Mover of Men and Mountains; Autobiography


R.G.’s thoughts on himself

“Had I been born 100 years earlier, I would have been a good blacksmith, as men like me had been since the Bronze Age. But the Lord chose to put me here when electric motors and gasoline engines were just starting to turn, and with His blessings I have been able to take part in and contribute to the development of those great, heavy-construction machines that have helped produce our twentieth century.” (2)

Pride

“Among my competitors are such giants as Caterpillar, General Motors, International Harvester, Allis Chalmers and some eight others, all big corporations with highpowered executive staffs and engineering departments. In their midst I am the hick from the backwoods of Duluth, but during World War II it was our organization that built over fifty per cent of the earth-moving equipment used in combat.” (3)

View on personal possessions

“What I want to say is that what I've done, anyone can do with the help of God. Reporters have often asked me, "Did you start from scratch?" My answer to that is, "Every time." I've been financially broke so often and in debt so long that it was a big day for us when my wife and I could move out of a cook shack and into a brand new tent.” (4)

Family history on ministry

“I could have learned that early in life, as my seven brothers and sisters did. We come from a long line of ministers and missionaries on both sides of our family. My grandfather, Jean LeTourneau, was a Huguenot minister, sent with his bride, Marie Louise, from Lyons, France, to the Grande Ligne Mission in Quebec in the 1840s.” (4)

"That's a French Canadian for you," my father once said. "When he crosses the border, he thinks he's as far south as he can get” (5)

“I never really knew my grandparents; my one recollection f my grandmother when she visited s in Duluth is that she as small and spoke only in French. But I have a great admiration for them." (5)
R.G.’s Education

“My teacher was delighted, my folks were stunned, and on this great wave of enlightenment I was skipped over the sixth grade and into the seventh. What a mistake that was for me. The seventh-graders had put in a long, earnest year on the subjects I had skimmed over so swiftly, and when it came to reciting, I wasn't in their league. Maybe with time and understanding, I might have caught up, but pampering is one thing a promising student didn't get then. Instead, he was usually pounded to a pulp as a sissy, a fate from which I was spared because I was already approaching six feet, and was the biggest hulk in the class. That only made it harder on me. I was not only the biggest in the class, but also the dumbest. We call what I had an inferiority complex today, and I was crawling with it. I quit trying entirely, and came to hate school with an almost physical violence. I wanted to break windows and kick out walls.” (12)

Design Build Attitude

“Mindful of the old German's warning that an unfinished machine never works, I started construction on the scraper that night, not even delaying to draw up plans. With my welding torch and plenty of scrap iron I could build a machine faster than I could draw one on paper anyway.” (36)

Wishing to help others

“Through the Joneses I got a glimpse of a world larger than an apprentice molder's sand pile, and from them, too, stemmed my desire to do something to improve the lot of underprivileged peoples.” (42)

Electrical experience

“I joined a line of men standing in front of a "Man Wanted" sign posted on a side door of the Yerba Buena Power System. I didn't know what the power system was for, nor why a man was needed, but I did know I wanted a job. "Know anything about melting lead?" I was asked. "I know it melts quicker'n iron," I answered. "Hire that guy," said someone. "He's the first one to know that much." (49)

Tobin-bronze Bob the one-tool mechanic

“Yet that was the job that introduced me to the welding torch and led to my being known at one time as "Tobin-bronze Bob, The One-Tool Mechanic." Beyond that, it led to my taking welding out of the "repair work" class, and making it a universally accepted manufacturing process. I wasn't alone in that, of course, but I will say that our company is unique in that we never use a bolt where a weld will do.” (50)
LeTourneau’s B.M. degree

“When I could take the motorcycle apart and put it together again in one day, I held a one-man graduation ceremony for myself and gave myself a B.M. degree for Bachelor of Motorcycles. That ended my education.” (54)

Introductions
Note: I have a later copy of the introduction of how he wanted to be introduced.

“You've all been at meetings where the speaker of the occasion is being introduced, and you know how the chairman making the introduction can get pretty flowery sometimes. Speaking as I do as often as eight times a week, I've heard myself introduced so glowingly that I wonder who is being described. And what do I think about when I hear myself presented as a "Horatio Alger character born to succeed," or a "gifted genius who does not know the meaning of failure"?" (82)

Giving due credit

“Several writers have credited me with being the first to build powered scrapers, so right now I want to give that credit to the right man, Mr. T. G. Schmeiser of Fresno. In 1915 he patented a scraper with a blade that could be raised or lowered by compressed air. It was a cumbersome affair, but with one man pulling it with a tractor, and another man on the scraper operating the compressed air valves, it could move three cubic yards of dirt at the rate of about three miles an hour. By comparison, that was about what six mule-skinners driving 24 mules on six big Fresnoes could do.” (96)

Mules over tractors

“For all that he had a revolutionary idea, public acceptance was slow. Contractors still thought mules were cheaper and more dependable than tractors, and there were very few ranchers big enough, and progressive enough to buy an expensive machine. Then one sale to a gold mining company in South Africa changed the course of history. Quite by chance some British military figures touring the mining property saw the machine in action. No ideas sparked then, but a few years later, when World War I bogged down in the mud of trench warfare, the memory of the old Holt crawling through the mud of the gold mine stirred up some ideas in the British Ministry of War. Things happened fast after that. In a matter of months the Holt, covered with armor plating and carrying a gun turret resembling a water tank, was on its way to the Western Front. The tank became the decisive weapon of the war. It wallowed through water-filled shell holes and crashed over sand bags to straddle German trenches. It knocked down stone walls and trees, crushed machine gun nests, and blew up ammunition dumps. By war's end there was no longer any doubt about what a track-type machine could do.” (102)

Vicksburg factory

“…in April, 1942, Evelyn and I were housed in a leaky trailer in the midst of acres of mud, ten miles south of Vicksburg where I was building a new factory.” (104)
Tractor eliminates mule

“When the crawler tractor and the powered scraper went into action after 1918, the day of the horse and mule began to draw to a close. It was fine that the machines were infinitely more efficient, but for most earth-movers it was enough that they had eliminated the ornery mule. They couldn't ask for more.” (106)

Point of view of earth moving equipment

“When I look back at it, I can see that in 1919 the automobile designers were already introducing most of the features of the 1960 car. The same was true in aviation, Henri Coanda having flown the first jet plane in France in 1912. John Hays Hammond, Jr., had launched the first radio-guided missile in 1915, and even television was coming out of the laboratory. And there were we dirt movers, men, we liked to say, who changed the face of the earth. What were we using? Scraper blades invented by a caveman.” (107)

R.G.’s Zen Moment

“Today I do my best thinking in an airplane or in a filled tub of luke-warm water, but I still remember my "thinking seat" on the old Holt with a great deal of nostalgia. Moving along at a mile or two an hour. Dust in your face and the sun on your neck. No traffic, no telephones, no distractions. Enough noise and bumps to prevent real sleep, and enough motor purr and seat spring to prevent full wakefulness. A lot of things rolled through your mind then. Put a belt on the tractor flywheel and let it turn a 10 h.p. D.C. motor. No good would come of that, but there was Mac Maroni, better known as Macaroni, my old foreman at the Mare Island Navy Yard. Showing me how to convert a D.C. motor into an A.C.-D.C. generator with a few slip rings. And there was Hank Rogers and his electric automobile starter. Hank showing me how to take the power off a gasoline engine to run a generator.” (111)

“So ran your thoughts while leveling land in the San Joaquin Valley. Most of them drifted away with the dust, but for me a lot of things were adding up. I knew exactly where a lot of Navy generators and motors were being sold as war surplus at junk prices. They were the same kind of motors and generators I had worked with at Mare Island. When they all came together in my mind, complete with rack and pinion gears for the scraper and a generator belted to the flywheel of the tractor, it was with a jolt that nearly flipped me out of the driver's seat.” (112)

“It was something! Not only was one man operating both tractor and scraper, but the job was being done better than could be done by follow-up crews with plows, harrows and shovels. Boy, was I excited. Maybe I was just a dust-coated figure in overalls, but I felt like an inventor fitting in somewhere between Edison, Bell, and Holt. I ran that machine until dark, and then turned in for my first full night’s sleep in two weeks.” (113)

“I dug up some other arguments to no avail. He couldn’t see splitting with me the salary of a man who wasn't there. That was my first encounter with the "man who isn't there" theory, and I'll probably spend the rest of my life not merely encountering it but rushing out to
Literature Review: Mover of Men and Mountains

meet it. Man is worth what man produces, and when machines increase his production he ' is worth more. The reason we have the highest standards of living in the world is because we are the most mechanized country in the world so our production per man is highest.” (113)

Don’t work hard, just fast

   Somehow I’m not made to think that way. I've heard it called both efficiency and laziness, but when I start a job I instinctively hunt first for the easiest way and then, mindful of Mr. Hill in Portland, the fastest way. "Don't work hard; just fast." (114)

Moving dirt

   “On the other hand, I was moving more dirt than anyone man had ever moved before in history. And because I was doing my job faster and better, I had more contracts offered to me than I could handle, even when I raised my rate to eight bucks an hour. But that still didn't count with me. For a man who likes to start a job and get it over with, moving the same dirt over and over was a pretty frustrating line of work, even when more hours meant more pay. I sat in my thinking seat on the Holt, waiting for an idea to strike. Nothing happened.” (114)

Touna-Melter

   “Later I was to build bigger electric - arc welders, and I still build my own, the latest being a big Touna-Melter that joins thick steel plates by flowing a stream of molten metal into the seam.” (119)

Oilrig gamble

   “We made a deal that I believe is unique for untested equipment running into so many million dollars. The Zapata Off-Shore Company of Houston, Texas, gave us the order for the platform, later christened in New Orleans as Scorpion. They would test it for us under actual operating conditions. If it worked as guaranteed, we were all in business. If it didn't stand up to my guarantee, and that's where I had to be pretty sure of myself, well, I'd, be the small boy going back to school on a wrong guess.” (121)

Start a small business not a large one

   “But, and I can't say this too emphatically, the young man of today is far better trained to start a business such as mine than I was. The point they miss in their impatience is that I didn't start a big business. It may sound like an exaggeration, but I was in my business for five years before I noticed it had started. It was that small.” (121)

Ugly brute

   “Two things came out of my first scraper. First it enabled me to get back into the land-leveling business with a one-man earth-mover as good as any in operation. My contracts were saved. And second, it was such an ugly brute I couldn't look at it without seeing a dozen
places where it could be improved. I hired a man to run it, and went back to the dusty driveway to work out my new ideas.” (121)

**Patents and the electric automobile**

“"Air power, of course," Throop said. "The best there is." I was relieved. I had something new of my own that Throop didn't know about. What I had was so old that it was obsolete, yet so new it hadn't been touched. Which brings up another point. There must be literally thousands of good ideas in the U.S. Patent Office that never got off the ground. Inventions that died and were buried because they were ten or 50 years ahead of their times, or maybe they were inventions designed to do one job when they could do ten other jobs much better if anyone thought to apply them. What I had was the old electric automobile, killed by a strange set of circumstances just as it was reaching peak performance.” (123)

**San Francisco electric power**

“I saw in an electric motor that could push a car up the steepest hills in San Francisco exactly what I needed on my scraper. I bought two, welded them to my scraper, fixed them up with gears and pulleys, and practically cooed when they boosted six tons of dirt out of the ground while whining for more. Air power might be the answer for other earth movers, but that old electric car put me on the path to electric power I've been following ever since.” (124)

**Overlooking the flaws**

“Carlton Case, more than a little impressed by my demonstrations, suggested, "Better protect yourself with some patents on that machine. It might be worth something."

Patents! That was more like it. Patents made me sound like an inventor. At once I turned my attention to all the good points of the Gondola, finding just enough to work on, and managed for a time to overlook its flaws.” (125)

“… arrived too late to make any major discoveries”

“I've read that Alexander wept because he had no more worlds to conquer. I've heard young engineers in my own shop complain that they've arrived too late to make any major discoveries. That's all nonsense. All inventors stand on the shoulders of the inventors who have gone before them, and the bigger the inventors, the higher the newcomers can stand. We mechanics are particularly blessed because all fields of science are constantly discovering new theories and products that open new worlds for us to conquer. I remember when fiber glass insulation first came out. We thought of it as something more durable than rubber, and therefore better. Then we discovered that with fiber glass insulation we could cut the size of our motors in half and maintain full power. Finally, with contributions from other fields, we could build motors so compact and powerful that we could fit them inside of wheel hubs.” (126)
Fifteen-million dollar electric motor

"Some of the above steps, from the spun glass of the ancient glass blowers to fiber glass insulation, might be called invention, but most of them are a part of the long and costly process of development. I don't know what it cost the other fellows, but I do know that after using every scientific contribution I could lay my hands on, it still cost me 15 million to develop the compact motors and the electric wheel." (127)

Holt tractor admiration

"Today I build the largest earth-moving equipment in the world, and I've got a few other specialized monsters around that will do for size, but that super-Holt still lingers in my memory as the BIGGEST chunk of machinery I ever owned. I'd walk around it, and pat the radiator higher than my head, and back off 20 feet or so to look at all of it at one time." (127)

R.G. the bumblebee

"At this point, I'm afraid, a good technical education might have ruined me. I am reminded of the bumble bee that, according to the laws of aerodynamics, is so bulky and has such little wingspread that it can't fly. Not knowing this, it flies anyway. Not knowing what I was up against, I just went ahead and did it." (128)

Gondola was a runt

"At the same time, as the owner of a Big machine, I couldn't help but think a little bigger, and on my next land-leveling contract, all the weaknesses of the Gondola, that I had refused to admit before, became starkly apparent. The Gondola was a runt, so puny that even when fully loaded my tractor could pull it while practically coasting. When a man loafs, you can't be sure if he's an idler, a dreamer, or a deep thinker; when a machine loafs you can be sure the inefficiency is not its fault. Quite obviously what I had to do was build a scraper big enough to match the bigness of the tractor. Once again it was a case of using the whole file, and not just the middle." (127-128)

Mountain mover

"After my first demonstration, somebody said, "That thing will move mountains," so Mountain Mover we named it. It was to live up to its name. For four years it was operated for me by a man named Ephraim Hahn, a natural-born earthmover if I ever met one. He took great pleasure in his artistry, and he told me why. "Y'know, Bob," he drawled, "when I was a mule skinner, I couldn't do a bit better work than the mules they give me. Some runt with better mules could do a better job than me every time, and you just know you can't take no pride in work where only the mules count. But on Mountain Mover here, and knowing how to operate it, and makin' it do more'n anybody, you got pride." (129)
Recognition of contributions from other fields

“And it worked. So did the Wright brothers’ flying machine. In comparing my self-propelled, electric-wheeled scraper with their flying machine, don't think I'm stacking myself up with them as an inventor. I am only once again pointing up the difference between invention and development. The airplane had a long row to hoe before it got off the ground commercially. My electric wheel had a hard row to hoe before it got into the ground commercially. Both at the start lacked, among other things, the contributions from the other fields of science needed for their development.” (131)

“Naming it” (the Touna-______)

“I didn't bother to name it. In later years, when I have something I'm proud of, and willing to back with my reputation, I call it a Tourna-pull or a Tourna-crane, or give it my full name of LeTourneau Electric Wheel or LeTourneau Log Stacker.” (131-132).

Keeping his men

“I had an idea that if I built my own machines for a job, I wouldn't have to fire my men when it was finished. I could put them to work building new machines and repairing the old ones to get set for the next job.” (134)

Building machines to make the machines

“In the end, I was forced to build my own machines to build my own machines, something I still have to do.” (134)

Man against Mother Nature… and rattlesnakes

“In talking about a contract that involves the movement of thousands of yards of earth and rock, man against Nature, one is apt to forget that Nature is not just Mother Earth. I remember the rattlesnakes, for instance. Blast out a rocky promontory, and you would irritate so many rattlers on the hillside above that they all went on the warpath, hunting for someone to bite. Slightly deafened by a few hours on a noisy tractor chewing rock, I got off one time for a drink of water just as a bulldozer operator shoved a load of rock into a wash. I heard the rattle of rock, thought it was a snake, and took off from there. I'm no athlete, but I think that was more of a flight than a jump.” (140)

“God needs businessmen”

“The Crow Canyon job, what with my rooter, telescoping scrapers and bulldozer, sort of stirred up the construction world. I had a lot of visitors and a lot of offers, both to buy my machinery, or to buy into my factory and put it on a big scale.” (141)

“I was frankly bewildered. I had accepted Rev. Devol’s statement that God needs businessmen, fully aware of the fact that in letting me in as a partner, God was getting a sorry specimen. When it came to making crisp, business-like decisions, I was still a dust covered country boy trying to get out from behind the plow.” (141)
"I will say that sounded pretty big to me. I was on the verge of signing a contract when one of my foremen came up to me on the job, real excited, and said, "Henry Kaiser is down there watching your big scraper work." (141)

**Measuring based on past experience**

"The general idea of building big machines is to turn them loose on bigger jobs. The fact is, there are no big jobs; only small machines. The Panama Canal and the Suez were big only because they were measured with a team of mules and a hand shovel, like the small boy who announced to his mother he was six feet tall. He had measured himself accurately enough, but with a small ruler he had made himself. Today we have machines that could dig a canal across Nicaragua or Arabia so fast that they would make of those "big" jobs an exercise in ditch digging. Yet the tendency is still strong to measure future jobs on the basis of past experience instead of modern machinery." (143)

**Instruments to make big jobs small**

"What sold me on Kaiser up there in Crow Canyon was not the fact that he could talk rings, spirals, and helical turns around me. He was the first contractor I had ever met who didn't look upon my machines as trick instruments to do small jobs faster. He saw them as instruments to make big jobs small." (144)

**No mules on the job**

"The Philbrook Dam was a milestone in the engineering business and in my life. It was the first major project in which the new broke entirely away from the old. There was not a mule on the site. We were still using some men with shovels and pick axes for clean-up work, but the heavy labor was done with power shovels, mechanized dump trucks, and, in the starring roll, my scrapers." (145)

**Turning point**

"I never did have time to figure it out then. The next day Kaiser arrived with the men who came to remove the machinery he had bought. "Your shop was all right, Bob," he began, and never slowed down after that, "but it was getting crowded. What I'm thinking of is the ideal factory where we can really turn out your scrapers. Cranes, hoists, one of Henry Ford's assembly lines. Things like that. You know how to build the machines so you ought to know how to build the factory to build 'em in. Why don't you come over with me to Oakland and build the factory and see that it gets going right, and-

"Now wait a minute," I managed to get in.
"What for?"
"I've got my men to think about."
"Of course. Your men know how to build your machines so they are the very men we'll be needing. We'll move them all over on my payroll instead of yours--"
"Don't forget I've got some good construction men that don't work in the factory. I'll-"
"Yeah, and I'll need them on that big construction job I just landed in Cuba. Now that that's all straightened out, when can you start?"" (148-149)
Tuning his own machines

“Without knowing it at the time, I was in a remarkable position in 1928, and one that gave me a big advantage over my competitors. As a contractor I was able to see all the weaknesses of the earth-moving machinery then in use, and as a manufacturer I was able to do something about it.

The rooter, the hopper wagons, the bottom-dump carts, the bulldozer, and the semi-drag scrapers were all products of what the contractor in me demanded and got from me, the manufacturer. They were built exclusively to help me get ahead as a contractor, but they were to become the foundation of our company.” (155)

A faster machine

“I had about four times as much as I could handle my only out was to design some machines to do four times as much work.” (158)

Making his own old designs of his machines obsolete

“The finished machine had only half the capacity of the telescoping scraper, but because of its compactness, ease of handling, and the speed with which it could be loaded and dumped, it moved twice the tonnage on long hauls, and up to five times the tonnage on short hauls. That one machine made obsolete all the patents I had sold Kaiser.” (159)

International businessmen

“Then one day my brother Louis came in with a cablegram from Moscow, Russia. Their purchasing office wanted to buy one rooter for immediate shipment. Since it was the policy of our State Department then to help backward Russia, I agreed to the sale: my only comment being to the effect that if we sold them one, we'd never sell another because they would copy it, as the Japanese were already doing with some of our better machines. Louis saw an entirely different angle. "Bob, you've missed the point," he said. "Don't you see, a sale to Russia makes us international businessmen! We're in world finance now. If we can collect the money."" (170)

All steel factory

“I had one answer to that question right off. If such a salesman were to sell ten machines, the order would swamp my factory, or as Ray Peterson put it, "We'd have to go on a 48 hour day."

We did a lot of hard thinking then. It didn't occur to us -, that the manufacturing business would one day become the tail wagging the dog. We still thought of ourselves as construction men with a profitable sideline in selling our machines to other contractors. In a final session lasting from Friday morning until Saturday night, with Evelyn providing the coffee and sandwiches, we drew up plans for a new factory triple the size of our Moss Avenue plant. I will say it was quite a plant. An all-steel, all-welded structure. Once my pencil got going, I couldn't stop it. Not a plant in which the roof and walls would serve to cover an internal
framework of steel girders. As I sketched away, it became a plant in which the welded steel roof and walls were in themselves an integral part of the structure’s strength. Instead of being supported by the posts and trusses on which I rigged my overhead crane and jib cranes, the walls and roof would serve to support them.” (171)

**Pneumatic tires**

“When you are in danger of losing a desperately needed sale like that, your mind can turn over real fast. And right then I felt something click. About a year earlier, because a California law forbids the moving of steel-wheeled machinery over concrete roads and oiled highways, I had hit upon substituting the biggest pneumatic-tired truck wheels I could find for my steel wheels, and had saved a lot of freight charges by towing my machines from job to job.”

**First rubber tires**

“This was the first time rubber tires were ever used on heavy equipment.” (191)

**Tourna-Cable operated scraper**

“I returned home shortly before midnight. There didn’t seem to be much point in taking up my pencil again. I was tired and drained of strength, but I felt the urge to draw, so I went into my drafting room and turned on the lights. It was an odd sort of a thing I drew. In fact, it was a tangle of sheaves and cables, with the sheaves pivoting every which way, and the cables weaving through them as though they were going to tie themselves into a cable net.

I spent the rest of the night developing the plans in detail, and the boys went to work on them in the morning. Long after the new sheave system was in successful operation, my engineers were still trying to figure out why.” (195)

**Vicious circle of big industry (4 steps)**

“My ignorance in that case turned out to be an asset. I still had to meet the still-unsolved vicious circle of big industry. First, no one will buy unproven machinery. Second, even after the machine has proven itself, you can’t go into mass production until you get the price down. Third, you can’t get the price down until you get into mass production. Fourth, the only thing you can do about it is stick your neck out somewhere. I think if I had known that then, I’d have stayed in something safe and sure, like building highways to Boulder Dam. Instead, I stuck my neck out.” (196)

**Need for big tires**

The wheel continues to sink into the sand as it rolls forward, and thus is in a constant state of climbing out of the hole. In short, it has an up-hill climb all the way. The rubber tire, spreading its weight on an air cushion—what we now call flotation—greatly reduced the angle of climb and thus greatly reduced the amount of pull needed. (198)

If I could get the tire companies to make me some giant, low-pressure tires, then I might have something. (198)
I was able to pick up some huge, low-pressure airplane tires when a bomber program was discontinued. (198)

**Broken window syndrome with heavy equipment**

“I noticed that when an operator is towing a jolting, banging, spine-wrenching machine, he doesn't care how much abuse it gets. It's his way at getting back at it for the kicking-around it is giving him. But when he has a relatively quiet machine behind him, smooth-rolling and with the shocks reduced to a minimum, he tends to take care of it.” (199)

**Makes own mold for large rubber tires**

“Even with these facts, I couldn't get a rubber company to build the tires I asked for. "The point is, LeTourneau," a big company man finally told me, "it would cost us thousands of dollars just to build a tire mold of the size you're asking for. Then you try it out, and go broke, and where does that leave us?"

“I thought that one over. As long as I had my neck out, I might just as well put it out full length and give the axman an easy target. "All right, what if I build my own mold? Then will you make my tires for me?"” (199)

**Rube Goldberg LeTourneau: Going from Bob to R.G.**

Note: A correlation can be drawn with both ways of thinking as well.

“Most of the machine tools which filled it I had invented for my special purposes, and about this time I began to notice I was being called R.G. All my associates from California called me Bob, and I thought the R.G. was just the eastern way of addressing the boss by his initials.

"Wal, maybe so, Bob," said Pop Cook, "but the way I heard it the R.G. stands for Rube Goldberg."" (202)

**From small scale to large scale**

“In this age of specialization I have been asked how I find time to run my business, fly hundreds of thousands of miles to give my testimonies, serve as president of the LeTourneau Foundation and the LeTourneau Technical Institute, write a bi-weekly column for my publication called *Now*, and maintain active supervision of my two missionary projects in Liberia and Peru. Maybe it does sound like a complicated program, but until I was asked the question the first time, I wasn't even aware of it. Everything began on such a small scale that the subsequent growth seems perfectly natural.” (207)

My first training program was begun in Peoria because few men in that city were familiar with the welding technique we used in building our machines. (207)

**NOW and its grammar**

“The growth of the publication has been startling enough, but just as astonishing to me was the reaction to my own column. When I am talking to my engineers, or the men in the plant, or even to an audience of strangers, I can make myself understood, or I can back off and give it a second try. When you're writing a column twice a month for several thousand
readers, it’s all there in cold type, and you can’t even hem, let alone haw. Put down a mistake in grammar, and then read the letters to the editor. "You would think," wrote one, "that a man of Mr. LeTourneau’s standing would be able to hire a graduate of kindergarten to edit his column for him." Some of the other comments were less kind." (209)

“Well, the readers were justified in their complaints. My columns were poorly written. At the same time, they were my columns, expressing to the best of my ability what I had to say. They still haven’t captured any prizes in journalism, but there has been a noticeable improvement in the tone of the “readers’ letters. I can’t say what an English professor would have done for me, but I do know that when you are writing for a few hundred thousand critical readers you soon learn to apply yourself to writing correctly.” (209)

Captive Audience

To solve this problem, I arranged for my "shop-talks" during working hours, and the men could either come to hear the speaker or stay away. An interesting note here is that while some would prefer work to "sermonizing," after listening to their fellow-workers discuss the speaker later, their own curiosity would bring them around to the next meeting or the next. What I really wanted was a full-time plant chaplain who could devote all his energies to the spiritual welfare of his fellow workers. But when I brought this up at a staff meeting, I was warned of the fate of other companies that had tried to extend their influences into the lives of their employees. Invariably the employees had resented what they considered an invasion of privacy," and reacted by claiming that what a man does on his own time is his own business. No one can agree with that more thoroughly than I do, so I dropped the program. Once again I was forgetting to consult the Lord. It was His word that an industrial chaplain could spread; not mine. Oh, yes, I've heard, "Your chaplaincy program must help the morale of your company," and I am more than happy to testify that it does, but that is a natural by product. We are seeking first the Kingdom of God and His righteousness, and He adds all the rest.” (210)

"What more do you want?"

“The Tournapull that I designed in 1937 was a thing of beauty only when it tore into action. Otherwise it looked so ridiculous that tractor manufacturers could not believe I was serious in suggesting it would one day replace their machines. It had a square, ugly snout housing a Diesel engine, a driver’s seat, and two huge, rubber tire wheels. That was all. "Where’s the rest of it?" was a question I was asked so often that I came to admire my own patience in not blowing up. My stock answer was, "What more do you want?" but it didn’t seem very satisfactory. Everybody knew that a tractor had to have four wheels, or a whole series of wheels supporting a track-type tread. A machine with no front wheels-or was it a machine with no rear wheels? -just didn't make sense to anybody.” (215)

Eliminated all unnecessary parts

“Yet all I had done- was obey one of the- first principles of engineering. I had eliminated all unnecessary parts and produced a machine that was stark in its simplicity. Of course it was useless when parked with its nose down in the dirt, but so was a tractor useless if it had no equipment to push or pull.” (215-216)
Needed no rear wheels of its own

“All I had to do was harness my Toumapull to a Carryall scraper and -up went its snout. With four big wheels on the scraper, it needed no rear wheels of its own. Now it was all pull or push. Steering was accomplished by powering one -wheel while relaxing or braking the other. That feature alone gave it an enormous advantage over the conventional crawler or four-wheeled tractor, but the main feature was that the Toumapull could cruise along with a full load at 15 miles per hour and return empty at 20.” (216)

Making his own tools

“Back in 1934 I was a fair-sized consumer of oxygen for my welding equipment, but I was neither happy with the service I was getting nor the price I had to pay. I squawked, but it was soon apparent that the big sellers of bottled gases thought it was far simpler for one Stockton customer to adjust to their ways than for them to adjust to his. I saw an endless parade of that kind of stuff, with my suppliers telling me to conform with their products. I rebelled. It took a lot of time, but finally, with the aid of a German chemist, I built an oxygen plant that not only supplied my own needs but met the requirements of enough other customers to cause some hasty revisions of policies and prices amongst the big distributors.” (217)

Limitations of the mass-produced items

“I've carried that on ever since. In my business the best is none too good. I know in many instances I can buy mass- produced electric motors, relay switches, gears and even steel plate and steel cable cheaper than I can make it myself, but in every instance I would have to sacrifice something of my machine to make it conform to the limitations of the mass-produced item. To cite just one instance, I bought a highly ingenious control panel and fitted it to one of my big Tournapulls at Toccoa. It worked fine, giving the operator greatly improved control over his machine until the steering button he pressed snapped off under his thumb. The machine veered sharply and headed for the embankment of the Southern Railway on the main-line between Atlanta and Washington, D.C. Working desperately to regain control of the machine, the driver snapped off four more buttons. I will say that when he hit the embankment he gouged out quite a chunk before the far rail hung him up.” (217)

My own specifications

“My choice was clear. Either I limited the size and scope of my machines to the mass-produced parts I could buy cheaply, in which case we became an assembly plant of other firms' products, or I built my machines the way I wanted them built, and backed them up with component parts built by myself to my own specifications.” (218)
Other peoples Tournapull models

“That was what I did in 1938 when I put my Tournapulls into production. I was out to provide my own machines with a-prime mover that would lift the lid on their present slow pace and let them -perform the way I thought they should. And I want to tell you I was the laughing-stock of the trade. But recently I had the last laugh. At the 1958 Road Show held in Chicago, exactly 20 years after my failure to interest anyone in my "monstrosity," eight national manufacturers were represented by-eight different versions of the Tournapull. I was flattered, of course, at the laudatory words they had for their model & of my machine, but they had caught up to me 20 years too late. My own machine, with every wheel containing an electric power house, could carry as much dirt as three of theirs combined.” (218-219)

There are no laborers there

“I was told why in no uncertain terms by everyone I consulted. There were no skilled laborers there. If I brought in my own skilled laborers, there was no housing for them. If they lived in tents, there were no dairies, vegetable markets, or any other sources of supply. No churches, no recreation, no nothing, but hills. It all sounded fine. For several years I had felt the need of plenty of hills on which to test my equipment. As far as skilled labor was concerned, the best men I had were the ones I had trained in my own classes. As for the lack of housing, I had just invented an all steel prefabricated house that could be welded together in a jiffy. (Later, because concrete was cooler in summer and warmer in winter, I invented a machine on ten-foot wheels that could be fed concrete and lay family-sized houses like a chicken lays an egg.) As for the lack of schools, churches, recreational centers, dairies, and general supplies, what a benefit and blessing it would be to a community when a modern industry brought all those things in.” (221)

Dirt-diggers and war

“As a dirt-digger, I probably knew less about the tactics of war than any man going. At the same time, not even the masters of military tactics knew the strange turn to earthmoving that the war would take. The turn, in fact, began almost unnoticed with the bombing of Pearl Harbor. When the Japs all but destroyed the fleet in the harbor, they also paid special attention to Hickam Field, turning it into a chaos of bombed runways, wrecked planes, and burning hangars. Yet minutes after the attack, out lumbered a weird assortment of earth-moving machines, neglected by the enemy as a worthless target. While bulldozers and cranes cleared away the wreckage, scrapers powered by Tournapulls filled in the bomb craters on the runways and aprons, packing and spreading the dirt so swiftly that the planes that had gone into the air to challenge the attackers were able to return to their own base. There was nothing spectacular about that. The machines were only doing what they were supposed to do, and always had done.” (225)

“To the Sea-Bees, the bulldozer was the prime secret weapon of World War II.” (226)
Steel plate and new factory during war: lean production

“At this point I remembered a supply of thin steel plate I had bought before the war when I was thinking of going into the manufacture of prefabricated steel houses. I asked if it was all right to use that, and was told to go ahead, though no one could understand how I could build a factory with it. They just didn’t know what an old welder can do with steel plate.” (228)

“Colony” of prefabricated houses (the word colony has been used several times)

“After my years as an earth-mover, statements like that get tiresome. I turned some scrapers loose, and they hauled a hill down to fill in a factory site ten feet above the highest flood mark, in the meantime leveling enough land to provide space for first a trailer camp and then a colony of prefabricated houses.” (228)

Aluminum semisphere: AKA the Billy Graham Tabernacle

“Our one serious lack was of enough steel for an overhead crane. That also meant I had no steel for trusses to give the factory the necessary strength to hold it together. This I solved by welding strips of scrap metal to cross members made of welded tubing, producing a truss that exceeded my expectations. For half the weight, I got twice the support. Some years later, when I had more time, this led me to believe that if half the weight of a normal truss gave me twice the strength, then no truss at all would give me four times the strength. Toying around’ with that idea, I invented an aluminum semisphere 350 feet in diameter and 85 feet high that is supported only by itself, at a cost, I might add, of two dollars a square foot of floor space as opposed to the conventional ten to $20 cost.” (229)

Market saturation with their own machines

“Every manufacturer of war equipment had to revise his production schedule overnight. We had it a little rougher. From Pearl Harbor to V-J Day we had turned out for the armed services some 10,000 Carryalls, 14,000 bulldozers, 1,600 sheepfoot rollers, 1,200 rooters, and 1,800 Tournapulls. It was a figure we were proud of, but now we could look at it ruefully. Most of those machines, including scores that had never been uncrated, were war-surplus items, ready to work for peace’ as hard as they had for war.” (232)

“In the amount of time it took the auditors to add it up, those earnings were lost in the cost of changing back to peacetime production, and we faced a market already saturated with our own machines.” (233)
Special purpose machines created fast

“If the war had taught us nothing else, it had taught us how to design machines overnight to meet special purposes. One such machine had been a high-speed truck for off-road duty, the main requirement being that it be capable of carrying 75 tons. That machine, on tires three feet wide, I now redesigned as an off-road pulp wood transporter, figuring that if it could carry a carload of wood out of those Louisiana swamps, it would work anywhere.” (235)

Abruptly we were faced, not with the job of repairing the nation, but of remaking it. (237)

Creating a sales department

“I couldn’t blame Caterpillar for at last seeing the light any more than I could blame my other competitors who were doing the same thing, but it did put me on a spot. Without sales representation around the country and the world, I had to start from scratch setting up my own sales and service centers. (239)

Creation of the technical institute

"What a place for a school," said Evelyn when we were at last back in our hill-top home in Vicksburg. "You're always talking about a technical institute to carry on where your shop classes leave off. Don't you think ?” (241)

The start of LeTourneau University in Longview Texas

“After that things moved fast. Through the cooperation of Mr. Estes, a program was presented in Washington for converting Harmon Hospital into LeTourneau Technical Institute, with specific attention being paid to veterans desiring a technical education under the G.I. Bill of Rights. It would be a nonprofit organization under the direction and support of the LeTourneau Foundation. So enthusiastic was the approval of this program that buildings and grounds, valued at some $870,000, were turned over to the foundation for the token payment of one dollar down, the only provision being that in the event of need within ten years, the whole was to be returned to the government for its original use as a hospital.” (241)

On production

“One day, speaking at the 1951 World Trade Conference, I got going on my favorite subject of production. I said men can have what men produce, and they can’t have what they don’t produce. Then I went on to say that if you paid every man that labors $1,000 an hour, he couldn't buy a bit more than he is getting now, because he has to produce it before he can buy it.” (245)
Production of raw materials

“In terms of world trade, I pointed out, the raw materials cost less than 1 per cent of the finished product. All of the rest of the cost is in wages, sales, and distribution. Some of the richest countries in the world in terms of raw materials, like the jungle areas of Asia, Africa, and South America, are the poorest economically because they don’t produce enough of their raw materials to live on.” (245)

Establishment of Tournata Liberia

“Since no outsiders can own land in Liberia, the lease was made out for 80 years, a term, as President Tubman told me, "ought to be long enough for both of us." The program I outlined was four-pointed.

One: By supplying the natives with machinery and training them in its use and maintenance, we would help them help themselves.

Two: We would establish a model village to be called Tournata, complete with electric lights, short-wave radio, airport, anchorage facilities, hospital, school, and non-sectarian church, to serve as a guide to higher living standards.

Three: We would engage in a land-clearing for the ultimate production of crops and livestock shown by experiment to be best suited to the locality.

Four: By word and example we would teach the Christian way of life, and through the training of local pastors extend God's Word to the villages of the interior.” (250)

Prefabricated Jungle Houses

“That brings up again the question of commercialism that I still hear from time to time. I'll let you judge for yourself.

On July 19, 1952, the first shipload of material was sent to Tournata from Vicksburg. Billy Graham gave the address and dedicatory prayer. On board were my son-in-law, Gus Dick, and daughter Louise to head up the project, along with their three children. With them were a crew of engineers and technical assistants, missionaries, and Janice Hoffer, R.N. For equipment they had a tree saw, Tournadozer, Toumapull with Carryall, a portable sawmill, crates of prefabricated jungle houses, electrical generators, short-wave radio, water purifiers, freezers: and all the rest of the items needed to establish a small town.

In the seven years since then, we've learned a lot. For one thing, while the bulldozer and Toumapull are powerful, the jungle is more so. There are some trees in there five to eight feet in diameter and 200 feet high that just will not fall over when a bulldozer pecks at their roots. When confronted with a situation like that, established thinking would have you believe the trees are too big. My own thinking was that the machines were too small, and once the problem becomes as simple as that, you build a bigger machine. I built what we call a jungle crusher.” (251)
Pride in the Jungle Crusher

“In its current version the jungle crusher looks like a giant steam roller, with its front and rear rollers studded with ax blades. It is 74 feet long, 22 feet wide, 19 feet high, and it weighs 280,000 pounds. Two big Diesels generate the electricity for my motors mounted inside the rollers and for the motor steering. But let me tell you about it, because as a means of opening up the jungles of the world, I think this machine is as important as any I’ve ever built. It rolls up against the jungle wall, a horizontal guide bar catching the tree trunks 19 feet above the ground. You think it will have to stop, but suddenly, in your steel and mesh enclosed cab, you see the wall collapsing ahead of you. The noise of tree trunks cracking is like the scattered reports of rifle fire. Overhead the ripping and snapping of vines and branches almost drowns out the roar of your Diesels. The guide bar relentlessly forces the trees to fall straight ahead. But, and this is an important point, just as the roots are about to be wrenched out of the ground, the ax-bladed roller reaches the base of the trunk, shattering it and forcing the severed, splintered roots back into the earth for mulch. Now the jungle crusher, rolling like a tugboat in surf, mounts the fallen trunks, and its overwhelming weight and ax blades crush them to pulp. So vast is its power that against a jungle of trees four feet thick and 150 feet high, it crushes them like corn stalks at the rate of four acres an hour. But every now and then you come up against one of those jungle giants so big that what you can see of the trunk looks like a solid wall. Now, you think, you’ve got to stop. But the guide bar crushes through the thick, spongy bark, and begins to slide up the slippery trunk. The ax-blades of the roller reach the base of the tree and start chewing their way upward. The whole machine just rears up like a dinosaur, the back roller pushing and the front roller pressing forward with all its power and weight. Something has to give, and so far it has always been the tree. Slowly and grudgingly, and with a terrific crashing noise, but down it comes. Inside the cab, the shock when the giant hits the ground is about like that inside the wheelhouse when high surf drops a landing craft on the beach.” (252-253)

The jungle crusher and the colony

“As my jungle crusher cleared land, it spared all the timber of commercial value. On either side of the clearing, it smashed trails through to make accessible other valuable trees. The sawmill went into action, and I had to invent a shallow-draft, three-keeled, twin propellered freighter to haul lumber to various Liberian ports. In the meantime the cleared land is not only producing food for our own rapidly growing colony, but is producing a surplus to help the economy of the country. Our model poultry farm will open up an entirely new source of eggs and meat, and we are now going to experiment with disease and tse-tse fly-resistant cattle. We are also looking to the sea, wealthy in fish, that the natives in their dug-out canoes have scarcely touched.” (253)
Fresh ideas

“In turn, I could use my remaining factories to manufacture any and all kinds of machines that did not move dirt. The restriction on my building of earthmoving equipment was limited to five years. I am sure they thought that at 70 I would have long retired from the battle, whereas what actually happened was that my five years of retirement from the earth-moving business were just what my mind needed to get rid of some rutted thinking and come up with some fresh ideas.” (256)

Not afraid to start

“And there was my electric wheel that could be adapted to any form of heavy-duty, off-road transportation. Recently I read in a technical journal that: "Accurately predicting the relationships of soil and vehicle on a deformable terrain—of the type encountered in cross-country locomotion—is a complex matter, due largely to the non-homogeneous structure of the soil and the random variation of elevation with forward motion. The problems involved in accurately predicting those relationships have successfully evaded analytical solution for many years." (Daniel Clark in Research Trends, Vol. VII, No.1.) I’m glad I didn’t know that when I began concentrating on the production of transporters, log stackers, logging arches, and electric land and snow trains. I’m afraid that nonhomogeneous soil structure might have scared me out if I had known what it was, and I know I would have been discouraged by something that has "evaded analytical solution for many years." (257)

Translate and recording of Indian languages

“For many years at considerable peril, as often from headhunters as bushmasters, jaguars, and poisonous insects, this dedicated group has been working in the jungles of Central and South America to translate in writing and preserve on phonograph records and tape all the various Indian languages. Then they translate the Bible into these languages, and so carry the Bible to the natives in their own tongues.” (257-258)

Tournavista, Peru: getting Christ to the jungle Indians

“Cam had heard of my Liberian project, and was convinced the same program would work in the jungles of the Amazon on a broader basis. "We still have to carry Christ to the jungle Indians," he said, "but we have another job, too. The eastern foothills of the Andes Mountains are being colonized by several hundred Peruvians. They have brought with them small schools and churches, and law and order, but they need help. They need your machines and your program. Mr. LeTourneau, it will take them 50 years with hoes and axes to do what you can do for them in a year." It was an enticing picture. Barney flew me down to Lima, and in a series of conferences with President Manuel Odria, a colonization program was outlined and approved. For the government I would complete 31 miles of the Trans-Andean Highway, linking the Amazonian slopes with the Pacific. For its part, the government would grant me 400,000 hectares of land—about a million acres—on the Pachitea River near the town of Pucallpa. The Pachitea, flowing into the Ucayali River, which in turn flows into the Amazon, is considered the head of navigation, though I will say that until I designed my own shallow-draft vessel traffic was extremely light
When I first flew over Tournavista, as our colony is named, it was just a part of the solid jungle that stretches from the Andes to the mouth of the Amazon. Its gently rolling hills, at an elevation of 800 feet above sea level, looked like long rollers on a green sea, and the thought of tackling it even with my biggest machines was awesome. My jungle crusher could just roll in there and disappear without a trace." (258)

**Jungle crusher and stinger in South America**

“And the thought of getting my roller there in the first place was equally awesome. Our supply route was 4,650 miles long~ from Vicksburg to the mouth of the Amazon and then up river across almost the width of South America, with the upper reaches filled with uncharted sandbars.

Well, there are no big jobs, only small machines, so I designed some bigger machines. Like my tree stinger for felling 150 foot trees in 20 seconds, roots and all. These trees, too thick to be felled with a tree saw, and too valuable as timber to be smashed under the jungle crusher, were a problem until I designed my fast, electric-wheeled stinger with an electrically powered pusher boom. After that all an operator had to do was roll up to the selected tree, elevate the boom to a good leverage point 30 or 40 feet up the trunk, and push a button. Electric motors would then start forcing an extension of the boom forward with a pressure of a quarter of a million pounds, and that was it. Except that some of those Peruvian monsters seemed rooted in China, and then my stinger would be the one pushed back with all electric wheels churning. I soon found an answer to that. I attached a huge steel blade to the rear of the stinger, and with that blade socked deep into the ground, the stinger was anchored and the tree had to go.

The stinger is winning a lot of friends among contractors who must clear out trees and roots for new highways, and among land-clearers not faced with dense growths requiring a jungle crusher. Another unique machine born of Peruvian necessity was my' walking ship the *Lizzie Lorimer*. This ship has four keels and four propellers for stability on the high seas, with the same four keels providing a wide distribution of weight to operate in water, as one skipper put it, "no deeper than the dew." The fact that I'm proudest of is that it really doesn't need the dew for beaching or crossing sand bars. On each side, amid ship, I placed two long steel rams with broad steel feet at both ends. To go forward on dry land, the rear ends of the rams are lowered and they heave and push forward exactly as would a man poling a boat.” (258-259)
Time is precious to him. I've heard him say, "If you waste dollars for me, it's not too serious--I can make that up. But don't waste my time--it can't be recalled." I saw him jotting some things on a small piece of paper one day, so I asked him about it. He told me that he had jotted down what he wanted to get done that day. It was his assurance that things would be done in the order of their importance and that no time would be wasted. (278)

“A suit of clothes, to him, is simply a garment for proper dress; his car, a means to bring him to his destination; his plane, a conserver of time; his office (unbelievably unpretentious), a place necessary to carry out the duties of the day.” (279)

“George Patton of Engineering” in *Looking Forward* by H. W. Bush (autobiography)


“A kind of George Patton of engineering. … He'd come to us with a proposition: he'd build the Scorpion at his own expense. We'd advance him $400,000 – refundable if the completed rig didn't work; if it did, he'd get an added $550,000 and 38,000 shares of Zapata Off-Shore common stock. Our feeling was that anybody who had that much confidence in himself was worth the gamble.”