. I said, "Sure, no problem." That evening we quit the poker game a few minutes early.

About 2:00 a.m., I had to get up to visit the outhouse, and as I came back by the trailer where Dow was sleeping all alone, I rocked it and called out, "Let's go, Dow." Then I went back to bed and was sleeping soundly until about 3:00 a.m. when Dow stuck his head in the door and announced to the crew that breakfast was ready and it was time to get up. He had prepared bacon and eggs for the whole crew and had never even checked the time.

Well, it didn't take someone else long to figure that out, and everyone was ticked off at Dow for such a dumb trick. His trouble didn't stop there, though. At 7:00 that morning, Dow was still in the sack, and the crew decided to leave him there until the last minute. Then he tried to tell us that someone woke him up in the middle of the night, but we pretty well convinced him he just had a guilty conscience and was dreaming. I left that day and never confessed—until now.

Tie Rods

It wasn't long after that when I got my comeuppance, though. Dow was at the wheel as we drove along on this road that was in the process of being graded. The grader had left a line of loose rocks and small boulders right down the centerline and some of them stuck up over a foot. He simply ignored them and straddled them as we went merrily along. Every so often, one of them hit the bottom of the pickup, but Dow didn't seem concerned. I finally urged him to use one side of the road or the other and try avoiding the rocks. When we got back to Gwynn Camp, we put the truck up on a ramp, and, just as I suspected, the tie rod was bent like a pretzel. Since we were a long way from a repair shop, we had to bend it back as best we could.

I took that opportunity to explain to Dow the facts of life about tie rods and that, in my opinion, there was no excuse for ever bending a tie rod. He was appropriately apologetic as I drove off in my personal pickup to go check up on a construction job nearby.

Our survey crew was working on this road project when I came along, so I stopped to talk to them. I noticed the large boulders on the road pushed there by a bulldozer, and I pulled up with one right in front of my vehicle. After talking to the crew for 10 minutes, I completely forgot about the boulder and drove into it, bending my own tie rod like you can't believe.

If I could have made it back to town, I would have, but I decided to eat crow and went back to Gwynn Camp where Dow was just finishing up. I then explained that I had just discovered an excuse for bending a tie rod. And to this day, I don't know how Dow ever kept from going into hysterics.

Survey Tacks

That same summer, I stopped in at the Beaverhead Ranger Station just as one of our Cessna recon planes flew over and dropped a small item to the ground in front of the office. It landed about 10 feet from the mailbox. I remarked to the Ranger about the excellent mail service he had, and he told me it was another 1-pound box of survey tacks that the Engineers had requested. They had radioed in to the Supervisor's Office to send them a box of tacks the next time the recon plane came up to Beaverhead. The request was handled by placing a note on the bulletin board at the smokejumper's

loft, and then they took it from there. The tacks were delivered the next day, but the notice stayed on the board. This being fire season, the recon plane made a pass over Beaverhead every day and dutifully dropped another box of tacks. There were about six deliveries made, and each one came closer to wiping out the mailbox. Those guys in the plane were real marksmen. I got back to Silver City the next day and removed the notice and thanked all concerned for the excellent service.

Horses & Trail Bikes

In the fall of 1963, on the Nez Perce in Region 1, we were starting to get some flak from horsebackers about annoyance from trail bikes and scooters. Dave Howard, the Ranger on the Salmon River District, was particularly concerned and proposed that bikes and scooters be banned from certain trails. Bob Miller, Recreation Staff Officer, and myself, Forest Engineer, were reluctant to go along with that without some investigation. We arranged a trip with Dave to drop down to the Snake River and come back up the same day. We would do this by trail bikes and scooters and cover about 20 miles. A note of explanation is needed here. A bike was a motorized vehicle with wheels about 26 inches in diameter, while a scooter was one with wider tires but a diameter of about 12 inches. Miller had his own Honda trail bike, while Dave and I used Forest Service-owned Tote Goats (scooters).

Things started out poorly and then got worse. It rained for several days beforehand, and we didn't get to the trailhead until noon. We would have been smart to wait over a day as we made no provision for staying overnight. However, it being hunting season, I took a 20-gauge shotgun along in case we found some birds along the way.

We dropped off the ridge, and it took about 3 hours to go 5 miles downhill. Dave and I had to scrape the gumbo clay off our tires every hundred yards, as it would stick between the tire and the fender and eventually the machine would simply stop. Bob had no difficulty at all and rather enjoyed our predicament.

It was dry when we got down to the river, and the trail was more rocky, but we knew we were never going to make it back out that same day. It was quite warm, and we figured we could find a nice sand bar to sleep on.

Since I had the shotgun, I went ahead looking for chukars and managed to bag several. Each time I got one, I would go back and give it to Bob as he had a pouch in which to carry them. After a few more, I asked him how many we had. He looked in the pouch and didn't have any. There was a hole in the bottom, and each time he put a bird in, one would fall out. Of course, after that we saw very few chukars but did end up with three.

Then luck came our way, and we found a tent with cots and some cooking utensils, and we had a meal of chukars over an open fire. They were burnt on the outside and still raw on the inside, but nobody complained since we had nothing else to eat. The tent camp belonged to a permittee who ran boat parties up the river from Lewiston, and they stayed overnight. We even found some cereal for breakfast the next day.

But the next day, luck played some dirty tricks on us. The fuel line on one of the scooters got torn loose, and we were running low on gas. Then we found another tent camp that belonged to the Fish and Game people, and there sat a 5-gallon can of gas just waiting for somebody to use it. We really thought we were home free when, about 500 yards later, the scooter with the newfound gas started missing and then died out completely. The gas we found was probably several years old and was half water. Dave was riding that machine at the time, and after an hour of starting and stalling every quarter mile, he was completely fed up and decided to call the trip off, abandon the scooter, and walk out. But Miller and I would have none of that and threatened all sorts of mayhem on him for getting us in such a pickle and then wanting to give up so easy. If we knew what was ahead, we would have agreed.

So we sputtered along until coming to a trail that would take us back up to the ridge we had come down the previous day. It paralleled a stream, the name of which I don't recall. But to get there it crossed that same creek at least 20 times and then at the top it was real steep on scab rock with no trail tread apparent. We raced the machines about to midstream before they drowned out, then manhandled them the rest of the way. The worst crossing was the very first as it was deeper, swifter, and had larger boulders. But when we all got across that one, we knew we could get across the others.

The scab rock was even more trying. It was late afternoon, and we were tired, hungry, and in a foul mood. I was helping Bob get his bike up a particularly steep section with him below the bike and me above it. On the count of three, we both jerked and lifted, the bike moved up a foot, and that damn Miller let loose and I was holding it by myself. I swore at him and told him to quit screwing around, then noticed him holding his shin and groaning. He would have killed me if the bike hadn't been between us. But it gave us some extra motivation, and we finally topped out just before dark.

We got back to Riggins that night and managed to look over some decent trails the next day. However, I rode a horse and enjoyed every minute. The end result of our investigation resulted in no change in policy. Any horsebacker would have paid good money to have seen us on those two days in October many years ago.

Skinny Dipping

Now you would expect to be able to do a little skinny dipping in the River of No Return (Salmon River) on a hot summer day without a lot of interruption. But that ain't the real world.

Dave Rogers, the Ranger from the Dixie District on the Nez Perce, and I had tied our horses in the shade along the trail above the river, which was quite wide and had a beautiful sand beach there. We didn't resist the temptation, just walked down to the river, deposited our clothes on the sand, and jumped in. Pure delight! In the middle of Idaho's largest wilderness in cool, clear, mountain-pure water.

We were there for only a minute, though, when a jet boat appeared from downstream going wide open as per usual. Other than by trail, that was the

only way to traverse the river, and there were only two or three jet boats in operation at that time. There was a rapids nearby, which drowned out the noise of the boat, and it was on us before we knew it. So we just stayed put hoping they would ignore us. But that is not the way people do things along the Salmon River.

As soon as the pilot saw us, he headed right our way and stopped to pass the time of day not 10 feet away. He and Dave were acquainted and probably could have spent the next half hour discussing the administration of the District. But, naturally, he had three female passengers, and they had discovered our predicament and were giggling at our embarrassment. It seemed like forever before they left, but they finally did, and Dave and I resumed our skinny dipping with a close watch in all directions.

Lightning Never Strikes Twice

But blasting is another matter. In 1958, I was the Forest Engineer on the Kaibab in Region 3. George Williams was the C&M Foreman and was an excellent man in all respects. He came in one day with a broken windshield on his pickup truck and told me how it happened.

He parked his truck so as to block the road several hundred yards from where he was preparing to blast a large boulder that was lying on the road. The other direction was a dead end, so he didn't have to worry about someone being that way. The dynamite did a good job, and the road was cleared. But when George got back to his truck, there sat a chunk of the boulder on his front seat, and it was obvious where it had come from.

Well, accidents do happen, and Murphy has to be around once in awhile. But in 1965, this same thing happened to me while I was on the Nez Perce.

George Crosier, another C&M Foreman, was blasting a ditch at the Cedar Flats Job Corps Center, and I had gone there to observe. I parked my truck under a tree in what I thought was a safe, secure place. But Murphy was on the job, and George put a real neat hole through this George's windshield without even trying. I figured it didn't really make any difference where I parked that day—the rock would have gotten me regardless. You see, we were blasting in a swamp and there were no rocks there, just sand and muck, or so I thought.

Snowmobiles

In the winter of 1970–71, I was working in the Regional Office in Milwaukee. Snowmobile use was becoming popular, and we didn't have much firsthand experience in the subject. Gene Kuhns from the Recreation staff and I decided to get the experience and arranged a trip on the Nicolet with Art Flancher and Chuck Blomdahl, two Engineers there who had some savvy, we thought. Gene had written a brochure on the basics of snowmobiling, and we took it along to see if it needed anything changed. It was quite thorough, such as (1) tell someone where you are going and when you will be back and (2) carry a compass, a map, a flashlight, extra fuel, first-aid kit—you know, all the common sense things—about 25 items in all.

We got to Rhinelander just before dark and drove out to a trail system south of town that was maintained by the county. We wanted to find out how

the trails looked at night. We had three machines, and I took along my downhill skis—I must have had a premonition.

Well, the trails were great, and we enjoyed the experience for a good 3 hours. It began snowing very gently with hardly any wind and not very cold. But when Chuck stopped in the lead machine when we came to a junction with an unplowed road, he seemed perplexed. When Art followed suit, both Gene and I figured it out. They were lost! Course, Gene and I were okay since we didn't know where we were to start with. The basic problem was we were running short on fuel, and if we took the wrong turn, we would probably spend the night in the woods. So we kept our heads, didn't panic, and assessed our resources.

We dug out Gene's brochure and read it by the headlight from one of the machines. That's right—we didn't have a flashlight. Anybody got a map? No. Anybody got a compass? No. An axe, a first-aid kit, a whistle, any food, matches, tell someone where we were going? No, no, no, etc. Honest to God, all we had was the brochure. We stayed there for a long time thinking maybe some other snowmobiler would come along or we could hear a car on a highway or airplane heading toward the airport.

The most sensible thing to do was to backtrack the whole route we had taken and hope no one else crossed our trail and that the snow would not come down real heavy and blot out where we had traveled before. Since I had the skis, I was certain I was going to be using them that night. But without a flashlight, it might be a little tricky.

Well, we made it back to the trailhead with not a drop to spare and congratulated Gene on his excellent brochure. I wouldn't be surprised if it is still in print in its original form. And the two Nicolet Engineers developed a lot more savvy than they really wanted.

Scramble Ways

Trails in the East are vastly different than most of those in the West. On the White Mountain in New Hampshire, a lot of them are nothing more than a way for a person to get from one rock to another, and we referred to them as scramble ways. A horse or mule would never cut it. At the time, about 1974, Sterling Wilcox was a staff Engineer in the Washington Office and had trail responsibility there. I knew he had experience in the West, so I invited him to join me and a few others on the White Mountain for a few days to look over a variety of trails there. I was an Assistant Regional Engineer in Milwaukee at the time. Floyd Curfman, Regional Engineer, and two Regional Office people from Atlanta also joined in.

The itinerary was set up so we would start out easy and save the toughest hike for the third day. Things went as planned, and the weather cooperated as well. Beautiful October sunshine! On the last afternoon, we drove up to the top of Mt. Washington for a looksee, which everyone enjoyed. About a mile from the top on the way down, there is a pulloff where a trail from the valley crosses the road. I suggested to Sterling that he and I walk back down to the highway below and meet the others later for dinner. You can see Pinkham Notch from that pulloff, and it appears deceptively close and all downhill—several thousand feet. I know that downhill can be a lot

tougher going than uphill, but Sterling and I were both in good shape and started off.

What I didn't expect was for all the others to follow suit, and I couldn't talk them out of it. It just looked so easy. It took Floyd and I a good 5 hours to get to Pinkham Notch, and we stopped often just to enjoy the scenery. Sterling and the Atlanta boys hopped down the rocks like mountain goats but got there only a half hour earlier. The upper part is easiest to descend by sitting on your butt and pushing off. It's just all rock and steep. Every so often, if you were still on the trail, you might find some evidence that it was a trail, like a paint mark or something left behind by another person. But overall, it was pure torture, and we were all glad to sit down to dinner that night.

The next day, my leg muscles were sore as hell, but I could still walk. Sterling's wife told me later he came home looking like he had been in a fight and could hardly get out of bed. I was afraid to ask Floyd how he felt, but he had a double hernia operation not long after that. And I haven't seen those two guys from Atlanta. Sure hope they got over their muscle spasms.

Testing the Regional Office

Every once in awhile, some of the people at the Forest level would play little games with the Regional Office to see how sharp we were. This time I caught them. I was an Assistant Regional Engineer in San Francisco in 1981 or thereabouts, and it was over the Christmas holidays. I usually worked this period of time, as most everyone else was on vacation and I could count on getting a few things done.

Bob Harris, Forest Engineer on the Tahoe, sent in a stack of project proposals all neatly stapled and in good order. Nothing unusual about that except maybe for the number, which was at least 12. So, since I had a few minutes to spare, I thumbed through them more for curiosity and then started to read the last one in depth.

It immediately drew my attention because of the superlatives and grandiose descriptions. It was a proposal for a visitor center on a site above the American River, and the site itself was inaccessible. Well, the more I read, the more wild, crazy, and ridiculous the project appeared. Not at all like Bob Harris. So I kept reading. At the very end was a statement that gave a rating of the Regional Office on how long it would take to reply to this proposal. Something like 100 points if the response came inside of 2 weeks down to a zero if we never answered.

I was sorely tempted to add a few choice words to the proposal and send it to Congressman Bizz Johnson's office. He represented the district encompassed by the Tahoe and would probably have been delighted by such a grand scheme. He also chaired the House Public Works Committee. Who knows, it may have been funded and would be there today. Instead, I sent back an informal speed memo to Bob telling him the project was not worth a formal reply but to keep up the good work. I later found out that Bob had a bet with one of his assistants on how long it would take us to respond. Bob had a hard time convincing that guy that we weren't in cahoots.

Comments for the Forest Service Engineering History Project

Thomas F. Smith

I first learned about Forest Service engineering job opportunities while serving with the U.S. Army Corps of Engineers in Libya, North Africa, in 1957. My wife sent me a North Carolina State University newsletter that mentioned that the Forest Service wanted engineers for outdoor work. It had never occurred to me that the Forest Service even employed engineers, even though my hometown of Morganton, North Carolina, was near the Pisgah National Forest.

I decided to send the Forest Service a résumé and an inquiry about the type of work offered. Imagine my surprise not only to receive a lot of information about the work from the Atlanta Regional Office, but an offer of a job, with a choice of three locations. I was so impressed with the type of work described that I accepted an assignment as a GS-7 Engineer on the Francis Marion-Sumter National Forests. Had I not learned of the Forest Service opportunity, I may have continued with a military career.

When I arrived in Columbia, South Carolina, in February 1958, the Forest had only two other Engineers, Jerry Allen, the Forest Engineer, and his assistant Tom Fendley. My second day on the job, Tom Fendley took me to the field to work on a road location and survey project. I recall that Tom spent only 2 days with me in the field and must have concluded I could do the work. From then on, I was pretty much on my own. I could not have asked for two more helpful and pleasant people to work with than Jerry and Tom. They helped create a very favorable impression of the Forest Service those first few months on the job. Tom Fendley left to become Forest Engineer in Alabama a few months after I arrived, whereupon I became Assistant Forest Engineer.

Quite a bit of my work on the Francis Marion-Sumter involved road location. Due to extensive military experience using stereo aerial photography, I used them to do road location. I generally didn't use a stereoscope when locating in the field. It seemed to amaze and impress some of the Forest Service people that I could readily see stereo without the aid of a stereoscope and could estimate grade from the photos within about 2 percent.

Some other reflections from my 2 1/2 years on the Francis Marion-Sumter are:

- (1) At that time, because there were no landscape architects, Engineers did all of the recreation area site survey and site design. I did a lot of this type of work.

- (2) In those days, the same engineer performed the total engineering job on a road from location, survey, and design through construction engineering. Design was 100 percent manual. There were no computers then, and calculations were done with a slide rule. Cross sectional areas were plotted with a planimeter, and earth work volumes were determined from a chart. There were no geotechnical engineers or other specialists, so an Engineer had to be pretty much a jack-of-all-trades. Most of the Forest Engineers in Region 8 had been around for a long time and were nearing retirement age.
- (3) Most Forest Service personnel, when in the field, stayed in private homes with guest rooms for rent rather than in motels. I can't recall the names of all of them, but I still remember Mrs. Waldt's home in Walhalla and the Niles' Plantation in McClellanville. The Niles served their guests breakfast and supper. It seemed to be mostly Forest Service people staying in these homes, and they were treated almost like a part of the families, watching TV and talking with the families in their living rooms in the evenings. I don't believe this continued much beyond 1960.
- (4) My arrival on the Francis Marion-Sumter was the beginning of a major buildup of Engineering personnel, not only on the Francis Marion-Sumter, but throughout Region 8. When I left in August 1960, the Engineering staff on the Forest had nearly doubled to a total of five Engineers.

In August 1960, I was assigned as Forest Engineer on the Ozark-St. Francis National Forest in Arkansas. Actually, my initial title was Acting Forest Engineer, until I had the required year in grade to be eligible to be promoted to GS-12. My rapid advancement was indicative of the excellent engineering opportunities in those days due to program expansion and more emphasis on engineering. Such opportunities have not existed since the early 1960's.

My 8 years on the Ozark-St. Francis National Forest as Forest Engineer were the most satisfying of my career. I was blessed with an exceptionally hard-working and dedicated Engineering staff and an Assistant Forest Engineer, L.J. Hickman, whom I considered to be one of the best in the Forest Service. L.J. was knowledgeable and competent in every aspect of Forest engineering work. I don't know what I would have done without him. He certainly made my job a lot easier. Anything I needed to know, he knew.

My staff on my arrival in 1960 consisted of L.J., Bob Conatser, Lynwood Smelser, Pat Tripp, and O.D. Smith. If I had any concern about their work habits, it was that they not overdo it, but get home in time to spend some time with their families. My staff was backed up by very fine, hard-working, and dedicated Construction & Maintenance Superintendents assigned to the Districts. I will always remember Pete Dalmut, Fred Emory, and R.L. Ballentine, who were there when I arrived and who had a wealth of experience.

During my years on the Ozark, I often looked upon my work as being my "play" and marveled that I was getting paid to do some things that other less fortunate people would gladly have paid money to do on a vacation.

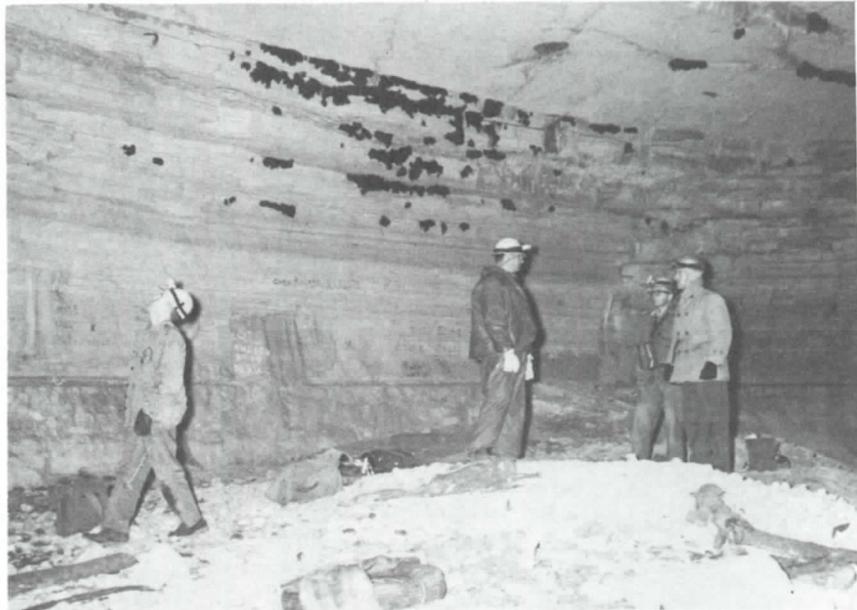
One thing that really impressed me about the Ozark-St. Francis was that virtually everyone on the Forest was so dedicated and willing to put in whatever time it took to get the job done. Many people gladly worked more than 8 hours per day, donating the extra time. The secretarial support in the Supervisor's Office was unbelievably good. I never ceased to be amazed at how well the secretaries could interpret my terrible handwriting, which was always a source of amusement among the secretaries. If I needed something typed in a hurry, it almost seemed like it got done by the time I got back to my desk.

While I was on the Ozarks, the Regional Engineer was Kelly Heffner, a person I had great respect for. He let me do my job without interference from the Regional Office, but when I asked for assistance, he always responded promptly and effectively.

Some highlights and experiences during my years on the Ozarks from 1960 to 1968:

- (1) *Major office and work center construction program.* When I arrived on the Forest in 1960, most offices and work centers were in deplorable condition. I was told they were the worst in the Region. Some of them dated back to before the CCC days. Cass Work Center, with its pot belly stove, was a good example. Within about a 5- or 6-year period, the Forest Service built three new offices and four new work center complexes. Part of the funding came from a big Accelerated Public Works Program on the Forest. Grady Burnett in the Regional Office provided a lot of valuable help on architectural drawings.
- (2) *Dam reconstruction program.* In the early 1960's, the Forest embarked on an ambitious program to reconstruct failed spillways and unsafe dams. Projects included a new spillway at Cove Lake, a new spillway and spillway bridge at Storm Creek Lake, and raising the height of Lake Wedington Dam. I will long remember the many pleasant days I spent with George Glendenning from the Regional Office on the dam projects. Bob Conatser did most of the construction engineering on these projects. I could always count on him to do a top-notch job.
- (3) *Well drilling.* We did a lot of well drilling on the Ozarks. When I first arrived on the Forest, I was told that some wells had been located using the services of a "water witch." I recall thinking it totally absurd that technical decisions had been made by water witches. About 2 years later, I began to realize I was not as smart as I thought. I had contracted for the drilling of a well at Rotary Ann Recreation Area, hoping to get enough water for a hand pump on a mountaintop area where prospects for water were poor. I told the driller where to drill, and he got a totally dry hole.

The driller then told me he had located water by using a witch stick. He said two small streams of water came together at a place he showed me and at a depth he had determined—just enough water for a hand pump. When I expressed skepticism, he showed me his technique and invited me to try it. I did, but the witch stick didn't work for me. The driller said it didn't work for everyone, but told me to hold one end of the fork while he held the other. He felt this would



Near the national entrance in Blanchard Springs Caverns, 1963. Left to right: Lewis Smith (District Ranger), Tom Smith (Forest Engineer), Jack Reichert (Assistant District Ranger), and Alvis Owen (Forest Supervisor). Note bats on wall and ceiling.

work. Of course, I was determined that he was not going to fool me by somehow twisting the stick around my hand. So off we went. Upon reaching the supposed location of underground water, the stick twisted down, and I couldn't stop it. I could see the driller wasn't responsible. I told the driller I had nothing to lose, so go ahead and drill. He hit water at the depth he had predicted. This caused me to look into the art of water witching, including reading scientific research done by the Russians that showed there was indeed merit to water witching. Nevertheless, I continued to rely on geologic data in locating future wells. I found that geologists and most engineers didn't look kindly on any thinking that involved witching for water.

- (4) *Development of Blanchard Springs Caverns as a major national tourist attraction.* In 1963, a newspaper report stated that a cave located on the Ozark-St. Francis National Forest had been designated as a fallout shelter in the event of nuclear attack. Alvis Owen, the Forest Supervisor and one of the best managers and effective leaders I ever worked for, decided to look into this report. He contacted the two cave explorers, Hale Bryant and Hugh Shell from Batesville, Arkansas, who were responsible for having the cavern listed as a fallout shelter. They invited him to a slide showing of the cavern one Sunday evening in Mountain View, Arkansas, a short distance from the cavern. Alvis, Bill Bryan (Recreation Staff Officer), Lewis Smith (District Ranger), Jack Reichert (Assistant Ranger), and I participated.

After viewing some impressive slides, Hugh and Hale asked half jokingly if we were ready to go see the cavern that night. I said sure, I was ready; let's go. So, after nightfall, we drove to the cavern area and walked the half mile to the natural entrance. The other Forest Service folks lowered Hugh, Hale, and me into the cavern about 10 o'clock that night on the end of a rope operated by a hand winch. Unfortunately, the winch jammed when I was half way down the 70-foot vertical shaft, so I dangled there for about 10 minutes wondering if this night excursion was such a good idea after all.

Hugh, Hale, and I spent the night exploring the cavern and were joined the next morning by Alvis, Bill, Lewis, and Jack. We were so impressed with what we saw that Alvis quickly made the decision to press for development of the caverns as a national attraction. I credit Alvis Owen's vision and strong leadership with bringing development to fruition. He was the right person at the right time. Without Alvis, there probably wouldn't be a developed cavern today.

The cavern development was the most interesting and challenging undertaking I have ever been involved with. It was unique in the Forest Service and was something every Engineer dreams about getting a shot at.

The first major project was the construction of a 161-foot-long entrance tunnel into the first area to be developed for tourists. Blasting was so sensitive that it had to be controlled with a seismograph. I located a nationally recognized expert, Harold White, from Joplin, Missouri, who provided technical assistance on the control of blasting with a seismograph. The vibration from each shot had to be limited to one half that needed to crack plaster. One mistake could have spelled disaster. Fortunately, there were no mistakes, due to a good contractor, good technical assistance from Harold White, and good construction control by the Forest Service. Bob Conatser provided the construction control and did a top-notch job. I could tell he did a lot of worrying about that project, which was reassuring and meant I didn't have to worry as much myself. I knew the project was in good hands.

Subsequent projects to construct a 216-foot-deep elevator and a 270-foot-long connecting tunnel between two rooms inside the cavern were equally sensitive. Don Williams was assigned full time as Cavern Engineer about that time and did a truly outstanding job. I can't speak too highly of Don's contributions. He had a lot of innovative ideas that saved money and time.

The engineering survey inside the caverns was challenging and not without danger. Jim Wigington, another of the Ozark's very fine Engineers, was assigned responsibility for the survey, with the Regional Office providing valuable assistance. It was during the survey that we came closest to having a bad accident. Jim Wigington slipped on an incline and was about to slide off a deep precipice. As he was sliding toward the precipice, a small stalagmite caught him in the crotch stopping his slide. I'm told he didn't say a word for several minutes after being pulled to safety.



Tom Smith being lowered into Blanchard Springs Caverns in 1963 through the 70-foot-deep natural entrance.

The cavern water and sewage system, with its two 200,000-gallon reservoirs, is one of the largest in the Forest Service. Jim Armfield from the Regional Office provided valuable assistance during the planning stage.

The 324-car parking area for the visitor center presented a construction engineering challenge due to its many vertical and horizontal curves. Clark Shively, who had a lot of State highway construction experience, was a perfect choice to handle this job. I don't believe I have ever seen as many construction stakes in my life. Clark did a commendable job on this complicated project.

One thing that really impressed me was the total dedication and great pride in work by the Forest Service construction crew that built the trails inside the caverns. The quality of the work was just exceptional. I wish I could remember the names of all those who worked on this project. They were a real credit to the Forest Service.

Public interest in the caverns was high during the 1960's, and the Forest Service was called upon to make a large number of presentations to civic clubs, professional societies, educational organizations, and religious groups. The Forest Supervisor and I made most of these. During the 5-year period, I alone made approximately 200 presentations throughout northern Arkansas, sometimes making as many as 3 per week.

- (5) *Rock masonry.* I must say something about this. We did a lot of it, and I'm convinced we had some of the finest rock masons in the country working for the Forest Service. The sheer beauty of the structures they built really impressed me. They practiced an art that may be lost now that they are retired.

In 1968, I left the Ozarks to serve a 3-year stint as Deputy Forest Supervisor in North Carolina under Pete Hanlon, one of the finest and most respected individuals I have had the privilege of working for. From an engineering standpoint, I had the privilege of working with Forest Engineer Lew Mielke, who I considered to be the "dean" of Forest Engineers in Region 8. He was probably the most respected Forest Engineer in the Region and could always be counted on for wise counsel and sound advice. He retired shortly before I left the Forest.

From 1971 until my retirement in January 1987, I worked in the Atlanta Regional Office handling a major Water Pollution Abatement Program and Water Resource Engineering, and was then Group Leader of the Structures and Architecture Group, and finally Group Leader of the Transportation System Preconstruction Group. Some highlights during this period were:

- (1) Being involved with the first design-construct project in the Department of Agriculture, the Berea Office-Lab. This was made possible by the openmindedness of Gene Cope, one of the best Contracting Officers I ever had the privilege of working with, and the forward thinking of Assistant Regional Engineer John Lamb.
- (2) The challenge of the 1980's of converting to a more simplified and less costly system for the survey and design of Forest Development Roads. Some of the changes were difficult for Forest Service Engineers to accept, making for some difficulties in implementation. This occurred during a period of contracting budgets and manpower reductions, a far change from the climate that existed when I first joined the Forest Service. It signaled what I believe to be the beginning of a new era in Forest Engineering.
- (3) Having an opportunity to work with Regional Engineer Red Ketcham, who was the most memorable person I knew during my stay in the Atlanta Regional Office. I admired Red for being unafraid to delve into controversial areas or take on problem situations that most people would have shied away from. He didn't hesitate to ask uncomfortable and probing questions that other people in his position might have been reluctant to ask. He really kept you on your toes, thus assuring a better, more well-conceived job of engineering. He expected you to argue your position with him, and he would even make statements he knew to be wrong just to see if you would contest the statement. I once told him what he said was a "bunch of baloney." He just smiled and walked away.
- (4) Having an opportunity to work closely with an exceptionally well-qualified technical staff in the Regional Office—what I considered to be some of the best talent in the Forest Service. Not only were they talented, but they worked well with each other. Bill Speer, Tom Baltzell, Don Critchlow, and Maurice Hoelting produced some of the most

thorough and complete architectural drawings I have seen. Dade Foote is one of the most technically qualified Bridge Designers in the Service. Don Wyatt, who retired at the end of 1985, was one of the Forest Service's top experts on road location, survey, and design.

Walt Robillard, who retired in 1988, was not only the top cadastral expert in the Forest Service, but he was world renowned in that field. Arch Kennedy, who also retired in 1988, was not only one of the Forest Service's top authorities on mechanical-electrical systems, but he could provide technical assistance on just about any aspect of civil engineering. He will really be missed.

There is probably no one in the Forest Service more knowledgeable on hydraulics than Dick Jones, and I doubt that Roger Mizell's expertise in water and sanitation is exceeded anywhere in the Forest Service.

The list could go on and on.

Upon my retirement, I could honestly say that I had the privilege of working for the finest organization, public or private, in this country. This is borne out by the U.S. Office of Personnel Management having selected the Forest Service a few years ago as one of the ten most effective organizations, either public or private, in the United States. These were organizations that should be studied to see why they are so effective. During the period of my career in the Forest Service, I'm convinced the Forest Service had far more than its share of capable, dedicated people not only in Engineering, but in all disciplines.

Comments on the History of Engineering in the Forest Service

Ray M. Powell, P.E.

Introduction

With the normal pressures of the construction season, I am afraid that my original intentions are now somewhat abbreviated.

My association with the Forest Service started in 1958 on the George Washington and continued through the spring of 1970 in the Chief's Office. In the intervening years, there were stops on the White Mountain, at the "ole" Region 7 in Philadelphia, and on the Monongahela in Elkins, West Virginia. Since that time, I have been in private practice with principal offices only about a block from the Supervisor's Office of the Monongahela National Forest in Elkins. Practice is essentially civil in nature but involves buildings, water, sewage, roads, highways, small dams, mining, etc., etc. In addition, my wife and I are still friends of some of the other Forest Service employees who are still around. My comments on the history of Engineering in the Forest Service are naturally predicated on the above associations.

In my opinion, there has been a change in Engineering in the Forest Service. This change has been brought about by both technological changes and changes in the overall management strategies of the Forest Service in the last 30 years.

People

In retrospect, one of the most significant memories of the Forest Service is of the people (employees) themselves. In this vein, I was fortunate enough to learn the practical aspects from some that came up through the school of hard knocks, the CCC's and others that were highly educated—James T. Hall, James N. Jefferson, Eddie Vanfossen, (Mechanic), John Henry Knott, (Engineering Technician), T.K. Gienty, Jerry Wheeler (Forest Supervisor on the White Mountain), H.T. Holmquist and Clayton G. Seitz in "ole" Region 7, and Eric Smith and Jack Moore on the Monongahela. They all still stand out in my memories. All contributed in shaping my career. Many in the other Divisions also were an integral part of the team. One such standout was a landscape architect on the Monongahela by the name of Don Potter. Basically, we liked and enjoyed the people. There were only two "bad apples" whom I won't mention by name, but fundamentally, they were a hard-working, hard playing, conscientious group with little internal politicking. And when you were called into Jerry Wheeler's or Clayton Seitz's office, you had better be prepared.

When I was considering going into private practice, I went to Ernie Smith, who was then retired, and discussed it with him. Ernie said, "Don't do it—you will never get paid." Ernie passed away shortly thereafter, but he was right!

I guess the worst "chewing out" I got from Jerry Wheeler was when we painted the new Forest Service lines and put up the signs, etc., on a land exchange with the State of New Hampshire in the immediate proximity of the "Old Man of the Mountain" and "The Flume" (I think it was called). Nobody told us not to. It was just unfortunate that the survey crew painted and signed all the interior trail crossings beautifully in full accord with the standards at that time for the young and vigorous engineer—so-called. You better believe it did not take long to find some dark paint and obliterate them.

On the other side of the coin, though, I remember meeting Mr. Wheeler at the office one Saturday afternoon to get a search and rescue team started. Unfortunately, somebody had mislaid the keys to the cache. With some humor, it did not take us long to gain entry with a fire axe. As I recall, it was either a GSA or Department building, and I was not around when the "keeper of the keys" was addressed.

Don't tell anyone, but while in the Regional Office we would pull a trick on Mr. Holmquist as to the approval of final road drawings going down to the Contracting Officer for advertising. Frankly speaking, he would not officially approve a set of drawings until he had found something—anything—that should be changed or corrected. After learning this, and with the cooperation of the technicians in the drafting room, we started "spiking" the drawings to meet time schedules. After reviewing the drawings from the Forest and placing them in order as might be applicable, we started inserting subtle corrections or things that should be changed. Sometimes they were on the cover sheet, sometimes the summary sheets, sometimes Sheet 1 or 2 of the plan-profiles, seldom beyond this point and occasionally on all said sheets. I don't know if Mr. Holmquist ever caught on, but it sure did expedite the review/approval process. (At times, with specific State agencies, I am still using the same strategy.) At this point, I don't know whether Mr. Holmquist is still alive or not; have not heard much since Region 7 split up.

All of this now reminds me of Contracting Officer George Cashion. In those days, and now for that matter, Contracting Officers with a Federal agency were "God." As those of you who knew Mr. Cashion know, he had a problem. Also, he was feared. We used to travel together occasionally doing preworks, semifinals, finals, etc. One time, in going from the White Mountains to the Green Mountains and on down to the Allegheny, I literally lost Mr. Cashion for 2 plus days. But we got the job done, and my per diem voucher was approved. I have heard that Mr. Cashion is now deceased, but my experiences with George Cashion have enabled me to take on about any Contracting Officer in the country. He was always truthful and conscientious in implementing the general conditions of the contract.

This now reminds me of another job that was hard at the time but now seems easy. The bid forms, bonds, etc., never got to the Regional Office as a result of some recent bidding on a road project somewhere—can't remember. I called the Forest and got a pencil copy of the bid tabulation. The award was made, and the contractor never knew that all the bidding papers were lost.

And then there was the time on the George Washington when Mr. Jefferson was in the process of opening bids on a road project and a contractor

jumped up and demanded his bid back and that he had made a mistake. Well, I was just on the periphery of this one, but I watched and listened the best I could. When it was over, Mr. Jefferson explained his actions and the rationale in meeting with the bidder after the other bidders had left. Since then, in administering public works with sealed bids, it has happened to me on at least three occasions and once in which the bidder had to forfeit bid bond.

The bidding process is currently a bit smoother, at least in my experience, with less shopping, last-minute price reductions, etc., and more professionalism from contractors.

Then there were all those training sessions at far off places—Region 7 had a checklist—I did them all. I still have a copy with all the initials just in case an employer wants to review. It was at one of these meetings that John Henry Knott clued me in on how to play poker, to the effect that when the training session leader sits in, let him win a few. There were always, however, a few Yankee Foresters—Findley, I believe—who were also good.

And then there was the special assignment to the Pinchot Estate rehab, which was handled directly out of the Regional Office by Ross Stump of Operations. There were a couple of guys detailed in from somewhere. We got the job done—had to buy the current uniform of the day and met Jack Kennedy on dedication day. Ed Reimenschneider—Forester on the Gauley on the Monongahela—was one of the detailer's on this project. He is with industry now and semiretired in Elkins. He was on his honeymoon during the project and still wonders what it was all about. He did get one of those big hand-blown glass floats for his decor. I got mine in the Caribbean or Grenada. The float cost \$25 and the trip several thousand.

There was the first plane ride out of Weyers Cave, Virginia. Made it and many more.

Then there was that trip from Harrisonburg, Virginia, to Laconia, New Hampshire, to find a place to live. It was okay going up, but a snowstorm caught me in Boston on return trip. I was lucky enough to get one of the last rooms in that hotel over North Station, I believe. I stayed for 3 days. Minnie, the clerk on the George Washington, really had to do some figuring to keep me out of jail.

Then when we moved to the White Mountain National Forest, the Administrative Officer went down and cosigned the note to pay the moving bill. The Government moving allowance would not cover the moving expenses.

In New Hampshire, we met a completely new social environment—very conservative and “Manicks”—John and Mary Herrick and Homer P. and Marilyn Morrison. I have not heard anything of either couple for a number of years. Mary taught us how to clean and prepare a fresh lobster, and I gave John my hair formula. I will never forget when Doc cut his leg, stitched it up himself with fishing line, and then had to go to the hospital a couple of weeks later with the infection and restitching, etc. I will never forget the day we started down Lake Winnessgum in an 18-foot whaler with a 3-horsepower motor and a storm came up. We finally got it beached.

Those were impressionable years with:

- (1) My wife, Mary Mitchell, at home, either pregnant or taking care of babies.
- (2) Similar to college years in many respects with no money, and yet we never lacked for a good time, a good movie, or what-have-you.

Then there was that home brew of Jim Wenner's. I never really figured out what his job was on the White Mountain—he always seemed very studious and smoked a pipe. He finally had to take his wife off the home brew and start using the more conventional spirits when gout set in.

As one can tell, most of the above comments pertain either directly or indirectly to people.

Technically speaking, many of the day-to-day technical problems were being addressed in much the same manner as they had been for the last 50 years. For instance, I have in my possession a copy of *Azimuth* by Hosmer (1910), the *Highway-Engineers' Handbook* by Honger and Bonney (1919) *Engineering Field Tables* (Forest Service), and several old Roads Handbooks from FSM. With the exception of maybe the outfitters camps, many of the design techniques and procedures had been in use a number of years. It was Region 6, I believe, that was just starting to come on line with the IBM 650 with a limited number of engineering functions. Computer use at this stage (1960) was pretty well limited to the bookkeepers.

In private practice, for specific limited projects, we still use similar techniques in reconnaissance, etc., where adequate mapping is not available. The days of locking all the young Engineers (and some Foresters for that matter) in a room to plot cross sections for 20 miles of road or do a transportation planning network analysis are gone forever. But, by the same token, given a certain amount of experience, the Engineer can now do a better engineering job.

Multiple Use

At that time, the Forest Service was advocating *multiple use*—Timber, Recreation, Wildlife, etc.

They also reiterated the fact that the Forest Service was one of the few Federal Agencies aside from the IRS that took in more money than it paid out.

Monongahela National Forest

From recall, in 1963, the Monongahela National Forest Engineering staff consisted of Ernie Smith (Forest Engineer), Bill Mahoney (Survey Crew Chief and Road Designer), Dick Feaster (Land Surveys), plus several WAE crew members and Jack Moore, the Construction and Maintenance (C&M) Superintendent, and five C&M crews.

Prior to moving down to the Monongahela, Clayton Seitz, then Regional Engineer, and Dick Dorge, I think it was, sat me down and reiterated:

- (1) The Monongahela has the largest allowable cut in the East—move it.

- (2) Recreation is starting to blossom or somewhat such words—build roads and get the utilities in.
- (3) Staff up for even bigger programs, including scenic drives.

In summary, over the 5 or 6 years, we had no real problems, for money and staffing were readily increased without the normal hassles with Personnel in the Regional Office. George Kramer, I believe, was the Personnel Officer. He just could not understand the organization chart. In lieu of a simple letter page, it was on a 2- by 3-foot sheet.

Aside from the normal timber management roads, of which there were *beaucoup*, special projects might have been included, such as the following (all in West Virginia):

- (1) Planning of the Spruce Knox—Seneca Rocks National Recreation Area in Pendleton, Hardy, Grant, Tucker, and Randolph Counties.
- (2) Planning of the Mouth of Seneca Visitor Information Center in Pendleton County.
- (3) Planning and construction of the Cranberry Mountain Visitor Information Center in Greenbrier County.
- (4) Planning and improvements in the Cranberry Glades Natural Area in Greenbrier County.
- (5) Planning and construction of the Spruce Knob Visitor Observation Tower in Pendleton County.
- (6) Investigation and repairs of the Sherwood Lake Dam failure in Greenbrier County.
- (7) Planning the rehabilitation of the Summitt Lake Dam in Nicholas County.
- (8) Design of various earthfill dams and construction of the Buffalo Fork impoundment in Pocahontas County.
- (9) Rehabilitation and expanding of the Sherwood Lake recreation facilities in Greenbrier County.
- (10) Planning of the Stuart Park day-use facilities in Randolph County.
- (11) Planning of the Summitt Lake recreational facilities in Nicholas County.
- (12) Planning and construction of the Neola Job Corps Center in Greenbrier County.
- (13) Design and construction of the Williams River Road in Pocahontas and Webster Counties.

- (14) Planning, design, and initial construction of the 110-mile Highland Scenic Highway in Nicholas, Webster, Pocahontas, Randolph, Tucker, etc., Counties.
- (15) Rehabilitation of buildings and all utilities at the Y.M.C.A. organization camp near St. George in Tucker County. This program evolved into one of the first seasonally operated land application projects of sanitary wastewater in the United States.
- (16) Planning and design of the Spruce Knob Scenic Drive.

Interestingly enough, over the 6 years, the staffing changed from a mere Forest Engineer to Forest Engineer with four division assistants in roads/highways, water/sewage/buildings, land surveys/landline location, and C&M. Employees were recruited from within and without. The total number of direct Engineering employees in 1969 was about 110. The Forest endorsed and assisted local vocational training in such things as forestry and surveying. Things were on the move. In addition, there were at least two Landscape Architects running around trying to figure out what to do and a forest hydrologist trying to route flows through a series of five dams plus in the National Recreation Area. There was almost as much 070 (Recreation) money as Roads and Trails money. Timber Management, Wildlife, Recreation, and Engineering had many *staff* meetings.

In addition, the Forest and Region had retained outside consultants to map and design Spruce Knob Scenic Drive and about a 5-mile timber access road above Sherwood Lake to the top of the mountain. Again, development was one of the large keys to meeting the multiple-use principles, especially with Senators Byrd and Randolph.

In addition, the battle between the Soil Conservation Service (SCS) for upstream impoundments and the Corps of Engineers for the larger downstream impoundments for flood control was being waged. One of the Corps of Engineers projects, Rowlesburg, touched heavily on the Forest, and negotiations were under way for the recreation development and mitigation of lost recreation areas. On another District, the SCS planned a whole series of small impoundments.

In general, the Forest was one of the leaders in economic development and integrally involved in the community and State. The State was assuming control of the wildlife program.

That was 1969–70. Now 20 years later, looking in from the outside, the files at the record center must be full of conceptualls, preliminaries, and, in some cases, even construction documents for projects that have been canceled or at least only partially completed. Although I don't know the details, Forest management plans appear to have gradually changed with the environmentalist impact to large roadless areas, designated wilderness areas, less timber cut, etc. Again looking in from the outside, I question the need for Engineers, and definitely the number of Engineering and related personnel has been severely reduced. There does not appear to be much going on. The refinements—the cost of microprocessors and production per manhour in such things as site development, roads, water, and sewage—further require

even fewer engineers and technicians. The same can be said of the new Global Positioning System (GPS) with land-surveying problems.

In addition, the Appalachian Regional Commission was doing preliminaries on Corridor H to tie into the Highland Scenic Highway and to bring the 15 million available people into the National Recreation Area and adjoining private/Forest lands. Naturally, the Forest Service was one of the main property owners. The Forest was even soliciting private resort development common to such areas as Cranberry Mountain. The State, with the assistance of an EDA grant, even did a study to evaluate the potential of the ski industry in the State, which identified five sites all touching on the Forest to some extent.

Interestingly enough, the populace has finally realized the importance of transportation in the economic cycle and are again turning real political heat on for Corridor H. The State is pushing tourism heavily. Winter sports have a foothold after the second or third bankruptcy. There is strong demand for summer destination resorts, but the supply is limited. (Now that the beaches on the east coast are all screwed up, this demand is expected to further increase.) Maybe its cyclic, but it will be interesting to see what the environmentalists do this time.

Now back to the people that were assembled back in 1970. Some, such as Jack Moore, followed the natural succession and retired to Florida. Others, such as Doc Morrison, Mickey Weinreib, Dale Ashby, and Mack Litten, transferred out to more responsible positions such as Forest Engineer. Mickey Weinreib died suddenly a couple years ago. Glenn Bergey was Chief Land Surveyor for the Forest Service, I am told. Some of the technicians recruited and trained are still with the Supervisor's Office, such as Roy Ryan, Kennie Shaffer, Sam Severino, Tommy Sanders, and Terry Poe. They all appear to be good, sound employees.

Those were interesting times:

- (1) On my first Friday on the Forest in February 1964, at about 2:00 p.m., the Forest Supervisor (Ephe Olliver) walked into my office and said the General District Assistant on the White Sulphur had just called in and there was excessive water coming out of Sherwood and the pool was going down. I didn't even know where Sherwood Lake was, much less what it was. At any rate, we went down early Saturday morning, put on snowshoes, and walked into the impoundment. The primary spillway was leaning at a 30-degree angle and water was flowing. Naturally, the Region considered it a dam failure, and filling out all those forms/reports kept Doc Morrison busy for at least 3 months.
- (2) Then there was the time during the construction of the Williams River Road that I had to call the Region to ask for assistance—40,000 cubic yards had just slipped into the Williams River. The project had already been anticipated to be difficult and had taken the flak of the soils people and other specialists, but management needed the road for both timber and recreation. To make a long story short, Herb Holmquist called back about 2 hours later and said that the soils people and water people were all now on "emergency leave" (whatever that is) and

to proceed with cleaning up and stabilizing the best we could and be sure to quantify for the Change Order. We did.

- (3) There was the customary discussion of force account construction versus contract construction. We were fortunate to have a good C&M Supervisor in Jack Moore who knew how to split purchase orders. So in the end, we had a balanced work force, which really worked well, especially in the small recreation areas where it would be difficult to get a contractor to bid.
- (4) Then there were those not-so-customary staff meetings at which the issue of permanent roads (10b, I believe) versus temporary roads (10c, I believe) was discussed. George Neitzold of the Timber staff was as hardheaded as me. Last week, I was in the Supervisor's Office, and I believe I could still hear those discussions echoing up and down the halls on the second floor.
- (5) Then there was the time in constructing the Job Corps center. After three attempts at wells with no results, we hired a water witch over at Hot Springs, Virginia. It wasn't very scientific, but it worked and we did not have to design or build a treatment plant for surface sources.
- (6) Then there was the day a specific private contractor called and asked if he and his lawyer could drop by in about 2 hours, to which I responded, "Yes." For the past several weeks, this particular contractor had been having considerable difficulty with a specific issue. Both technical and District personnel had really been on him to the extent that if the contractor did not get on top of the issue very soon, he would have been shut down. Well, at any rate, the contractor and his lawyer showed up at about 11:00 a.m. Needless to say, the discussions started again. After about 5 minutes, the contractor reached inside his left coat pocket and laid out a stack of banded bills, U.S. currency. I can still see it. It was about 2 inches thick. I cannot remember how much money was in the stack nor what I said. I can remember standing up; the lawyer immediately slid the money off the desk into his open briefcase, grabbed the contractor by the elbow, and practically manhandled the contractor out of the office on the double. About 10 minutes later, the lawyer returned without the contractor. We never had another problem with that specific contractor on that and several other projects.
- (7) Then there was the time the Supervisor's Office hired their first black girl. I don't think anybody particularly wanted her, but she was coming back into the area from D.C., and the Forest needed to try to fill quotas. The current girls did not particularly like doing the Engineering typing, as a lot of it was reports, manuscripts, feasibility studies with numbers, etc., requiring a lot of effort. In addition, some Engineers at that time were worse than doctors. It just happened that as this girl was reporting to work, we had a very lengthy, complex manuscript ready for rough drafting. I told the Administrative Officer that Engineering would gladly take her if she could do the work, so we contrived to simply hand her the pencil manuscript on her first day and see how she approached it. She did it, and the following week, she

moved to the third floor to take care of all the Engineering typing. Ms. Lewis is deceased now.

I had previously gotten secretarial training from Rose Lewis in the Regional Office. There was one who could run a show—she would have those young girls in tears, though, at times.

Conclusion

This has gotten a bit long-winded, and I must return to work. As one can tell, we enjoyed the work and people of the Forest Service. Our decision was one of location to raise a family and put down roots, not one of friends or work. Now that the children have grown and are educated and on their own, my wife and I often comment, "Wonder where we would be if we had stayed with the Forest Service?"

The literature is full of the technical advances that have occurred in this same time period. There is little need to address these further.

Chronology & Comments

Jeff M. Sirmon

1958

This was my senior year at Auburn University (called API or Alabama Polytechnic Institute), and the job market for civil Engineers was good due to an expanding aircraft industry, the national interstate highway system, expanding and rebuilding of railroads, and sanitary and water supply needs for expanding cities. I had a number of good job offers, but none really appealed to me. A classmate, who had worked on the Pan-American highway, and I seriously considered going to Central America until a landslide took out an entire village and work camp. This same friend told me about the Forest Service and the freedom and responsibility they gave young Engineers. The 190-million-acre land base interested me since I enjoyed farming and growing things.

I sought out the Forest Service in Montgomery, Alabama, and interviewed with Heyward Taylor, Forest Engineer. I liked what he said and took the lowest paying job—the Forest Service as a GS-5 at \$4,490 per year.

I went to work at Montgomery in September 1958, with a 6-month military obligation to be served within the year. I was in the Corps of Engineers, ROTC program, and got a second lieutenant commission upon graduation from Auburn.

1959

From September until leaving for active military service in May of 1959, I worked on a number of road projects, work center designs, water systems, etc. I was a road inspector for 2 months on the Flat Top Experimental Forest near Birmingham.

One interesting experience during this period occurred when I invited Senator John Sparkman to participate in a weekend youth conference at the Blue Lake conference center on the Conecuh National Forest. During the conference, the Senator said it would be no problem to expand the camp since the Government owned land on all sides. I reported this to my Forest Service superiors, and I couldn't understand why they got so excited—called the Regional Office and the Washington Office. I realize now the Forest Service doesn't give up land very easily—I didn't at that time. That episode gave me a glimpse of how the Forest Service handled relations with congressional delegations. Senator Sparkman was very powerful at that time.

May 1959

Entered 6 months' active Army duty with basic training at Fort Belvoir, followed by assignment to Fort Benning with a 6-week TDY at the Army

Ranger and Airborne special forces winter training center near Dahlenega, Georgia.

December 1959

Returned from active duty to Montgomery, Alabama—Alabama National Forest, GS-7—and continued working on various projects with occasional details to the Regional Office in Atlanta. Bill Nichols, Roads and Trails Engineer, advised me to go west within the Forest Service—preferably to Ogden, Utah.

My details to the Regional Office were to work on 5610-9R, 9B, and 9T records and maps—my first experience with computer printouts. How boring. Minor Huckaby, Bill Nichols, Monk Farnum, and Remer Crum were some of the fellows in the Regional Office Engineering.

There were a number of Engineers hired in Region 8 about the time I came on board, and the Forest Service management, especially Engineering, made us feel welcome and constantly involved us in all activities and talked about our development.

1960

Promoted to GS-9 and started handling a wide variety of complete projects. Got married in April. Heyward Taylor moved to the Regional Office, and Red Harkins transferred in from the Ouachita National Forest as Forest Engineer. Tom Fendley was his assistant.

1961

The Forest Engineer on the South Carolina, Jerry Allen, was seriously injured in an auto accident, and the Forest needed help. I was offered the Assistant Engineer job, GS-11, and moved to Columbia in July. Bought our first house—\$16,000—brand new—no furniture.

The Forest Supervisor and the Forest Engineer did not get along at all. My first day on the job, the Supervisor called me in and said as far as he was concerned I was his Forest Engineer. Jerry Allen recovered in a few weeks and upon returning to work told me I was on my own. He wasn't going to tell me a single thing going on in the Forest, and he didn't need my help.

Life was interesting to say the least. I did a lot of field work, which the Rangers liked, and their working directly with me didn't make Jerry any happier. I had a cold and stayed home the day before Thanksgiving. The postman greeted me with a notice to return to active Army duty as a result of the reserve activation triggered by the Berlin Crisis. I had 10 days to report to Fayetteville, North Carolina—Fort Bragg—and join a battalion of engineers from Buffalo, New York. I spent 9 days telling the Army they had made a mistake and the 10th day traveling to Fort Bragg.

A new baby, new house, and new job—all disrupted. Oh well, it fixed the tense situation with my boss.

1962

Eight months later, we were back with the Forest Service in the Regional Office in Atlanta. In October, I was on a trip to Hot Springs, Arkansas, and had a message to call the Regional Office—urgent. This was the

beginning of the Cuban Missile Crisis, and reserve units were being activated again, and I just knew the message was to report to active duty again—it wasn't. It was a job offer to the Lassen National Forest in California as Forest Engineer, with a reporting date of December 1. After a trip to the library upon my return to Atlanta, the only information I could find was that Susanville had a population of 5,000 and an elevation of 5,100. We said we'll take it but would report January 2. A telegram came back and said offer withdrawn; offer made for the Modoc National Forest instead. We didn't know any difference and readily agreed. A few days later, another telegram came and said, Susanville job reoffered and can report January 2.

1963

We said goodbye to family and friends and went west, where a whole new lifestyle, Forest Service, and culture waited for us. I found out several years later there was a betting pool on the Lassen as to whether we were black or white. The man I replaced, Bliss Haynes, was outstanding in running the Engineering organization and as the top Fire Service Chief in Region 5.

A 100-year storm had just hit the Forest, the annual sale program was raised from 160 million board feet to 230, an accelerated road program was starting, and I was the first graduate engineer (age 26) to occupy the Forest Engineer job. I had one graduate assistant, Chuck Paletti, and a host of top-quality technicians. In February 1963, the Lassen was hit with a rain on snow situation, and another 50-year storm occurred, leaving more damage. Needless to say, my platter was full.

I kept following the literature on PERT and Critical Path programming. I especially followed Professor Fondall's work at Stanford and started to experiment after hours with some techniques to help organize this huge work load increase—as well as a whole new world for me. To make a long story short, I was able to combine work planning, crew hiring, production rates, survey and design standards, equipment assignments, and budget into a process readily adopted by crew leaders and party chiefs so that there was little lost work and maximum delegation. This saved my bacon.

The job of Fire Service Chief fell my lot, and with the experienced Engineering crew, we serviced a number of large fires on the Lassen and throughout Region 5.

The use of the computer for road design was in its infancy, and we had some progressive technicians who, with the above leadership of Russ Schwultz, Chuck Paletti, and Jim Mattizzi, took advantage of this new tool to keep ahead of our exploding work load.

The Lassen was very centralized for Engineering. We ran almost everything out of the Supervisors Office. The Lassen and Klamath were by far the most efficient Engineering organizations in Region 5, not only from the standpoint of unit cost, but had the least lost work. Quality was high.

When I came to the Lassen, the Northern California County Supervisors were a powerful force, fighting high road standards. The more spent on roads out of stumpage, the less 25 percent funds they received. Their complaining stopped when purchaser credits were treated as income for

25-percent fund calculations. We fought the battle of "prudent purchaser" roads and used the concept of prudent landowner roads. Because we had high-value timber and generally packaged large volumes in our sales, we were able to finance the standards needed for multiple use without much supplementation. The timber industry continued to fight the construction requirements primarily because we were not allowing enough for them to subcontract to road builders. This situation was changed when we started using contract unit cost for estimating.

One mistake we made in designing the large campgrounds on the south shore of Eagle Lake was to assume the lake level would not rise above a certain level because there was a tunnel that would regulate the level, and it had not been above the level for many years. We built the campground and large parking areas, and the lake started to rise.

As Clair Hill, part owner and founder of CH₂M Hill, told me during a job he was doing for us, "The Forest Service puts too much responsibility on its Engineers before they are ready." He was right, and it sure was exciting. I don't think we made too many serious mistakes with the young, eager crew we had.

1965

Webb Kennedy and Clayton Sykes called me the day my daughter was born and offered me a job in Ogden, Utah. I told them I had too much work left to do and declined.

1966

I was asked to go to the Shasta-Trinity as Forest Engineer. We went to Redding and looked around and decided the Lassen and Susanville were too good to leave.

I spent a long detail to the Six Rivers to help on the repair of the Columbus Day storm of 1964.

1967

Max Peterson worked his magic on me, and I agreed to take a new job he established to recruit and develop Engineering talent in Region 5. Max had done the research and produced the report "Use of Engineers in the Forest Service." This job was a product of that report and would help implement other recommendations.

We debated long and hard about leaving Susanville and the Forest-level organization. I finally concluded that too many people who stayed in the same job too long, especially in their latter years, wound up being bitter or unsatisfied. I didn't want this to happen.

We spent 4 1/2 wonderful years on the Lassen and in Susanville, and all left with tears in 1967 as we transferred to San Francisco, a place I vowed to never work.

We moved to Walnut Creek, a suburb of San Francisco, and the Regional Office in September.

This new job was quite a change. After 3 or 4 weeks, I had a more relaxed feeling and realized that I was no longer on-call 24 hours a day or had 150 people reporting to me with all the attendant concerns.

I became involved in two significant projects that helped change the course of management for the Forest Service—developing a Transportation Planning Model and the Visual Resource Model. I'll describe further in another section.

My new job included recruitment, and I soon had direct hire authority from the Civil Service Commission for GS-5 and GS-7—could walk on campus, interview, evaluate, and hire on the spot.

I also designed and conducted Region 5's first 2-week Engineer's orientation at Twain Harte on the Stanislaus National Forest. Our lodging was at the same location that Kim Novak stayed while filming a movie a month earlier. I arranged to reserve her room so I could say I slept in Kim Novak's bed.

1969

In July, we moved to Washington, D.C., to the job of Information and Data Retrieval, training, employee development, and a myriad of other things (GS-14); this job allowed me to get involved in my activities across functional lines.

With the big layoff of engineers at Boeing in Seattle, I worked with the Department of Labor in a special retraining program where we recruited and trained a number of engineers who came to the Forest Service.

We piggybacked on large existing engineering data bases and made this service available to the Forest Service. We started *Field Notes*, the in-house Engineering newsletter.

In 1971, I was offered the job of heading up Engineering Research. I wanted to be a Regional Engineer, so I turned it down.

I helped revitalize the full-time advanced engineering training at the University of Washington and at Berkeley.

During my Washington Office tour, two events occurred that had substantial effects on the Forest Service: Earth Day and the passage of the National Environmental Policy Act.

1972

In August, we moved to Missoula, Montana, as Regional Engineer. The Regional Forester, Steve Yurich, had set out to reduce the Regional Office from about 600 employees to about 250 (he used to say to 50). Needless to say, employees were shook up. His method for determining the remaining number was to have each staff director propose a reduced organization that gained the consensus of the rest of the staff directors. Since I was the newest kid on the block, my turn in the barrel was last. This exercise went on for about a year and was further compounded by the Nixon Administration's plan to establish ten standard Federal Regions, which would have eliminated the Missoula Regional Office and the Chief's direction to

reorganize each Regional Office and establish three Deputy Regional Foresters—a move directly opposite the Regional Forester's objectives.

Some staff directors did not serve the Regional Forester well since they offered unrealistic and unworkable proposals—a 50-percent cut in their organization—a percentage that came to be synonymous with “being on the team.”

When my turn came, I told the Regional Forester I was going to justify my organizational proposal to him—he was my boss—and not the staff directors. I directed all my remarks to him over a 2-day period. The central thrust of my argument was that the Regional Forester had certain duties and responsibilities that he could not ignore—many that he could not redelegate. It took a certain-sized organization to redeem these responsibilities, and until he and I were relieved of these, the organization I was proposing was the minimum. My organization was approved with only minor cuts and a phase-in period for those. Some staff directors told me later they wished they had used my approach. Lots of people and programs were hurt by this exercise. The exercise got caught up in the ten standard Region fight and other internal politics and never ran its complete course.

We actually outplaced a number of people to other Regions, anticipating the closure of the Regional Office. I was offered the Regional Engineer job in Region 6 but declined. I would take my chances in Region 1, even with the risk of closure. That was a good decision.

My education on road cost-share agreements was enhanced as we dealt with Burlington Northern. They were getting the best part of the deal based on the national rules for determining shares. We made some progress in getting more equity but didn't completely succeed.

The sudden move to establish three Deputy Regional Foresters at each Regional Office—National Forest System, State and Private, and Administration—was to help stave off efforts to combine the Forest Service into Interior or a new Department of Natural Resources. The Forest Service wanted more support from the Association of State Foresters. A national task force had proposed a much more streamlined Regional organization. This was rejected by the Chief, and he chose to expand the number of staff directors substantially at the Regional level. This was quite a rebuke to what was going on in Region 1, and the leadership lost credibility. I'm not sure what my contributions were during these turbulent two years—maybe to lend stability to a hard-working Engineering force and revitalize certain areas, such as the purchaser credit road program.

Steve and I worked well together, and I later realized I served his interest best by doing it my way—after all, that's my job. To do my job with the boss calling every move is not doing my job. One needs to know the difference between what the boss asks for and what's in the boss' best interest.

1974

I was surprised to get a job offer to go to Region 4 as Deputy Regional Forester in April of 1974. I had thought the Regional Engineer job would be mine for the rest of my career. I had not even contemplated a move out of Engineering. I had no idea where this path would take, but I did

remember Bill Nichols telling me back in 1960 that Ogden, Utah, was paradise and the place to be with the Forest Service. He was right in many ways. It took three moves across the country and 14 years to get there from the time Bill told me.

Region 4 was the most balanced Region in terms of the various programs. No single resource program dominated, although minerals came close during the energy and mineral crisis of 1975-78.

Vern Hamre was a good boss and gave me lots of room to make mistakes. He had a good land ethic and would not compromise the resources for short-term gain.

I'll discuss my transition from Engineering to line management in another section.

Some major accomplishments during my 8 years as Deputy Regional Forester and Regional Forester:

- (1) Implemented the Sawtooth National Recreation Area legislation and developed regulations that withstood challenges all the way to the Supreme Court.
- (2) Determined future skill needs, recruited over 600 graduates of all disciplines, and conducted regional professional orientation courses.
- (3) Reduced a large backlog of oil and gas lease applications to near zero in the overthrust belt and brought environmentalists and oil and gas folks together, resulting in reduced conflict.
- (4) Served on the Governor of Utah's Power Plan Siting Task Force and successfully sited the free world's largest coal-fired plant at Delta, Utah. Two expensive siting efforts, spanning 8 years, had previously failed—Kaparaitis and Salt Wash.
- (5) Successfully sited a number of coal, gold, and other hard rock mines, such as Jarett Canyon, Thompson Creek, Borealis, Battle Mountain, phosphate, and coal, most requiring environmental statements and representing several billion dollars of capital investment.
- (6) Conducted a major bug-killed timber salvage and roading program on the Targhee National Forest.
- (7) Managed through several major disasters, such as the Manti landslide (second largest in United States), the Teton Dam failure, 105 MM shell impact into a private home, three Forest Service or leased airplane crashes, and the first major prescribed natural fire escape under the new fire policy.
- (8) Wrote the management plan and EIS for the Frank Church River of No Return Wilderness.
- (9) Initiated a silvicultural certification program in Region 4 with Utah State providing on-campus instruction.

- (10) Pushed through Federal legislation authorizing the Forest Service to accept over 50,000 acres of private land as settlement for Federal inheritance taxes (Redfield property near Reno).
- (11) Served on the national task force to determine management and computer needs for the Forest Service. This led to the development of the current Data General system.
- (12) Served on the national negotiating team for the first national union contract.
- (13) Developed and initiated a management improvement program (ME 80) aimed at upgrading the abilities of the Region 4 Rangers.

1980

Dick Worthington retired in Region 6, and I was offered the Regional Forester job. I had the support of industry, the environmentalists, and John Crowell, Assistant Secretary. My challenge was clear—Mt. St. Helens had just erupted, land management planning was just getting started, the timber industry was headed into a depression (holding huge volumes of timber under contract at record high stumpage prices), old growth and spotted owls were starting to be hotly debated, battle lines over wilderness areas had been drawn, budgets were being reduced, legislation to set aside a large area for the Mt. St. Helens monument was being formulated, and pressure was mounting to create a Columbia Gorge National Park.

Who would want to go to Region 6 with all this on the platter? My 8 years of experience in Region 4 paid off in that I didn't have to learn the internal workings of a Regional organization. I could hit the ground running as far as making internal decisions was concerned.

One of the first things I did was to implement weekly staff meetings with the notes immediately available to the rest of the organization. I used these notes as the major communications with all employees in Region 6. I personally prepared the notes for the first 6 months.

Within a few months, I redistributed the work load between the Deputies, split the budget job into two, eliminated several staff director jobs, and implemented a number of cost-cutting measures. The Regional Office had been growing at a rate much faster than the rest of the Region, and the course I set was to reduce spending and keep the Regional Office growth, if any, at a rate no faster than field units.

One immediate problem was how to get in charge of the land management planning. Forests were going their own way, and the regional industry watchdog planning group was watching and challenging everything we did. They were finding lots of differences between Forests on identical issues. My chance for change came with the *California v. Block* decision in the 9th Circuit Court decision on RARE II. The Service now had to redefine how decisions about roadless areas would be made. I immediately called a halt to all Region 6 planning (I called it a pause), got a new planning director, and directed the Forest Supervisors that they were staff to me as far as LMP's were concerned since I had to sign all plans and could not tolerate

differences on identical problems on two or more Forests without a justification I agreed to.

I started frequent meetings with the Supervisors and their planners to accomplish the degree of uniformity in definitions, processes, and procedures needed for success. I also agreed on the places I would sign off on their work. National direction wasn't very complete, and many questions had not even been asked until the Region 6 plans got under way. I tried to bring industry and environmentalists along on such basic matters as definitions, how to construct yield tables, suitability mapping, etc. The industry representatives would go straight to Washington (John Crowell) if they didn't like what we were doing or what they suspected we were doing. Ralph Pinake wrote me several threatening letters—Ralph was Chairman of the Region 6 Industry Planning Steering Group and also Vice-President of Boise Cascade. I told Ralph how shortsighted he was to press some of his points so hard. I was determined to produce plans that put multiple use in every Region 6 Forest. Also, it was clear to me after a couple of years of looking at the data and the NFMA requirements that the sale level in Region 6 would have to be lowered. I went public after the first five Forests reached the AMS point, and talked about the decision space available in timber, historic offer level, NFMA requirements, and implications for the future sale levels. I wanted the public to start thinking in those terms so a public discussion would ensue for a couple of years before I had to make the final decision on the individual plan. Both industry and the environmentalists thought they could get a bigger piece of the pie, so neither wanted to talk at this time.

The spotted owl treatment in our Regional Guide was appealed to the Secretary by both industry and the environmentalists. The Secretary remanded the Regional Guide with instructions to see if a reasonable settlement could be reached and, if not, prepare a supplemental EIS. No agreement could be found, so an SEIS was prepared and signed by the Chief in December 1988, about 4 years after the remand.

I could go on for pages describing the numerous issues that occupied my attention during my 4 years in Region 6. I'll just numerate a few:

- (1) Readjusting our sale program in 1982-83 so industry could operate sales based on current market conditions and the 25-percent funds to counties would not dry up.
- (2) Tremendous inputting into the legislative effort for timber sale contract relief (i.e., buyback).
- (3) Working with Senator Hatfield (Tom Imason) in reaching a politically viable Oregon Wilderness bill. Also, working a lot with key members of the Washington delegation.
- (4) Trying to resolve the Mapleton lawsuit.
- (5) Dealing with the suspended use of herbicides and associated lawsuit.
- (6) Removing 600 MMBF of downed timber in the Mt. St. Helens area outside the monument boundaries.

- (7) Exchanging out the private and State land inside the monument.
- (8) Siting the monument visitor center and securing the \$5 million to construct. (John Crowell had said we shouldn't need over \$120,000 or equivalent of a three-bedroom house.)
- (9) Emergency pumping of Spirit Lake to reduce the threat of flooding of Kelso and Longview and the mass condemnation of 106 lot owners.
- (10) Finding substitute lots on the Olympic and Wenatchee National Forests for some of the 106 displaced owners.
- (11) Working with the Corps of Engineers to construct a tunnel to regulate Spirit Lake level.
- (12) Developing a management plan for Mt. St. Helens.
- (13) Dealing with a massive blowdown of timber in the Bull Run Watershed.
- (14) Constructing the Bald Mountain road and dealing with the protesters.
- (15) Dealing with tree sitters and protesters concerning old growth and roadless areas.
- (16) Having my office occupied by Earth First demonstrators.
- (17) Coordinating the challenge to the Early Winters ski area decision, which we won in the Supreme Court 9 to 0.
- (18) Trying to organize the debate in the Columbia Gorge so the citizens and leaders could help shape certain legislation. I was later active in the legislative process in Washington, which resulted in the establishment of a unique arrangement for the National Scenic Area.
- (19) Handling the timber buyback and subsequent spinoff of 1,000 Region 6 employees.
- (20) Coordinating the BLM/Forest Service interchange proposal and the cooperative planning of the two agencies, which could have been very contentious.
- (21) Participating on the Oregon Board of Forestry, the Oregon State Research Advisory Board, and the University of Washington visiting committee.
- (22) Substantially increasing the number and grade level of women and minorities.
- (23) Establishing good relations with Indian tribal leaders and with the U.S. Park Service.
- (24) Settling a 20-year dispute with the City of Tacoma concerning the Cedar River Watershed.

(25) Team building for the Regional Office staff and Supervisors.

1985

Max had been twisting my arm to come to Washington for several months, so in June, while at the World Forestry Congress in Mexico City, he announced I would move to the Deputy Chief for Programs and Legislation in September. I looked forward to the change since I had been in Regional administration for 12 years. I moved in to find an experienced, talented, and hard-working group in P&L. My staff has kept me afloat while learning the ways of Washington.

When we get an Assistant Secretary, it will be the fourth to occupy the chair since I have come to D.C. Educating new people is a constant part of a C&S job—one of the most important.

I'll continue this part some day as the trail gets colder and the memories of those involved gets dimmer.

1987

Received the Presidential Rank Award.

1988

Attended J.F. Kennedy School of Government at Harvard—3 weeks.

Significant Engineering Efforts Over the Last 30 Years

Probably the most significant and lasting contribution the engineering profession made specifically for the Forest Service by Forest Service Engineers was to develop a rational procedure (model) for transportation planning. As we began to rapidly expand our transportation system in the early 1960's, the professional had no tools that fit the needs of the Forest Service. The techniques taught in college fit the needs of Federal and State highway departments—not large *landowners* or land-managing agencies.

Forest Service Engineers saw this need and went to the leading academicians at the University of California—Stanford and San Jose State to form a consortium with Forest Service Engineers and started from scratch to design a rational planning process. This was the genesis of land management planning as we know it today. The ultimate questions the Engineers ran up against were: what do you want to do on this land?, when?, how fast?, how much?, by whom?, and how do you want the resources protected?

There is one other example where a profession went back to the basics to develop a tool specifically to serve the needs of the Forest Service. The profession of landscape architect, which had no tools for scenic resource management of mountain range scale scenic planning, combined with Forest Service Research and practitioners and developed a process for inventory analysis and classification of the kinds of scenarios we deal with.

Forest Service Engineers also pioneered and perfected low-volume road design and construction standards and techniques. There are particular problems unique to low-volume, low-standard roads not addressed in traditional highway design college courses. Our Engineers are leaders in this area.

A lot of credit for allowing Engineering to play a prominent role in the development of the infrastructure and providing services to a high standard must go to the top line and Engineering leadership. Without the backing and support from top line officers at the national level and the vision of top Engineering managers through the late 1950's and 1960's, when national standards and policy were being set, the Forest Service would not have the quality of facilities and Engineering services it has today.

I'm sure in my own mind that costly compromises to quality would have been made at the Forest and District levels.

One of the reasons Engineering started out in the 1950's with a position of strength in top circles was that it laid claim to the FR&T appropriation line item. To do this and have a degree of outside support at appropriations time, whether it be professional or trade, gives a function a powerful edge.

The strong centralized control was needed and was maintained through a system of inspections and reporting through the late 1960's and mid-1970's. Engineering standards and the process of making decisions had progressed so that some relaxation could occur. The overall Forest Service management, including Engineering, had matured to the point that good engineering decisions were being made and accepted, particularly at the Forest level. NEPA facilitated this maturing.

The Change From Engineering to Line

I've been asked about this many times by Engineers and non-Engineers as well. From the standpoint of using the basic functions of management (i.e., planning, organizing, staffing, budgeting, controlling, and reporting), there wasn't much change except I didn't have to do the nuts and bolts apart; nevertheless, I had to perform the same functions.

Having run large organizations with line responsibility within the Engineering organization prepared me well for overall line management. Also, since Engineers have to work with all disciplines from the day they enter the Forest Service and have to understand the customers' needs, I had a pretty good appreciation for the various resource and administrative requirements. Most of this understanding had been gained by osmosis and word of mouth, and I had never gone back to ground zero in the resource areas and tried to justify their policies and procedures. In my new job as Deputy Regional Forester in 1974, I felt I had to understand why the policies and procedures existed and if they were still appropriate for today and the near future.

My first year in line was a lot of hard work and a very steep learning curve. I also discovered a good understanding of why things were the way they were in their own area of expertise.

My first step was to clarify the roles of each staff director and make sure we had a common understanding. Then I examined and/or helped develop work plans to fulfill those roles.

The generic roles were policy formulation, analysis, and execution; program formulation, execution, and evaluation; accountability; technology assessment; and training. This became the basis for performance evaluation not only for the director but other key staff in the director's area. In addition to being

the basis for work planning, it helped me separate the work that should go on at a Regional level from that at the Forest level. The Supervisors liked that—it got some Regional people out of their hair since some employees who transferred to the Regional Office brought Forest-level work with them.

After about a year, the job got to be fun again. There are a lot more perks that come along with line jobs than I had experienced in Engineering.

Another big change was the dealing with many more politicians and policy-level officials at the county, State, and Federal levels. This automatically involved more interaction with the press and news media. I had to think more about the political implications of proposed actions and decisions. I also had to deal with more corporate executives.

It didn't take long to realize that one of my main products was decisions. An organization runs on decisions—if there are none, it doesn't run. I tried to make sure proposals or situations were presented in a way to facilitate a decision and followup action. Also, in the process of making decisions, I tried to get enough ownership by those who would have to carry them out so that chances for success were improved.

My Forest Service Career

Floyd E. Curfman, P.E.

My Forest Service career really started in an engineering management class at the University of Missouri, Columbia. One of the class assignments was to write a 10,000-word paper and give a 10-minute speech to the class on the advantages of a selected organization for an engineering career. I had been doing research for about a week and was about to select a major oil company.

The "career start" day began with Professor Harry Rubey introducing two Forest Service Forest Engineers to the class. Professor Rubey explained that he was bending the rules to permit the two Forest Engineers, who were on campus recruiting, to talk to the class. He explained that he liked the Forest Service as an organization and was giving the two Engineers the rare opportunity to recruit from the class. He did emphasize that their talk to the class would be to explain what Engineers did in the Forest Service. (Until then, I had never heard of the Forest Service and didn't even know that there were two National Forests in Missouri at that time. I had traveled in National Forests and National Parks in the Western States and thought that the goals of both organizations were to grow trees as tall and as large in diameter as possible.)

Immediately, I concluded that if Professor Rubey was willing to bend the rules for the Forest Service, then it should be a good organization to write about to get a good grade. Professor Rubey explained to the class that the two Engineers had been on campus all morning and not one engineer had come to interview with them. He further explained that he felt sorry for them plus some engineers who might be missing out on a challenging career. The older Engineer was Glenn Eierman from the National Forests in Missouri and the young one was Max Peterson from the San Bernardino National Forest in California. When they explained Engineering in the Forest Service to the class and told about the literature they had down in the recruiting room, I decided that I might shift my class paper and speech to the Forest Service. I went to talk to the Forest Service Engineers after class to get all the available literature.

The literature turned out to be a single brochure and, in my opinion, was a real "turn off." I was not comfortable with an organization that thought a picture of a transit on the cover of the recruiting brochure would motivate engineers to join the organization. However, as I talked to the two Engineers, I determined that the Forest Service sounded attractive to write and talk about from a career standpoint. I developed a plan to get the information I needed for the class project and in the right format. I was determined

to take advantage of the soft spot, for the Forest Service, in the heart of Professor Rubey.

I selected Regions 9 and 5, the Washington Office, the San Bernardino, and the National Forests in Missouri to obtain information. Region 5 was selected as that was the Region Max represented, and he said that it was the largest and best in the Forest Service from an Engineering standpoint. Of course, Glenn countered that Region 9 was just as challenging, although the amount of Engineering work was smaller. Glenn also commented that a new Engineer working in Region 9 would probably get more diversified experiences than a new Engineer would in a larger Region such as Region 5. Region 9 was selected, as that was the Region that contained Missouri. I debated with myself whether to include both Regions for information and decided that it would give me some data to compare. I developed and sent blank charts and other specific questions for each unit to supply data and answers that would make my paper easier to write along with convincing information.

As it turned out, there was no data duplication. The Regional Office in Region 5 responded that they were too busy to put their ongoing work aside to provide me the information as requested. The letter was signed by Regional Engineer Webb Kennedy. Region 9 responded with a letter from the Assistant Regional Forester for Personnel, providing answers to a few of the questions but very little useful information. The San Bernardino and the National Forests in Missouri sent me acknowledgment letters, but I never did receive the promised information.

Needless to say, I became pretty well turned off by the Forest Service. Then, when I had just about given up getting a reply from the Washington Office and using the Forest Service as a subject, I received the Washington Office reply that turned my life around. The response provided all the information I requested and more. (I became so interested that I even submitted an application. Of course, I convinced myself that I was only doing it for experience plus looking at a possible alternative. I had no intention whatsoever of working for the Forest Service at that point.) I later found out that it was due to the personal efforts of Paul Brown in the Washington Office that its reply was so good. (He visited the Forest a few years later, and I was able to thank him in person for his efforts and to show him some of the exciting things that we were doing on the Forest.) After receiving an excellent grade for content and enthusiasm in the class assignments, I soon started questioning whether to proceed with plans to go back to my previous employer. To get a better idea of what I would be doing in the Forest Service, I went to the Shawnee National Forest and spent a day with Forest Engineer Joe Hollingsworth to review what I would be doing if I accepted the Region 9 offer of employment, which included the Shawnee as one of four locations I could accept. He did an excellent job of explaining the work to me and took me to the field for an afternoon of reviewing typical Forest Service projects. With all honesty, I can say that it was due to my wife that I accepted the Forest Service job instead of another that paid considerably more than twice the Forest Service amount to start plus a promised schedule of substantial raises. My wife convinced me that, with my enthusiasm for the Forest Service and the expected future salary increases, our family could get along okay—if that was what I desired.

In June 1958, I graduated with an engineering degree. As soon as I could get there, I started out on the Shawnee National Forest in Illinois, which also administered four Ranger Districts in Missouri. With headquarters in Illinois and most of our work in Missouri, I was on the road a lot. As I look back, I am sure that had I not firmly believed in the National Forest management practices, I might have had a problem with a work schedule that seemed to demand about 60 hours each week to carry out a shorthanded Engineering program. My ultimate goal—getting a Forest Engineer job—was a good motivator.

That goal came quicker than I expected. Although I had been Acting Forest Engineer for nearly a year, my big day came in January 1961, when I was officially appointed and promoted to Forest Engineer (GS-11) of the Shawnee National Forest. Although it was never verified that I know of, I was told at the time that becoming a Forest Engineer in 2 1/2 years out of college was a Forest Service first. I am sure that my prior railroad bridge construction foreman experience was a factor. I was then and still am very appreciative of the confidence Regional Engineer Malcolm Arthur and Forest Supervisor Paul St. Amant expressed by selecting me for the job. While I was Acting Forest Engineer for most of the previous year (1960), I decided that I would develop a set of gates for my management decisions. I determined that any significant decision would meet four gates, or I would seek another alternative. The gates were (1) Is it legal?, (2) Is it ethical/professional?, (3) Is it morally right?, and (4) Is it the "right" thing to do, considering all available information, including economics and resource management goals? In looking back, I am proud that I was able to stick to those gates.

My first Engineering job on the Shawnee was very simple from an engineering standpoint but very complex from an organizational standpoint. The job involved laying out and building a combination campground and picnic ground from scratch. A new recreation development emphasis program was just getting under way in the Region, and updated handbooks and manual supplements had not been developed. We certainly had a lot of interest from Forest and Regional people, as the project was among the first recreation construction projects to be constructed by Region 9 in many years. Recreation development in the National Forests was just beginning to be emphasized. The project was complex, too, in that a contour map that had been contracted was inaccurate and required design changes in the campsites, roads, and facilities. Recreation area designs at that time could more appropriately be called sketches. Requested changes were many, and when our Forest and Regional Recreational staff people would see the plans staked on the ground, there always seemed to be more requested changes. Some of the changes were minor but seemed to be very important to the reviewing person at the time. One example was a road curve that had to have the radius changed by 1.2 feet. (Perhaps the field change took care of it during construction.) The only person I remember who looked over the on-the-ground staking and didn't ask for changes was Forest Supervisor Paul St. Amant. The best part that came out of this was the analysis of problems and the writing of Regional and Forest manual and handbook material, which built on our efforts and made future work in the Region and the Forest Service more efficient. Writing (and rewriting, mostly on my own time) was good experience.

To include an item for our good roads advocates, I recall an assignment during my first year to try to get a road right-of-way (ROW). (Engineering staff obtained road rights-of-way in those days.) The landowner had previously refused to give or sell the ROW. He had the reputation of being disagreeable, ornery, and ill-tempered. The word was out that the Forest Service would never get the ROW. I must admit that I went to his house with an uneasy feeling. It helped, though, that the Forest Engineer had told me he wanted me to have the experience but didn't really expect me to get the ROW. After I arrived at the landowner's house, we talked about a lot of things in general. The conversation shifted to the road by his house, which the Forest Service maintained. He had knowledge and some stories to tell about the roads that the CCC program had constructed and reconstructed. He also told me how it was necessary to use creekbeds for roads in the early days before roads. Of course, use was limited to dry seasons. One trip that stood out in his mind was when they cleared out and leveled a creekbed, when he was just a boy, to use as the wagon road to get his mother to a cemetery when she died. Just when I was about to bring up the ROW subject, out of the blue he told me that if I happened to have the ROW in the car, he would sign it. Although I felt good at the time, I felt even better presenting the paper at the office the next morning.

Because Chief Max Peterson and I are both retired, I recall another item of interest that relates to public relations. We received a letter in the Supervisor's Office from a Mr. Ralph Peterson, who just happened to be Max's father, who lived on a farm in Missouri mingled in with the National Forest land on one of our Districts. Ralph was also a road commissioner. He wrote to us, as the Shawnee National Forest also had administrative responsibility for four Ranger Districts in Missouri. Our Forest had a policy that any time we received a letter of concern from anyone within or adjacent to the Forest, one of our Supervisor's Office staff would meet with the individual and make sure that there was a full understanding of the problem and whether we could or could not help solve it. I was of the opinion, at the time, that the letter was written by Max, or he helped with the wording. (Max convinced me later that he wasn't involved.)

My meeting with Max's father went very well. Although we couldn't help him with road maintenance, I became well-acquainted with him and later stopped to visit on occasion. He was very proud of Max and always had a story or two he wanted to tell. Some of the stories involved Max when he was a youngster. I never did share any of the stories with Max, but some day we may be able to sit down and talk about them. (Boys will be boys.) I can assure you that Max showed initiative and was aggressive in getting things done even as a youngster. (Max and I would later be Regional Engineers at the same time, but I was determined not to discuss the stories with him or anyone else while he and I worked for the Forest Service.)

When I was promoted and transferred to the Clark National Forest in 1962, I was told that there were two things that just couldn't be done. One was to get the State of Missouri to show the National Forests on their State maps (they considered it advertising), and the other was to get a new bridge at Slabtown. Through my efforts with the State Highway Engineers, both were accomplished.

The bridge at Slabtown was interesting. The Forest Service maintained a road up to the bridge from one side, and the State of Missouri maintained a highway up to the bridge from the other side. The bridge itself was supposed to be on the county maintenance system, although they did not have any roads leading to the bridge. They had the bridge by default but, of course, refused to recognize any responsibility or to spend any money on it. The bridge was in urgent need of replacement, which explained why no one would claim any responsibility.

I always liked it when Regional Office people came to the Forest. They always seemed to have additional insights into how things got financed and done. I learned early to always budget additional high-priority survey and design work for the Forest, even though the work might not have received the highest Regional priority. The Forest Supervisor was always complimentary and thrilled when our projects were ready at the end of the year and were funded with yearend money from the Regional Office that was originally planned for projects on other Forests that would not have plans completed in time to meet contracting deadlines. These yearend funds were usually significant in size, so our administrative officer often would recalculate the overhead assessment. This made everyone on the Forest especially happy and supportive of Engineering, as it provided some give-back funds to other staffs and the Districts. Everyone on the Forest was appreciative and fully supported our Engineering efforts. I considered it a very high compliment when one day during the accelerated public works program, the adjacent Forest Supervisor, Henry DeBruin, told me that he wished that he had me as his Forest Engineer so that his Forest could have been considered the leader in the program instead of our Forest. Of all the people that I have known and worked with over the years in the Forest Service, it is my opinion that DeBruin had the highest energy level. Jay Cravens is a real close second. Jay was always supportive of Engineering activities and is more personable and sensitive to people than any other person I have known in the Forest Service.

My assignment went so fast on the Clark National Forest that it seemed I had little more than arrived when the Regional Office asked me to transfer to the Region 9 Regional Office as Road Construction Engineer. When I moved from the Clark, I did so with the thought that I was probably leaving the best job that I would ever have in the Forest Service and the one that I had set at the start of my career as my ultimate goal. I felt strongly, however, that an organization should be able to move employees where they can best serve its interests. So off I went to the Region 9 Regional Office.

My Road Construction Engineer assignment was a good one and really interesting. It gave me an opportunity to travel to all the National Forests in the Region and get acquainted with many management styles. Consider New England, the Lake States, and the Ozarks and Appalachian areas; it is my opinion that the Region was similar to three Regions in one. Our road program was building in the Region, and we were shifting rapidly from force account to contract construction. The job required me to make lots of final inspections for road and bridge construction projects. One unusual but interesting final inspection specifically comes to mind. It was an experience I had while making a final inspection of a recreation campground road.

As we entered the construction area, we observed Forest Service people completing the work on the project. It became very sensitive, as the contract did not include the Forest Service doing any of the work. To make a long story short, the problem developed because the Forest Engineer had released the contractor's equipment and agreed the project was complete during a telephone conversation with the contractor. The project was later inspected by the Forest Engineer and determined to be incomplete. To get the job finished, an unwritten "deal" had been made whereby the contractor would return the equipment to the site and the Forest Service would provide the labor using force account crews. The Forest Engineer had expected the project would be completed and the crew would be out of the area the day before our inspection, but it took longer than expected.

After writing up the facts and getting the appropriate Regional Office people involved in what was to be done, the Forest Supervisor and Forest Engineer were required to make a followup report. It was interesting and educational to me that the problem was settled by personnel from contracting, fiscal, and engineering getting together and carefully selecting and writing statements. They concluded that it was a judgment problem and administratively acceptable in that exceptional special case situation, considering how the problem developed and how it was resolved. Everyone seemed to be a winner in the situation. (I was commended for acknowledging and doing a good job writing up the sensitive problem as it existed, and the Forest was commended for solving a sensitive contracting problem in the best interest of the government while learning more about the fiscal and administrative parts of contract administration.) The final product on the ground was a good job.

While I am thinking about this Regional Office assignment, I think that it is appropriate to point out that the Regional Forester during this time was George James. George was recognized throughout the Forest Service as being very sensitive to its role in serving the public and providing information to the public. He had made it his career and was outstanding at his job. He recognized the value of Engineering projects in explaining and showing how the National Forests served the public's interests. It was not generally known, however, that George was a graduate engineer. (His specific Forest Service assignments were all in other than Engineering.)

As my superiors talked more and more about me getting a promotion and perhaps becoming a future Roads and Trails Branch Chief somewhere in the Forest Service, Regional Engineer Don Turner apparently became concerned about the delay and put me in as Acting Branch Chief for dams, water and sanitation systems. It was a new challenge but lasted only about a year. The Washington Office refused to permit me to be promoted to the job and held tight that I needed to go to the Washington Office or another Region for additional experience. It was the Regional Office versus the Washington Office, with the Washington Office finally winning. Just when it looked as if I had my choice of four vacant jobs, I was formally asked by letter to accept a promotion to the Washington Office. It wasn't clear from discussions whether I could turn it down and go to a vacant Roads and Trails Branch Chief job in Region 4 (my revised goal). I decided to take the offer and head to the Washington Office.

I feel that I was very fortunate to work for and be influenced by two extra-high-quality Regional Engineers, Mal Arthur and Don Turner. Arthur was a

true professional, who was always striving for and demanding Engineering excellence and would not accept less. I worked for Don Turner longer and was often impressed with his sensitivity to people and his ability to explain complex engineering problems in an understandable way to nonengineering people. An example of this took place one noon hour over lunch. A non-engineer asked him what Polaris meant and how it was used in surveying. With the help of a pencil and paper napkin, Don proceeded to illustrate how it was used and to explain it in very simple language. He made it easy to understand—in little more than 5 minutes. I was really impressed. He would have made a good professor.

One of my first Washington Office assignments was to impress me very much. I was working as an assistant to Mike Howlett, who would later become Assistant Director and Director of Engineering. One morning about 10:30, I had a call from Associate Deputy Chief Dick Droege. A delegation from a county was coming that very afternoon to meet with Chief Cliff at 2:00. Because Howlett was not in the office that day, I was to prepare a 1-page briefing paper to cover anything and everything the county might want to talk about and have it to Droege at 1:30 p.m. We expected to meet with the Chief for a briefing soon after I discussed the report with Droege. I called the Region immediately to get the information and tried to impress upon them to work fast, as the information was needed quickly.

When time kept running and the Region still did not have information to provide me, I started getting concerned. With time zones and lunch hours to deal with, I started getting desperate. My followup calls to the Region were efforts to get any information at all that we could start putting together. Responses were that "we don't have anything yet," but, "we are doing our best and as fast as we can." It was a relief when a call came back about 12:30 p.m. I knew that I didn't have time to write anything out for typing, so I used the notes to dictate what was expected to be 1 page to my secretary. (Remember the good old days when secretaries could take shorthand?) At 1:15 p.m., with typing still under way, a cab was ordered to go from Rosslyn to the South Agriculture Building. The 1-page report was handed to me without any proofreading as I headed to the cab to meet the time constraint. I was determined to meet the time constraint and accept whatever quality the report had developed. As I read the report in the cab, I was pleasantly surprised. My secretary had helped reword the information, and the format was good. It was an excellent job, and I was pleased. As I walked into Droege's office 2 minutes ahead of the 1:30 p.m. appointment time, he informed me that the delegation had arrived early and that they were just going into the Chief's office. Also, there would be no time for report information review. Droege took the paper from my hand and said, "Come along, and we will take this to the Chief. You need to be there in case there are questions." While I was being introduced to the delegation, Droege put the paper on the desk in front of the Chief. Chief Cliff read/scanned the report while he slowly filled and lit his pipe. From that time on, he never looked at the report again. He discussed the problems with the delegation with much knowledge, concern, and understanding. I am sure that the County Delegation thought that the Chief had been and would continue helping the local folks with all that could be done within laws, regulations, and policies. I was very impressed. The Chief had done an excellent job, and I had witnessed a public relations session that would help me in later years. Trust and teamwork had been severely tested and was a

success. The exercise was a great learning experience for me. I was to find out later that the Washington Office revolves around crises with very short timeframes. (That was more the rule than the exception.)

It was a happy day when I received word that I had been appointed Regional Engineer of Region 9. The plan had been for me to go to another Region, but a problem developed when the Regional Engineer there decided not to move. My family and I were disappointed that we were not going to the expected new location. Although I often joked that I expected to be Regional Engineer of Region 9 longer than Mal Arthur, I expected the Region 9 assignment to be an interim one. (I never thought about it until now, but I wonder if anyone had previously been appointed to a Regional Engineer position by the time they were out of engineering school 12 years.)

As I influenced Region 9 Engineering to develop a frontline, get-involved-as-early-as-possible approach to resource management, I became aware of how appreciative the Regional Forester was of these efforts. With my new job, I found that doing the right thing for Engineering and Resource Management for the National Forests through my gates was no special problem. It was the correct way. I still am amused at times when I recall some in-service meetings. It was interesting to see expressions when, introduced as the Regional Engineer, I would tell them that my real title was Resource Manager. There were very few important resource management decisions that Engineering was not involved in. It was always my view, although I was always careful about its expression, that Engineering often made more sensitive resource management decisions indirectly than Resource Management people made directly. I made sure that all our Engineering staff throughout the Region were sensitive that they were hired to use their technical expertise as part of a team to further resource management and to be eagerly involved. To hear some of my comments, advice, and training echoed years later is a great feeling. Many small and large projects were completed, but I am most proud of the people that made up the Engineering organization throughout the Region.

I mentioned earlier that I expected my Region 9 assignment to be an interim one. There are probably three of the potential jobs that should be reviewed in this regard so that my 14 years as Regional Engineer aren't considered "interim." One developed as an informal telephone discussion, in which I was casually asked, near the end of the conversation about other matters, how I would like to move to a certain job vacancy. In my opinion, the job was not presented as an offer, and I was surprised to learn months later that I had turned down the job. I was not eager for the job but would not have turned it down if requested. Another was lateral to a specific Forest Supervisor position. I turned it down, as I felt strongly at the time that people should properly go from Forest Supervisor jobs to Assistant Regional Forester jobs instead of the reverse action. Doing the reverse seemed to me to be against proper career ladders and deemphasized the stature of Regional Engineer and Assistant Regional Forester positions. The third opportunity relates to a Deputy Regional Forester position. I had a telephone call one morning to make me the offer and confirm that I was immediately available. Although the answer was yes, I received a followup call saying that an unexpected problem developed, as the Regional Forester was against having an Engineer for a deputy. I was told that it would be unfair to go under those circumstances and that I could expect another opportunity real soon. I

didn't follow up regarding a later assignment, as I perhaps should have, and it never came about. (I only bring these up now to share a historical perspective regarding a key period of organization transition, when more Engineers were branching out into other-than-Engineering jobs and going into line positions. It is expected that some young people reading this can gain from my experience and be sensitive to some future discussions and actions that may be focused differently than might be interpreted on the surface. Be careful of comments—even if they are presented in a joking way.) In looking back, I am extremely pleased that I had the opportunity to serve the Forest Service and Region 9 for 14 years as Regional Engineer. Working jointly with all the Regional Engineers over that period was an experience that I will always remember and cherish. Looking back, I am very glad those years were not interrupted with some other assignment.

We had one Region 9 project that I sometimes jokingly referred to as “the largest dam building project in the world.” It was so large that part of the structure had to be built in another country. Really though, it was a relatively small structure, but part of it was in Canada. From an engineering standpoint, the project was fairly simple. However, there were other things that made it difficult. The dam was required by treaty with a foreign government. A temporary dam existed that replaced a previous temporary dam that had failed. The project was in the Boundary Waters Canoe Area, and we had to coordinate and work closely with Regional Office staffs, Superior National Forest Supervisor's Office staff and Ranger Districts, the State of Minnesota, and the Washington Office. The U.S. State Department also had to be kept informed of all our discussions with the Canadian Government. The Department of Agriculture had to be kept informed of discussions with the Department of State and the Government of Canada. I was asked to participate in most of the contacts (that were by telephone) personally, because of the great concern for sensitivity. The Forest Supervisor and I kept in close contact as we expected him to keep in touch with the Senators and Congressman. Of course, we had to make sure that the Washington Office was kept informed of all the contacts as appropriate. Although the project was small, the State Department people, at first, had thought that we were building a huge “Hoover Dam” type project that would cost millions or billions of dollars. They sometimes expressed surprise and concern that the project was not adequately large for their increased involvement. Whenever a few months went by, the contact people seemed to change, which meant repeating lots of information with explanations. Funding kept being delayed, which made it very difficult to respond to questions on status and expected completion dates. The project did not have support from some Forest Service people, who did not want the dam at all and worked as hard as they could behind the scenes to stop the project and return the area to a natural condition. There was a sigh of relief by some of us when the project was done.

There is another story to pass along that some may find interesting. During my first year as Forest Engineer, we developed what we called a “prescription” for any Engineering project. The form included the purpose for the project, along with all the engineering and resource management information for the project from design to maintenance. The form for a project consisted of one page and was agreed to by the District Ranger and Supervisor's Office involved staff(s) before the project progressed beyond the reconnaissance stage. (The Washington Office adopted a modified project

prescription as part of the manual many years later. However, it was designed for Service-wide use and was complex to use compared to the one we had.)

I was with a survey crew one day when a forestry summer student came by where we were working and noticed that our survey for a new road was going through some pine trees. He stopped his jeep and ordered us to stop the road survey, as a road would remove more than a dozen of the pine trees. He was concerned about pine trees but not hardwoods. I tried to discuss the situation with him, but he was determined that we had to stop. In his opinion, he had all the answers and would not listen to our reasons for putting the road there or even look at the project prescription. When we tried to explain that the Ranger had personally reviewed the survey with us just a few days ago, he would not listen and hastily turned around and departed, saying, "I'll get the Ranger, and we will see that the project gets stopped. Those pine trees have to be saved." Some time later, he returned, and when it became obvious that he wasn't stopping, I flagged him down. I asked him what the Ranger had to say. He replied, "That guy just didn't seem to give a damn."

During my early Forest Engineer years, I decided to retire as early as I could and go back to school to complete whatever courses would be necessary to teach mathematics in a junior high school. I was always interested in working with and motivating young people. It always disturbed me to hear people say that math is too hard to learn. I believe that anyone can learn whatever math is needed for whatever profession they choose. If they can learn the other subjects, they can learn the math, too.

After 2 years of retirement that included going back to college to meet Wisconsin requirements for certification, I am now certified, licensed, and teaching. The teaching license covers mathematics grades 7 through 12 and is reciprocal in 45 States. I am also eligible for a license to teach grade 6.

Looking back over my Forest Service career, I think that it would be appropriate for my contribution to a history of Forest Service Engineering to include a personal opinion regarding what could be called the three greatest items of interest/concern/impact related to Engineering progress and activities.

The first started during my first year on the job. Because engineers were hard to recruit into Government service because of lower salary, the Government started to provide engineers with differential pay to close the gap with private industry. When this started, instant animosity developed toward the engineers from others, especially foresters. The engineers had no control over the situation. The foresters felt that it was unfair for any nonforester to be recognized with the status of extra pay in a forestry organization. To understand how sensitive the situation was, we need to recognize that, until about this time, foresters were often put in engineering type jobs as vacancies occurred. Most of those jobs had special status that went along with handling funds and groups of people. As more and more funds came along, it became apparent that more and higher levels of engineering expertise had to be recruited. The National Forests were getting lots of national attention, and along with it came larger capital investment programs for efficient and economic management by Engineering.

I have personally spent lots of time trying to soothe the raw nerves of many people throughout the Forest Service who felt offended and sometimes let it show. The problem was a Service-wide problem and seemed to be more sensitive in areas where nonengineers had been traditionally doing Engineering work. The problem surfaced in ways as simple as remarks in meetings and as complex as relationships among spouses. It was so sensitive around the National Forest System that some nonengineering spouses reacted by completely ignoring engineering spouses. Other reactions included fighting verbally and physically. One area of high sensitivity was the joint use of property. It was not unusual for feelings to overflow into fights over use of backyards at Forest Service housing compounds. To have feelings erupt into incidents, such as cutting clotheslines with wet clothes on them and personal attacks that sometimes included instruments such as scissors, indicates the sensitivity of the situation. The situation has softened over the years, of course, but we still have many people working, some at very high-level jobs, that were and still are very offended and irritated about the differential recognition and salary. I think our Engineering folks are to be complimented on how they have handled this problem over the years.

The second item of concern is the "Forest Service Family." Efforts are started from time to time to recapture some of those strengths but always seem to come up short. The Forest Service Family developed through very sensitive people who worked extra hard in the Forest Service mission that they believed in. Each Forest Service individual was a frugal, strong person who viewed immediate family and the Forest Service as nearly equal partners—to be continually respected and cherished. The new Forest Service generation often appears to be more concerned with what is in it for them in the short term than what could be best for the organization in the long term. We older folks may be too concerned about seeing some of our feelings and values being tossed aside, but I doubt it. It has been with great pride that our older folks considered two levels of Federal employees—the Forest Service (the best) and the rest.

An example is a call I received a short time ago from a retiree who was concerned about his visit to a Regional Office. He found that an entire staff group was out of the office attending a group meeting. In the "old days," we wouldn't have done this without someone available to answer telephones and questions from the public. The specific case just cited involved the staff group with responsibility for providing answers to questions from the walk-in or telephoning public. Ringing telephones went unanswered. If this was an isolated case, I would not be concerned. Indeed, the Forest Service values and sensitivities have lapsed.

Separate but closely tied in with the development of changing Forest Service values is the system of merit pay and the Senior Executive Service (SES). In my opinion, merit pay and the SES have combined to erode engineering, forestry, and professional values. Although I have received my share of merit pay, or more, it is a system that has been generally thought to be unfair throughout the organization. I agree with that assessment. (I hope it has changed by now, but I doubt it.) The best that could be said for it is that it divided some available funds among selected individuals in a subjective way. The worst part, though, is that the system created barriers and often took away some of the valuable teamwork that had made the Forest Service so strong. It also removed much of the candid feedback to

policymaking officials. Forest Service Engineers and other employees appear to be caught up into being more timid about providing comments and conclusions to the higher levels of the organization. Many employees appear to be more concerned about fringe benefits and making sure that they do not tell their bosses anything that they don't want to know than with the Forest Service mission. Some people will even admit that they have become reluctant to pass on some information because they fear higher level management will penalize them in some way. It has sometimes been debated that the changes in organizational structure (levels added) resulted in some isolation that created the lack of sensitive listening by top officials. I think that has been a factor but certainly not the only factor. I will limit my comments on SES to an opinion and observation that, after our leaders were assigned SES status and went through special training, there was too often a significant observable change that lacked sensitivity and was not in the interest of people and the organization. The past spirit of honesty, integrity, professionalism, and real employee interest too often appeared to be transformed into the "ends justify the means" type of management.

The third item of interest is an observation that deals with Engineering as a whole. Engineering has always been a "can do" outfit. I have always been proud of the esprit de corps of this organization within an organization. The dedication and hard work of our Engineering folks had much to do with the recognition received by the total organization over the years. It extended all the way from the Chief Engineer in Washington, D.C., to technicians and laborers on the Forests. No project or amount of work was too large or the timeframe too short for Forest Service Engineering personnel to accept the challenge. I hope and pray that those of us responsible for developing people and an engineering organization will be judged in the long term as doing a satisfactory job.

Engineering in the Forest Service: Anecdotes

Sotero Muniz

**Logan Canyon,
Cache National
Forest, Region 4**

This is a forgotten story about what line officers do in the Forest Service. In 1960, only 2 or 3 of Region 4's 19 National Forests had Forest Engineers. The interstate freeway system existed only in concept. President John F. Kennedy was "getting the country moving again." Government programs were beginning an expansion not to be seen again. The Multiple Use-Sustained Yield Act had just been enacted.

Early in the 1960's, and against the above background, plans to build four-lane highways in several Utah canyons, including Logan Canyon were being prepared. High-level discussions between the then Bureau of Public Roads (BPR), the Utah Highway Department (now the Utah DOT), and the Forest Service were under way. All plans were progressing well until the Logan Canyon Highway proposal was put to the Region 4 multiple-use test. Line officers had established a Travel Influence Zone for Logan Canyon. Coordinating requirements for this zone included the maintenance or enhancement of the canyon's scenic values, protection of the canyon's riparian vegetation, and its water quality.

Line officers found that the reconstruction of the Logan Canyon Highway to a four-lane standard was inconsistent with the management requirements of the canyon's Travel Influence Zone. Regional Forester Floyd Iverson concluded that a four-lane highway should not be constructed because of its incompatibility with the multiple-use plan and its requirements. As a junior Engineer at the time, I remember thinking—"Who is this guy?" No one can tell Engineers what should or should not be done where highways are concerned. I knew Floyd Iverson was the Regional Forester, but after all, my boss was the *Regional Engineer*. Further, the Utah highway engineer and the chief engineer for the BPR had decided that this highway should be reconstructed to the four-lane standard.

That was when I learned what line officers do. I also learned about Ranger District Multiple Use Plans, Region 4 style, and that anything Engineers locate, design, or construct must respond to and implement the objectives established by line officers for a given area of land. This lesson stayed with me for the rest of my career.

Nearly 40 years later, we drove through Logan Canyon. We had to slow to 30 mph at times, and RV's slowed us up some, but it was still a beautiful scenic drive. Several campgrounds and day-use areas were still there. Summer homes and organization camps remained. Most of these would have been removed to make room for the four-lane construction. Today you can drive through Weber Canyon, Provo River Canyon, Parleys Canyon, and

The Legacy of the Bureau of Public Roads

others at 65 mph. In Logan Canyon though, you are forced to drive at about 40 mph. In so doing, the objectives of the long-gone Travel Influence Zone management requirements are still intact. We can debate, of course, the relative merits of a scenic drive versus the efficiencies of an interstate route. In the case of Logan Canyon, Floyd Iverson was right.

In the early 1960's, many engineers and engineering technicians from the then BPR (now the Department of Transportation) moved to the Forest Service. Most National Forests at that time did not have Engineers or Engineering organizations. There was just not all that much going on. What few projects were constructed were designed in Regional Offices. As the expansion of the early 1960's began, the influx of Engineers in the Forest Service began. These Engineers (at least in Region 4) received their early training from the seasoned veterans of the BPR. Their influence went beyond the technical-practical training of new engineers. There was an ethical stability that communicated itself to us from these veterans. There was patient coaching, and we were challenged by them giving us early responsibilities. The lessons learned, as well as how they were given, stayed with those of us that had the benefit of their early influence. Most of us passed on to the next generation of Engineers the lessons learned from these early BPR veterans.

The origin of much of this early training and influence, at least in Region 4, may be passing from memory. This is what prompts this anecdote. We learned by doing. We field designed roads in house trailers at night. We calculated end areas by planimetry cross sections and used Curta calculators for road design computations. We were allowed to serve as contracting officer representatives on projects where the "Cat" drivers had more experience building roads than we did. We made mistakes, but these were used to drive lessons home. We didn't "get in trouble" over these and were able to turn these into constructive instruction.

We respected these BPR engineers for the good men we knew them to be, and for the good fathers they were, despite the long tours of duty that had us in the field 10 days at a time. Some of their names were Emmett Barton, Avery Wheelwright, Harlan Petterson, Clem Davis, "Hob" Howard, and Ab Adams. There were others in Region 4, but I can't recall all their names. Their influence in Region 4 extended to dozens and dozens of us. This influence spread throughout the Forest Service Engineering ranks as their trainees moved interregionally. This history of Engineers in the Forest Service will recognize and record the gratitude and appreciation to these early BPR engineers. We are a better Forest Service today because of them.

My 25 Years in the Forest Service

Larry Bruesch

I joined the Forest Service in July 1960 to avoid moving to the East or to a large urban area. The Bureau of Public Roads (BPR) bridge design office, Juneau, Alaska, where I worked as a design engineer, was being phased out to make way for the new State highway organization. Alaska had achieved statehood in 1959. Since the BPR officials were known to send people to places like Washington, D.C., I began looking for other opportunities. A coworker knew Cliff Miller, who worked in the Forest Service Region 10 office at that time. Cliff suggested that a résumé be sent to Arvil Anderson, Region 1 regional engineer. Arvil called after receiving my letter and offered a GS-11 design job under Art Kahl, which I happily accepted. Here was an opportunity to move to a small town in the West in a bridge design office, amidst good hunting and fishing, with little risk of doing much traveling. Neither Cliff nor Arvil thought to explain how much traveling and moving Forest Service employees do!

My new boss, Art Kahl, was an institution in Region 1. He was the first Regional Bridge Engineer and the only one from 1934 until 1961. The Regional bridge program, except for site surveys and routine maintenance, was his domain—program planning, design, construction, and heavy maintenance. He occasionally had design help from young engineers passing through, like Jim Byrne, Floyd Nelson, and Bill Howard, to name a few, and he had a group of construction foremen to force account the field work. In the 1930's, much of his construction work force came from the Civilian Conservation Corps. Later, in the early 1940's, the World War II German and Italian internees held at Fort Missoula were used. Because of his long tenure, Art probably put his "stamp" on more Forest Service bridges than any other Forest Service bridge engineer. Art retired in September 1961, when he reached mandatory retirement at 70, and shortly after that, Arvil offered me Art's job. With a "new kid on the block," the Region bridge organization changed. Everything but design went to the Forests. The bridge construction foremen became contracting officer representatives, went to other types of work, or retired. In the late 1950's and 1960's, Region 1 was slowly and grudgingly changing from force account construction to contracting. At least one of the Forests was still tenaciously hanging to bits of the force account operation when I returned to Region 1 in 1981.

When Jim Byrne replaced Tony Dean as Director of Engineering in the Washington Office, he began restructuring his staff to include specialists in the various engineering fields. For bridges, he recruited Rex Cocroft, a Federal Highway Administration (FHWA) design engineer. After a year in a different administrative environment, Rex decided to go back to FHWA, and the bridge position was offered to me, effective November 19, 1967.

Having worked the first 12 years of my engineering career on project-oriented tasks, the Washington Office offered a challenge. Jim and his three assistants—Ed Massie, Clayton Seitz, and Webb Kennedy—for the most part let the staff engineers develop their day-to-day work program. As specialists, we were to determine what was needed and respond accordingly. However, the Assistant Directors occasionally had special projects that they passed on to the staff engineers, sometimes rather indiscriminately.

My first special project was given to me by Clayton Seitz, even though Webb Kennedy was my supervisor. Clayton wanted a new highway drainage handbook published. When I told him I knew next to nothing about culverts, he just grinned and said the experience would be broadening. It was my first experience dealing with Forest Service Regional specialists who do not always agree with each other and with industry representatives who have their own product to support. One of the most memorable arguments was over the proposed use of 18-gauge steel culverts. Sixteen-gauge had been the minimum thickness for many years, and the steel industry was happy with that until competition from other materials began affecting their sales. The steel industry also had strong support from one of the bigger Regions. Another major argument was whether the minimum size of cross-drainage culverts should be reduced below 18 inches in diameter. In the published handbook, both minimums were maintained. This was my first attempt to get material published in the Forest Service Manual system, not an enjoyable or rewarding experience.

Webb passed on the next special project. Congress had produced the National Trails System Act of 1968, and the subsequent Forest Service implementation responsibility had been passed down to Engineering by Chief Cliff, much to the dismay of the Recreation staff. Since Les Morris had retired, or was about to retire, Webb asked me to act as the responsible staff Engineer until Les's replacement, Sterling Wilcox, arrived (in August 1970). Most of the Forest Service effort during this period was directed toward getting the two most noted trails, the Appalachian and Pacific Crest Trails, set up as National System trails. It involved a lot of work with the National Park Service and Bureau of Outdoor Recreation. As Clayton had said earlier, it would also be a broadening experience.

Collapse of the Silver Bridge, a State highway bridge near Cincinnati, Ohio, killing 46 people in 1967, focused national attention on bridge safety. Subsequent legislation in 1968 caused a flurry of action for all agencies administering road systems—city, county, State, and Federal. Although the legislation and appropriations covered only Federal Aid systems, no public agency could have ignored the regulations on bridge safety. The Forest Service attempted to modify them in a limited manner to fit low-volume roads, but Forest Service Engineers had to make more frequent and more thorough safety inspections, load rate and post bridges, and improve railing systems. This meant more manual direction, more training sessions, and more inner-agency coordination. I'm sure the Nation as a whole benefited from this nationwide effort, but I'm not sure it was cost-effective for the Forest Service.

By March 1970, Jim had a new set of assistants—Mike Howlett, Heywood Taylor, and Don Turner—the latter my new boss. One of Don's first directions was to produce some manual material to control blaster certification

and to get the blaster's handbook updated. By now, I knew the futility of saying I knew nothing about the subject, but my previous "broadening" experiences gave me the confidence to proceed. Legislation again was a part of the reason for the effort. Dissidents and terrorists had been stealing explosives, mostly from poorly protected sources. Congress reacted, and several agencies were publishing new regulations. I became acquainted with a new group of people, the Regional blaster examiners, fellow agency representatives, and Jim Lott, Missoula Equipment Development Center. Jim was a certified blaster and the most qualified Forest Service authority. He, with the help of the Regional blaster examiners, prepared the new handbook. The most difficult task in this process was finding satisfactory procedures for handling and storage of military ammunition and weapons used in snow avalanche control. The newly promulgated regulations did not cover these explosives, and Defense Department requirements were for large arsenal facilities or wartime situations. While the military people were willing to listen, they had few recommendations. However, the China Lake Naval and Toole Army facilities conducted some tests with explosives and ammunition that helped solve some of our problems.

Several "explosive" incidents come to mind. Some individuals were attempting to enter a storage facility by shooting off the lock with a high-powered rifle. One bullet went through the door and detonated the stored explosives. The steel door was found a quarter of a mile away. The individuals were found at the site. One went to a hospital, the others to a morgue. In another situation, a helpful Ranger had his "recoilless" rifle crew shooting down a possible avalanche above a county road. Unfortunately, the crew missed their target, missed the mountain it was setting on, but managed to hit the town on the other side. Fortunately, no one was working on the building where the shell exploded. And there was the case where the blaster drove his pickup over the bridge on a dead-end road to remove a beaver dam upstream of the bridge and watched with horror as his ignited explosives floated over the dam, lodged against the bridge, and exploded.

In late 1971 or early 1972, Mike Howlett visited the Forest Products Laboratory. A new wood-laminating concept dubbed "Pres-Lam" was discussed for use in timber bridge construction. It is a method of parallel laminating wood veneer into thick sheets of any width or length. Advantages were increased treatability, less restriction on component size, and use could be made of tree species not heretofore considered structural material. Under an agreement, the Forest Service, FHWA, and the State of Virginia Highway Department developed, constructed, and tested a Pres-Lam bridge over Stony Creek on Virginia State Secondary Route 610 on the George Washington National Forest. The Lab fabricated and tested the Pres-Lam components, with some commercial help on fabricating deck panels and pressure treatment. The State erected the bridge in the latter part of April 1977, and it was load tested in May and again 5 years later. The project was expensive, as most research projects are, but produced an adequate, structurally sound bridge. However, to my knowledge, no other structures have been built. The laminating industry didn't seem to be ready to accept the process, whether it was due to the cost of retooling, competition with the conventional laminating industry, or marketing problems.

The Pres-Lam project is a good example of the Lab's strong interest in supporting timber bridge construction. To name a few, Bill Bohannon, Joe

Clark, Russ Moody, and Roger Tuomi spent much of their time and effort on various bridge-related projects during my tenure in Forest Service bridge activities.

Another research project (1977) involved the Forest Service, FHWA, and the American Institute of Steel and Iron (for all practical purposes U.S. Steel). Researchers had developed a concept called "autostress design," which involved overloading continuous-span steel bridge members slightly above normal design loads. These loads develop stresses and moments caused by local plastic deformations. Subsequent passages of a similar load would then be within the elastic range of the members. The Forest Service was involved primarily because of the availability of off-highway loads. The Forest Service provided the site, the Windchuck River Bridge in Region 6, and the construction dollars. FHWA designed the structure based on U.S. Steel research. The autostressing was accomplished using a timber operator's overloaded truck, probably one of his normal everyday loads. Autostress design is now an approved procedure included in the bridge designer's bible, the AASHTO Standard Specifications for Highway Bridges.

When Jim Byrne retired, Mike was promoted to his job, and Don went to California. Rich became my supervisor for the next 5 years, when he retired, and Walt Furen replaced him. Rich was of the same mind as Clayton Seitz; he liked to broaden one's experience. It always worried me to see him coming down the hall with a paper in his hand. Under his supervision, I had the opportunity to work several months each on buildings and dams in between changes in the appropriate staff engineers and to manage the development of a transportation nomenclature handbook.

Rosslyn, Virginia, was an interesting, dynamic place during the 1970's. It was a major construction site with new buildings being erected on two sides of our office and the Metro construction boring underneath. Since bedrock was close to the surface, construction required a lot of explosives. We never knew when minor earthquakes would occur.

Finally, after 13 years in the Washington Office, Bob Larse, then Director of Engineering in Region 1, decided that I must have had enough broadening experience and offered me a job as Assistant Director. Unfortunately, all of that experience had little to do with supervising people, but I survived for 4 years and retired in March 1985.

Remembering

Fleet L. Stanton

My career with the Forest Service began quite by chance.

My early years, through high school and graduation from the 12th grade, took place in east central South Dakota, the farm belt. The farthest west I had been was Wolsey, South Dakota, 15 miles away. The farthest east I had been was St. Paul, Minnesota, and this was while I was still a small child. Smokey Bear and the Forest Service were terms that had no meaning for me.

Then I enrolled in the South Dakota School of Mines and Technology, Rapid City, South Dakota. Thus, I became acquainted with the Black Hills. I fell in love with the mountains and forests. Even then, I was not aware of the Forest Service. At that time, my major was chemical engineering. Later, I changed it to civil engineering because of my love for surveying and mapping.

After I had obtained my degree in civil engineering, I worked for the City of Rapid City as a construction engineer. Later, I entered Government service. For the first 10 years of my Government service, I surveyed for the Bureau of Reclamation and later joined the Bureau of Public Roads (now known as the Federal Highway Administration). It was during this period that I became acquainted with the Forest Service. I was assigned as project engineer on road construction from Vernal, Utah, to Manila, Utah. As we built our roads across Forest lands, I came in contact first with the Forest Engineer and next, the *District Ranger*. I emphasize this because it is here that my education of what the Forest Service does began.

My world as a highway engineer existed between the right-of-way lines. However, I sometimes had to go outside of these boundaries to find sources of aggregate for roadbeds, concrete, etc. I found some very good sources near my project. But, my supervisors cautioned me that I had to get approval from the *District Ranger*. Full of righteousness of my cause, I proceeded to contact the *District Ranger*, knowing that it was just a matter of formality to get permission, since, after all, we were building a road for him. Alas, I took the *District Ranger* to my very good source only to find that permission was not to be granted. "Too visible from the road," "eye-sore," "create an erosion hazard," "can't cut the trees here," and on and on. Needless to say, my feelings toward the Forest Service as represented by the *District Ranger* were not too positive. Any thoughts I might have had of ever working for such an outfit were killed right there.

But things work in mysterious ways. During a tour of duty with the Bureau of Public Roads (BPR) building roads across the Ashley National Forest in Utah, I worked very closely with the Forest Engineer. As it turned out, he was looking for a construction engineer with experience in heavy construction because the Flaming Gorge Dam was under construction, and the whole mountain was about to change forever as a result.

The Forest Engineer at that time knew I was worried about transferring so much since my daughter was about to start school. He began questioning me discreetly and finally approached me about transferring to the Forest Service and staying in Vernal, Utah. At first, I was adamant about not transferring. What possibly could a civil engineer do in the Forest Service! Finally, I consented, and a transfer eventually took place. When I returned to Vernal (I had left my family there and returned to Denver, Colorado, for several months while awaiting the transfer) and reported for duty, I began having serious doubts.

As I sat in my new office, wearing, of all things, a uniform, I felt pangs of depression at my decision. There is nothing for civil engineers to do in the Forest Service! I was actually wearing the uniform of a *District Ranger*!

Needless to say, I became very busy in my new job in construction. Also, my worries over my decision began to recede. As the years began to go by, I found I had entered a much larger world than what existed between the "rights-of-way" lines of a road. Little did I know how much I had changed.

I remember vividly one day when we were to inspect road construction with a BPR area engineer. In one vehicle, there was the staff men from the Supervisor's Office—Range, Watershed, Forest Supervisor, myself, and the *District Ranger*. We met the area engineer for the BPR at the project site and proceeded to inspect the road. At one place, there was a very steep fill slope, and the Forest staff wanted a berm built to control water runoff over the slope. The area engineer scoffed at the idea, wherein I became indignant and proceeded to give the area engineer a lecture in "multiple-use concepts" that lasted for some time. During my lecture, not one person in the vehicle said a word.

Later, after leaving the site and on the way home, everyone in the vehicle burst out laughing. I asked what the laughing was about, and one of the staff men said, "Fleet, you are now officially a bona fide member of the Forest Service. That lecture you gave the area engineer from the BPR was the best multiple-use concepts dissertation we have ever heard."

My world with the Forest Service had expanded in ways I was not aware of. I began to realize that a career with the Forest Service created so many diverse choices for almost anyone to choose from. I also found that the people I worked with cared. During a fairly bad period in my life, I was supported, encouraged, and sustained by many of the Forest Service people I worked with. For this, I will always remember the Forest Service.

I also learned what a *District Ranger* was responsible for and what an important part in the Forest Service mission he played. During one tragic

period on the Ashley National Forest, I came to see a side of the *District Ranger* that I will always remember.

It was June 5, 1965, when a freak snow pack was melted by a torrential downpour of warm rain above Sheep Creek Canyon. I was living in a trailer camp on the mountain supervising the construction of a road and campgrounds through Sheep Creek Canyon. The contractor had completed the final roadbed and was getting ready to lay asphalt. On June 4, 1965, the contractor moved all of his construction equipment to high ground. I still do not know if it was precognition or not. We quit for the day, and I returned to the camp site. It was quite late, and the rain was pouring down. I had made one last pass through the construction site and campgrounds. The place seemed deserted to me.

During the night, I repeatedly woke up since the sound of the rain on a trailer is deafening. Finally, about 5 a.m., I woke up, dressed, and went to my vehicle. I turned the radio on and heard an excited voice saying that part of the Sheep Creek road had washed out. At first, I felt that some critical parts of the road sections may have been damaged. As I approached the top of Sheep Creek Canyon, I looked down at the most devastating scene that I have ever witnessed. Where the contractor had most of his equipment the night before, there was nothing but a sheer wall. Water was raging from canyon side to canyon side. The campground had disappeared. I edged the vehicle as close to the creekbed as possible and got out to look. Another vehicle was there also—the BPR project engineer, as it turned out. We watched the water raging when, all of a sudden, debris caused the stream to change course before our very eyes. And there in front of us was the tail end of a station wagon sticking out of the now dry creekbed. We quickly wrote down the license plate and barely returned to our vehicles before the stream changed back to its original course and buried the vehicle.

I radioed the license number to the District Ranger. Later, it was discovered that the vehicle belonged to a family of five and two relatives who were vacationing in the area, but were supposed to be at Antelope Flats. They apparently came upon the campground late in the evening and decided to stay, since it was deserted.

We had tried to mark the location of the station wagon in our minds so we could later point it out. The crew that were to dig for the station wagon were skeptical that there had even been a vehicle. However, they excavated 8 feet down and finally found the station wagon. No one was in it. All seven people perished in this flood.

It was during this period that the weight of the tragedy fell upon the District Ranger's shoulders. I found him to be extremely compassionate and caring. The job of rescuing other tourists stranded and rebuilding also fell upon the District Ranger. He carried out his duties above and beyond the call. For this reason, I will always think fondly of the *District Ranger*. The italics now indicate my respect for the work of this dedicated breed of Forest Service frontline people.

I spent the first 7 years of my Forest Service career in the Supervisor's Office, Ashley National Forest, Vernal, Utah. These are perhaps the most memorable 7 years of my life. Life here was never dull. And I grew in

knowledge and understanding. There were many happy moments and tragic moments. The message I want to convey is how I finally became a member of the Forest Service family and how much the Forest Service has influenced my life.

In 1969, I transferred to the Regional Office, Region 4, Ogden, Utah. Here I changed careers from construction to Surveys and Maps. My world grew even larger. I visited the Washington Office and several Regions and met many different disciplines that make up the Forest Service. I had contact with such a variety of people that I will always look back upon that first day with the Forest Service when I wondered, "What the heck is a civil engineer going to do in the Forest Service?"

Now I know.

Memories of a Forest Service Engineer

Ron Hayden

Introduction

My Forest Service Engineering career covered the years 1961–1987 and included assignments on three National Forests and in three Regional Offices in four Forest Service Regions. There have been many changes in conducting the Engineering business of the Forest Service and many changes in direction and emphasis over these years. More sophisticated equipment and processes have been introduced, and additional programs have been started, but the basic engineering tasks and assignments have never changed.

As you read these pages, you will find that I, like others before me, am embarrassed by the use of “I” so much in these writings and tend to dwell on the early part of my career, as those were the “doing” years. They were the “fun” days, when I was directly involved in the “nuts and bolts” of design and the “hands-on” field work of construction and maintenance, which caused me to take up engineering in the first place.

Unfortunately, most of the “doing” work is done at the lower levels of the Forest Service Engineering organization, unless one becomes a specialist in some relatively narrow field of expertise, such as bridge design or materials engineering. If we civil engineering generalists wanted to advance up the ladder in the Forest Service, as elsewhere, we had to turn from being an on-the-ground practicing engineer to becoming an engineering manager. Although fulfilling in its own right, engineering management just wasn’t as enjoyable to me as the direct designing, building, and repair of things that appeal to most engineers.

I met many interesting and enjoyable people in the Forest Service during my career and learned a lot from all of the different experts in all of the fields Forest Service Engineering encompasses. I seldom encountered an individual in any of the Engineering units who didn’t know his technical field, didn’t pull his or her own weight in the organization, or wasn’t pleasant and interesting. My career in the Forest Service was interesting, enjoyable, and fulfilling to me, and I’d probably do the whole thing over again if given the opportunity.

Regional Office, Alaska, 1961

It seemed like the completion of a long chain of unrelated circumstances that found me reporting to the Forest Service Regional Office in Juneau, Alaska, in June of 1961 as an engineer in training. I was already in my 30’s and had just graduated from Oregon State University in civil engineering. Although older than most trainees at that time, I was almost as “green” at engineering, but did have the advantage of having spent two construction seasons with the Bureau of Public Roads (BPR) in Alaska as an engineering

aide and two summers in Oregon with the Oregon State Highway Department as an engineering technician.

I had gone back to school on the advice of two BPR engineering technicians who told me that I would never get very far in the engineering field unless I got a degree. During my senior college year, I contacted the BPR about joining their training program, but was told that they were looking for younger, single men. I had never thought of working for the Forest Service, but believed meeting with their job interviewers while they were on campus would be a good experience for me. Don Turner was there as the Alaska Region interviewer, and we seemed to hit it off immediately. Before the interview was over, we had both decided that it would be a good idea if I joined the Forest Service as an engineering trainee in the Regional Office in Juneau.

My first assignment was working for Rulon Gardner in the Buildings, Water, and Sanitation Branch. The Region's Engineering staff was very small at that time and consisted of a GS-14 Regional Engineer, two GS-13 Assistants (Don Turner for Roads and Trails and Rulon Gardner for Buildings, etc., and Fleet Equipment), and one GS-12 Assistant in charge of Geometronics. Rulon had two other people in his organization, George Danner, the Architectural Technician, and a Fleet Equipment Manager. My job was to do the minor building and structures work that Rulon and George didn't have time to do, read pertinent parts of the Forest Service Manual and Handbooks, and learn as much as possible about the unique Forest Service language, acronyms, basic management policies, and the Forest Service Engineering way of doing things in preparation for being assigned to a Forest.

One of my first assignments was to check the analysis of the towers for the Pomagalski chair lift which had been constructed at Mt. Aleyaska Ski Area near Anchorage. This assignment was my first introduction to the world of ski lift engineering, an interest that I continue to this day and that has resulted in my maintaining my membership in the North American Continent Section of the International Organization for Transportation by Rope (OITAF).

I worked quite closely with George Danner and learned a lot of things from him about building construction and maintenance that would serve me well in future assignments. George was assigned to coordinate with a local private architect who had the design and construction inspection contract for the Mendenhall Glacier Visitors Center near Juneau and the Portage Glacier Restroom Building on Portage Lake out of Anchorage. We also worked with Forest Engineer Loren Adkins, who was overseeing the Mendenhall project for the North Tongass National Forest.

Shortly after this project was completed, I worked with Don Turner on the design and construction of a foot bridge at the Mendenhall Glacier site. Don designed the structure using commercial open truss roof joists as bridge beams. This was a new application of roof joists, and we worked with the manufacturer on using them in the design. The structure is still in place and functioning well in the extremely wet climatic conditions at the site after some 30 years of service. Pictures of the newly completed structure were used in State and private travel agency brochures over the years. However, the recent lack of proper maintenance of the railings and approaches by the

**North Tongass
National Forest,
1962**

local Ranger District detracts from the looks of the bridge and surrounding area. Esthetics were a major concern when the bridge was designed and built, but don't seem to be as important now.

I was assigned to the North Tongass National Forest at Juneau in 1962 and spent most of my time there working on buildings, water, and sanitation. My primary assignment was to provide engineering support for the Mendenhall Glacier Visitors Center, which had recently been completed. The visitors center originally had a small lunch counter and coffee shop in the area, now taken over by the theatre, and the Forest had a concessionaire who ran this shop as well as serving as a watchman. Prior to my arrival on the Forest, an attempt to drill a well to supply water to the visitors center was unsuccessful. We designed, and the Juneau District crew built, a small diversion dam to supply surface water.

The water line from the dam to the visitors center couldn't be buried deep enough to keep it from freezing because of shallow bedrock along its route. We bought a package water treatment plant (these were quite the rage at the time) and placed it in a small building we constructed adjacent to the dam. We also built a water heating system in the same building, which raised the temperature of the water about 5 degrees Fahrenheit so it wouldn't freeze in the waterline on the way to the visitors center. This system was used until the Forest succeeded in drilling a suitable well near the visitors center.

Another challenge at the visitors center was the installation and operation of a package sewage treatment system. These systems had become popular at the same time package water systems had. We worked on the system countless times immediately after it was installed, but could never get it to function properly. We finally discovered that one of the motors in the unit had been wired incorrectly at the factory. After that little problem was corrected, we were able get the expected results from the plant. More than 20 years later, Les Paul, the present Hydraulics Engineer for the Region, showed me a copy of a report I had written describing some of our problems with the plant, which he had reviewed in order to take care of similar problems. Somebody in the office did their filing work, and it paid off!

After we got the visitors center equipment running properly, I was intermittently assigned to a road survey party near Kake, Alaska. Jack Crane was the Party Chief at that time, and we lived on a wanigan on a barge at Hamilton Bay during the first few trips and later lived in a crew trailer. It was as much of a struggle to keep the water lines thawed out during the cold weather we had one November as it was to do the survey work. I enjoyed this assignment, although being in an isolated camp on an island away from home wasn't all that pleasant. I was finally back into road location and design, a couple of my favorite engineering activities, and met Morris Lively, an exceptional engineering technician, at that camp. Morris is a rare individual who almost always has a smile on his face, has an optimistic outlook, makes a good camp mate, and knows what he is doing in his job. He has spent almost all of his Forest Service career in southeast Alaska, and his local knowledge is priceless to Engineering in that area.

**South Tongass
National Forest,
1963**

In 1963, I was promoted to the GS-11 Assistant Forest Engineer, Road Pre-construction position on the South Tongass National Forest under Forest Engineer Bob Stribling. Bob Hadley was the other Assistant, in charge of Road Construction and just about everything else. Frank Rambosek was the office Engineering Technician. We were doing road survey and design work for roads to be built by Forest Service contract, by the timber purchasers, and under cooperative agreement with the Ketchikan Pulp Company. Most of the work was located on Prince of Wales Island, the largest island in southeast Alaska, and the roads we built then were the beginning of what is now a network of State highways. The cost of our roads ran extremely high when compared to other Forest Service Regions, as did the cost of preliminary survey, location, and design. When I arrived in Ketchikan, the survey crews I would be responsible for had already surveyed the route from Thorne Bay on the east side of Prince of Wales Island to a small lake near the center of the island. The surveyors had named this lake Control Lake because of its unique location in regard to the road network and survey lines that would project from it. It was barely large enough so Cessna 185 float planes could take off from it if loads were kept pretty light.

We continued surveying road locations on Prince of Wales Island during the summer and designing the roads back at the office in Ketchikan during the winter. Logistics were rather difficult, to say the least. We had to supply the main camp of six men (including a cook) on the island, plus a camp at Shoal Cove on Carroll Inlet nearer Ketchikan. Later on, we also had to maintain and supply a two-person recon camp, which we turned into a preliminary survey camp at other locations on Prince of Wales Island.

The larger camps consisted of a half a dozen or so knockdown portable buildings of wood and fiberglass, a water system with pump and storage tank, lots of stoves to get things dry, a generator, two-way radio, and plenty of food in case the supply planes couldn't get in on schedule. Our crews stayed in the field from the first break in the weather in April or May until November. We always got them back into town for the winter by Thanksgiving at the latest, but tried to get them in by Veteran's Day because the poor weather at that time of year stopped lots of aircraft flights, and we never knew when we would be able to supply our camps or get our crews out.

The crews would survey about a 6-mile stretch of road from one camp location, 3 miles each side of camp, and then we would pack the camp up and move it by helicopter to a new location along the projected line. Our head road locator, Mel Peura, would spend the winter trying to fit proposed road locations on aerial photos of the areas we were interested in. Some locations had to be discarded during this first step, but the crown cover of the trees, dense brush, and large areas of muskeg visible on the photos meant that many others had to be field checked to determine their feasibility.

Since our survey and construction costs were so high in Alaska, we were always on the lookout for new ideas and methods to use to reduce these costs. One of our first steps to get better surveys and reduce construction costs caused by poor line and cross-section information was to go back in time to what Forests in the lower 48 States were doing with low-order compass and abney preliminary surveys. We converted the two-person recon and line location check crew into a preliminary survey crew. This crew

used a compass, abney level, and tape to lay out a preliminary location. The method had been used for years by other Regions for low-class road location and is now more automated and computerized in the present PAL survey method. The crew's notes were sent into the office, where the office design crew would prepare the first preliminary road location drawings and notes. These first drawings and notes were then sent to the location survey team in the field, who would lay the mainline of the proposed location of the road on the ground and gather earthwork information for the final design. We found that there was very little more time required to follow this process and that we saved a lot of money and time in building the roads while reducing the number of claims from contractors.

We worked with Ketchikan Pulp Company, the aluminum culvert manufacturers, and other road building agencies in checking out the feasibility of using aluminum culverts in the acidic soils of southeast Alaska. Each survey crew carried rolls of pH paper and recorded the pH of every stream and other potential drainage structure locations as just another piece of information the designers and buildings could use. Most of our roads had to be built of "shot rock" obtained from rock quarries, as there are very few naturally suitable borrow areas in this country, and we spent a few hours crawling through aluminum culverts to observe any deformation or puncturing that might be occurring during construction or operation of the road system.

We also worked with Engineers from the Forest Products Laboratory in Madison, Wisconsin, on the preparation of loading and design tables for the design and construction of native log stringer bridges constructed of Sitka spruce or western hemlock. Later on, Frank Muchmore, who became the Regional Bridge Engineer, did extensive work in this field. Another of our special projects was to provide field support to Dr. Joe Clark, Forest Pathologist at the Madison Lab, on procedures to preserve and extend the life of native log stringer bridges in southeast Alaska. Without exception, the individuals from the Lab who we met and worked with accepted our less-than-palatial quarters with extreme good humor and taught us a great deal about our native log bridges and how to take care of them.

**Administrative
Leadership School,
Missoula**

In February of 1965, I had the good fortune to be selected to attend the Administrative Leadership School presented by the University of Montana at Missoula. This was my first exposure to a monthlong training session that included people in other technical disciplines from other Federal agencies and from all parts of the country, and it had a major influence on me and my career. I attribute my attendance at this school for keeping me in the Forest Service at times when pastures looked greener elsewhere. While the sessions did not relate specifically to engineering, they were important to my training and education in that they taught more of where the country was going and how we lower level managers in the Federal service fit into accomplishing overall national policies. A school of this type should be made a prerequisite for future Forest Engineers and other Engineering managers.

**Regional Office,
Alaska Region, 1966**

In March of 1966, I was promoted from the South Tongass to work in the GS-12 position of Assistant Chief, Roads and Trails, under Branch Chief Harry Gillette. This is a glorious looking title, but in a two-person shop, all

it means is that I did as much of the priority work that he didn't have time to do as I could turn out. The rest just didn't get done. One of these assignments was to work on verified recon with the Chief of Geometronics in the Region, Bill Bayer, and with Clair Arneson, who was the Chief of the Geometronics Branch in the Washington Office.

This program involved the field checking and analysis of a proposed method of locating and surveying roads in Alaska through the application of aerial photography and stereoplottling procedures. We were told that the process had been used in the more open areas of the Southwest for some time, but had not been tried extensively in southeast Alaska. There were a couple of old verified recon plots in our files that had been done as a demonstration project before I was on the South Tongass, and we had used them along with our regular aerial photos and topog maps, but found them unreliable and oftentimes downright suspect.

We selected a proposed road location project in the Carroll Inlet area near Ketchikan for our test of the proposal. We had started constructing logging roads from Shoal Cove and wanted to investigate the possibility of having a road from Shoal Cove to Princess Bay on Thorne Arm, a distance of about 16 miles over steep, thick timber-covered, and muskegy terrain. We felt this location was typical of a lot of southeast Alaska and would provide a fair test of the process. Bill Bayer and I field checked the plots Clair's stereoplotter operators had prepared in Washington and found several places along the route where existing grade and other terrain problems had not been picked up by the stereoplotter. We then prepared and forwarded our negative report, which was based on the results of this field check, to the Washington Office.

The large tree canopies obscured too much of the terrain to permit selection of a route location that could be expected to be suitable for use when checked out on the ground. In addition, tree growth patterns concealed steep rock cliffs and tended to "level" out the terrain that deceived the stereoplotter operator into thinking roads could be located where they, in fact, could not be. We believed that the local method of road location, which depended on local experience and existing topographic and aerial photography backed up by some work by local stereoplotter operators, was, if not superior to the proposal, just as good at much less cost as long as we had experienced woods-wise road location people available.

**Coeur d'Alene
National Forest,
1968**

In January 1968, I requested a transfer outside the Alaska Region for personal reasons and was offered and accepted a GS-11 Assistant Forest Engineer, Facilities position on the Coeur d'Alene National Forest in northern Idaho. This was a newly established position under Forest Engineer Earl Wilson. Some of my responsibilities, in addition to buildings, water systems, and sanitation systems, were ski lifts, fleet equipment management, road maintenance, signs, and supervision of the Forest Construction and Maintenance crew.

Bus Peterson, a superior roads/highways technician and an exceptional individual who was dedicated to the Forest Service, was in charge of the fleet and road maintenance. He also handled the licensing of drivers and took care of the sign program. Earl Lunceford was the leader of the C&M crew

and had a highly skilled group of artisans who could do almost any construction or maintenance job one needed to have done on the Forest. This group was so well known throughout the Northern Region that we were constantly being asked to loan them to other Forests to perform many highly skilled jobs, such as the erection of wooden fire towers and maintenance and repair of complicated water systems. In their spare time, this crew would build complete campgrounds and picnic facilities. They also provided support to the Coeur d'Alene and Savenac Nurseries when facility construction or repair work was needed.

The Forest Engineer had a special interest in providing safe drinking water at all our facilities and was the first that I know of to have us set up one man, Earl Burris, to conduct a regular, routine testing program for all water systems on the Forest. This was the only time in my Forest Service career that I saw what I thought was an adequate potable water program that met all Forest Service Manual requirements conducted on a Forest. Although our operations were being conducted before the era when Giardiasis was publicized and became important to the public, we were testing ultraviolet light water purification systems to find a method of water treatment that would be more effective than the commonly used chlorination process. The ultraviolet light process did prove more effective than chlorination but was limited to use at locations where 110-volt a/c power was available. As a result, we weren't able to make much use of it at campgrounds on the Forest.

In fulfilling my responsibilities for supplying technical engineering support to the Forest Service nurseries in our area, I began to work closely with Bud Mason, who was in charge of them and attached to our Forest Staff. Bud had a staff of resident nurserymen and nursery workers at the Coeur d'Alene and at Savenac until it was closed. We provided contract inspection services to him for the drilling of an additional well, installation of an irrigation pump, and design and construction of a dust collection system in the seed extractory at Coeur d'Alene and drilling of a well and installation of the irrigation system at the Lone Mountain "Super" Tree Farm.

We also began work with Bud on the growing and use of native brush species along road cuts and fills to prevent erosion. One year, we worked with Spokane high schools and had some of their student volunteers camped on the Forest to plant some of the brush along specific roads as part of their environmental awareness education. Bud Peterson worked directly with the students and spent much of his own time at their camp in the evenings discussing the National Forests and the environment with them. The Forest Service gained a lot of good friends through this short-lived program.

One of my "other" duties, and one I was most interested in, was to inspect the ski tows at Lookout Pass on the Idaho-Montana border. This was a small ski area, which was run by a local ski club, and we spent quite a bit of official and personal time helping them with extra inspections and advice to get their area up to national safety standards required for them to keep operating. We called on Leroy Schultz, the Regional Ski Tramway Engineer, and Chuck Dwyer, the National Tramway Engineer for the Forest Service, for advice and assistance. We had to convince many people, both inside and outside the Service, that tramway inspections and tramway engineers were necessary to assure public safety at ski areas located on the National Forests.

There were very few State or insurance company inspection programs at that time, and many of the programs that did exist were inadequate. Fortunately, Chuck and others, like Leroy, were fairly successful in promoting the need for adequate inspection programs, and time has shown that qualified tramway inspection engineers were indeed needed. Much of this work has now been taken over by insurance and State inspectors, and there is little need for a separate Forest Service program where adequate programs have been developed. However, some States have resisted forming any kind of tramway safety oversight program, and the Forest Service still needs the inspection expertise to assure public safety in those States where local authorities have done nothing. Through their involvement in the inspection and safety aspects of tramway engineering, Forest Service Tramway Engineers are generally held in high esteem by such organizations as the National Ski Area Association (NSAA), OITAF, and the North American Continent Section of OITAF.

In 1971, Earl Wilson, the Forest Engineer on the Coeur d'Alene National Forest, was promoted to a position in the Regional Office Engineering Division in Missoula, and I was fortunate enough to be promoted in place to Forest Engineer. That was the easiest transition I ever made in my Forest Service career, because I had been Acting Forest Engineer upon Earl's departure and he had left a truly professional working organization on the job. The promotion came at about the same time that Forest consolidation was a hot subject, and plans were afoot to combine the Coeur d'Alene, Kaniksu, and St. Joe Forests into one super Forest to be called the Idaho Panhandle National Forests. In fact, it was to be so big that many on the Forests involved and in the Regional Office began to call it the Regional Office—West. As plans for the consolidation progressed, many of us who held staff positions on one or the other of the Forests and were assisting in working on the plans and proposals for consolidation realized that we were going to be surplus to the needs of the new Forest organization. We were given some minor choice in being reassigned when the consolidation finally started to take place, and I was offered a GS-13 Road Preconstruction Engineer position in the Regional Office at Milwaukee, Wisconsin.

Regional Office Milwaukee, 1973

My assignment in Milwaukee was as Preconstruction Engineer, Roads. However, I found on my arrival that the Construction Engineer, Roads position was vacant, and I took care of both jobs for awhile. Other assigned tasks included trails, road maintenance, signs, transportation planning, and bridge design. I had a combined preconstruction and construction staff of seven to do these jobs. The Eastern Region Engineering organization had recently gone through a reorganization to move its direction from a central road design office in the Regional Office and Forest Service road construction to a program of road design work at the Forest level and timber purchaser construction as was used in the West.

My assistant for preconstruction was Kent Armentrout, who had recently been promoted to the Regional Office on a directed reassignment from his former position as Zone Engineer on the Wayne-Hoosier National Forests at Ironton, Ohio. He was one of the young engineers in the Region who displayed managerial potential but didn't want to move. Regional Forester Jay Cravens had resorted to directed reassignments to break this pattern and succeeded. Although there was some grumbling by the individuals involved,

it got the desired results and was able to be tempered in a couple of years. This program worked very well for Kent and for the Forest Service as he would have stayed a GS-11 Zone Engineer forever. When I checked on him in 1985, he was a GS-13 Forest Engineer on the Nicolet National Forest, with potential for an Assistant Regional Engineer position.

Assistant Regional Engineer George Scherrer was my boss, and he gave us all the support and encouragement we could ask for. We quickly learned we had to start from scratch if we were to change the Regional emphasis from Forest Service to purchaser construction. Fortunately for me, and for the Region, Kent was an eager, willing worker with good common sense, as well as being a quick learner. We were able to make the changes needed, and I think they were easier on us than on those in the field, even though the people on the Forests appeared to work at making the changes with optimism and enthusiasm. We went from 15 miles of timber purchaser road construction project starts in FY 1973 to approximately 90 miles in FY 1974 and to an estimated 204 miles in FY 1975 when I left the Region. Although small by western standards, these construction mileages had a big impact on the way the Eastern Region operated.

We worked on some important road and highway safety projects that George Scherrer proposed to us from time to time, and when I left, I took the results of these projects with me for use in other Regions. We reviewed the process for checking designs for adequate sight distances and design speeds that were commonly used and found them to be inadequate and time consuming to apply to the higher speed recreational-traffic-type roads we were building in some areas. We asked for help from Harvey Krantz, our Engineering Computer Specialist, who developed a computer program for determining design speeds on segments of roads. We then incorporated some design speed transition charts that George had modified for Forest Service use into our proposed process but, because of my and Harvey's promotions and transfers, never got that part of the process computerized.

We also worked on providing adequate guidelines for placing guardrail on road projects. We found that even the Federal Highway Administration was in a quandary on this subject and had changed their guardrail warrants (as they called guidelines) often in the short period we were trying to get them set for field use.

One summer while I was in Milwaukee, forest fires out west continued for so long that the regular firefighting crews were exhausted. Many fire line teams were formed by Eastern Forests and State land-related agencies. A crew made up of Regional Office personnel (called RO Crew #1) was formed, and we joined about 225 people forming other crews in Chicago early one morning en route to the Pilikan fire near Lake Tahoe in California. We took lots of jeering and ribbing from the regular hotshot and Indian fire crews when the PA system would announce the RO #1 fire line assignments, but we performed well and came back a lot prouder Forest Service employees.

**Regional Office,
Ogden, Utah, 1975**

In 1975, I was promoted and transferred to the position of Assistant Director of Engineering, Technical Support in the Intermountain Region and worked for Regional Engineer Cliff Miller. I had been following Cliff around the

country during the course of my career. He had been in Alaska before I got there and was Regional Engineer at Missoula, Montana, when I first went to the Coeur d'Alene National Forest in that Region. I was very pleased to finally be working directly for him. My responsibilities included transportation planning; road survey, design, construction, and maintenance; bridges and ski lifts; buildings; water and sanitation; dams; and electrical engineering.

As could be expected at this level in the organization, almost all of the technical work was done by my 12 staff specialists, while my tasks were primarily office assignments and paper work and was pretty much routine.

Our major emphasis was to adopt a program that took all of the budget and project planning information to prepare a listing of funded projects and then tracking these projects through to completion. The lack of continuity between proposed programs and actual programs had been a problem at the Regional Office level for some time. We were able to present proposals and plans very well, but seemed unable to keep them as firm project programs during design and construction. I recalled what a Forester on one of the Forests had told me years before about the 2-year timber sale program when I had complained about its lack of continuity. He had said that we could pretty much count on the first 6-month listings in the program, feel that some of the sales in the second 6-month listing would occur, but that the second year of sale listings was only a wish list. We wanted to change that type of operation for Engineering projects.

We decided to tackle this problem in the bridge design and construction program first and made special efforts to adhere pretty much to the original priority listings. It was pretty tough sledding at first because other staff units in the Regional Office didn't want to lose their "flexibility" in their programs that we were supporting. However, we were able to show them savings in work time and dollars over a period of time and succeeded in gaining their cooperation and support for what we were trying to do. As a result, we were finally able to present a 5-year bridge design and construction program where the first 2 years of projects were firm and the third year nearly so. The fourth and fifth years' projects were more subject to change because of changes in national direction or environmental concerns that arose after projects were originally identified and placed on the programs. With this success behind us, and with support from the Forests, we proceeded to do the same with our buildings and other programs. The buildings program was generally as successful as the bridge program had been, but congressional and Washington Office changes and additions made this program more difficult to stabilize.

Our bridge design unit placed special emphasis on bridge inspection and maintenance needs reporting to comply with the requirements of the laws and direction on the inspection and maintenance of existing bridges. We found this to be a time-consuming task, even though we had expert people doing the job, and often questioned whether all Regions were able to complete this task according to Manual direction. We always felt that field testing of this kind of program was necessary before we attempted to implement it. We believed that those in the Washington Office in charge of this and similar programs should go to the field for 6 weeks or so and try to comply

with the direction they had formulated and required. Certainly some Manual direction would be changed if this were done.

A lot of emphasis was being placed on closing low-class and intermittent roads during the period of 1975-1988 because of criticism from environmental groups and others about the Forest Service road construction program coupled with a reduction in funding for the road maintenance activity. (Other maintenance programs were facing the same problems.) As a result, we were forced to recognize that our Region was beginning to change from a road construction to a road maintenance outfit. This change was readily apparent on the Uinta National Forest, where no new roads were being proposed and the management team declared the Forest fully roaded. During this period, we closed many roads and let them return to a natural state. I don't think we obliterated any, but we did require oil well drilling companies to obliterate some of their access roads after they had completed drilling for exploration wells that didn't go into production. Gary Marple, Forest Engineer on the Bridger-Teton National Forest and an exceptional individual, was the most successful in walking a tightrope between the production and environmental factions using the Forest and carried out a successful program of providing needed access to the oil industry while demonstrating to the environmental community that we were concerned about the environment and could be trusted to carry out our promises to protect it. All of us in the Regional Office pointed with pride at Gary and the projects he rode herd on and the excellent results he achieved in their completion.

Much of our staff time was taken up with the review of draft and final environmental impact statements and analyses and Forest Plans. Many of us looked upon the review and comment on these documents as a necessary evil because the laws required them, but often felt that they were seen by those who prepared them as paper exercises to comply with the law but were not really what would happen when the time came to execute the Plans. One outstanding exception to our general feeling was the excellent presentation in the engineering portions of the Forest Plan for the Targhee National Forest. Dick Hahn was the Forest Engineer at the time, and his well-thought-out proposals were well documented in this Plan.

Unlike many writeups of roads and facility proposals in other Plans, Dick's were clear and concise and included proposed dates for execution of the proposals and methods of financing. The clarity and conciseness of the draft Plan stood out when compared to the more general run-of-the-mill Plans that left the reader wondering what was really going to happen.

Les Paul was in charge of the facilities group for a time and published the first Forest Service public information and warning brochure about Giardia that I had seen. Giardia had become a serious problem for backpackers in the Jackson Hole area, was rapidly becoming a threat to all Forest recreationists throughout the country, and was beginning to receive national attention. Les' brochure, which was distributed to the Forest users and to other Forest Service offices, was soon followed by one on the same subject prepared by the Washington Office.

We did a lot of work on providing a program to use factory-built modular unit buildings to bring building construction costs down. Wilden Moffett,

our Architect, was successful in making this program effective and in getting more standardized designs for new Ranger Station buildings. He also standardized designs for Ranger District office buildings, which could be modified to provide for solar energy alternatives as the need and desirability of using solar energy for assistance in heating the buildings dictated. Some of the more interesting projects we were involved in at the time were the design and construction of a new Ranger Station residential area for the Cobalt Ranger Station and the expansion of housing facilities for the Salmon National Forest.

Although our policy had been to get out of providing Government-built employee housing wherever practical, we were faced with providing it at the remote Cobalt Ranger Station location on the Salmon National Forest to keep our employees there. A similar problem, and just as important if we wanted to keep high-caliber employees, was to provide housing in the resort community of Jackson Hole, Wyoming, where housing costs were completely out of the economic reach of most of our people. Wilden Moffett came up with some unique designs to house various-sized crews at Cobalt while providing the Ranger the flexibility of opening and closing units to accommodate the various sizes of crews, thus conserving heat and energy wherever possible. The first phase of this project was nearing completion when I left the Region.

The solution to the Jackson Hole situation was quite different. We had some land in the town of Jackson and close to the outskirts of that community that had some dwellings on it but that would accommodate several more. However, funding was not available to build the needed housing, and the Forest proposed setting up trailers on this location. After much discussion pro and con, everyone involved decided that we would be subject to extreme pressure from the local community against the project and it would be contrary to local policy to install a trailer court.

At about that time, the Bureau of Reclamation was beginning to implement their project to rebuild the Jackson Lake Dam and had need for employee housing for 2 or 3 years. They met with our Forest managers and agreed to fund the construction of permanent housing on our site at Jackson, which would be turned over to us for our use after the dam reconstruction job was completed. Our tasks under the agreement would be to design the project and provide the construction inspection and administration to meet their time frame for occupation. Forest Engineer Gary Marple and his Forest Supervisor came into the Regional Office to present the proposal. Thanks to Gary, who called ahead to give me the pertinent details of the proposal, we were able to assess our architectural work load with Facilities Engineer Terry Harwood and Architect Wilden Moffett before Gary arrived to make the presentation.

Although our architectural work load was very heavy at the time, we felt that Gary's proposal was too good an opportunity to pass up. We also had a lot of faith in Gary and knew that he would stand by any agreement he made to assist us in getting the job done. We were pleased to give the project our immediate approval and backing and to assure the Regional Forester that we could and would get the job done. There was an excellent show of cooperation and coordination, and everyone involved had a good feeling about the project. The project had just started when I left the

Region, but further checking with Terry Harwood later on indicated that it was completed to everyone's satisfaction and on time.

The same era saw the importance of archeology increasing in impacting our work, especially in our construction and heavy maintenance projects. Much of the southern part of the Region had once been settled by ancient Indian tribes, and ruins and artifacts are still to be found in that area.

We had archeologists traverse our road and other project locations and provide direct input into project design. One particular project I remember was on the Manti-LaSal National Forest, where the archeologist had found an ancient storage chamber in the shoulder of a proposed road improvement project. Forest Engineer Bill Boley worked directly with the archeologist to determine how to best preserve this find. They finally decided to catalog the site, map its location, and cover it carefully so that it wouldn't be disturbed. The project was then built over the find so that people wouldn't be able to discover it and destroy it.

We were heavily involved in ski lift inspections in the Region. The Wasatch Front was a nationally important ski area, and there was an aerial tram as well as several ski lifts located there. Jackson Hole and Grand Targhee were a couple of other popular areas. Our work involved doing the annual ski lift inspections, usually in conjunction with the lift inspectors employed by ski area insurance carriers. On one trip, Bill Turner, our Regional Tramway Engineer at the time, was involved in working with the Washington Office Tramway Engineer, Chuck Dwyer, and the manufacturer to determine why the carriage on a Riblet lift installed at Grand Targhee Ski Area didn't move according to the designer's calculations and specifications. After many phone calls, discussions, and some harsh words from the lift manufacturer, we found that some of the equipment had not been properly lubricated or maintained. The manufacturer finally replaced some parts with a different material that was easier to maintain and did a better job, and our relationships took a turn for the better.

I was always proud of our Tramway Engineers, Bill Turner then, and Dick Bird later, and of the thoroughness that they demonstrated in performing their work and of the excellent help and support we got from Chuck Dwyer. Some of their publications and programs have been used as models in developing operating plans for off-Forest ski areas. Although insurance companies, State tramway authorities, and private inspectors are now taking over much of the work we did, Forest Service Tramway Engineers were pioneers in the field and were instrumental in assuring lift user safety on the National Forests.

Alaska Region, 1985

After more than 9 years in Ogden, I transferred to the position of Assistant Regional Engineer, Program Support in the Alaska Region, working for Regional Engineer Jim Wolfe. This position had become vacant, and a candidate had been selected to fill it under a directed reassignment because of changes that were being made in another Region. However, the selected candidate was rather reluctant to take the job if some other assignment in a location more to his liking could be arranged. Since I had lived in Alaska for years, was familiar with the living and what I remembered of working

conditions there, and thought I had done all the good I could in Ogden, I volunteered to trade assignments.

Top management agreed, and I was on my way back to Juneau. Fortunately, I had enough presence of mind to understand that things would be far different than they had been 20 years before and to treat this assignment as a completely new job for me in a new office. A few oldtime Alaska hands I had worked with before were still around, and several others who I had worked with or met at other locations were in the office.

Since my new job was more in the bookkeeping and office-oriented engineering work than my previous assignments had been, I had to think back about 12 years to recall how we handled things in these areas when I was responsible for them on the Forest. I had good, experienced people in place, and business went on as usual while I got up to speed. My responsibilities were the Engineering budgets for the Region and for the Regional Office Engineering organization, fleet management, signs, Engineering computers, transportation planning, aviation management, cadastral survey, and geometronics. I was also deeply involved in reviews of environmental impact statements and analyses, reviews of Forest Plans, and special Engineering organization studies.

We also became deeply involved in the use of a global positioning system for land surveying, which used satellites and electronic equipment for locating our positions on the Earth. This system was used by our land surveyor and geometronics people to survey and map the Hubbard Glacier and Situk River areas near Yakutat, Alaska, under emergency conditions.

The glacier had blocked Russell Fiord and threatened to back water up high enough behind it to flood the surrounding land area and seek another overflow outlet down the Situk River to the ocean. The Situk River is an extremely important fishery and fish-spawning resource for the local population and is noted for its sports fishing by steelhead fishermen throughout the country. This situation became a national issue with fisheries people, sportsmen, and environmentalists, and the USGS was put in charge of a multi-agency project to prepare plans to take care of the expected flooding and to provide plans for the mitigation of damages.

Good maps showing accurate elevations in this remote area were not available, and no one was able to determine what directions the overflow from the newly formed lake was likely to take without them. Our Regional Cadastral Surveyor used the new satellite surveying system to prepare the location and elevation information for the mapping that would be done to continue with the project. At first, there was quite a bit of questioning of the process and the accuracy of this method of survey (especially regarding the accuracy of the elevations) by some of the USGS people involved in the project. But, on rechecking their notes, they found some discrepancies and finally agreed that the information provided by our surveyor was indeed accurate. The results of this survey have been used by the interagency team, our hydrologists, engineers, and others for planning how to divert the overflow from behind Hubbard Glacier should it block Russell Fiord again. The last scientific predictions that I saw indicated this would eventually happen.

Our Aviation Manager, Ned Horn, and Engineering Computer Specialist, Phil Fishel, worked with the Washington Office in trying to get a computerized system for aircraft use reporting that would be suitable for use nationwide up and running. The leaders of this program in the Washington Office had prepared the program and issued it to us with directions to use it without change.

They had taken care of all of the aircraft use situations they were familiar with, especially for fire use, but had not provided for some of the other operating situations we encountered daily in Alaska. We sent them a report describing the problems we encountered in trying to implement the system for our situation and pleaded with them to visit us and experience what we had to do to obtain good information to manage our aviation program. Unfortunately, for some unknown reason, pride of authorship perhaps, they would not listen to what we thought were constructive suggestions that outlined our concerns about fine-tuning the system so it would include those portions we needed.

The result was another edict to use the system as it was. This resulted in having Forest aviation managers and dispatchers keep two sets of records. They were forced to keep the records needed to run the local aviation program effectively by hand and to prepare a separate one they could not use in the computerized format to forward to Washington for Washington Office use. This direction created more useless work, which took up the time of trained personnel who should have been available in the field to promote aviation safety and to run this vital program. We believed that the computer had been used to create more work for computerizing's sake instead of having it save us time and effort. A field trip by those in charge of the program would have saved them and us a lot of grief and misery and provided a more efficient program.

Retirement, 1988

So much of my work in the Regional Office in Juneau was so routine and merely a repeat of introducing some of the same planning, programming, and follow-up procedures that were not being used there but had proved successful in the past that I became bored with the work and decided that it was time to move on to something else and take regular retirement when I became eligible.

The work load was smaller than that I had routinely handled on the Coeur d'Alene National Forest in my earlier years, and, with the advancements in transportation and communications over the years, I really question the need for a Regional Office in Alaska, except for purely political reasons. Since there wasn't any available assignment I knew of in the Forest Service that I was interested in at that time or that I had an opportunity of obtaining, and I was effectively isolated from the field of engineering I liked, I decided to retire.

In looking back, there are a couple of jobs I would liked to have tried my hand at during my Forest Service career. These are Regional Engineer or a technical engineering position in the Washington Office, but those opportunities never came my way. Nevertheless, as I stated earlier, my career in the Forest Service has been a good one, and I'd do the whole thing over again.

My History of Engineering in the Forest Service

William Kent Armentrout

My Forest Service career began on the Monongahela National Forest in West Virginia in 1962. I had worked for the Forest Service for three summers while attending West Virginia University. Those were some good times. I learned a lot during those summers. It was a welcome break from the books—good hard physical work—and I made some lasting friends. A lot of the men on the survey crews had considerable experience. I remember they would let us young fellows just wear ourselves out swinging a brush-hook in mountain laurel. Then, as we were about exhausted, Charlie Mauzy would say, “now that you are willing to listen.” He would then show us an easier, safer way of cutting that type of brush. Experience was often the best teacher.

I can recall an incident in the design shop. William (Bill) P. Mahoney did the majority of road surveys on the Forest during the summer months and drafting in winter. He was without a doubt the fastest man in figuring slope stakes in his head of any one I ever met. I learned a lot from Bill. While I was working during one semester break, we were working on drafting plan and profile sheets for a road design job. In those days, we did drafting the old-fashioned way—by hand. As Bill worked on the profile sheet, an ash fell from his cigarette and burned a small hole in the sheet. Well, Bill looked around and thought no one saw him. He circled the small hole and wrote “Forest Fire” and went right on as if nothing had happened.

We developed several low water crossings on the Monongahela, consisting of a bank of culverts encased in concrete. Those crossings were designed to permit water to flow over them in times of high water without damaging them.

I worked on several local road designs. Those were the early days of computerized road design—we hand carried road designs to the old BPR office on North Glebe Road near Washington, D.C., and used their computer.

I was involved with some of the early work in establishing the facilities for the Camp Anthony Job Corps Center.

As the inspector on Cranberry Mountain Visitor Center, I spent the better part of a year on the mountain. I remember when that project first got started—the Forest Supervisor, Ephe Oliver, visited the site, and he came up to me and just shook his head—“Kent,” he said, “I knew it was going to happen sooner or later—the bears have started using toilet paper.” We had a portable toilet the next day.

Many of my closest friends from the Forest are long since gone, but I will cherish their memories. I guess I have a soft spot for the Monongahela—because I was born and raised in Elkins, West Virginia.

In January 1967, I was offered and accepted a GS-11 position as the Zone Engineer on the Wayne National Forest in Ironton, Ohio.

The Wayne was an interesting Forest with a District Office in which Engineering shared the rental space in Ironton, Ohio, another District Office at Athens, Ohio, and a small office on the Marietta Purchase Unit.

The Vesuvius Job Corps Center was located on the Ironton District. Unfortunately, it was among some of the Job Corps Centers that were closed.

John Ward was the Ranger at Ironton when I arrived. John retired as Ranger on our sister Forest, the Chequamegon, in July 1989. I also met Tom Richart at the Vesuvius Job Corps Center and later worked with Tom on the Nicolet, where he was Administrative Officer. Tom is now in the Regional Office in Milwaukee in Planning/Program/Budget.

The Wayne was heavy on recreation use. We had a variety of facilities—Vesuvius Campgrounds, Vesuvius Dam. We had our own water treatment system in which we took water from Lake Vesuvius, treated it, used it in our campground and bathhouse facilities, ran it through an extended aeration treatment plant and then through rapid sand filters, and discharged it back into the lake at a higher quality than when we took it from the lake.

It was during one of our inspections of the water treatment facilities that Rick Hann, my assistant, was holding up a steel manhole cover while I was observing the degree of flocculation in the water tank, and Rick noticed an extremely large spider on the bottom of the cover near his hand. He let go of the cover, and it came down across the toes of my left foot. That hurt so much that I just ran around in a circle for about 5 minutes before I could even say ouch! One broken big toe.

We did some fairly heavy road construction on the Ironton District. One project was about 4 1/2 miles of double lane on new location. The majority of the project went very well. We had a landslide problem on one end of the project that we later determined was caused by a thin layer of montmorillonite clay overlaying a coal seam.

I remember one incident when Paul Brohn, District Ranger at Athens, and I were doing some transportation planning and route location when we got in one heavy downpour. We were probably 2 miles from the truck, and we started out when Paul said he knew a shortcut. Well, the shortcut didn't turn out so well, and when we got back to the vehicle, I was so wet my pockets were full of water.

Strip mining for coal was in progress when I was working on the Wayne. We had one operator who trespassed on National Forest land and strip-mined coal. Strip mine reclamation was required on National Forest land. We used to regrade the slopes and plant locust trees for stabilization. We discovered that one could get a better initial stabilization by planting a mixture of grasses, including Kentucky 31, and then go back in a year or so and

plant locust trees. The only time I have been to court in my career was when I was subpoenaed as a witness in a case in Ironton involving strip mine spoil material sliding off of a mountain and onto private land.

The work on the Wayne was enjoyable. It is a little different situation when the Forest Engineer (H.P. "Doc" Morrison at the time) was located almost 300 miles away in Bedford, Indiana. We sometimes used small single-engine contract planes for getting together. Some of those flights in the weather common to Indiana were not my most pleasurable experiences.

For relaxation, I used to look for arrowheads in the plowed fields along the Ohio and Scioto Rivers. That area is rich in archeological items. I also hunted small game; in fact, I believe that the wild turkey that I shot in the late 1960's (in the State's first spring season) was the first legal wild turkey taken since about 1905.

I was offered a promotion to the Regional Office in Milwaukee in the fall of 1972, which, after some thought, I decided to accept.

The position in Engineering was to work in the timber purchaser program as the Region was becoming more deeply involved in this area. This opened the opportunity to work with other Regions and capture their experiences in the development of CT clauses. I probably worked as much with the timber folks as I did with Engineering in these first 2 years. We were able to use several of the western Region's CT clauses, but in some cases we had to go through the development stages to generate our own Regional clauses.

We made several Technical Assistance Trips (TAT) to the various Forests to assess the implementation of the timber purchaser program. We met several dedicated, hard-working people on the Forests.

There was one story told to me by John Castles, Director of Timber Management in Region 9, concerning purchaser credit roads. It seems that John had been on a road inspection with a young engineer, and the inspection wasn't going the best. There was concern about the clearing width, the drainage, the slash disposal, and the surfacing. When they got to the end of the project, the exasperated young engineer said, "Well, you didn't have much of anything good to say about the road, John—how did you like it for length?"

I was able to participate in a 30-day detail with Billy Hawse from the Monongahela and Neal Mason from the Regional Office to Region 1 to assist in designing several miles of purchaser roads. This was at a time when sales could be sold and the road packages completed at a future date. We had a very busy, but enjoyable time.

Shortly after getting into the purchaser credit program, I recall accompanying Sterling Wilcox on a trip through some of the Lake States' Forests. We flew to Cadillac, Michigan, rented a car, looked at various projects, and met many of our Engineering personnel on the Huron-Manistee, the Hiawatha, and the Nicolet. It was a quick trip, but an enjoyable one.

I enjoyed my tour in Milwaukee, once I arrived there, and worked with some fantastic people: Floyd Curfman, George Scherrer, Norm Sears, Ron

Hayden, Ken Tompkins, Chuck Bloomdahl, Chuck Gilbreth, Victor Hedman, and Bernie Jenkins, just to name a few.

I was able to work with many of the disciplines and made lasting friendships. I believe the value of an assignment in the Regional Office is the different perspective you receive when dealing with issues and policies affecting a broad geographical area. I was able to become familiar with the interworkings of some of the other areas in Engineering, such as budget, facilities, geometronics, fleet, and signing. I participated in developing and testing some of our Engineering Certification examinations.

My assignment in Milwaukee was very beneficial, provided experiences that you couldn't get anywhere else, and prepared me for a Forest Engineer's position, which I assumed in the fall of 1976 in Rhinelander, Wisconsin, on the Nicolet National Forest.

My assignment on the Nicolet has been interesting, challenging, and rewarding. I don't believe I could have had a better group of people to work with.

When I arrived on the Nicolet, the Forest was experiencing a growing timber program. The Forest is blessed with an abundance of markets for just about any timber product. The timber program was about 45 MMBF then and has steadily grown to 89 MMBF this year.

This steady growth caused us to look at our Engineering work load and organization. We conducted a work load analysis that resulted in upgrading the Forest Engineer's position and identifying two Assistant Forest Engineer positions. The steady growth in the timber program required an accelerated roads program. It was in the late 1970's that we were involved with Senator Nelson (Wisconsin) in the development of a preroad program for the National Forests in Wisconsin. The Senator was seeking the support for small Wisconsin loggers that would relieve them of the responsibility of constructing roads in excess of \$2,000 instead of the \$20,000 figure established nationally. Rather than affect the National threshold, monies were made available for a preroad program for the National Forests in Wisconsin. This accelerated roads program peaked in fiscal years 1981-1986 to produce a roads program of 55 to 60 miles annually, consisting of both preroads and purchaser credit roads.

Roads were identified as an issue by our publics during our Forest planning effort. Some believed there were too many roads, others not enough; some believed roads were too high a standard, some not high enough; some believed more roads should be opened, some more roads closed. The planning effort did allow us to focus in on road standards and provided for the Traffic Service Level concept, which I believe made it easier to communicate with our publics. At the request of Forest Supervisor *Jim Berlin*, I produced a Nicolet roads booklet in an attempt to answer public concerns about roads on the Forest.

The success of our roads program was due to the hard work and dedication of people like Larry Williams, Jake Savoula, Mike Miller, Mike Bancroft, and Jim Kennedy in preconstruction; Dick Stelow (one of the best designers I have worked with), Bob Hubacher, and Bob Conner in design; Randy

Smits, Steve Sprister, and Rich Ahlfs in construction; Jim Marcell and John Sedivy, Zone Engineers; and Al Johnson, Assistant Forest Engineer, for construction and preconstruction. They, along with others, are the key players on our Engineering team.

Shortly after I arrived on the Nicolet, the responsibility of landline location was shifted from Lands to Engineering. With the support of the Supervisor, Rangers, and the Region, this program has grown steadily with the program averaging well over 100 miles per year for the last 4 years. We have had the opportunity to use some of the latest technology. We completed the Region's first major 36 Section Township Subdivision using a global positioning system (GPS) and aerial photography. This very rewarding project was carried out by our North Zone Cadastral Surveyor, Bill Cochrane, and generated substantial savings over conventional survey methods. Milo Stefan, our South Zone Cadastral Surveyor, coauthored a publication—*Identification of Bearing Tree Remains*. The publication utilizes colored electron microscope slides to aid surveyors in the field to identify wood species. Al Harrison replaced Milo and is doing an excellent job of surveying.

A considerable amount of Engineering effort is expended in providing technical support to our Blackwell Job Corps Center. Let me say right here that we count ourselves very fortunate to have Blackwell on our Forest. It adds a very positive dimension to our management opportunities. Blackwell is a 205-person center; we went coed in 1987. We have a very good partnership with Blackwell and have integrated them into management on the Forest. We have always had a very active vocational skills training program at Blackwell with about one-half of our training expended on Forest projects. The vocational offerings at Blackwell include: carpentry, painting, electrical, welding, culinary arts, business/clerical, and maintenance. It is so impressive and rewarding to be part of a program that can mold and shape young men and women to be productive members of our society.

Probably, the program that has had the greatest impact and rewarding experience of my career has been the development and implementation of a program that we have called Mobile Corps. The program started in fiscal year 1986 and is expanding today. Mobile Corps is basically the fabrication of wall panels and trusses for various building types in a controlled environment. The panels are prepainted, insulated if required, electrical conduit installed, and loaded on flatbeds along with trusses and shipped to the erection site. Generally, the receiving Forest is responsible for providing the site work and slab. An erection crew is then sent to the site, spike camped, and the buildings are erected in a little over a week.

The primary benefits of this program are:

- (1) Affords a quality opportunity for training on a variety of buildings in support of our vocational offerings at the Blackwell Job Corps Center.
- (2) Helps support funding for vocational skills training needs—the Forest Service purchases materials for structures.
- (3) Is rewarding experience with a lot of self-satisfaction as projects are completed within a relatively short time—from 6 to 12 weeks.

- (4) Meets a Forest Service need in the area of building construction and maintenance and improves our efficiency in this area.

This program is an excellent example of teamwork and everybody pulling together, such as Dennis Pratz, Union Carpentry Coordinator at the Center; Frank Koenig, Center Director; Jim Berlin, Forest Supervisor; Milford Jones, Regional Engineer; Dave Dercks, Regional Architect; Jim Rawlinson, Director of HRP; and Regional Foresters Larry Henson and then Floyd (Butch) Marita. We have had excellent support from Gordon Carlson, Regional Director of DOL, Region 5. As someone said, "The sun, moon, and stars are all in alignment in this program."

The design for Mobile Corps projects is done on the Forest by Dennis Nordquist, a very talented civil engineer, and reviewed and approved by the Regional Engineer. The drafting is done on a Compaq 386 by Randy Bacon, Engineering Technician. Randy spends many full days in front of "his" machine.

We have concentrated primarily on warehouses 26 feet by 32 feet deep, with the lengths in multiples of 12-foot bays—the most common length being 78 feet or 102 feet. We have also designed chemical storage buildings, a three-bedroom ranch home, and will be starting on an office complex that will be unique. I am referring to a combined natural resource and information center (two levels of 10,000 square feet each) to house our Florence Ranger District, the Wisconsin Department of Natural Resources District Office, Florence County Division of Parks and Forestry, and University of Wisconsin—Extension. Mobile Corps will fabricate the wall panels, trusses, and do all erection to enclose the building to the weather. The remaining work will be done through normal contracting procedures. This has been an interesting and challenging project—to coordinate and develop the lease and project development agreement for three levels of Government and four agencies under one roof.

Our accomplishments in Mobile Corps to date include the information provided in the tables at the end of this chapter. I estimate that we have been able to infuse into the Job Corps vocational skills training program \$176,000 in fiscal years 1987–89 by purchasing materials for Mobile Corps projects. During this same period, we have conservatively saved our FA&O program over \$300,000.

We are currently marketing the Mobile Corps program, and this gave me the opportunity to make presentations at the National Meeting for the Directors of DOL in Washington, D.C., in December 1988. We also met with Jim Webb, an Associate Deputy Chief, and Larry Bemby, Director of HRP. I participated in the 25th Anniversary Meeting for Job Corps in Green Bay, Wisconsin, this past May to share the program with the Center Directors of the 18 remaining Conservation Centers in the Forest Service. I have prepared two brochures, one just on Mobile Corps and the other on partnership opportunities between Forest Service offices and Job Corps centers.

I have also been working with other Regions and sharing information and designs with them. Key contacts have been Ken Tompkins, Assistant Director of Engineering in Region 2; Tom Pestotnik, Forest Engineer, Shasta-Trinity National Forests in Region 5; and Sam Fischer, Engineer in

Technical Services, Region 6. It is easy to share designs with the use and compatibility of many personal computers.

The Nicolet has been on the cutting edge of many of the Service's innovative applications: a geographical information system (GIS) called Map Overlay Statistical System (MOSS); a public domain supported system—Integrated Resource Management Automated (IRMA)—working with Texas A&M University personnel utilizing artificial intelligence applications; computerized road design utilizing the HP 9000 (the only HP 9000 capability in Region 9); and the development and testing of the National Job Corps Database, the first CAD System (Compaq 386 utilizing Cadvance) as a Forest in Region 9.

Things are changing in the Forest Service with the implementation of Forest Plans and the public more interested and concerned about the management of their National Forests. We have seen exciting changes taking place—more freedoms through Project Spirit, better teamwork through Team Excellence, working closer together internally and externally through IRM, recognition and awards for our people, Workforce 1995, and strength through diversity.

Through my tenure on the Nicolet, I worked for a fantastic Forest Supervisor, Jim Berlin. I believe Jim may be one of a vanishing breed. He told it like it was. He didn't pull any punches. He shot straight from the shoulder—well, sometimes from the hip—but he was generally very accurate. I learned a lot from Jim, and I wish him the best in his retirement.

FY 1987-1988

<i>Project</i>	<i>Size sq. ft.</i>	<i>Cost of materials & shipping</i>	<i>Cost of site work & slab</i>	<i>Total \$ \$/sq. ft.</i>	<i>Appraised value @\$25/sq. ft.</i>
Bessemer Vehicle Storage (Ottawa National Forest)	<u>26 by 78</u> 2,028	19,750	11,888	<u>31,638*</u> 15.60	50,700
Ontonagon Vehicle Storage Warehouse (Ottawa National Forest)	<u>26 by 102</u> 2,652	20,200	12,500	<u>32,700*</u> 12.33	66,300
Forestry Sciences Lab Vehicle Storage Warehouse (Rhineland)	<u>26 by 78</u> 2,028	19,000	9,973	<u>28,973*</u> 14.79	50,700
Cass Lake Vehicle Storage & Warehouse (Chippewa National Forest)	<u>66 by 104</u> 6,864	28,400	105,500	<u>133,900*</u> 13.27	252,300
	<u>3,228</u> second-level storage 10,092				

*Does not include design and spike camp costs.

FY 1989

<i>Project</i>	<i>Size sq. ft.</i>	<i>Cost of materials & shipping</i>	<i>Cost of site work & slab</i>	<i>Total \$ \$/sq. ft.</i>	<i>Appraised value</i>
Toumey Chemical Storage (Ottawa National Forest)	<u>26 by 40</u> 1,040	18,231	13,000 (est.)	<u>31,231*</u> 30.03	41,600 (@\$40/sq. ft.)
Park Falls Vehicle Storage Workshop (Chequamegon National Forest)	<u>26 by 102</u> 2,652	21,955	23,100	<u>45,055</u> 16.99	79,560 (@\$30/sq. ft.)
Lumber Storage No Slab (Blackwell JCC)	<u>26 by 90</u> 2,340	11,021	2,576	<u>13,591</u> 5.81	23,400 (@\$10/sq. ft.)
Rapid River Vehicle Storage Warehouse (Hiawatha National Forest)	<u>32 by 102</u> 3,264	22,274	22,911	<u>45,186</u> 13.84	97,920 (@\$30/sq. ft.)

*Does not include design and spike camp costs.

Twenty Years of Equipment Development— March 1965 to July 1985

Farnum M. Burbank

I came to the Forest Service in March 1965 to a position of Branch Chief, Design and Test, in the Equipment Development Center. It was then located in the Southern Zone Fire Depot, Arcadia, California. A new facility in San Dimas, California, was under construction but not ready for use at that time. We made the first part of the move in July 1965, but it took almost a year to completely activate all facilities. This, by itself, was a real challenge for “a new hire,” as I was assigned responsibility for all installations and “getting things going.” But in addition, we had an assigned program to work on, and I was busy learning all about Forest Service Engineering practices.

No history or reminiscing would be complete without remembering some of the people I worked with in those early years, who had such an impact on the following years of my Forest Service career. Foremost in my memory is Gene Silva, then Director of the Center. Gene was a wonderful, warm-hearted gentleman. He seemed to take me “under his wing” and tutored me in the ways of the Forest Service and Equipment Development. He had over 20 years of background in Engineering and seemed to know everyone. I know he was highly respected by everyone who knew him. He became my close friend and ultimately my benefactor. I attribute to him all of the success that I may have achieved in the Forest Service.

Herb Shields was Branch Chief of Planning and Programming at the time I started. Herb had also been around for many years and provided me with much knowledge and background in overall Forest Service activities. We did have much in common, also, as I had come out of 15 years in the aerospace industry, and Herb’s first love was aviation. I believe that he was personally responsible for most of the early development in fire retardants and aircraft delivery systems. I followed his lead when we were involved in those activities. I remember well the patience and understanding of the two planners who were at the Center when I started—Elmer “Hokie” Hokanson, Resources, and Virgil Shoemaker, Fire Specialist. They were typical of what I expected Forest Service people to be like—dedicated, likable, and helpful. When they talked, I listened and listened and. . . .

A year or so later, three more specialists came on board to help broaden our team of operations at San Dimas. They were Sterling Wilcox, Engineering, Walt Weaver, Sanitation, and Dick Spray, Recreation. My association with these three was a real experience—hectic, humorous, educational, and productive. They developed projects in their respective areas of expertise, got the funding arranged, and coordinated with field personnel. My Branch then did all of the design, development, and testing, so we had a close day-to-day



Farnum Burbank (left) with Gene Silva, 1971.

working relationship, and my education continued. My thanks to all of these people. They molded my career.

In addition to the above, there were others that worked closely with me and supported me in our efforts to move ahead in an effective Engineering organization. Coming to mind now—Dan McKenzie, Mechanical Engineer, Don Sirois, Mechanical Engineer (Don eventually moved to Washington, then to Engineering Research in Auburn, Alabama), Lu De Bernardo, Mechanical Engineer and Spark Arrestor Specialist (now deceased), Rob Harrison, Mechanical Engineer (Rob became the sound and noise specialist), Leonard Della Moretta, Civil Engineer, Tom Roberts, Photographer, and Harry Peterson, Shop Foreman. After a couple of years, Dave Rising, Mechanical Engineer, came on board. Dave was a great help in our planning efforts and worked on several special projects.

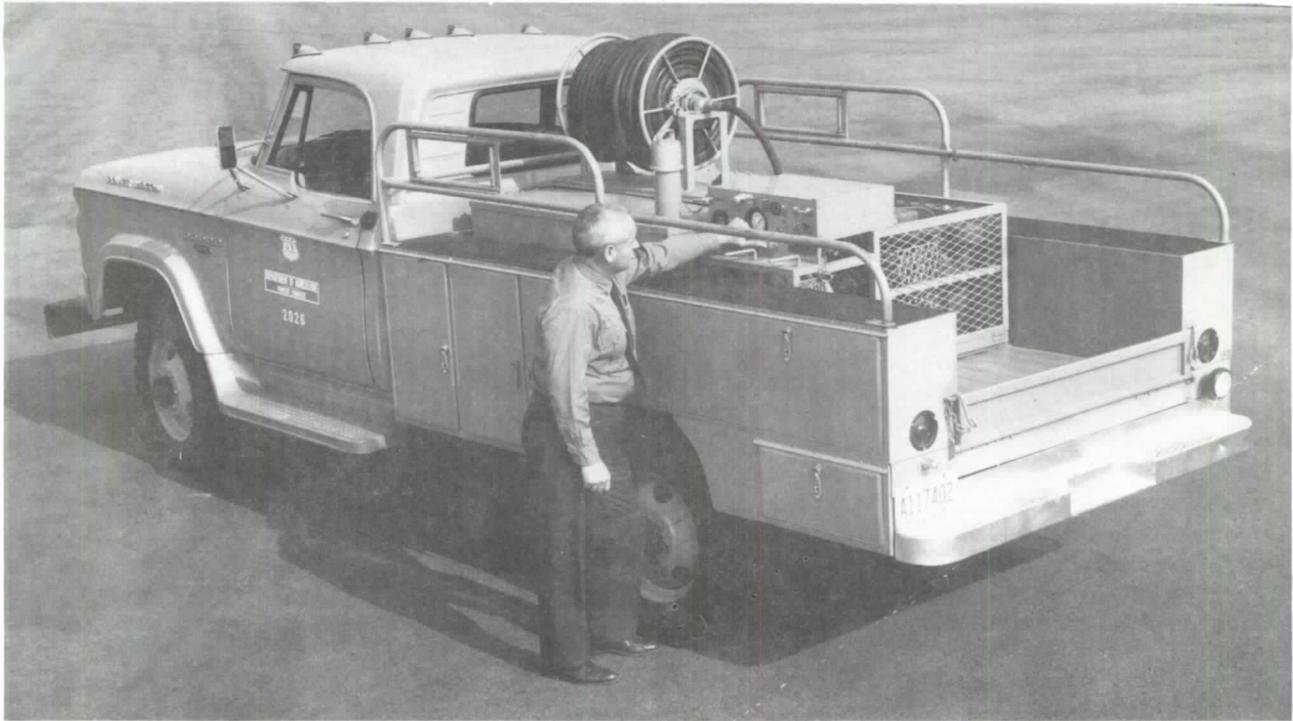


Retardant drop.

The work accomplished by the Center is so broad that it would require a full volume just to recount all of it. Also, much of the work had been under way before I arrived, and some was started and still going when I transferred, so all I can do is recap some highlights.

In Fire activities, specifications and standards was a major part of the work load. This involved searching out appropriate needed equipment; testing and developing; coordinating with many agencies and manufacturers; and then preparing the specifications and standards. This included nozzles fittings, hose, pumps, and many more items of fire equipment. From this work evolved the "Water Handling Equipment Guide," a catalog of all equipment that became a working guide for all firefighting agencies, State and Federal. One of the activities for which San Dimas gained national and international renown was spark arrester testing. This involved much routine testing of manufactured products, some detailed engineering work, plentiful public relations work with manufacturers, and consulting with all agencies, public and private. We also issued a spark arrester guide that was (and still is) the bible for conformance for all field personnel. This was a major effort and led into other projects, such as development of revised fuel systems to eliminate vapor-lock and extensive testing of catalytic converters when they became a requirement on vehicles.

One other major activity in fire-related projects was the development of a family of fire tankers. These ranged in size from 50 gallons to 1,000 gallons. Some were slip-on configurations, and others were integral with the vehicle. Eventually, we had a complete set of specifications for all sizes. This was not really easy, because every unit had its likes and dislikes; but over the years, they have become the standard for most Forest Service units



Two-hundred-gallon slip-on.

and many States. In the California region, we had the advantage of the Region 5 Tanker Committee made up of representatives from across the Region and the Development Center. The committee met at least once a year and provided coordinated guidelines for the Region, which also met the requirements of many other jurisdictions.

One task that got off to a slow start but gained momentum rapidly was the measurement of noise, which moved into areas of noise reduction and hearing conservation. One of our engineers, Rob Harrison, was given extensive training through attendance at academic institutions, literature searches, and consultation with specialists in that area. We obtained equipment necessary to make measurements. Our first task was to measure a variety of noises in the forest environments. This soon branched off into the reduction of noises resulting from field tasks. The next logical step was the study of noise, as related to its effect on employees' hearing. We developed a number of publications that listed various noise sources and what was necessary to reduce their impact on people, that is, hearing conservation. The Center has gained a national reputation in this highly complex and controversial field. Most recently, they were asked to participate with other agencies in the measurement of noise in sensitive scenic recreation areas.

With the arrival of a road engineering specialist at the Center, the *Engineering* program took on a new direction. Much of the initial effort was to identify priority problem areas. One of the first to get under way was a



Region 5 tanker on the Lassen National Forest.

study of road maintenance systems. There was a real need to gather information about potential maintenance machines and begin to evaluate several promising products. One of these was a cutter-crusher-compactor, which was tested on roads that had been difficult to maintain with standard methods. With the cooperation of the manufacturer, modifications were made, and a usable machine evolved. However, it had its limitations, so a search was made for an in-place rock crusher to handle larger rock that the cutter-crusher-compactor could not (by itself) reduce to proper size. Work continued for some years on the project, and ultimately a workable, economical system evolved that utilized those machines together with road graders and other auxiliary equipment.

Another priority need that surfaced was a better method of cleaning roadside ditches. The equipment in use at the time included road graders and Grad-Alls. These did the job within limits but required handling the material two or more times to ultimately get the residue into a truck. A concept was developed to have one machine to shape and clean the ditch and carry the waste belts onto a truck. There was a major contract for development, and a machine was finally built. As in any pioneering development, many problems resulted. To the best of my knowledge, the machine finally was assigned to a Region 6 Forest for continuing evaluation under actual operating conditions.

Two other Engineering projects were of interest. One was an energy dissipator to slow and spread the discharge of water from flumes and culverts to reduce soil erosion from the outfalls of road drains. Very successful models were developed in cooperation with hydraulic engineers from the

Corps of Engineers. A number of units were installed at field sites and were operating very successfully at last word.

The other project was the development of flexible downspouts to carry water long distances down road banks and fills and thus prevent erosion from the running water. The solution was fairly simple—large, coated fabric tubes. A search was made for samples of various composition, and several were found. They were installed at several field sites. The main problem was that some of them were quite palatable to rodents—squirrels, porcupines, raccoons, etc. Eventually a suitable product was found, and its use was very successful.

In the Recreation area, Dick Spray got things started with an informal survey of forest recreation specialists to determine if there were some critical needs. We couldn't work on everything, of course, but we started with a project to develop a cleanup machine for campground restrooms. This evolved into a completely self-contained unit—a high pressure spray masher, rinse water, etc., mounted on a small Cushman three-wheel vehicle. It worked very well, so plans and specifications were prepared and then distributed.

During this time, we also updated our information on campground grills. The Center had previously tested many grills and had a report out on the findings. A number of manufacturers had improved their products, and new ones were marketed, so we evaluated those that looked as if they might have potential and prepared an updated report. These were welcomed by several agencies that also had campground responsibilities. Dick also made a market search for finishes for picnic tables and picked out several promising products to test. The best ones were put out on local campgrounds for field testing. Some good results were observed and reported.

Although it never became a roaring success, one intriguing evaluation was of a mobile incinerator called the "Incin-O-Mobile." The concept was good, but the problems were numerous. The idea was to gather trash in campgrounds and burn it as the vehicle was moved from one site to another. This was supposed to reduce the amount of solid waste that had to be disposed of. Region 4 had several of them in use at good sites but was never able to solve all of the equipment problems that occurred.

I believe that two of the most difficult challenges presented in those years were sewage disposal and water purification. In both areas, the criteria were almost insurmountable, that is, remote sites, low volume, no electrical power, minimum maintenance, and little water availability. We looked at all kinds of products and systems. Of course, requirements were very tight, so with all of the limitations, efforts were frustrated at every turn. We even tried to improve the old vault toilets. Aircraft type toilets and other minimum water usage units were evaluated. Some eventually proved to be marginally acceptable and were put out for field evaluation.

During my time at San Dimas, we had one very challenging and intriguing project that gained a great deal of attention. This was a streambed gravel cleaner used to clean salmon spawning beds, primarily in Alaska. The Center had developed a concept that injected high-pressure air into the gravel bed to stir up the fines, followed by a suction device that sucked up the



The Incin-O-Mobile.

water with the suspended fines, passed this through large pumps, then to a large nozzle (monitor) that shot the water/slurry stream up onto the stream-bank. With this background, we went out for a major development contract to incorporate this or a similar system into a vehicle that could travel directly in the streambed. Development work went on for several years, but again the problems were rampant, and we could never achieve a reliable working model. Another “back to the drawing board” project—but the work done provided others with a base to start from.

When I started at the Center, work had been under way for several years on Range equipment, such as the rangeland drill, the contour furrower, and the brushland plow. We continued these projects in order to make refinements and improvements as technology advanced. Also, we started on a project to develop a seed collector for rangeland, a plant species which provided browse feed for many types of wildlife. Previously, all seed had been collected by hand slowly and tediously. We eventually came up with a device that utilized a vacuum to pluck the seeds from the bushes, draw the seeds through large tubes, and deposit them in large bins. This proved to be very effective, but was large and had to be mounted on a flatbed truck. This was great for large areas where a truck could be driven. For other areas, and small volumes of seed, work shifted to handheld devices. The last I heard, this work was still going on at field sites and research units.

We also became involved in the improvement of hitches for towing a variety of implements. In use at the time was the three-point hitch, but it had some limitations for new implements and rough terrains. Improvements were made, but operationally it had shortcomings. So, for Range implements and for the Center-designed Forestland Tree Planters, a whole new hitch was



Contour furrower, 1968.

designed—the Vertical Lift Hitch. It had all degrees of freedom necessary to carry implements and provide good ground contact under all operating conditions.

One outstanding memory I have of the Range program was the Range Seeding Equipment Committee (RSEC). This was an informal gathering of Range specialists who had been meeting annually for many years to review work in the Range Program and to develop projects for Equipment Development to work on. Representing the Center, I was fortunate to be able to become a part of this group. It was an important part of our Range planning and project work. I continued with RSEC until I retired and remember it as a highpoint in my career. More about it later.

The Timber project that sticks in my mind was the Forestland Tree Planter. This was a major step in the development of tree planters for the forest industry. It was safe, efficient, and productive. Dan McKenzie did a great job on this one—it was almost a one-man effort. Eventually, the design was picked up by several manufacturers and became a popular commercial product.

One immense effort started shortly after I left San Dimas, but it is certainly worthy of mention. This was the slash treatment program. Much investigation went into it initially, identifying quantities, the nature of the material, removal or onsite treatment, etc. This effort went on for several years. Every available device for onsite reduction of logging slash was evaluated. None were totally successful, so a large-scale effort was undertaken to develop a machine. A new cutting wheel was designed, incorporating technology learned in “slash lab” for breaking up logs and limbs. This was fitted to a new commercial machine that operated very well. A manufacturer picked it up and began production. As I remember now, there are

probably a number of these machines in operation. In addition to that effort, the Center evaluated several commercially developed products for incinerating the slash at high temperatures. And they tried every device that purported to be a "chipper." A couple of these turned out to be quite successful and were (and no doubt still are) in extensive use at field locations, both in Government and private industry.

Before I quit reminiscing about San Dimas, I must mention what I believe to be a significant contribution to the whole operation. This was in relation to the planning effort. When I came on board, I was very surprised at the informal planning and cost-estimating procedures. Therefore, one of my first management efforts was to initiate a more organized method of estimating project costs. This changed each year as concepts came forth and we gained experience. After 3 or 4 years it was beginning to show results, and we finally had good, definable numbers to work with. Of course, along with that came project accounting. We worked at scheduling, too, and most of our personnel began learning the concept of "accountability." We all learned some hard lessons. Over the years many changes have occurred, especially with the advent of computers. But I feel personally responsible for getting things started.

In November 1969, I moved to the Missoula Technology Development Center (MTDC) as Director. Along with this, a number of personnel changes were occurring. I replaced Herb Harris, who had retired. He had been at MTDC from its inception. Shortly after, that Gene Silva moved to Washington, and Charlie Howard went to San Dimas as Director.

At MTDC, Frank Lewis was Branch Chief, Planning and Programming, and Ernie Amundsen was Branch Chief, Design and Test. Both of the men were very experienced and competent in their positions and were extremely helpful to me as I got acquainted and worked into my new position. In addition to these two, there were others in key positions who were outstanding in their support and technical expertise in their respective fields. They were Art Jukkala, Fire, Ron Stoleson, Resources, Lynn Marsalis, Safety and Pest Management, Bob Ekblad, Mechanical Engineer, Eli Milodragovich, Mechanical Engineer, Martin Onishuk, Tech Writer and Editor, Loren DeLand, Electronics Engineer, Lynn Colvert, Illustrator, Le Moure Besse, Mechanical Engineer, and Malcolm Greany, Photographer. My apologies if I have left any out, but the years in between probably have dimmed my memory. I appreciate all of their help and will remember everyone as friends. After about a year, Frank Lewis, who was a fire equipment specialist, moved to Region 6, Fire Management. Dave Rising came to MTDC from SDTDC to be Branch Chief, Planning and Programming. About this time, we created a new organization. Ernie and Dave became Assistant Directors to reflect some new organization and management philosophy that I had been interested in for some time. This also opened up grade-level potentials for engineers and planners. Fortunately, this trend has continued, and the Equipment Development organization was able to grow and to recognize the technical potential of all personnel.

The project programs at MTDC were certainly different from SDTDC's, and I found them to be very interesting—some fascinating—and certainly challenging. One of the major areas of longstanding effort was in mechanization of trail-building equipment. This work continued and expanded. We



Morrison Trailblazer.

evaluated trail graders of many sizes and configurations. As a result, we found one, the Morrison Trailblazer, that met most of the criteria. Eventually, a number of these were purchased by the Forest Service and put into service where mechanized equipment was permissible. We finished up work on a small mobile rock crusher for trail construction and maintenance. We also evaluated two-wheel bikes and scooters for personnel use on trails. Some turned out to be very successful, and even today such vehicles are in use—the result of Center work in the 1950's and 1960's. This was one of Herb Harris' favorite projects, and I am sure he would be proud of the results of his early efforts.

Along this line was a major project that captured the imagination of the Nation. This was the gyro-stabilized trail vehicle, intended to carry loads up to 500 pounds for trail construction equipment. This started before I arrived at MTDC, but it continued well into the time I was there. It was being developed by a private contractor, Tom Summers, the brains behind the World War II Sperry Bombsight. Several models evolved, each being a little more sophisticated and, unfortunately, more complex. Some made it onto trails as shown in the photo with Bob Knudson at the helm, but there were so many technical and contract problems that we finally had to drop our work. But while it was under way, it gained national attention in the media, which continued long after the "mechanical mule" was put to rest.

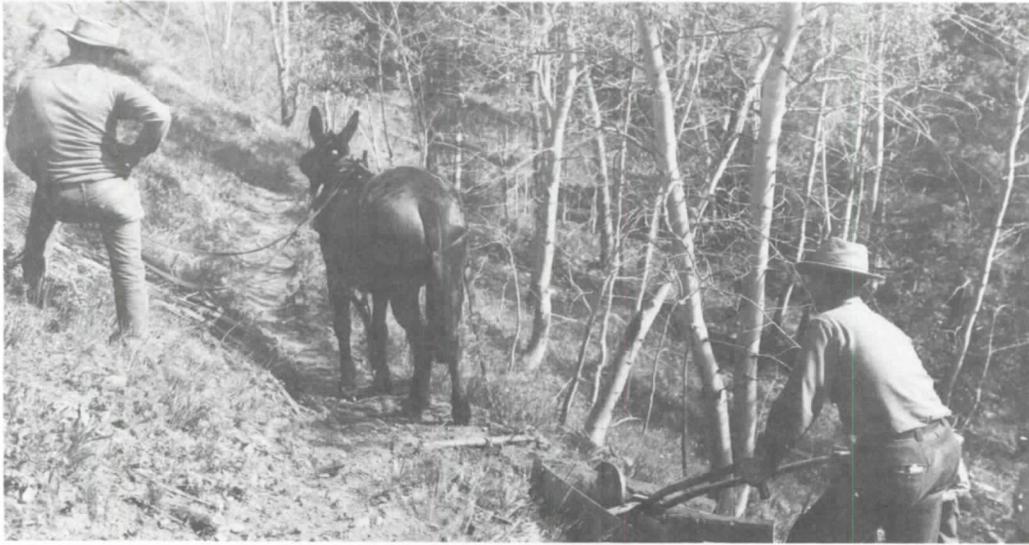
From machine trail work, we branched off into lightweight gear for use by personnel and animals. There was then, and still is, much trail construction and maintenance done in areas where machines are prohibited. Therefore, there was great potential for improvement in personal gear and tools for both man and animal. This was occurring at a time of rapid advancement



Gyro-stabilized gear carrier (the "mechanical mule").

of technology for recreation use, so we found many potential resources for materials and equipment. This effort resulted in reports, movies, and videos that were welcomed by many agencies involved in recreation and engineering activities.

One fun experience came about as a result of this project. Jerry Oltman was surveying Forests, Service-wide, to determine needs in this area and also to see if they had any unique techniques that could be used elsewhere. I went with Jerry to the Los Padres National Forest to learn how these interviews were carried out. During this visit, we were taken into the San Rafael Wilderness Area where the Forest was building a new trail system. We rode the "Sisquoc Express" up the Sisquoc's riverbed to the work area. The "Express" was a rubber-tired farm wagon drawn by two mules and driven by a real honest-to-God mule skinner, a delightful, colorful oldtimer with all of the language and personality one would expect. We rode the



Mule-drawn trail grader.

wagon 10 miles up the riverbed, mostly dry and full of rocks, holes, and remaining waterholes. We were bringing a new crew in to replace the one that had been working its normal 10-day shift. We stayed in their work-camp for 2 days and 3 nights, going out with them for the trail construction activities. They were using a horse- or mule-drawn trail grader that had been in use on the Forest for 25 to 30 years. Being an ardent outdoorsman and backpacker myself, this turned out to be a fascinatingly different experience. Of course, we rode the "Sisquoc Express" back downstream to the road ahead, full of ideas and memories.

Another significant development in the early 1970's was a trail traffic counter, then much in demand for measuring volume of use on popular trails where counting with manpower was becoming expensive and inefficient. Loren DeLand and Dave Gasvoda did all of the initial experiments and development; then we went to contract for finalizing production models. Ultimately, these became popular commercial products for use in a number of different applications. Also during this time, we were working on a variety of devices for road traffic counting. Even though there were commercial counters available, they were largely unreliable and required constant attention. Our needs were for devices that could be installed in many different applications—dirt roads, paved roads, remote locations, roads untended for long periods, etc. We tested many commercial devices and found some that had potential. Tom Nettleton worked with manufacturers, and through great cooperation came counters that would meet our requirements.

Tom Nettleton was also deeply involved in the Center's sign program, which had been going on for a number of years. There had been tremendous improvements made in routed wood signs, both in the manufacturing techniques and paints and finishes. Coordination and cooperation with manufacturers continued during my time there, resulting finally in painted wood

signs that would endure 6 to 7 years with minimum maintenance. The next logical work was on signs made with reflective material. At the time, there were great problems with application of the reflective material to the backing (wood or metal) and with longevity of the material itself. Tom led us through the tests and gained cooperation from manufacturers toward the development of long-lasting signs, meeting all of DOT's requirements. Tom gained national recognition for his work.

MTDC also had a major program in Fire Equipment Specifications and standards covering every conceivable item of personal gear, including clothes, canteens, tents, mattresses, sleeping bags, the famous fire shelter, tools, gloves, etc. This list goes on and on. Significant developments in this regard during those years were improvements in fire-resistant clothes and the fire shelters. The new material Nomex was coming on the market then, and the designs and patterns of existing shirts were revised and then evaluated with Nomex. This was very successful, and the new shirts went into mass production for use by all firefighting agencies. The fire shelter had been developed several years before my time at MTDC but had limited use, because it was bulky and the original materials were becoming obsolete. Therefore, major changes were made in construction without compromising their integrity; in fact, the new models were far superior due to advanced technology. As is by now well known, their value has been proven many times. They have saved the lives of firefighters throughout the country.



Fire shelter.

We evaluated a number of aircraft for smokejumping suitability during my tenure at MTDC. We worked hard on writing complete test plans prior to any flying, finally resulting in plans that were recognized by the industry as outstanding for covering all aspects of smokejumper usage, especially safety. One instance really stands out in my mind. It was our testing of the Short Brothers Skyvan—ugly but functional. All of the live jumps were made from a 600-foot-long, grass-covered airstrip in Nine Mile Canyon, west of Missoula. The plane was piloted by a factory crew who had come from Ireland to demonstrate their aircraft. They and their plane were most impressive. After the day's activities, I was invited to ride in the co-pilot's seat on the return trip to the Missoula Airport. After getting airborne and leveling off, the pilot told me to handle the controls and promptly took his hands off his controls. He wanted me to "get the feel" of how easy it was to fly and how inherently safe the aircraft was. This probably violated all the rules, but I had fun. Obviously, I did not "fly" the plane for long, and the pilot landed it.

Along with this aircraft evaluation, MTDC was also responsible for parachute development and jumper gear design and development. While I was there, we went through a major effort in selecting a new parachute. I found that this was one of the most controversial issues that one could imagine. Almost every smokejumper unit had its own ideas about what a parachute should be and how it should be designed. This started with sport chutes and covered the entire range of versions. Eventually, the Forest Service selected a version that was made operational—the FS-10. We also made major improvements in the jumper suits and their protective gear, which included all of the equipment they carried with them on jumps. Not to be left out were cargo chutes and drop techniques. Those were busy times for Art Jukkala, Ray Beasely, and all their associates who worked on those projects.

One new idea emerged during that time that almost revolutionized fireline building. This was the use of explosives for fireline construction. This started with tests of prime-a-cord, an explosive rope-like material used primarily in construction work. First tests were rather interesting, as the explosion itself started many fires on its own. However, Jim Lott (now deceased) picked up the project, and through close relationships with the Naval Weapons Center in Inyokern, California, and marvelous cooperation from the manufacturers, a new product evolved that we called "Linear Explosive." It worked quite well, and Jim developed all of the techniques for its use. There were many problems to overcome, primarily in transporting the product—especially in airplanes. Most problems were overcome, and Jim trained a number of personnel in its use. I really don't know now whether its use was continued, but I remember that it was used operationally on a number of fires. From this start, Jim became a proficient specialist in all types of explosives—those used for avalanche control, construction of roads, etc. He was called on by many Forest Service units to train personnel and eventually helped rewrite the Forest Service manual section of explosives. Jim was a great engineer in many areas and is sorely missed. He died several years ago in a river floating accident.

Sometime in 1970, Ron Staleson left to take a position as a District Ranger. Shortly thereafter, we recruited Dick Hallman, Forester, to be planner on the Resources projects. We then began to push for timber management projects



Short Bros. skyvan.



Parachute development and testing.

in areas where Ron had been laying the groundwork. One of the first big efforts, actually for State and Private Forestry, was a tree seedling lifter. It seemed that there were a number of devices in use for different States, but most were single-row machines and not very reliable. Jim Lott was assigned to this project and in a fairly short time had a prototype eight-row lifter. This was tested, modified, tested, modified again, and so on. Eventually, a private manufacturer picked up Jim's concepts and brought out a commercial model. We had accomplished our purpose.

One of the first projects that I recall for Timber was a study of greenhouses. This involved a survey of greenhouse design and equipment, costs, etc. The result of this study was a series of reports covering needs, design and costs, and planning guides. Then branching out from there was work on seedling protectors (to prevent deer damage), a root pruner, nursery seed counters, an orthographic projector, marking cutting boundaries in heavily forested areas, a precision nursery seeder, and field portable data recorders. Two more big projects come to mind, probably because they were more "fun" and possibly because I was a little closer personally to them. One was a site preparation machine to clear competing ground cover from areas in which seedlings would be planted. We looked at many concepts and some existing machines. The biggest problem was that most machines had to stop, make a spot by some method, move to a new spot, work again, move, etc. This was very time-consuming when several hundred seedlings per acre were to be planted. Our final design was a backhoe mounted on the back of a large crawler tractor. There were two operators—one for the tractor and one for the backhoe. After a little practice, the two could make spots continuously without stopping. A number of units were built under contract and put into use on Forest Service and private lands. I guess the reason this project sticks in my mind is that I chased a unit up and down mountainsides in several areas, trying all the time to keep up and record data along side Ben Loman, one of our Center's Engineers.

One of the other projects that got started while I was at MTDC was cone and seed collection. During the early 1970's, there was an increasing demand for pine seeds for forest regeneration. Methods for collecting seed up to that time were slow and inefficient, and all of the hand work required could not keep up with the demand. Examples included robbing squirrel caches, shooting down cones with .22-caliber rifles, picking up the fallen cones by hand, and personnel climbing trees to handpick cones that could be reached. Some of our first efforts centered on tree-shaking devices developed for commercial fruit harvesting. This met with some success on a few varieties of trees, but on others the cones were persistently difficult to dislodge and some shaking frequencies would damage the trees. This work continued after I left and was finally quite successful. The technique of shaking was refined, and several tractor-mounted machines were built and put into use. They were even usable in rough terrain in the West.

The other device resulted from a modified commercial pecan-picking system. This turned out to be extremely successful in the Southeast, where there were many high-value seed orchards located on relatively flat ground. This machine resembled a giant window shade, using a fine mesh fabric that could be rolled out in large quantities and lain on the ground under the trees. This was deployed at just the right time to catch the natural seed drop. Then the fabric was rolled up on the machine, and the seed was



Tree shaker.

dropped into hoppers after removal of the unwanted litter. The third device was developed commercially in cooperation with Region 8 Engineering personnel. This was a large vacuum cleaner. Just before seed drop, the grasses around the trees were cut and cleaned thoroughly. After the seed dropped, the vacuum was used to pick it up directly off the ground. This worked quite successfully.

There was a well-established safety program at MTDC. We were responsible for a complete line of first aid kits, ranging from an individual kit to a complete field first aid station. There were specifications for gloves, goggles, and all types of protective gear. We went through a complete redesign of chainsaw chaps, based on new materials that were then becoming available. Although we were just off to a start while I was there, we began studying the requirements for a physical fitness program. Cooperating with us on this work was Dr. Brian Sharkey of the University of Montana. This was really an extension of some of the concepts from the longstanding Fire Management step-test for determining physical condition of firefighters. The new program covered all aspects of physical fitness and conditioning. An outgrowth of this work was an obstacle course, which could be set up in any Forest Service facility. The entire program received national recognition, a USDA Superior Service Group Award, and it was implemented as a Service-wide voluntary program for all employees.

Another study was made of poison oak and poison ivy reactions and their effects, primarily on firefighters. Previously, this had been established as the leading problem encountered by firefighting units. Most of the research was done by medical specialists under contract. The end result was a new technique for determining individuals' sensitivity to the poisoning and then a kit

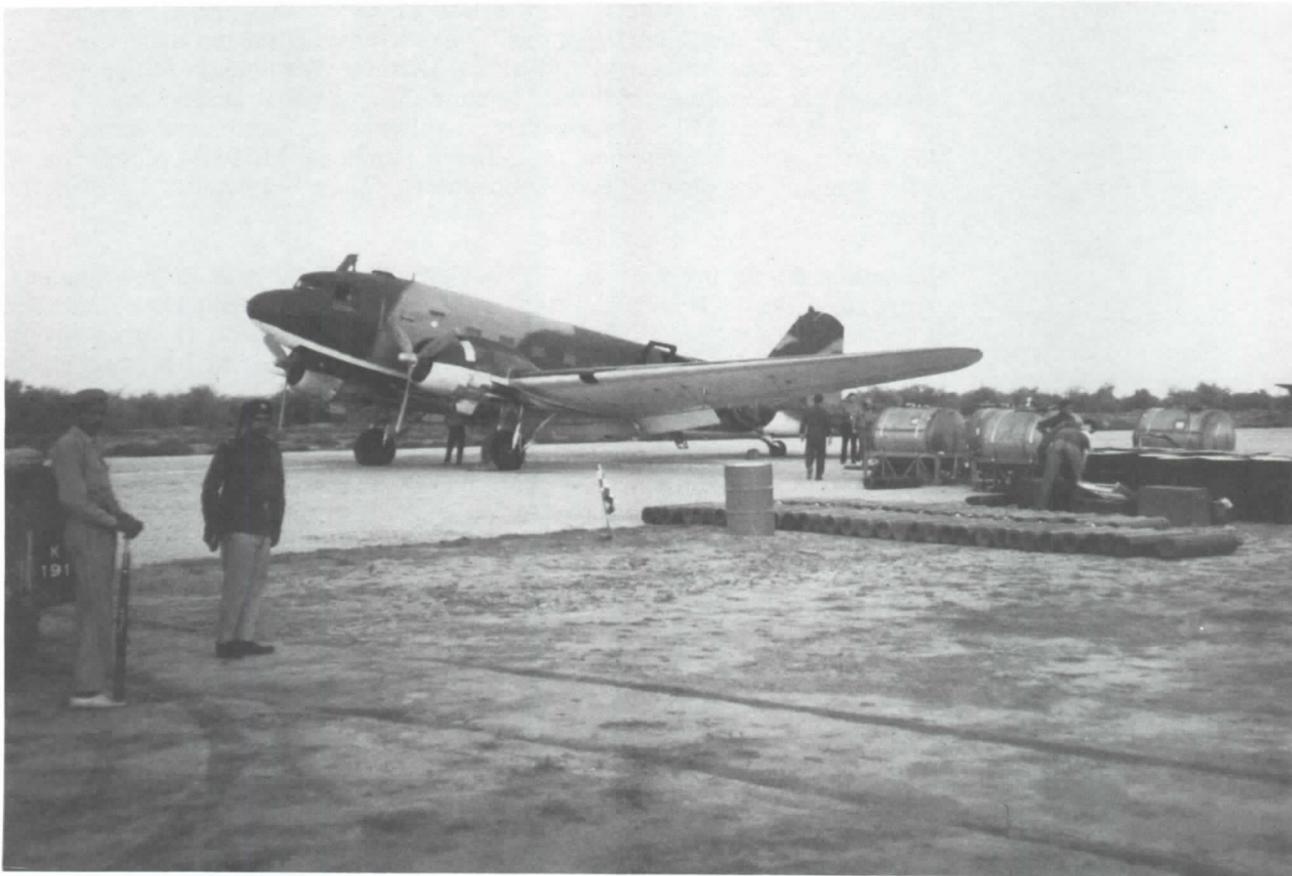
for treatment containing the very latest medical recommendations and medicines. This project was reported on a national TV news program.

The Range program at MTDC was very minimal when I went there. However, it was an area in which I had considerable interest, and we began making project recommendations to the Range Seeding Equipment Committee. One of the first projects on which we worked was a system for thermal brush control. This concept had originated in Region 4 Range country with a crude device. We did develop a device for passing over Range brush species with a hot-air blower. It was effective, so a larger model with four big hot-air blowers was built and tested. It was not intended to be a cure-all for undesirable range species, but it was felt that it could be useful where massive disturbance of land by plowing was not practical. We did not start any fires, but that was always a concern. It was put into limited use under appropriate conditions. As we did frequently, we conducted a survey of various Range Management units to try to identify equipment needs. Some 150 problem areas surfaced, some new, and some old ones that were continuing problems from years past. These were reported to the Region Seeding Equipment Committee for their information and possible work by one of the Centers.

Just before I left Missoula, we began getting requests to become familiar with reclamation of strip-mined lands. Ernie Amundsen and I visited several big commercial operations in the Northwest. This was quite fascinating, and the challenges were almost mind-boggling. However, the similarities to Range activities were quite evident, so we made recommendations that the Centers become involved. From that humble start, MTDC embarked on a significant program of designing, testing, and evaluating equipment that met the special requirements of reclamation. Of course, there was great interest in this subject throughout the country, so we worked on equipment that others had not touched as of yet. Bob Knudson and Dick Hallman did a great job on this program. As a result, there were a number of machines brought forth, new or commercial modifications, i.e., sod transplanter, tree transplanter (Vermeer Treespade), sprigger, contour trencher, several types of plows, seeders, etc.

Work for Pest Management had been under way at MTDC for several years. They had several spray systems already in use, and were beginning to work primarily on spray assessment systems. This involved the ground measurement of spray deposits, meteorological considerations, guidance of aircraft, and collection of insect samples from trees. This developed into a highly complex set of equipment and systems. It became a full-time challenge for Bob Ekblad. He gained tremendous cooperation from the Army Dugway Proving Grounds in Utah. They were doing similar work. I cannot truthfully say that I understood everything that was going on, especially when they started discussing spray physics. However, Bob became a recognized specialist in this work. He authored many papers and even had international requests for his expertise.

One of the most exciting times I had at MTDC was when we received a request from the State Department for technical assistance in eradicating an epidemic of rice stem borers in flooded areas of Pakistan. They had learned of MTDC's involvement in spray systems from the USDA Forest Service's Washington Office. After it was established by several phone calls that we



C-47 aircraft used in Pakistan by MTDC to spray and eradicate the rice stem borer, 1973.

could help, we went into an almost 24-hour operation. We still had equipment on hand for two spray systems for C-47 aircraft. Within a few hours, we had selected a team consisting of Ernie Amundsen, Lynn Marsalis, Tony Jasumback, and John Cavill to carry out the work. The rest of us would provide all of the backup they needed. Within 5 days, we loaded all of the necessary equipment and tools onto a flatbed (Army furnished) and waved goodbye. They were taken to Malmstrom AFB, Great Falls, Montana, and loaded onto a C-141 aircraft and sent on their way to Pakistan. They were there for almost a month. Two C-47's were flown in by the Air Force from Burma. Our crew installed all of the equipment and were ready to go within a few days. Their accomplishment was 400,000 acres of rice fields sprayed and pronouncement by the Pakistanian Government that we had saved their rice crop. In the meantime, those of us at home were doing whatever was needed to keep them going. I was in contact with them by phone every 2 days, relaying messages to families and providing the team with supplies or information. There were many exciting days for me personally, because I was the go-between with the State Department, Agency for International Development (A.I.D.). After the safe return of the team,

we were invited to Washington, D.C., for a debriefing. I was included because I happened to be Director of the Center. While there, we spent several days at the State Department, where we received the thanks of officials and were treated like royalty. Also, the Washington Office had arranged for a meeting with the Montana Congressional Delegation. So we met with Senator Mike Mansfield, who subsequently introduced the team to the Senate, and Congressman Dick Shoup (our local Missoula representative), who arranged for pictures and introductions. These were times I will never forget.

Sometime during my time at MTDC, Gene Silva (who was in Washington) retired and Boone Richardson took over as Chief Equipment Development Engineer. Boone and I had almost daily telephone contact. I also went to Washington, D.C., two to three times a year, so Boone and I became close friends. Don Sirois was there, and we continued a close relationship.

So time moved on and in 1974 several changes took place. Charlie Howard retired from SDTDC, Boone Richardson was appointed the new Director there, and I was asked to move to Washington as the new Chief Equipment Development Engineer for the Forest Service. With some mixed emotions, I agreed to the move. By that time Mike Howlett was the Director of Engineering, and Hayward Taylor was the Assistant Director to whom I would report.

So in October 1974, I arrived in Washington, D.C. I was in charge of all Equipment Development budgeting, planning, and coordination. Budgeting and planning were the least exciting of my responsibilities, although they were probably the most important, because that was what kept the Centers' ongoing and important programs viable. Also, I was fortunate enough to work with many great people in the other Divisions and the Chief and his staff.

Before going on about my Washington Office experiences, I should mention one other significant personnel assignment. A few months after I left MTDC, Lee Northcutt was selected to be the new Director there. At that time, Lee was in Fire research in the Washington Office. I had known Lee for a number of years; he was at the Fire Lab in Riverside, California, when I was at SDTDC. We had worked together on some cooperative projects out there. I felt good about working closely with Lee in his position at MTDC. He was still there when I retired, so we had over 10 years of a very satisfying working relationship.

Also, in 1975, Don Sirois took a Project Leader position in Engineering Research in Auburn, Alabama. Mike Lambert, who had been at SDTDC for several years, moved into the Washington Office to work with me. Mike was young, technically outstanding, and very personable. He worked right into the Washington Office organization and was very valuable in our overall Equipment Development operations.

I really believe that the most satisfying part of the Washington Office job, and where the memories are, was in coordinating activities with other agencies, congressional offices, and private industry. It would be impossible to recount all of my contacts. Those that stand out are cooperative work with the Bureau of Land Management, Park Service, the Marine Development

group at Quantico Marine Base, the Army Engineers at Fort Belvoir, the U.S. Navy Technology Transfer personnel, and the Coast Guard.

There were several other groups of which I was a member, that will provide pleasant memories for years to come. These were all interagency groups and provided a wide diversity of interests and people, as well as the kind of activities that I found to be very satisfying. One was the Range group that I have mentioned before. The Chairman of the committee was on the Washington Office Range Management Staff, so I worked closely with him. About the time I moved to the Washington Office, the name of the group was changed from Range Seeding Equipment Committee to Vegetative Rehabilitation Equipment Workshop (VREW), to more adequately reflect the changing role in strip-mining rehab work. At the annual meeting, held in conjunction with the Society of Range Management, ongoing Center projects were reviewed and new project work was discussed. Soon after the scope of VREW was expanded, we began receiving requests from the Canadian Land Reclamation Association (CLRA) for cooperative meetings. Foreign travel presented problems for many Forest Service employees, so VREW was limited in its representation at Canadian meetings. One representative was selected from VREW and, fortunately, it was me. I was able to attend a number of CLRA annual meetings, where I made presentations each time about work going on here, exchanging information, and arranging contacts with appropriate personnel. I was able to get some closeup views of reclamation work in progress and some very intimate knowledge of machinery and techniques in both countries. This was valuable experience for my responsibilities in overall programming and budgeting of the Centers' project assignments.

Another group was the Fire Equipment Working Team (FEWT). It was a working committee of the National Wildfire Coordinating Group (NWCWG). FEWT was made up of representatives from the Forest Service, the Bureau of Land Management, the Bureau of Indian Affairs, the General Services Administration, and States. It was an eight-man team, and we met semi-annually to review interagency fire equipment needs and to establish priorities for work. Much of the work was to be done by the Centers, but some was done by team subcommittees, and specialists from participating agencies. The first group was organized in 1975. With only one or two exceptions, the original personnel stayed together for 9 to 10 years. Close friends resulted from this activity, and we were able to accomplish significant coordinated work.

In 1975, increasing concerns about chainsaw safety resulted in the establishment of a government-industry group to coordinate all work going on with chainsaw safety improvements. Initially, two groups started working closely—the Consumer Products Safety Commission (CPSC) and the Power Saw Manufacturers Association (PSMA). By chance, we heard that these two organizations were to hold a meeting to lay out a program for future work. I was able to attend this meeting as a representative of the Forest Service. As MTDC had been doing some testing of chainsaws, we did have a real concern about what was going on. As a result of my attendance at that meeting, talking with people, and expressing serious concerns of our own, the Forest Service was invited to have a representative on the group. I was appointed. This was the time when the manufacturers were under extreme pressure to make major changes and improvements in safety

considerations, but primarily in kickback prevention. For me, this started a long association with this group and its members. The concerns of the Forest Service were certainly well-founded because of the statistics that showed chainsaw kickback as a major accident cause. This was born out by public concerns, Hexice CPSC involvement. I was involved with this group until I retired. Those years were full of advancements in the state of the art by the manufacturers. As a group, I cannot recall any other situation that demanded more attention and technical advancement by industry than what I saw in a period of 5 to 6 years. Standardized testing equipment and procedures were required. This was going on at the same time that major design improvements were being made in anti-kickback devices and saw-chain. Controversy was frequent, threats were made to shut down the industry, and tempers flared many times. I was a part of all the fun and games! By the time I retired, the problems were almost resolved. As a result, much safer chainsaws are in the hands of our Forest Service people and the general public.

In 1975 (seems like that was a big year), catalytic converters were first installed on passenger cars in the United States. This touched off a controversy that went on for many years. The auto industry had tried many different ways to reduce the pollution from cars. Nothing worked very well on sulfur products in exhaust gases, so the catalytic converter was devised to provide more complete combustion of exhaust gases. Forest Service Fire Management then funded a project to test several models of autos to determine if there was a heat problem in the exhaust system, primarily the muffler and catalytic converter area. The tests run by SDTDC showed that, as long as an engine was properly tuned, there was no more probability of a converter-equipped vehicle causing a fire problem than a vehicle with a standard exhaust system. We were joined in this work by EPA and the National Highway Transportation Safety Administration. I was doing all of the coordination for the Forest Service, so I wound up in the middle of many interesting discussions. There were people around who could not believe our results. Round and round we went. I became an "expert witness" for EPA in a court case in which they were involved. I was interviewed on TV in the Washington, D.C., area in regard to cars starting fires from their exhaust systems when parked above piles of dry leaves. This kind of assignment made that job very interesting although frequently controversial.

Sometime in 1982, Mike Lambert moved on to Engineering Research in Portland. His background and experience in Equipment Development filled perfectly into the residue management work unit in the West.

Replacing Mike Lambert was Tom Kerns. Tom had been a Forest Engineer on the Mark Twain National Forest, preceded by many years of Forest work in the West. This experience added a new dimension to our Washington Office operation. We worked closely until he retired in December 1985 to return to his ranch in eastern Oregon.

During the last few years of my time in the Washington Office, the Centers were doing some noteworthy work. Even though I was not closely involved, I did have some peripheral involvements, and I cannot wrap up this accounting without mentioning them. Through activities in support of several Forests in the Northwest, MTDC accomplished some outstanding

work in the development of small harvesting systems. Their first effort was to do some detailed engineering on a Forest-developed cable system for clearing large slash from steep slopes. This operated so well that drawings were made and commercial manufacturers began producing comparable models. From this, they stepped down in size and developed at least two more systems to meet varying onsite conditions. These also were highly successful and became commercially available.

Another major project was assigned to SDTDC—to search for devices to act as substitute anchors for large, cable-logging rigs. Historically, these rigs' guylines were anchored to existing trees or stumps. As time passed, the opportunities for these stumps decreased. Logging moved into tougher conditions, and in second-growth logging areas the stumps used previously were rotting or nonexistent. SDTDC's work started as an in-house effort, but after a couple of years, it became obvious that this was more complex work than we could handle alone. So we went out on a major contract to attract industry support. A manufacturer of large mining machinery won the contract and went to work. My involvement on this project was one of coordination with Forest Service units at the national level primarily, but I was into it enough that I was part of the "team." It was probably the largest multiyear project that Equipment Development had been involved in, so there were many concerns from an administrative and technical standpoint. The project was brought to a successful conclusion after I retired, but I know that a very workable system was developed and put into use in the Northwest and Alaska. Briar Cook was the project leader for the entire time and did an outstanding job of keeping the work progressing on schedule and bringing it to a successful completion.

The last project that I feel I should highlight was also at SDTDC. This was to be known as Central Tire Inflation (CTI). This started at a very minimal level, and was only to study initially the concept and see if it had any applicability to forest activities, primarily logging trucks. The concept was first known in the military, most prominently in Russia; as time passed, the highway researchers became interested, as benefits to roadways began to surface. Initially, the most intriguing value of CTI was that rough road surfaces could be healed by riding over them in heavy vehicles with very low tire pressure. Certainly, as far as Forest Service Engineering was concerned, the effect on roads had to be the priority. The effects on vehicles, such as lower maintenance, better handling, etc., had to be of secondary importance. Leonard Della Moretta was the project's leader, and it was through his persistence and industry contacts that the work even got through its first couple of years. Then as more facts emerged about the benefits, Forest Service interest grew. Eventually, through controlled tests with logging trucks, the concept came of age. Basically, the principle is quite simple—for off-highway travel, deflate the tires to about 15 to 20 psi. Traction improved, the ride was better and less fatiguing, truck damage decreased dramatically, and maintenance was minimized; hence, costs were reduced. Then on the highway, tire pressure was raised up to 90 to 100 psi for normal highway operation. This would be accomplished by an onboard compressor and valving system, by which the tires could be inflated or deflated under the control of the operator without having to stop. The last I heard, the system had been proven to the satisfaction of both highway engineers and truck operators and was being implemented.

If any of the technical details in the preceding pages are vague (or even wrong), I beg the reader's indulgence. Time probably has dimmed my memory, and minute technical details would only lengthen this already too long narrative.

Before leaving the account of my Washington Office experiences, I must make mention of some more people. Certainly some stick out in my mind more than others. To Mike Howlett, Director of Engineering and Hayward Taylor, Assistant Director for several years, I owe a word of gratitude for their friendship, guidance, and technical direction. Also, to my friend and the current Director, Sterling Wilcox, much, much thanks for the help he provided in planning, budgeting, and personnel as he went through several different positions in the Washington Office before going to Region 4 as Regional Engineer. Sotero Muniz, as Director after Mike retired, was most helpful and supportive. There never was a better gentleman and friend, whom I shared carpool experiences with, in one of his previous Washington Office assignments. After Hayward retired, Hal Strickland took over as Assistant Director of Technical Applications & Support. We didn't always see eye-to-eye on things, but we made significant advances and desirable changes in equipment development operations. Others that I will always remember working with in various capacities are Terry Gossard and Paul Simmons (carpool buddies), Adrian Pelzner, Vic DeKalb, Dave Badger, Ray Allison, Walt Furen, Bob Hartman, Bob Swarthout, Tom Kerns, Mike Lambert, Larry Matson (longtime Assistant Director at SDTDC), Briar Cook (Assistant Director at SDTDC), Dale Petersen, and George Lippert. My apologies to those whom I have left out.

I can't approach closing this dissertation without paying tribute to my dear and closest associate for many years, Boone Richardson, even though we did not work at the same location at any time. He was Director at San Dimas for many years, during the time when some of the big projects were in progress. He was a true gentleman, and I never heard harsh words from him. Boone suffered some severe medical problems back in the early 1980's and was forced to take medical retirement in 1984. He will be in everyone's mind and heart forever.

It seems like no discussion of Washington Office experiences should leave out carpooling. However, to recount 11 years of those memories with the likes of Terry Gossard and Paul Simmons would be another story. Maybe sometime I will compose "The Great American Comedy Novel."

The last 2 years in the Washington Office were rather traumatic and need not be dealt with here. We were going through a major Center reorganization designed to significantly reduce the number of personnel. This led to many hard feelings—best put behind us. Responses to congressional inquiries became the bane of my existence. So there was little room for pleasant memories.

I retired in July 1985. Twenty years of mostly intriguing and challenging fun were behind me. The time flew by, and it was hard to realize that "my time had come." I believe in the work we were doing in *Equipment Development* and hope that it continues to provide high-level Engineering expertise for the Forest Service and other natural resource activities.

Reflections of a Forest Service Engineer Managing “Administrative Studies”— (Also Known as “Research”)

*Adrian Pelzner**

I am sure most Forest Service employees and retirees consider their Forest Service career as being “unique.” I certainly do. I came to the Forest Service directly from another Federal agency, and my first and only duty station was in Engineering in the Washington Office. Unlike most of the Engineers in the Washington Office, I never served on a District, National Forest, or Regional Office. Also, I came in at a relatively high grade. I had 10 years of highway experience with private sector consulting engineers plus 5 years of highway research experience with the Federal Highway Administration before coming to the USDA Forest Service. Therefore, I consider my Forest Service career as unique. I didn’t have to work myself up from the bottom—I started right in at the top! Let me say right away that I regret not having the opportunity of working in a District, Supervisor’s Office, or Regional Office. I am sure such experience would have added another dimension and perspective to my work with the Forest Service, but it was not to be. I reported to Jim Byrne (former Director of Engineering) in Rosslyn, Virginia, in September 1965.

The first thing I learned was not to use the word “research”—although I had been hired to develop and manage a road research program in Engineering. The conduct of research was restricted to the Research part of the Forest Service organization. Engineers did “administrative studies.” I suppose there was some sound bureaucratic reason for this arrangement—but it always seemed awkward to me. Anyway, shortly after I came to the Washington Office, I received a request from Region 8: “Please send us a simple, useful, and rational method of pavement design.”

Although the request was straightforward, fulfilling the request was like chasing a wild goose. “Simple, useful, and rational” are, in many ways, mutually exclusive terms when it comes to pavement design. I sent Region 8 some information on pavement design. But, I am sure it never met all the criteria. In fact, as pavement designers move into mechanistic models and resilient modulus testing in the 1990’s, we may be getting closer to “rational,” but we are definitely moving away from “simple,” and “useful” remains to be proven.

I can see that if I ramble on like this, the “History of Engineering in the Forest Service” will indeed take on a monumental size. Suffice it to say

* Adrian Pelzner is a former Chief Materials Engineer in the Washington Office of the USDA Forest Service, 1965–1985.

that, over the years, I was involved in many "administrative studies." There were studies on cost allocation for log-hauling trucks, timber bridge protection, effects of sedimentation from road building (no long-term effects), cost-effective sedimentation control, aggregate surfacing, thickness design, landslides, use of emulsions, and much more. In between, there were Forest Service directives, manual writing, many field trips, "information brokerage" for the Regions, and various team efforts to explore and solve engineering problems. It was a full and satisfying career.

The 1960's, 1970's, and early 1980's were times of expansion for the Forest Service. People and money resources were more plentiful then than they are now in the late 1980's and early 1990's. Road building to support timber harvesting proceeded at an intensive pace. Service-wide, in the mid-1970's, about 10,000 miles of roads were being built or rehabilitated each year. During this time, geotechnical groups were established in the Regions. Forest Service geotechnical engineers were called on to establish materials engineering programs in the Regions. There was much going on that required geotechnical and materials engineering—retaining structures, geotextiles, landslides, route locations, earthworks, rock excavation, erosion control, asphalt-concrete mix design, emulsions, and surface treatments are but a partial list. All of these areas were fruitful areas for research (that is, "administrative studies"). I encouraged the engineers who were directly involved with these various materials and geotechnical projects to share their knowledge and submit formal papers documenting their efforts. Also during this time, I became chairman of the Transportation Research Board's (TRB) Committee on Low-Volume Roads and the American Society for Testing and Material's (ASTM) Committee D-18 on Soil and Rock. Being Chairman of these two major committees gave me the opportunity to initiate and endorse committee sponsorship of a variety of low-volume road subjects. This, in turn, presented Forest Service engineers with a forum for both giving and receiving information on low-volume road subjects. I consider providing these opportunities for the professional development of Forest Service engineers one of the most significant and long-lasting contributions I made in my Forest Service career.

But most of all, there were the wonderful people that I met and worked with along the way. It has been my fortune to have been associated with coworkers (and bosses!) that have been hard-working, dedicated, smart, sincere, demanding, challenging, informed, and even good friends! Too many for me to name, but nevertheless, each one is unique and important to me.

I would be remiss if I didn't say a few words at this point about Mike Howlett. During most of my tenure in the Washington Office, Mike was the Director of Engineering. In many ways, he was instrumental in building a strong Engineering organization in the Forest Service. He fought for more budget and skilled personnel—and usually won—to handle the challenges and opportunities that Engineering was facing during this time. Mike was a tough, challenging administrator—always demanding the best that you could produce. However, Mike was not one for giving a lot of praise. It was rare, very rare indeed, to get a pat on the back from him. After I put together something for Mike—a report, letter, speech, or the like—I expected him to say something like "thanks" or "good job," but he never did. However, I did find out from Forest Service personnel outside of Engineering

that he did praise and even brag about his engineers (including me!)—he just didn't tell us directly. Well, I would like to say to Mike Howlett, directly, that he did a great job building a top-notch Engineering organization in the Forest Service. Thanks, Mike!

It was only after I retired in December 1985 that I began to understand how well known and respected Forest Service Engineering is in the "rest of the world"—TRB, ASTM, the Federal Highway Administration, the Corps of Engineers, State Departments of Transportation, counties, and developing countries, to name but a few parts of the rest of the world. I still work in engineering (in the National Academy of Sciences' Strategic Highway Research Program), and I have the opportunity to meet many engineers. Inevitably, there is always a good word about Engineering in the Forest Service. Those of us who have retired and those still working should feel proud of being a part of the "History of Engineering in the Forest Service."

Ski Lift Engineering in the Forest Service

Charles F. Dwyer, P.E.

Introduction

In his letter of June 20, 1989, Sterling J. Wilcox, Washington Office Director of Engineering, asked me to volunteer participation in updating this historical document, *Engineering in the Forest Service*. The request was not entirely unexpected; my acceptance was, in all probability, a foregone conclusion. After all, a request to prepare one's memoirs or to recount a period of history is a sign of our times; presidents of our country or major organizations, turned out to pasture after a lengthy period of service, are frequently asked to record events for the gratification or chagrin of the living who shared their experiences and, theoretically, for the benefit of those who follow and study our historic records.

Those who have preceded me in preparing their memoirs regarding Engineering in the Forest Service, have established a format for their writings. They begin with an apology for any hint that their effort might smack of an autobiography, when that is not intended. They apologize profusely for the inevitable use of a pronoun in the first person singular, after a lifetime wherein the pronoun "I" was avoided in writing, as though it was a *four*-letter word. They include a tongue-in-cheek apology for the fact that their shaggy-dog stories, particularly those involving an engineering specialty in an already narrow field, might not have wide and lasting reader appeal. They begin their narratives with a date for filing their original Form 57's and proceed step-by-step as they climb the career ladder through District, Forest, Region, and, finally, the "Puzzle Palace" of the Washington Office. My effort, which follows, will not break with this tried-and-true, traditional format.

My autobiography, limited to a period of approximately 20 years, beginning in 1966, is an excellent backdrop for the chapter "The History of Ski Lift Engineering in the Forest Service." Boastful? Hardly! A lament? Perhaps. But, nonetheless, my tenure in the Forest Service spanned the period when Ski Lift Engineering ranked well in the organizational structure of Forest Service Engineering. I saw the rise from a shadowed beginning, the apex of recognition and stature, and then the decline and fall of Ski Lift Engineering in a changing world of Forest Service involvement. This autobiographical sketch is a framework on which others may hang their accounts of that which preceded by tenure, that which accompanied it, and that which followed. We can record our shortfalls along with our accomplishments.

Part I—Signing on

My Standard Form 57, Application for Federal Employment, was tendered May 3, 1966. It was submitted almost in jest and definitely with tongue in cheek, since I had no concept of what government engineers did for the

Forest Service. Regarding the Forest Service itself, I knew only that they dealt with trees and that I didn't know a pine tree from a pussy willow. My application followed a suggestion by a long-time and highly respected friend, Paul I. Hauk, Recreation and Lands Ski Area Specialist on the White River National Forest in Region 2. My half-hearted initial inquiry at the Regional Office level received encouragement from Louis A. Hepfl, then recruiting for Engineering in Region 2. His encouragement was qualified with the admonition that, knowing I was a native Coloradan with a determination to live and die in the shadow of the Rockies, the ski lift engineering position he believed open and for which he thought I might qualify was a Washington Office position. My airmailed application and Form 57 brought an immediate response from Washington—a visit by a recruiter for Washington Office Engineering, Roderick MacDonald. My credentials, including 20 years of experience in ski lift design, manufacture, construction, and ski area operation, seemed to meet Government expectations. My Civil Service rating, with the bonus points for nearly 4 years of wartime military service in the United States Navy Civil Engineering Corps, exceeded the job requirements and my own expectations. One stumbling block remained: This was a Washington Office position, and I was determined to live and work in Denver. After a number of proposals and stalemates, a compromise was made and supported by James L. Byrne, Director, Washington Office Division of Engineering. Following a 6-week indoctrination in Region 4 at Ogden, Utah, I was to serve on the Washington Office Engineering Staff, detached for duty in Denver. Region 2 was to provide support services. This was a highly satisfactory (from my standpoint) arrangement, which endured, with measured opposition, for my entire Forest Service career.

My indoctrination in Region 4 was a unique experience. I reported aboard at 0800 hours 27 July 1966 (that's Navy parlance); by 9 a.m., I had a key to the building and a driver's license; by 10 a.m., I had an airline ticket in hand and was en route to Jackson, Wyoming, to assist Clifford N. Lee in load testing the new 63-passenger reversible aerial tramway at Teton Village. My travels continued, and, in 6 weeks, I had visited nearly all the Regions and the Washington Office. During a brief stay in Ogden, I asked Regional Engineer James M. Usher when I might expect a measure of "indoctrination" to the wily ways of the Forest Service, generally, and Forest Service Engineering in particular. "Hell, Chuck," he said, "you'll pick it up by osmosis." On November 6, I had a desk among the crew of Boyd O. Fisher's Region 2 Engineers in Denver. Although I was not directly responsible to him, Boyd served as a mentor, confidant, and friend until his retirement in July 1970.

Part II—The Training Program

In my first job description, under "Principal Duties and Responsibilities," Item 9 directed that I was to: "Provide special training for engineers working in the ski lift fields on a nation-wide basis." I began that assignment immediately, on an informal basis, by answering inquiries from the staff Engineers assigned aerial tramways, ski lifts, and tows in each of the Regions. The need for more formalized training was immediately apparent, and I began preparations for my first National Ski Lift Engineering Workshop to be held in Denver, March 6–10, 1967. That meeting was highly successful, and it formed the basis for all training sessions that followed through my years of service. My publication, *Aerial Tramways, Ski Lifts, and Tows—Description and Terminology*, was introduced at this workshop.



Old lift in Utah. Early chair lifts and tows presented special engineering and administrative problems for the Forest Service. Condemnation often brought howls of protest from local ski enthusiasts.

Updated revisions of this publication are in use today by State and Federal government agencies, industry interests, and students internationally. A *Technical Manual for Review and Checking of Ski Lift Design Plans and Specifications* was also introduced. This manual continues to be used by Forest Service Engineers to this date.

The first National Ski Lift Engineering Workshop brought together staff Engineering representatives who were destined to work together in close cooperation for many, many years. Some turnover occurred, naturally, but an original nucleus held firmly for many years:

Region 1	LeRoy Schultz	previously, Larry Bruesch; later, Frank Muchmore, Duane Yager, and Glade Roberts
Region 2	Richard "Dick" Kasel	previously, Wesley Wilkinson
Region 3	Bernard Etzkorn	later, Jose Martinez
Region 4	William Turner	previously, Verne L. DeSpain and Clifford Lee; later, Richard Bird and Dave Matz
Region 5	Gordon Linebaugh	
Region 6	—	Stanley Thorn, William J. Grabner, Dale Petersen, Russell Rogler, and George Lippert
Region 8	—	John Lamb and Jerry Edwards
Region 9	John Cochran	later, Richard Wilson and David Summy
Region 10	—	later, Leslie Paul, Lloyd Dille, and Mike Ritter

The closeness of this group was unique in Forest Service annals. It was prompted by the specialization involved. Most Directors of Engineering and their assistants distanced themselves from the day-to-day activities of the staff Engineer assigned to ski lifts and tows. Most lift-related problems circulated through my office in Denver, where problems could be given immediate attention through the combined assistance of "the group." Forest Service knowledge and experience were shared, but the close cooperation of my office with industry interests often provided the greatest assistance.

The Denver office was a "nerve center" for cooperation between State and Federal authorities exercising jurisdiction over ski lifts, for other government agencies involved with aerial tramways and cableways, and for industry interests, including insurance companies, lift manufacturers, area operator associations, and organizational interests. At national training sessions, both the professional and personal closeness of the participants was obvious to all, envied by a few, and viewed skeptically by others. Our "group" worked together and (after hours) played together; however, the accusations of a "closed shop" or "country club clique" were unfounded.

A National Ski Lift Engineering Workshop was held again in 1968, after which the frequency was reduced to every other year. As new Engineers took over in a Region, they were assisted by me and others of "the group." At the same time, training at Regional level was initiated and soon flourished. The Regional Ski Lift Engineers, as they were proud to entitle themselves, conducted training for Forest Engineers and for Forest and District Ski Area Administrators or, more popularly, the Snow Rangers. Interest and enthusiasm were high, and Engineering/Recreation cooperation was excellent. Gordon Linebaugh, in Region 5, had a particularly aggressive training



A modern, high-speed, high-capacity, quad chair lift. Forest Service Ski Lift Engineering played a role in the rapid expansion of skiing and the tremendous development in uphill facilities during the 40 years following World War II.

program, including a program for “qualifying” participants. He assisted training in Regions 3, 4, and 6. Training material, most often initiated at the national sessions, was made available for training at Forest and District levels. Regions and Forests with a well-developed ski lift program assisted those having a lesser impact from skiing. Our early success, both within the Forest Service and with industry interests, led to similar programs initiated by Recreation. A National Winter Sports Symposium was held in Denver in 1973 and again in 1976.



Forest Service Ski Lift Engineers gathered for a field training session at Copper Mountain, Colorado, 1974.

Part III—The Ski Lift Engineering Program

What, precisely, did Forest Service Engineers do with aerial tramways, ski lifts, and tows? A fair question, when it is generally known that our permittees were responsible for providing engineered facilities. Generally, the work of our “hardcore” members epitomized what the engineering specialist did in Forest Service Engineering. They found their work challenging, varied, stimulating, important, and satisfying. Their work directly served public health and safety; it helped preserve the environment, wildlife, and watersheds. Professionally, as specialists in a unique field of engineering, our group was encouraged to obtain professional registration and licensing, to become members in professional organizations, to both subscribe to and contribute to professional journals, and to seek membership in national and international aerial tramway organizations. They found satisfaction in being part of a group recognized and respected for its professionalism. They accomplished difficult engineering tasks in rugged terrain and, often, under extremely adverse working conditions. Specifically, our Ski Lift Engineers assisted in lift selection and location, approved design, supervised construction, performed load tests, and concurred in the approval of lifts for public operation. They established the codes and standards applicable to design and set the procedures for load testing, periodic inspections, and requirements for area maintenance and operating plans.

Under a well-established program centered on Ski Lift Engineering, the Forest Service began functioning as an authority having jurisdiction in the aerial tramway field. This was highly significant in that, prior to this time, no controls were exercised for these facilities locally or nationally. Our involvement in this capacity had wide-ranging repercussions. An industry-initiated call for national safety standards gained impetus, with Forest Service adoption and enforcement of that document. States began exercising their prerogative to enforce control measures on behalf of workers and in the public interest. Both autonomous boards and restructured State agencies



The original Forest Service Ski Lift Engineers (1966) had a close working relationship that carried over to after-hour activities. At left, Gordon Linebaugh (in sunglasses) overlooks ski slopes. At right, Gordon rides a slide.

began functioning in States experiencing new and increased skiing activities. State-Federal joint jurisdiction was coordinated and implemented in areas on Federal land, and Forest Service personnel—most often an Engineer—served on State tramway boards or on advisory groups. I assisted a number of Western States in enacting legislation with enforcement programs. LeRoy Schultz was instrumental in organizing, and then served as a member of, the Montana Passenger Tramway Safety Board; Dick Kasel has served for years as a member of the Colorado Board. Chandler St. John, Wasatch Forest Supervisor, served on the Utah State Passenger Tramway Safety Board.

The ski lift-ski area operation industry responded favorably to this new governmental interest and involvement. Area operator associations welcomed State-Forest Service participation in their program. Two major insurance programs, specializing in ski lift and ski area operating insurance, cooperated fully in control and enforcement programs. With their knowledge and active involvement, the Forest Service began fulfilling its obligations to enforce terms of special-use permits regulating ski lifts and allied engineered facilities. It was big business—for example, in 1976 there were some 3,500 aerial tramways, ski lifts, and tows in the United States (800 of these were under Forest Service jurisdiction).

Service to the Industry

During a decade beginning about 1968, a number of noteworthy programs in the aerial passenger tramway field were initiated under Forest Service influence. Requirements and procedures for passenger tramway load testing and inspections were established. The Forest Service publication, *Post Construction Inspection and Load Testing of Aerial Passenger Tramways and Ski Lifts*, became an early standard for the entire industry. In more specialized fields of interest, procedures for investigating and reporting ski lift accidents, evacuation procedures for aerial tramways and lifts, and other standards and procedures were introduced or furthered by Forest Service Engineers. Our computer program "Ski Ball," for ski lift design review and checking, was one of the first uses of a computer program in the aerial tramway and ski lift industries. That program was largely developed in Region 5 by our Ski Lift Engineer Gordon Linebaugh and Computer Program Specialist C.D. Swarthout.

"The National Safety Standards for Aerial Passenger Tramways, Ski Lifts, and Tows" was a landmark document for the aerial tramway and ski lift industries. Initiated by area operators and supported by all facets of industry interests, this standard brought regulation to an otherwise uncontrolled field of passenger transport. It heavily influenced State codes and industry practices. A voluntary standard is, basically, unenforceable unless and until adopted by an agency or other interests having enforcement powers. Forest Service representatives participated in preparing the initial 1960 edition, and we adopted it for enforcement in 1963. Washington Office Engineers supported Recreation's Henry A. Harrison, who was named our member of the original B77 Committee. As I had worked previously with that committee, I was immediately assigned Forest Service representation in 1966, and I carried that responsibility until my retirement in October 1987.

The National Safety Standard for ski lifts became an essential part of Forest Service permits and was the basis for our enforcement regarding these facilities. When provisions of the current standard lacked in lift development or operational safety requirements, the Forest Service had the prerogative to supplement the basic document. We did that in 1965, by issuing the famed "Yellow Pages," which supplemented the outdated 1960 Standard until the ANSI B77.1-1970 edition was issued. In 1977, following the tragic Vail gondola accident, we issued interim directives enforcing other unspecified safety measures until they were incorporated in the Standard.

Forest Service "pressure" within the B77 Committee was a contributing, steadying, and compelling influence for an ever-improving National Standard. Our ready acceptance of the document increased its use in State codes and other regulations. Other Forest Service Engineers who made significant contributions to B77 Committee work included Dick Kasel of Region 2 and Gordon Linebaugh of Region 5.

Ski Lift Engineering played an important role in bringing the Forest Service into closer cooperation with other persons, organizations, and interests. It promoted increased cooperation with the National Ski Areas Association (NSAA) and regional or local ski area operator associations. Our Engineers never failed to attend an NSAA National Convention and Trade Show during my tour of duty. Our Engineers were stalwart participants in meetings of their local area operator associations—LeRoy Schultz with the Montana Area Operators Association, Richard Kasel with the Rocky Mountain Lift

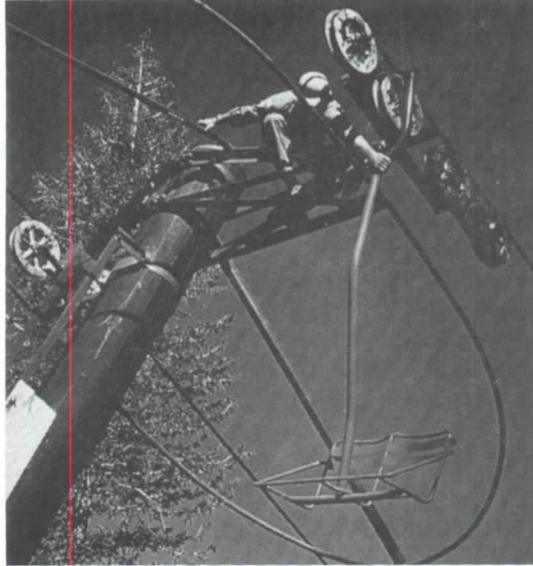
Association, Gordon Linebaugh with the Sierra Ski Area Operators Association, and others on a less actively involved basis. These close working relationships furthered the Forest Service goal of close cooperation with the private sector to bring winter recreational use of the National Forests to the general public.

Aerial Tramway Engineering brought the Forest Service to "lead agency" status among all Federal Government agencies in matters relating to aerial tramway and cableway use. The Department of the Interior's veteran Bureau of Reclamation called us for consultation on projects using or proposing use of these facilities. The National Park Service used our Regional Ski Lift Engineers to inspect facilities operating in ski areas within National Park boundaries. The U.S. Geological Survey turned to us for assistance regarding their cableways involved in stream gauging. The Department of Transportation's Federal Aviation Authority sought our help regarding their aerial tramways for personnel accessing their isolated radar control stations. Even the Department of the Treasury's Secret Service asked for assistance in updating their manuals for procedures to safeguard persons under their protection while using aerial tramways and ski lifts. The "lead agency" role was a source of pride for our Department of Agriculture and Forest Service ranking officials for many years, but interest in maintaining and continuing it seemed to wane when the effort to maintain it involved a measure of time commitment and funding.

Forest Service Ski Lift Engineers played a leading role with a number of organizations in the aerial tramway field. In concert with a few State officials, I organized and became the first president of the Association of Recreation Tramway Authorities (ARTA). This organization for State and Federal authorities having jurisdiction over aerial tramways and ski lifts was much needed. Initially, ARTA was well received and supported by all industry interests. After a number of years, activities faltered as program implementation presented problems, and the organization was disbanded in 1983. Our Engineers were among the charter members of the Society of Aerial Tramway Engineers (SATE), and I served as its first president. SATE included lift engineers from all major lift suppliers, consulting firms, and insurance companies. As with other volunteer technical societies, it was difficult to keep interest and activities at a high level, and this society was dissolved in 1983. Internationally, the Forest Service became a member of the International Organization for Transport by Rope (OITAF) in 1966. This brought U.S. Government representation into this worldwide organization for the first time. I was privileged to be the Forest Service representative and attended the General Assembly meetings every 3 years and the International Congresses every 6 years. As an offshoot of OITAF, Bob Kinney, a consulting engineer, and I organized the North American Continental Section of OITAF. I was honored to serve as its first president. OITAF-NACS flourished and remains the strongest aerial tramway-related organization in the United States today. It carries on, to the extent feasible, the activities of predecessors ARTA and SATE and forms our tie, internationally, with OITAF.

The Specialist in Forest Service Engineering

Ski Lift Engineering in the Forest Service represented a classic case of the specialist in an organization more geared to the generalist. There were advantages and disadvantages. The pattern for the generalist was well



Forest Service Ski Lift Engineers brought a high a degree of professionalism to design review, construction supervision, load testing, and periodic inspection of aerial tramway and ski lift facilities. Here, Cliff Lee on a lift tower.

established by tradition. Advancement was premised on years of experience and the diversity of assignments—roads, bridges, and water systems were the norm. Grade advancement was furthered by individual performance and length of service; but, often for the specialist, it was limited by the number of employees supervised. I, for example, entered the “system” as a GS-13, but with an understanding that advancements to a GS-14 level would be forthcoming. Contrary to the prediction of others and with opposition from Personnel at each turn, the Forest Service remained true to its agreement with me. Jim Byrne, Washington Office Director of Engineering, played a key role in support of the specialist who did not directly supervise others. At Regional and Forest levels, the program went less smoothly. I recall Cliff Lee, on the Region 4 staff in Ogden, saying in 1966, “Damn you, Chuck. Don’t you get me sidelined into a specialized field and a blind alley; I want to stay in the mainstream of Forest Service Engineering.” Shortly thereafter, Cliff was honored by his selection over 54 other applicants and accepted the position as Forest Service Coordinator when Walt Disney proposed the major ski area development at Mineral King in California.

Other Regional staff Engineers fought the battle and suffered the consequences. For example, Gordon Linebaugh in Region 5 remained at a GS-12 level for 18 years, in spite of his outstanding job—limited to a specialized field. Dick Kasel had the same experience until, being well advised, he diversified to extend his duties to bridges as well as ski lifts. The shadow of advancement and “career ladders” formed ominously for others who found fascination in the rapidly expanding and challenging field of Ski Lift Engineering. We lost a number of outstanding individuals to the private sector.

LeRoy Schultz, whom I selected in 1967 as the Engineer in the best position to move into a Washington Office position with me, welcomed the opportunity to train for the position that then never materialized. He left the Forest Service in 1971 to serve as chief engineer for the Thiokol Corporation, which had decided to enter the ski lift manufacturing field. He has remained in the private sector and distinguished himself in ski area/ski lift-related work since that time.

By the early 1980's, Ski Lift Engineering in the Forest Service began its decline. Directives calling for less "on-hands" involvement by both Engineers and administrators and the advent of the "monitoring role" changed the scene dramatically. The "golden days" of Ski Lift Engineering in the Forest Service were over, and the minimal involvement that exists today at national, Regional, and Forest levels is virtually relegated among our Engineers to "other duties as assigned."

An Early Involvement

The old Forest Service Engineering tradition of a direct approach and "on-hands" involvement held fast for our work in ski areas and for ski lifts. A classic example involved the work of Verne L. Despain, Region 4 Engineering Branch Chief, in 1962. At this time, fiber rope tows were still used extensively, particularly in smaller and more remote areas that were invariably on Forest Service land. The drawbacks and potential dangers for the tows were well known, but they were accepted as inherent. Rope twist was a major culprit. Responding to an initiative from the Washington Office, Region 4 personnel studied the problem in nearby ski areas and on a prototype rope tow built in the Forest Service Salt Lake Base Repair Shop yard. The study proved rope twist could be controlled. The control measures were documented and became a standard for the industry throughout the United States.

Verne Despain continued his interest in ski lift-related work and was largely responsible for an early training session at Sun Valley, Idaho. The session included primarily Ski Lift Engineers and Administrators in Region 4, but others from adjoining Regions participated.

Load Testing

Among Forest Service Ski Lift Engineering involvement, none was more interesting, often spectacular, and invariably chilling than post-construction inspection and load testing. Far from routine, even as procedures became standardized, the load test was always noteworthy. As mentioned previously, Cliff Lee and I conducted load tests for the reversible tramway at Jackson Hole's Teton Village in July 1966. The spectacular tramway was 12,500 feet long and rose 4,060 feet vertically to an upper terminal elevation of 10,450 feet. Problems during construction presented additional problems during the inspection and load testing. I recall hanging precariously from the carrier support frame, hundreds of feet in the air, and searching for wire breaks in the track cables, when Cliff broke the tension with his observation, "Now *there* is an unobstructed view of the Tetons."

With their "on-hands" direct involvement, our Engineers became knowledgeable and proficient regarding the equipment they were load testing. I recall at Breckenridge, Colorado, on their first chair in the Peak 10 area when, in the absence of a manufacturer's representative, Dick Kasel directed

the adjustment of brakes in the drive system so that load testing could be completed. The urgency to complete load testing often involved working after dark and under extremely miserable conditions. Because of the potential danger to personnel and equipment, this practice was discouraged and sometimes stopped at the insistence of the Forest Service. My article, "Danger—Load Test in Progress," in *Ski Area Management*, followed a load test involving an accident at Steamboat Springs, Colorado. The load test experience had its unique and positive moments as well. For example, at Breckenridge, barrels of Coors beer were used as test weight in the carriers on a new chair lift. Traditionally, following successful load testing, the owner held a party for all hands involved; the occasion frequently became "memorable."

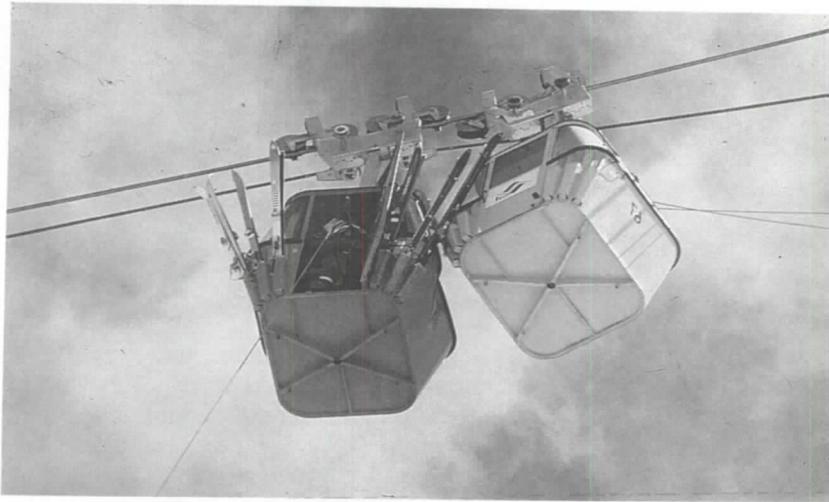
Night Lighting

The 1970 ANSI Standard was overly restrictive in its demand for intensity of night lighting in ski areas. Responding to an outcry from ski area operators, the B77 Committee conceded to study the matter. The study was headed by LeRoy Schultz, Forest Service Ski Lift Engineer from Region 1. LeRoy and I traveled to western areas that offered night skiing. At Bogus Basin, Idaho, we skied by moonlight with no problems. On Snoqualmie Pass, Washington, we skied in rain and snow under varying light conditions. This study, supported initially by the Forest Service and continued through the years by LeRoy Schultz, has led to definitive requirements for night lighting of ski areas and has won endorsement by the National Society of Illuminating Engineers.

Part IV—My Most Memorable Experiences

This account for *Engineering in the Forest Service* was to include "those experiences in your career that you found to be most interesting or memorable." My account here should be viewed not as that of a particular individual, but rather as that of an individual selected to act in the capacity of Washington Office Staff Engineer assigned aerial tramways, or, as the industry and press preferred, "Chief Aerial Tramway Engineer." The opportunities presented and the recognition and tributes given to me were forthcoming because of the position I held. With elimination of that Washington Office Engineering position in 1986, these same opportunities to serve the Forest Service, our Federal Government, the aerial tramway and ski area industries, and the public may never be open to another person. Hopefully, there will be similar opportunities for Forest Service Engineers to serve in other equally rewarding specialized fields.

My job provided the opportunity to travel and to meet literally hundreds of Forest Service employees—largely those involved in engineering or administration associated with ski lifts and ski areas—and perhaps that added to my impressions of them as outstanding individuals. I traveled from Gorham, New Hampshire, to San Diego, California, and from Anchorage, Alaska, to Atlanta, Georgia, in the course of assisting Regional programs. Special assignments carried me to more select and distant areas. My most memorable special assignment involved a feasibility study for a passenger tramway on El Yunque in Puerto Rico. Helicoptering over this tropical paradise was exceptional "duty," but the passenger tramway never materialized. My helicoptering over the Mendenhall Glacier and the mountains near Juneau and Douglas Island, in search of a new ski area, was equally thrilling and



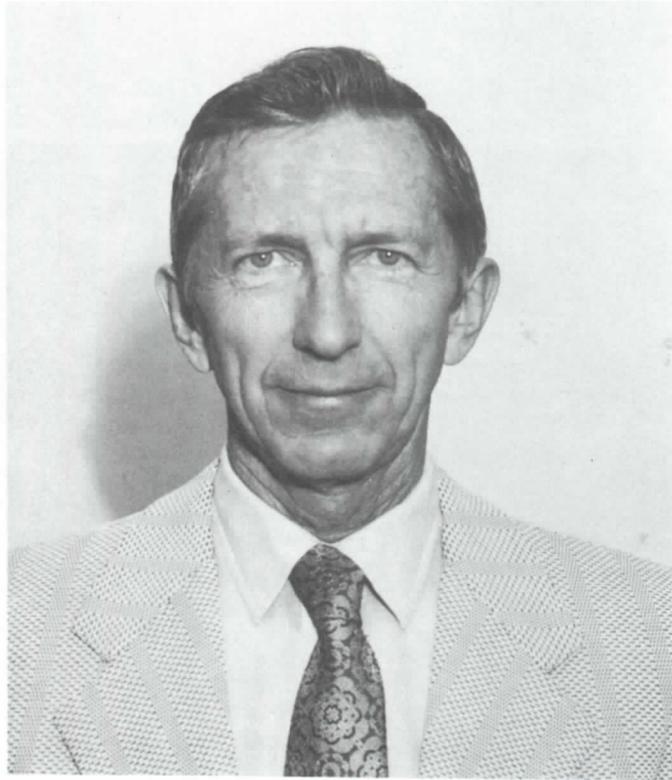
Aerial tramway accident investigation was an unpleasant but necessary part of Ski Lift Engineering. Here, the Vail gondola accident in 1976.

spectacular. This effort was fruitful, and the ski area on Douglas Island serves Juneau today.

Regrettably, assisting in aerial tramway accident investigation was a part of my duties. The experience, however unpleasant, does qualify as "interesting or memorable." The deaths and injuries involved in Colorado—namely, the T-bar at Loveland Basin in 1967, the Vail gondola in 1976, and the chair lift at Keystone in 1985—were all traumatic. I assisted Gordon Linebaugh in investigating California chair lift accidents at Mount Baldy and Heavenly Valley. Our jurisdictional arrangement with the State of California precluded our direct involvement in the tragic April 1978 Squaw Valley Tramway accident, in which four died and many were seriously injured. The only compensation for this type of work was the hope that your investigation would reveal a cause that could be remedied and made known—to others to prevent a recurrence.

Special project studies prompted my involvement in a number of interesting projects and memorable locations. Outstanding among these was my study of materials tramway feasibility for the proposed mining venture in the spectacularly beautiful White Cloud Peaks Area on the Challis National Forest in central Idaho. This and similar projects might well have involved Forest Service Engineers in the materials tramway field. Although we began preparing for this new involvement, for the most part, it did not materialize.

My work with various organizations was rewarding. If it ever reached "memorable" proportions, it was when I represented the U.S. Government at international congresses in Europe. These occasions involved the pomp and circumstance of European customs, the scenic beauty of the Alps, and some



Charles F. Dwyer.

of the latest aerial tramway innovations in Europe. As part of the 1987 International Congress, we traveled from Paris to Grenoble via the famed French T.G.V. railroad, the world's fastest. The French countryside at 180 miles per hour was most memorable. My personal recognition at the 1987 OITAF Congress, amid the splendor of a dinner dance, will remain with me as an ultimate for both personal achievement and recognition for my efforts as a Forest Service Engineer involved with aerial tramways and ski lifts.

Recognition by our industry organizations in the United States was rewarding, and the occasions for award ceremonies remain memorable. In 1982, the Rocky Mountain Lift Association made me the first recipient of their coveted Robert F. Lesage Memorial Award for "outstanding contribution to the aerial tramway and winter sports industries." In May 1987, OITAF-NACS selected me for its Engineer of the Year Award—"In Recognition of Outstanding Contribution to the Advancement of Tramways as a Viable and Safe Means of Transportation." The same year, the NSAA presented me an award, which read, "In Recognition for Your Many Years of Outstanding Service to the Ski Industry of the United States." All are tributes indirectly to Ski Lift Engineering in the Forest Service.



Organizational activities provided the opportunity to elevate and to bring recognition to Forest Service Ski Lift Engineering. Here, Chuck Dwyer is with former President Gerald Ford at the OITAF-NACS cosponsored Vail Aerial Tramway and Ski Safety Seminar, 1981.

Appendix A

Historical Lists of Regional and Forest Engineers

The following lists were, in most cases, compiled by the Regions and are as accurate as possible. Some records were incomplete, unclear, or unavailable; therefore, some information may have been inadvertently omitted. We apologize for any omissions and would appreciate your comments.

Washington Office Engineering Directors and Assistants

Directors	Oscar Merrill	1910–1920
	Theodore Norcross	1920–1947
	Anthony Dean	1948–1964
	James Byrne	1964–1971
	Myles Howlett	1971–1983
	Sotero Muniz	1983–1985
	Sterling Wilcox	1986–Present
Deputy Directors	Walt Furen	1985–1986
	Milford Jones	1987–1990
	Gerald Coghlan	1990–Present
Assistant Directors¹		
Consultations & Standards	K.W. Kennedy	1966–1970
	Donald C. Turner	1970–1971
	Charles Weller	1972–1977
	Walt Furen	1978–1984
Technological Improvement	E.S. Massey	1966–1968
	Myles Howlett	1969–1971
	Harold Strickland	1972–1984
Operations	C.G. Seitz	1966–1970
	Heyward Taylor	1970–1978
	Stan Bean	1978–1984
Standards & Evaluations	Floyd Curfman	1984–1986
	Chris Schwarzhof	1987–1989
	Terry Gossard	1989–Present
Technical Applications & Support	Harold Strickland	1984–Present

¹ In 1984, Consultations & Standards became Standards & Evaluations while Technological Improvement and Operations combined to form Technical Applications & Support.

Northern Region (Region 1) Regional and Forest Engineers

Regional Engineers

Frank Bonner	1916–1936
Fred Thieme	1936–1951
Howard Jones	1951–1959
Andy Anderson	1959–1964
Cliff Miller	1964–1972
Jeff Sirmon	1972–1974
Robert W. Larse	1974–1981
Beryl Johnston	1981–Present

Forest Engineers

Beaverhead National Forest

Chuck Wingard	1955–1957
Bill Reeves	1957–1960
Ted McDonald	1960–1966
Oliver Bacus	1967–1971
Rick Hockley	1972–1989
Rex Blackwell	1989–Present

Bitterroot National Forest

Ed Morris	??–1948
George Wright	1948–1968
Phil Ballard	1968–1976
Frank Klement	1976–1989
Roy Grant	1990–Present

Clearwater National Forest

Jack Hamblet	1947–1949
Harold Munson	1949–1951
Bernie Glaus	1951–1957
Chuck Wingard	1957–1959
Bill Reeves	1960–1962
Paul Nickerson	1962–1967
Phil Ballard	1967–1968
George Olson	1968–1969
Jerry Knaebel	1969–1974
LeRoy Gilbert	1974–1981
Tom Russell	1981–1983
Bob Littlejohn	1983–Present

Custer National Forest	Lee Evans	1956–1960
	Chuck Wingard	1960–1963
	Roy Wise	1963–1966
	George Olson	1966–1968
	Ken Gallik	1969–1971
	Dayton Nelson	1971–1976
	Dick Hathaway	1976–1977
	Dave Lee	1977–1990
Deerlodge National Forest	Walt Kasberg	1961–1963
	Glenn Decker	1963–1965
	Jerry Knaebel	1966–1969
	Willie Mehlhoff	1969–1972
	Dick Haines	1972–1978
	Bill Perry	1978–1980
	Joel Marshik	1980–1989
	Frank Klement	1989–Present
Flathead National Forest	Roscoe Winbegler	??–1950
	Les Morris	1950–1951
	Ed Morris	1952–1955
	Ed Daigle	1956–1959
	Ken Yeager	1960–1963
	Walt Kasberg	1963–1977
	Jim Merrill	1977–1980
	Ron Van Natta	1980–Present
Gallatin National Forest	Earl Wilson	1960–1965
	Sam White	1965–1971
	Ken Gallik	1971–1976
	Dick Creed	1976–1984
	Gene Gibson	1985–Present
Helena National Forest	John Mufich	1956–1957
	Ken Yeager	1957–1959
	Norman Allison	1960–1963
	Parley Waters	1963–1978
	Larry Cronenwett	1979–1989
	Joel Marshik	1989–Present
Idaho Panhandle National Forests (established in 1973)	Roy Wise	1973–1988
	James Spaulding	1988–Present
Coeur d'Alene National Forest		
	Hugh Lockridge	??–1956
	John Mufich	1957–1960
	Sam White	1960–1965
	Earl Wilson	1965–1971
	Ron Hayden	1971–1973

Kaniksu National Forest

Harold Horschel	1956–1959
Bill Howard	1960–1963
Lee Landman	1963–1966
Roy Wise	1967–1973

St. Joe National Forest

Carl Nelson	1956–1959
Elmer Taft	1959–1960
Rod MacDonald	1960–1963
Gary Flightner	1964–1967
Bob Hadley	1967–1973

Colville National Forest

Fayette Griswold	1954–1957
Bill Howard	1958–1967
Gerald Heath	1967–1974

Kootenai National Forest

Gene Dyson	1950–1952
Jack Mead	1952–1954
Bruce Plath	1954–1958
Lou Hepfl	1958–1960
Elmer Taft	1960–1972
Larry Hornberger	1972–1976
Mel Teigen	1976–1980
Bill Perry	1980–1986
Frank Votapka	1987–Present

Lewis & Clark National Forest

Shirly McKinsey	1956–1961
John Braida	1962–1975
Bob Hadley	1976–1978
William Duryee	1978–Present

Lolo National Forest

Herb Norgaard	1951–1953
Paul Ingebo	1954–1957
Fayette Griswold	1958–1964
Ken Yeager	1965–1966
Bill Howard	1967–1976
Bob Pertile	1976–1984
Robert Kaufman	1985–Present

NezPerce National Forest

Fred Stillings	1936–1946
Fayette Griswold	1946–1954
Gene Dyson	1954–1959
Ed Daigle	1959–1963
George Scherrer	1963–1965
Willard Clementson	1967–1975
Bruce Pewitt	1975–1981
Michael Cook	1981–Present

Rocky Mountain Region (Region 2) Regional and Forest Engineers

Regional Engineers

Charles Remington	1960–1962
Boyd Fisher	1962–1970
Dick Wilke	1970–1980
Donald Loff	1980–1990

Forest Engineers

Arapaho and Roosevelt National Forests (established in 1972)

Pete Hager	1972–1973
Jerry Bowser	1977–1982
Thomas Edwards	1982–Present

Arapaho National Forest

William Pugh	??
Howard Kelso	??
Leon Lehr	??

Roosevelt National Forest

Horace Stephens	??
Leland Fansher	1969–1972

Bighorn National Forest

Jon Kennedy	1957–1961
Allan Hessel	1961–1966
Pete Hager	1966–1972
Wally Bunnell	1977–1978
Gerry Grady	1978–Present

Black Hills National Forest

Francis Freeland	1950–1967
Arvo Kujala	1967–1980
Larry Seekins	1980–1988
Ray Ollila	1988–Present

Grand Mesa, Uncompahgre, and Gunnison National Forests (established in 1973)

Charley Miller	1973–1976
Bill Sutton	1976–Present

Grand Mesa and Uncompahgre National Forests

Bill Lavery	1958–1960
Kirby Lee	1960–1966
Vince Maloney	1966–1971
Charley Miller	1971–1973

Gunnison National Forest

Maurice Barz	1956–1962
Thomas Edwards	1962–1964
Milt Marshall	1964–1966
Bill Smith	1966–1973

Medicine Bow National Forest

Ray Adolphson	1953–1958
Harry Gillete	1958–1962
Pete Hager	1962–1963
Thomas Edwards	1963–1968
Fred Thomas	1968–1970
John Gillum	1970–Present

Nebraska National Forest

Ray Adolphson	1962–1971
Dave Coe	1977–Present

Pike and San Isabel National Forests (established in 1975)

Joe Beck	1975–1983
Dan Bishop	1983–Present

Pike National Forest

Milt Marshall	1960–1963
Maurice Barz	1963–1975

San Isabel National Forest

Bob Ewin	??–1962
Jim Trenholm	1962–1966
Jerry Murphy	1966–1970
John Langskov	1970–1975

Rio Grande National Forest

Joe Beck	1958–1975
Russ Schwultz	1975–1987
Charles Keller	1987–Present

Routt National Forest

Ray Adolphson	1958–1962
Maurice Barz	1962–1963
Wayne Wilkins	1963–1967
Walt Perryman	1977–1978
Bob Kaufman	1978–1984
Rex Blackwell	1985–1989
Ellen Lafayette	1989–Present

San Juan National Forest

Arvo Kujala	1959–1967
Bruce Morgan	1967–1971
Vince Maloney	1971–1977
Michael Clinton	1978–1981
John Quenoy	1981–Present

Shoshone National Forest

Linn Bowman	1960–1977
Wally Bunnell	1977–1978
Jim Baker	1979–1980
Bill Hayes	1980–1985
Jim Fischer	1986–Present

White River National Forest

Howard Kelso	1958–1962
Tom Williams	1962–1975
Dan Wagner	1975–Present

Southwestern Region (Region 3) Regional and Forest Engineers

Regional Engineers

Howard Waha	1936–1952
Ray Huber	1953–1961
Roger Nelson	1961–1964
Richard Weller	1966–1971
Homer L. Cappleman	1971–1975
Walter E. Furen	1975–1977
D.O. (Jack) Frost	1977–1985
John R. Pruitt	1986–Present

Forest Engineers

Apache-Sitgreaves National Forests (established in 1974)

Dow B. Bond	1974–1976
Dick Bringham	1976–1982
Lloyd Dille (Acting)	1982
Walt Brooks	1982–Present

Apache National Forest

Tom Utterback	??
George Sohn	1956–1965
Dow B. Bond	1965–1974

Sitgreaves National Forest

Dave Fordyce (Forester)	1955–1958
Ralph Brown	1958–1967
Bill E. Harper	1967–1974

Carson National Forest

Ross Kimball (C&M Foreman)	1948–1964
C.C. Ketcham (see Santa Fe)	1954–1956
Don Ford	1959–1963
Zieg Warner	1963–1965
Dayton Nelson	1965–1971
Bill Clarke	1971–1982
Jim Kocer	1982–1989
Steve Okamoto	1990–Present

Cibola National Forest	Chuck Hill	??-1962
	Howard Emerich	1962-1964
	John Mufich	??-1968
	John Pruitt	1968-1970
	John Austin	1970-1976
	Ben Baca	1976-1982
	Bill Woodward	1982-1988
	John Fehr	1988-Present
Coconino National Forest	John Wakenigg (with Prescott)	1958-1962
	Ron Metcalf	1962-1965
	Jerry Vossenkemper	1965-1971
	Ollie Bacus	1971-1979
	Jerry McConnell	1979-1989
	Jose Martinez	1990-Present
Coronado National Forest	Marshall Wright (C&M Foreman)	??-1962 or 1963
	Mike Noland	1963-1974
	Bob Feather	1975-1985
	John Elmquist	1986-1987
	Lou Liebbrand	1988-Present
Gila National Forest	Bob Leanord (C&M Foreman)	1940-1956
	Bob Feather	1956-1960
	George Scherrer	1960-1962
	Robert Turner	1962-1965
	Dave Badger	1965-1967
	Zieg Warner	1968-1980
	Art Marty	1980-1983
	Loyd Dille	1983-Present
Kalbab National Forest	John Wakenigg (Acting)	??-1958
	George Scherrer	1958-1959
	Tom Clough	1960-1974
	Carl Winslow	1974-Present
Lincoln National Forest	Charlie Sutton (C&M Foreman)	pre-1951-1958
	Roy Calloway (C&M Foreman)	1958-1960
	Dick June (C&M Foreman)	1960-1963
	John Beene	1963-1968
	Barry Burke	1968-1973
	Jerry F. Adamson	1973-1981
	Gary Mick	1982-1987
	Jose Martinez	1988-1990

Prescott National Forest	Arthur Mugford (C&M Foreman)	1942–1946
	Jack Foster (C&M Foreman)	1946–1961
	John Wakenigg	1962–1972
	Royal Ryser	1974–1977
	Charles Snyder	1977–1980
	Bob Deadmond	1980–Present
Santa Fe National Forest	C.C. Ketcham (see Carson)	1954–1956
	Dale Long	1959–1961
	Frank Ferrelli	1966–1967
	Bill Laverty	1967–1969
	Harry Gilette	1969–1976
	Dave Neeley	1976–1986
	Bob Adams	1986–Present
Tonto National Forest	Ted Schubert	1958–1969
	Dave Badger	1969–1972
	John Haynes	1973–1977
	Walt Shjeflo	1978–1982
	Rod Mendenhall	1982–Present

Intermountain Region (Region 4) Regional and Forest Engineers

Regional Engineers

Joseph P. Martin	1910–1938
Arval L. Anderson	1939–1942
Winfred W. Blakesly	1942
Henry M. Shank	1942–1946
Arval L. Anderson	1946–1959
H. Minor Huckeby	1959–1961
James M. Usher	1961–1972
Clifford A. Miller	1972–1981
Sterling J. Wilcox	1981–1986
John V. Lupis	1986–Present

Forest Engineers

Ashley National Forest

Durray Dalley	1958–1966
Levi Allen	1966–1970
Kirby Lee	1970–1981
Richard Snyder	1981–1986
Ken Lesh	1986–1987
Don Marchant	1987–Present

Boise National Forest

George Kreizenbeck	1944–1965
Glade Roberts	1965–1967
James Trenholm	1968–1973
Jerry Knaebel	1974–1981
Kirby Lee	1981–Present

Bridger-Teton National Forests (established in 1973)

Tom Grant	1973–1977
Gary Marple	1977–1986
Al Koschmann	1987–Present

Bridger National Forest

Joe Feltner	1938–1958
Bernie Hostrop	1959–1960
Darrell Cherry	1961–1966
Don Housley	1966–1973

Teton National Forest

Tom Grant	1958–1973
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Caribou National Forest	Phil Schultz	1962–1963
	Dick Hahn	1963–1965
	Harry Ames	1966–1977
	Ralph Geibel	1977–1984
	Larry Gorringe	1984–Present
Challis National Forest	Roy Wise	1959–1962
	Hank Clow	1962–1966
	Rick Hockley	1966–1972
	Bill Martin	1972–1973
	Wayne Valentine (Acting)	1973–1975
	Max Montgomery	1975–1978
	Dale Armstrong	1979–1988
Bob Sengl	1988–Present	
Dixie National Forest	John Riley	1959–1960
	Charles Hendricks	1960–1964
	Don Lance	1964–1965
	John Nielsen (Acting)	1965
	Lew Morcom	1965–1967
	Howard Emrich	1967–1971
	Jay Commander	1971–1979
	John Bentley	1979–Present
Fishlake National Forest	Levi Allen	1962–1966
	John Nielsen	1967–1969
	Allen Thompson	1969–1973
	Bruce Reese (R&E)	1973–1975
	Richard Harris	1975–1981
	Don Marchant	1981–1987
	Clyde Lay	1987–Present
Humboldt National Forest	Sotero Muniz	1962–1965
	Wayne Valentine	1965–1970
	Frank Collett	1970–1972
	David Neeley	1972–1976
	Lee Greer	1976–1981
	Norbert Smith	1981–1987
	Dale Armstrong	1988–Present
Manti-Lasal National Forest	Harry Siebert	1963–1970
	Bill Boley	1970–1988
	Aaron Howe	1988–Present

Payette National Forest	Cecil Stowell	1955–1962
	Lew Morcom	1962–1965
	Hank Clow	1966–1968
	Phil Schultz	1968–1969
	Clifford Lee	1969–1981
	Billy Reed	1981–1984
	Ralph Geibel	1984–Present
Salmon National Forest	Art Bevan	1959–1970
	Wayne Valentine	1970–1975
	Patrick Gallagher	1975–1977
	Tom Vanderpool	1977–1980
	Jim Baker	1980–Present
Sawtooth National Forest	Robert Jones	1955–1956
	Edward Jereb	1956–1960
	Russell Lyon	1960–1963
	Harry Ames	1963–1966
	Dick Hahn	1966–1970
	Tom Pestotnik	1970–1975
	Dow Bond	1975–Present
Targhee National Forest	Rulon Gardner	1955–1960
	Verl Waite	1960–1970
	Art Bevan	1970–1973
	Dick Hahn	1973–1985
	Lee Collett	1987–Present
Toiyabe National Forest	Ray Briding	1945–1948
	Cecil Stowell	1948–1950
	Harry Tullis	1959–1967
	Lew Morcom	1967–1976
	Billy Reed	1976–1978
	Max Montgomery	1978–1983
	Dave Greene	1983–Present
Uinta National Forest	Ben Plowgian	1961
	Grant Jensen	1961–1963
	Clifford Lee	1963–1965
	Hal Hatch	1965–1966
	Norm Corbridge	1966–1986
	Clyde Lay	1986–1987
Vaughn Stokes	1987–Present	
Wasatch-Cache National Forests (established in 1973)	John Nielsen	1973–1985
	Ken Page (Acting)	1985–1986
	Richard Harris	1986–Present

Wasatch National Forest

Ben Plowgian	1961-1966
Durray Dalley	1966-1969
John Nielsen	1969-1973

Cache National Forest

Phil Schultz	1963-1968
Hal Hatch	1968-1973

Pacific Southwest Region (Region 5) Regional and Forest Engineers (1956–1988)

Regional Engineers

Webb Kennedy
Max Peterson
Don Turner
Jon Kennedy
Bud Unruh
Dick Deleissegues

Forest Engineers

Angeles National Forest

Mike Howlett
John Mufich
Bill Morgan
Bill Kinworthy
Levi Allen
Bob Black
Tom Dooley
Ed Gililand

Cleveland National Forest

Cliff Miller
Phil Russell
Jack Barnickol
Bill Laverty
Bob McCall
Sam Fischer
Royal Ryser
Bob Harris
Ted Zealley
Tom Russell
Fred Gregory
Jack Van Lear

Eldorado National Forest

Harold Williams
John West
John Walker
Bruce Meinders
Sam Fischer
Hank Clow
Mike Calvert

Inyo National Forest

Hank Thorne
Vic DeKalb
Chuck Frankboner
Del Beedy
Bill Beekman
Steph Johnson
Bruce Pewitt
Dick Silberberger
Dan Totheroh

Klamath National Forest

Jim Pratley
Ed Jereb
Carl Carlson

Lassen National Forest

Bliss Haynes
Jeff Sirmon
Greg Margason
Byron Bartholf
Dick Tatman

Los Padres National Forest

George Newhall
Phil Russell
Mike Rebar
Larry Hornberger

Mendocino National Forest

Jack Ewing
George Blodgett
Jay Mika
Ed Shea

Modoc National Forest

Paul Moyer
Ed McKelvy
Bruce Meinders
Jerry Wooten
Russ Schwulst
John Langskov
Darrell Cherry
Mike Alaux
Mike Calvert
Don Lampe

Plumas National Forest

Ted Schubert
Rich Weller
Byron Bartholf
Greg Margason
Mike Alaux

San Bernardino National Forest

Max Peterson
Vic DeKalb
Chuck Paletti
Dick Deleissegues
Leon Lehr
Jim Mattiazzi
Mike Florey

Sequoia National Forest

Don McBean
George Downing
Jim Allen

Shasta-Trinity National Forests

Don Turner
John Daniel
Kirby Lee
Phil Hirl
Tom Pestotnik

Sierra National Forest

Paul Googins
Harold Horschel
Paul Sweetland
Jerry Wooten
Durray Dalley
Walt Weaver
Bob Sutton

Six Rivers National Forest

John West
George Blodgett
Austin Thompson
Bob Black

Stanislaus National Forest

Vern Eaton
Jon Kennedy
Red Thompson
Jack Crane
John Holt
Bob Bader

Tahoe National Forest

Merv Schock
Ted Raabe
Bill Morgan
Bob Harris
Jim Reeves
Larry Gruver

Lake Tahoe Basin Management Unit

Sarah Baldwin

Pacific Northwest Region (Region 6) Regional and Forest Engineers (1959–1989)

Regional Engineers

Ray Grefe
Ward Gano
Dave Trask
Tim Rogan

Forest Engineers

Colville National Forest

Gary Heath
Sid Nerdahl
Pat Gallagher

Deschutes National Forest

Slim Hein
George Goddard
Beryl Johnston
Bill Martin

Fremont National Forest

Red Ketchum
Bill Waters
Jim Home
Lee Greer
Ron Thompson

Gifford Pinchot National Forest

Gene Dyson
Dave Trask
Gene Dyson
Don Loff
Frank Ferralrelli
Jerry Vossenkemper
Russ Rogler
Mel Teigen
Larry Seekins

Malheur National Forest

Ward Hall
Phil Heyn
Tom Kerns
Carl Wofford
Francis Fiebiger

Mt. Baker-Snoqualmie National Forests

Tim Rogan
Sid Nerdahl
Walt Weaver

Mt. Baker National Forest

Bill Shiley
Ward Hall
Dale Petersen

Snoqualmie National Forest

Jim Mallonee
Tim Rogan

Mt. Hood National Forest

Wilton Roberts
Bud Unruh
Gary Heath
Harold "Woody" Wood
Mike Ash

Ochoco National Forest

Rob Keeney
Bud Unruh
Bob Swarthout
Jack Crane
Tim Rogan
Jim Pifer
Jim Saurbier
Glenda Wilson

Okanogan National Forest

Bob Larse
Bob Turner
Harold "Woody" Wood
Truman Sheldon

Olympic National Forest

Dick Swartzlender
Carl Willrich
George Jansen
Luis Santoyo

Rogue River National Forest

Hector Langdon
Jim Horne
Mel Dittmer
Dick Hathaway
Dave Ewing

Siskiyou National Forest

Bob Hendricks
Rob Keeney
Gene Dyson
Nick McDonough
Dick Haines
Dan Magallanez

Siuslaw

Stan Bennett
Bob Larse
Dick Schoof
Mike Rebar
Sam Morigeau

Umatilla National Forest

Ruben Kurti
Dick Schoof
Bruce Morgan
Phil Ballard
Bob Yoder
Jim Stapleton

Umpqua National Forest

Dan Olin
Howard Emrich
Walt Furen
Bob Turner
Homer Chappell
John Sloan

Wallowa-Whitman National Forest

Sky Chamard
Jack Frost
John O'Leary
John Austin

Wenatchee National Forest

Jack Frost
Paul Enberg
Al Thompson
Gordon Anderson

Willamette National Forest

Ed Stout
Hank Clow
George Goddard
Chris Schwarzhoff
Jim Mattiazzi

Winema National Forest

Kjell Bakke
Tom Kerns
Dan Helm
Joe Jedrykowski

Southern Region (Region 8) Regional and Forest Engineers

Regional Engineers

Rezin E. Pidgeon	1934–1956
H. Minor Huckleby	1957–1959
Kelly B. Heffner	1959–1969
John A. Adams	1969–1974
Cleve C. Ketchum	1974–1980
Kenneth R. Rikard	1980–1984
Bruce E. Meinders	1984–1988
Jerome B. Knaebel	1988–Present

Forest Engineers

National Forests in Alabama

Haywood Taylor	??–1959
Tom Fendley	1959–1960
Red Harkins	1961–1966
Bruce Medford	1966–1969
Raleigh Meadows	1969–1972
Charles Garrison	1972–1977
Dennis Bradford	1977–Present

Caribbean National Forest

Ernie Quinn	1976–1980
Carl Maxwell	1980–1981
Luis Santoyo	1981–1986
Jorge Rodriguez	1986–1988
Ed Martinez	1988–Present

Chattahoochee-Oconee National Forests

Ed Reese	1952–1957
Charles Hunicutt	1957–1978
John Daly	1978–Present

Cherokee National Forest

Abner Casey	1927–1930
Carl H. Mussey	1930–1935
J. Grady Siler	1935–1938
A.R. Kinney	1938–1940
J.E. Tipton	1940–1947
R.I. Lowndes	1947–1963
H.L. Strickland	1963–1967
L. Ralph Fair	1967–1970
Paul E. Stutes	1970–1977
Donald Miller	1977–Present

Daniel Boone National Forest	A.T. Kendrick	1933–1956
	James T. Hall	1956–1962
	Frank J. Hammond	1962–1969
	Lynwood Smelser	1969–1970
	Glen Bonar	1970–1979
	Robert D. Bowers	1979–1981
	Clyde Weller	1982–1984
	Floyd Gibbs	1984–Present
National Forests in Florida	Harry Goodrich	1940–1957
	Ray White	1957–1960
	Tom Fendley	1960–1969
	Harland Welch	1969–1976
	D.H. Carmichael	1976–1980
	T.E. Fraser	1980–1989
	S. Buntrock	1989–Present
Francis Marlon-Sumter National Forests	J.E. Vernon	1936–1942
	“War Years”	1942–1945
	Lewis Mielke	1945–1953
	Clyde Woody	1953–1957
	Jerry Allen	1957–1964
	Archie Grant	1964–1968
	Bill Stalcup	1968–1970
	Bob Bailey	1970–1976
	Jerry Marsh	1976–1986
	Bill Hayes	1986–Present
George Washington National Forest	L.R. Strickenberg	??–1941
	John Lang	1941–1949
	J.N. Jefferson	1949–1969
	Van LaBoone	1969–1976
	J. MacNaughton	1976–Present
Jefferson National Forest	Ray Bierbaum	1935–1963
	Steve Law	1964–1971
	Bob Stribling	1972–1977
	Jim Milner	1977–1984
	T. Poulin	1984–Present

Kisatchie National Forest

Ed Reese	1932–1933
Bob Diseker	1933–1938
Charles Niles	1939–1942
Joe C. Galloway	1942–1951
Cline Woody	1951–1954
Jerry Allen	1954–1957
Jim Hays	1957–1960
W.O. Farnum	1960–1961
Jerry Marsh	1961–1967
Dudley Hixson	1967–1970
Don Metzger	1970–1973
Peter Hager	1974–1978
Ted Zealley	1978–1980
Carl Davis	1980–Present

National Forests in Mississippi

Ed Reese	1934–1940
Carl Mussey	1940–1946
Jerry Allen	1946–1949
J.A. Abercrombie	1949–1951
William D. Patterson	1952–1961
W.O. Farnam, Jr.	1961–1970
Bob Bailey (Acting)	1970
William J. Gournay	1970–1976
Bob Bailey	1976–1990

**National Forests in
North Carolina**

Rudy Fairfax	??–1953
Lewis Mielke	1953–1970
Ralph Fair	1970–1973
Jerry Marsh	1973–1976
Billy Harper	1976–1980
Bruce Medford	1980–1989
Jim Gilpin	1989–Present

Ouachita National Forest

Red Harkins	??–1961
Jim Hays	1961–1972
R. Meadows	1972–Present

**Ozark-St. Francis
National Forests**

Charles F. Niles	1940–1956
J. Wayne Hidgon	1957–1960
Thomas F. Smith	1960–1968
William J. Gournay	1968–1970
William E. Gales	1970–1973
John L. Greenwald	1973–1976
David Crigger	1977–Present

National Forests in Texas

Marion Lamb	1936–1938
C.E. Pequignot	1938–1940
Sam K. Greenwood	1940–1951
J.A. Abercrombie	1951–1964
Lynwood Smelzer	1964–1972
Jim Merrill	1972–1973
Ralph Fair	1973–1990
Ruben Natera	1990–Present

Eastern Region (Region 9) Regional and Forest Engineers

Regional Engineers

Malcolm B. Arthur	1952–1968
Donald C. Turner	1969–1973
Floyd Curfman	1974–1983
Milford Jones	1984–1986
Richard Hathaway	1987–Present

Forest Engineers

Allegheny National Forest

James R. Sleeper	1965–1966
John V. Lupis	1967–1971
Charles Blomdahl	1972–1974
Clifford H. Hill	1975–1976
Robert Bernero	1977–1979
Martin F. Bilafer	1980–1987

Chequamegon National Forest

Murvin G. Johnson	1962–1966
Milford Jones	1967–1969
Blaise Erickson	1970–1980
John K. Bowman	1981–1989
William P. Sullivan	1990–Present

Chippewa National Forest

Peter J. Meyer	1962–1967
H. Reinhardt	1968–1974
Ronald C. Pokrandt	1975–1979
Clifford H. Hill	1980–Present

Green Mountain and Finger Lakes National Forests (established in 1989)

Chris Hanruhan	1989–Present
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Green Mountain National Forest

William R. Thomas	1965
Frank Baxandall	1966–1970
Thomas P. Dooley	1971–1975
Denzil D. Hamby	1977–1979
H. Dale Ashby	1980–1985
Michael Weinreb	1986–1987
Chris Hanruhan (Acting)	1988

Hiawatha National Forest	Leonard Della-Moretta	1962-1964
	Homer C. Chappell	1965-1967
	Stanley O. Bean	1968-1969
	Philip P. Hart	1971-1979
	Dewayne Ide	1980-Present
Huron-Manistee National Forests	Robert G. Porter	1962-1985
	Paul K. Naylor	1986-1988
	James D. Thompson	1989-Present
Mark Twain National Forest (current organization established in 1977)	John V. Lupis	1977
	Tom M. Kerns	1979-1981
	Robert M. Willis	1982-Present
National Forests in Missouri		
	Bruce Parsons	1974-1976
Mark Twain National Forest (former organization)		
	Glen Eierman	1962-1968
	Ron Pokrandt	1969
	Glen Eierman	1970-1971
Clark National Forest		
	Floyd Curfman	1962-1963
	Harold Zornig	1964
	Bruce Parsons	1965-1971
	John Lupis	1973
Monongahela National Forest	Raymond E. Powell	1965-1969
	Milford Jones	1970-1977
	James Pifer	1979-Present
Nicolet National Forest	William Fahrenbach	1962-1975
	Kent Armentrout	1977-Present
Ottawa National Forest	Elbin J. Strom	1962-1964
	Robert P. Pertile	1966-1967
	Carol L. Robinson	1968-1977
	James B. Thompson	1978-1988
Shawnee National Forest	Frank W. Baxandall	1962-1964
	John P. Steger	1965-1973
	Clifford H. Hill	1974
	Lawrence Piche	1975-1986
	Norbert Boe	1987-Present

Superior National Forest	Kermit W. Udd	1962–1967
	Robert Pertile	1968–1975
	Allen C. Groven	1976–1989
Wayne-Hoosier National Forests	Ronald C. Pokrandt	1962–1963
	Leon B. Boland	1964
	Homer P. Morrison	1965–1976
	Thomas E. Dudley	1978–1981
	Paul E. Stutes	1982–Present
White Mountain National Forest	Edward K. Gienty	1965–1967
	Russell L. Rogler	1968–1973
	Joseph Reinhardt	1975–1989
	Peter Minard	1990–Present

Alaska Region (Region 10) Regional and Forest Engineers

Regional Engineers

Gerald Mitchell
Dick Wilke
Red Ketchum
Bill Kinworthy
Milford Jones
Jim Wolfe

Forest Engineers

Chugach National Forest

Phil Hyne
John Mufich
Dave Shephard
Ken Reikard
Skip Coghlan
Duanne Klassen
Bo McCoy
Steve Okamoto
Mary Miller

Tongass National Forest*

North Tongass

Buel Hixson
Loren Adkins
Pete Neyhart
Bob Berryhill

South Tongass

Bob Stribling
Steve Law

Chatham Area

Bob Berryhill
Bill Brooks
Steve Brink
Ron Skillings

Stikine Area

Bill Martin
Gus Nelson
Doug Barber
John Bowman

Ketchikan Area

Steve Law
Walt Brooks
Gus Nelson
Jim Moe

Note that the North Tongass evolved into the Chatham and Stikine while the South Tongass evolved into the Stikine and Ketchikan.





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