THR BUSINESS

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THE BEGINNING OF BUSINESS

On May 31, 1921, the Ford Motor Company turned out Car No. 5,000,000. It is out in my museum along with the gasoline buggy that I began work on thirty years before and which first ran satisfactorily along in the spring of 1893. I was running it when the bobolinks came to Dearborn and they always come on April 2nd. There is all the difference in the world in the appearance of the two vehicles and almost as much difference in construction and materials, but in fundamentals the two are curiously alike - except that the old buggy has on it a few wrinkles that we have not yet quite adopted in our modern car. For that first car or buggy, even though it had but two cylinders, would make twenty miles an hour and run sixty miles on the three gallons of gas the little tank held and is as good to-day as the day it was built The development in methods of manufacture and in materials has been greater than the development in basic design. The whole design has been refined; the present Ford car, which is the "Model T," has four cylinders and a self starter - it is in every way a more convenient and an easier riding car. It is simpler than the first car. But almost every point in it may be found also in the first car. The changes have been brought about through experience in the making and not through any change in the basic principle - which I take to be an important fact demonstrating that, given a good idea to start with, it is better to concentrate on perfecting it than to hunt around for a new idea. One idea at a time is about as much as any one can handle. It was life on the farm that drove me into devising ways and means to better transportation. I was born on July 30, 1863, on a farm at Dearborn, Michigan, and my earliest recollection is that, considering the results, there was too much work on the place. That is the way I still feel about farming. There is a legend that my parents were very poor and that the early days were hard ones. Certainly they were not rich, but neither were they poor

. As Michigan farmers went, we were prosperous. The house in which I was born is still standing, and it and the farm are part of my present holding. There was too much hard hand labour on our own and all other farms of the time. Even when very young I suspected that much might somehow be done in a better way. That is what took me into mechanics - although my mother always said that I was born a mechanic. I had a kind of workshop with odds and ends of metal for tools before I had anything else. In those days we did not have the toys of to-day; what we had were home made. My toys were all tools - they still are! And every fragment of machinery was a treasure. The biggest event of those early years was meeting with a road engine about eight miles out of Detroit one day when we were driving to town. I was then twelve years old. The second biggest event was getting a watch - which happened in the same year. I remember that engine as though I had seen it only yesterday, for it was the first vehicle other than horse-drawn that I had ever seen. It was intended primarily for driving threshing machines and sawmills and was simply a portable engine and boiler mounted on wheels with a water tank and coal cart trailing behind. I had seen plenty of these engines hauled around by horses, but this one had a chain that made a connection between the engine and the rear wheels of the wagon-like frame on which the boiler was mounted. The engine was placed over the boiler and one man standing on the platform behind the boiler shoveled coal, managed the throttle, and did the steering. It had been made by Nichols, Shepard & Company of Battle Creek. I found that out at once. The engine had stopped to let us pass with our horses and I was off the wagon and talking to the engineer before my father, who was driving, knew what I was up to. The engineer was very glad to explain the whole affair. He was proud of it.

He showed me how the chain was disconnected from the propelling wheel and a belt put on to drive other machinery. He told me that the engine made two hundred revolutions a minute and that the chain pinion could be shifted to let the wagon stop while the engine was still running. This last is a feature which, although in different fashion, is incorporated into modern automobiles. It was not important with steam engines, which are easily stopped and started, but it became very important with the gasoline engine. It was that engine which took me into automotive transportation. I tried to make models of it, and some years later I did make one that ran very well, but from the time I saw that road engine as a boy of twelve right forward to to-day, my great interest has been in making a machine that would travel the roads. Driving to town I always had a pocket full of trinkets - nuts, washers, and odds ends finery.to broken watch and tried to put it together. When I was thirteen I managed for the first time to put a watch together so that it would keep time. By the time I was fifteen I could do almost anything in watch repairing - although my tools were of the crudest. There is an immense amount to be learned simply by tinkering with things. It is not possible to learn from books how everything is made - and a real mechanic ought to know how nearly everything is made. Machines are to a mechanic what books are to a writer. He gets ideas from them, and if he has any brains he will apply those ideas. From the beginning I never could work up much interest in the labour of farming. I wanted to have something to do with machinery. My father was not entirely in sympathy with my bent toward mechanics. He thought that I ought to be a farmer. When I left school at seventeen and became an apprentice in the machine shop of the Drydock Engine Works I was all but given up for lost. I passed my apprenticeship without trouble - that is, I was qualified to be a machinist long before my three-year

term had expired - and having a liking for fine work and a leaning toward watches I worked nights at repairing in a jewelry shop. At one period of those early days I think that I must have had fully three hundred watches. I thought that I could build a serviceable watch for around thirty cents and nearly started in the business. But I did not because I figured out that watches were not universal necessities, and therefore people generally would not buy them. Just how I reached that surprising conclusion I am unable to state. I did not like the ordinary jewelry and watch making work excepting where the job was hard to do. Even then I wanted to make something in quantity. It was just about the time when the standard railroad time was being arranged. We had formerly been on sun time and for quite a while, just as in our present daylight-saving days, the railroad time differed from the local time. That me a goof s ea an so I succeeded in making a watch that kept both times. It had two dials and it was quite a curiosity in the neighbourhood. In 1879 - that is, about four years after I first saw that Nichols-Shepard machine - I managed to get a chance to run one and when my apprenticeship was over I worked with a local representative of the Westinghouse Company of Schenectady as an expert in the setting up and repair of their road engines. The engine they put out was much the same as the Nichols-Shepard engine excepting that the engine was up in front, the boiler in the rear, and the power was applied to the back wheels by a belt. They could make twelve miles an hour on the road even though the self-propelling feature was only an incident of the construction. They were sometimes used as tractors to pull heavy loads and, if the owner also happened to be in the threshing-machine business, he hitched his threshing

machine and other paraphernalia to the engine in moving from farm to farm. What bothered me was the weight and the cost. They weighed a couple of tons and were far too expensive to be owned by other than a farmer with a great deal of land. They were mostly employed by people who went into threshing as a business or who had sawmills or some other line that required portable power. Even before that time I had the idea of making some kind of a light steam car that would take the place of horses - more especially, however, as a tractor to attend to the excessively hard labour of ploughing. It occurred to me, as I remember somewhat vaguely, that precisely the same idea might be applied to a carriage or a wagon on the road. A horseless carriage was a common idea. People had been talking about carriages without horses for many years back - in fact, ever since the steam engine was invented - but the idea of the carriage at first did not seem so practical to me as the idea of an engine to do the harder farm work, and of all the work on the farm ploughing was the hardest. Our roads were poor and we had not the habit of getting around. One of the most remarkable features of the automobile on the farm is the way that it has broadened the farmer's life. We simply took for granted that unless the errand were urgent we would not go to town, and I think we rarely made more than a trip a week. In bad weather we did not go even that often. Being a full-fledged machinist and with a very fair workshop on the farm it was not difficult for me to build a steam wagon or tractor. In the building of it came the idea that perhaps it might be made for road use. I felt perfectly certain that horses, considering all the bother of attending them and the expense of feeding, did not earn their keep. The obvious thing to do was to design and build a steam engine that would be light enough to run an ordinary wagon or to pull a

plough. I thought it more important first to develop the tractor. To lift farm drudgery off flesh and blood and lay it on steel and motors has been my most constant ambition. It was circumstances that took me first into the actual manufacture of road cars. I found eventually that people were more interested in something that would travel on the road than in something that would do the work on the farms. In fact, I doubt that the light farm tractor could have been introduced on the farm had not the farmer had his eyes opened slowly but surely by the automobile. But that is getting ahead of the story. I thought the farmer would be more interested in the tractor. I built a steam car that ran. It had a kerosene-heated boiler and it developed plenty of power and a neat control -which is so easy with a steam throttle. But the boiler was dangerous. To get the requisite power without too big and heavy a power plant required that the engine work under high pressure; sitting on a high-pressure steam boiler is not altogether pleasant. To make it even reasonably safe required an excess of weight that nullified the economy of the high pressure. For two years I kept experimenting with various sorts of boilers - the engine and control problems were simple enough - and then I definitely abandoned the whole idea of running a road vehicle by steam. I knew that in England they had what amounted to locomotives running on the roads hauling lines of trailers and also there was no difficulty in designing a big steam tractor for use on a large farm. But ours were not then English roads; they would have stalled or racked to pieces the strongest and heaviest road tractor. And anyway the manufacturing of a big tractor which only a few wealthy farmers could buy did not seem to me worth while. But I did not give up the idea of a horseless carriage. The work with the Westinghouse representative only served to

confirm the opinion I had formed that steam was not suitable for light vehicles. That is why I stayed only a year with that company. There was nothing more that the big steam tractors and engines could teach me and I did not want to waste time on something that would lead nowhere. A few years before - it was while I was an apprentice I read in the World of Science, an English publication, of the "silent gas engine" which was then coming out in England. I think it was the Otto engine. It ran with illuminating gas, had a single large cylinder, and the power impulses being thus intermittent required an extremely heavy fly-wheel. As far as weight was concerned it gave nothing like the power per pound of metal that a steam engine gave, and the use of illuminating gas seemed to dismiss it as even a possibility for road use. It was interesting to me only as all machinery was interesting. I followed in the English and American magazines which we got in the shop the development of the engine and most particularly the hints of the possible replacement of the illuminating gas fuel by a gas formed by the vaporization of gasoline. The idea of gas engines was by no means new, but this was the first time that a really serious effort had been made to put them on the market. They were received with interest rather than enthusiasm and I do not recall any one who thought that the internal combustion engine could ever have more than a limited use. All the wise people demonstrated conclusively that the engine could not compete with steam. They never thought that it might carve out a career for itself. That is the way with wise people - they are so wise and practical that they always know to a dot just why something cannot be done; they always know the limitations. That is why I never employ an expert in full bloom. If ever I wanted to kill opposition by unfair means I would endow the opposition with experts. They

would have so much good advice that I could be sure they would do little work. The gas engine interested me and I followed its progress, but only from curiosity, until about 1885 or 1886 when, the steam engine being discarded as the motive power for the carriage that I intended some day to build, I had to look around for another sort of motive power. In 1885 I repaired an Otto engine at the Eagle Iron Works in Detroit. No one in town knew anything about them There was a rumour that I did and, although I had never before been in contact with one, I undertook and carried through the job. That gave me a chance to study the new engine at first hand and in 1887 I built one on the Otto four-cycle model just to see if I understood the principles. "Four cycle" means that the piston traverses the cylinder four times to get one power impulse. The first stroke draws in the gas, the second compresses it, the third is the explosion or power stroke, while the fourth stroke exhausts the waste gas. The little model worked well enough; it had a one-inch bore and a three-inch stroke, operated with gasoline, and while it did not develop much power, it was slightly lighter in proportion than the engines being offered commercially. I gave it away later to a young man who wanted it for something or other and whose name I have forgotten; it was eventually destroyed. That was the beginning of the work with the internal combustion engine. I was then on the farm to which I had returned, more because I wanted to experiment than because I wanted to farm, and, now being an all-around machinist, I had a first-class workshop to replace the toy shop of earlier days. My father offered me forty acres of timber land, provided I gave up being a machinist. I agreed in a provisional way, for cutting the timber gave me a chance to get married. I fitted out a sawmill and a portable engine and started to cut out and saw up the timber

on the tract. Some of the first of that lumber went into a cottage on my new farm and in it we began our married life. It was not a big house - thirty-one feet square and only a story and a half high - but it was a comfortable place. I added to it my workshop, and when I was not cutting timber I was working on the gas engines - learning what they were and how they acted. I read everything I could find, but the greatest knowledge came from the work. A gas engine is a mysterious sort of thing - it will not !always go the way it should. You can imagine how those first engines acted

It was in 1890 that I began on a double-cylinder engine. It was quite impractical to consider the single cylinder for transportation purposes -the fly-wheel had to be entirely too heavy. Between making the first four-cycle engine of the Otto type and the start on a double cylinder I had made a great many experimental engines out of tubing. I fairly knew my way about. The double cylinder I thought could be applied to a road vehicle and my original idea was to put it on a bicycle with a direct connection to the crankshaft and allowing for the rear wheel of the bicycle to act as the balance wheel. The speed was going to be varied only by the throttle. I never carried out this plan because it soon became apparent that the engine, gasoline tank, and the various necessary controls would be entirely too heavy for a bicycle. The plan of the two opposed cylinders was that, while one would be delivering power the other would be exhausting. This naturally would not require so heavy a fly-wheel to even the application of power. The work started in my shop on the farm. Then I was offered a job with the Detroit Electric Company as an engineer and machinist at forty-five dollars a month. I took it because that was more money than the farm was bringing me and I had decided to get away from farm life anyway. The timber had all been cut.

We rented a house on Bagley Avenue, Detroit. The workshop came along and I set it up in a brick shed at the back of the house. During the first several months I was in the night shift at the electric-light plant - which gave me very little time for experimenting - but after that I was in the day shift and every night and all of every Saturday night I worked on the new motor. I cannot say that it was hard work. No work with interest is ever hard. I always am certain of results. They always come if you work hard enough. But it was a very great thing to have my wife even more confident than I was. She has always been that way. I had to work from the ground up -that is, although I knew that a number of people were working on horseless carriages, I could not know what they were doing. The hardest problems to overcome were in the making and breaking of the spark and in the avoidance of excess weight. For the transmission, the steering gear, and the general construction, I could draw on my experience with the steam tractors. In 1892 I completed my first motor car, but it was not until the spring of the following year that it ran to my satisfaction. This first car had something of the appearance of a buggy. There were two cylinders with a two-and-a-half-inch bore and a six-inch stroke set side by side and over the rear axle. I made them out of the exhaust pipe of a steam engine that I had bought. They developed about four horsepower. The power was transmitted from the motor to the countershaft by a belt and from the countershaft to the rear wheel by a chain. The car would hold two people, the seat being suspended on posts and the body on elliptical springs. There were two speeds - one of ten and the other of twenty miles per hour - obtained by shifting the belt, which was done by a clutch lever in front of the driving seat. Thrown forward, the lever put in the high speed; thrown back, the low speed;

with the lever upright the engine could run free. To start the car it was necessary to turn the motor over by hand with the clutch free. To stop the car one simply released the clutch and applied the foot brake. There was no reverse, and speeds other than those of the belt were obtained by the throttle. I bought the iron work for the frame of the carriage and also the seat and the springs. The wheels were twenty-eight-inch wire bicycle wheels with rubber tires. The balance wheel I had cast from a pattern that I made and all of the more delicate mechanism I made myself. One of the features that I discovered necessary was a compensating gear that permitted the same power to be applied to each of the rear wheels when turning corners. The machine altogether weighed about five hundred pounds. A tank under the seat held three gallons of gasoline which was fed to the motor through a small pipe and a mixing valve. The ignition was by electric spark. The original machine was air-cooled - or to be more accurate, the motor simply was not cooled at all. I found that on a run of an hour or more the motor heated up, and so I very shortly put a water jacket around the cylinders and piped it to a tank in the rear of the car over the cylinders. Nearly all of these various features had been planned in advance. That is the way I have always worked. I draw a plan and work out every detail on the plan before starting to build. For otherwise one will waste a great deal of time in makeshifts as the work goes on and the finished article will not have coherence. It will not be rightly proportioned.

Many inventors fail because they do not distinguish between planning and experimenting. The largest building difficulties that I had were in obtaining the proper materials. The next were with tools. There had to be some adjustments and changes in details of the design, but what held me up most was that I had neither the time nor the

money to search for the best material for each part. But in the spring of 1893 the machine was running to my partial satisfaction and giving an opportunity further to ..test out the design and material on the road.

WHAT I LEARNED ABOUT BUSINESS

My "gasoline buggy" was the first and for a long time the only automobile in Detroit. It was considered to be something of a nuisance, for it made a racket and it scared horses. Also it blocked traffic. For if I stopped my machine anywhere in town a crowd was around it before I could start up again. If I left it alone even for a minute some inquisitive person always tried to run it. Finally, I had to carry a chain and chain it to a lamp post whenever I left it anywhere. And then there was trouble with the police. I do not know quite why, for my impression is that there were no speed-limit laws in those days. Anyway, I had to get a special permit from the mayor and thus for a time enjoyed the distinction of being the only licensed chauffeur in America. I ran that machineabout one thousand miles through 1895 and 1896 and then sold it to Charles Ainsley of Detroit for two hundred dollars. That was my first sale. I had built the car not to sell but only to experiment with. I wanted to start another car. Ainsley wanted to buy. I could use the money and we had no trouble in agreeing upon a price. It was not at all my idea to make cars in any such petty fashion. I was looking ahead to production, but before that could come I had to have something to produce. It does not pay to hurry. I started a second car in 1896; it was much like the first but a little lighter. It also had the belt drive which I did not give up until some time later; the

belts were all right excepting in hot weather. That is why I later adopted gears. I learned a great deal from that car. Others in this country and abroad were building cars by that time, and in 1895 I heard that a Benz car from Germany was on exhibition in Macy's store in New York. I traveled down to look at it but it had no features that seemed worth while. It also had the belt drive, but it was much heavier than my car. I was working for lightness; the foreign makers have never seemed to appreciate what light weight means. I built three cars in all in my home shop and all of them ran for years in Detroit. I still have the first car; I bought it back a few years later from a man to whom Mr. Ainsley had sold it. I paid one hundred dollars for it.

During all this time I kept my position with the electric company and gradually advanced to chief engineer at a salary of one hundred and twenty-five dollars a month. But my gas-engine experiments were no more popular with the president of the company than my first mechanical leanings were with my father. It was not that my employer objected to experiments - only to experiments with a gas engine. I can still hear him say: "Electricity, yes, that's the coming thing. But gas - no." He had ample grounds for his skepticism - to use the mildest terms. Practically no one had the remotest notion of the future of the internal combustion engine, while we were just on

the edge of the great electrical development. As with every comparatively new idea, electricity was expected to do much more than we even now have any indication that it can do. I did not see the use of experimenting with electricity for my purposes. A road car could not run on a trolley even if trolley wires had been less expensive; no storage battery was in sight of a weight that was practical. An electrical car had of necessity to be limited in radius and to contain a large amount of motive machinery in proportion to the power exerted. That is not to say that I held or now hold electricity cheaply; we have not yet begun to use electricity. But it has its place, and the internal combustion engine has its place. Neither can substitute for the other - which is

exceedingly fortunate. I have the dynamo that I first had charge of at the Detroit Edison Company. When I started our Canadian plant I bought it from an office building to which it had been sold by the electric company, had it revamped a little, and for several years it gave excellent service in the Canadian plant. When we had to build a new power plant, owing to the increase in business, I had the old motor taken out to my museum - a room out at Dearborn that holds a great number of my mechanical treasures. The Edison Company offered me the general superintendency of the company but only on condition that I would give up my gas engine and devote

myself to something really useful. I had to choose between my job and my automobile. I chose the automobile, or rather I gave up the job - there was really nothing in the way of a choice. For already I knew that the car was bound to be a success. I quit my job on August 15, 1899, and went into the automobile business. It might be thought something of a step, for I had no personal funds. What money was left over from living was all used in experimenting. But my wife agreed that the automobile could not be given up - that we had to make or break. There was no "demand" for automobiles—there never is for a new article. They were accepted in much the fashion as was more recently the airplane. At first the "horseless carriage" was considered merely a freak notion and many wise people explained with particularity why it could never be more than a toy. No man of money even thought of it as a commercial possibility. I cannot imagine why each new means of transportation meets with such opposition. There are even those to–day who shake their heads and talk about the luxury of the automobile and only grudgingly admit that perhaps the motor truck is of some use. But in the beginning there was hardly any one who sensed

that the automobile could be a large factor in industry. The most optimistic hoped only for a development akin to that of the bicycle. When it was found that an

automobile really could go and several makers started to put out cars, the immediate query was as to which would go fastest. It was a curious but natural development—that racing idea. I never thought anything of racing, but the public refused to consider the automobile in any light other than as a fast toy. Therefore later we had to race. The industry was held back by this initial racing slant, for the attention of the makers was diverted to making fast rather than good cars. It was a business for speculators. A group of men of speculative turn of mind organized, as soon as I left the electric company, the Detroit Automobile Company to exploit my car. I was the chief engineer and held a small amount of the stock. For three years we continued making cars more or less on the model of my first car. We sold very few of them; I could get no support at all toward making better cars to be sold to the public at large. The whole thought was to make to order and to get the largest price possible for each car. The main idea seemed to be to get the money. And being without authority other than my engineering position gave me, I found that the new company was not a vehicle for realizing my ideas but merely a money-making concern - that did not make much money. In March, 1902, I resigned, determined never again to put myself under orders. The Detroit Automobile Company later became the Cadillac Company under the ownership of the Lelands, who came in subsequently. I rented a shop - a one-story brick shed - at 81 Park Place to continue my experiments and to find out what

business really was. I thought that it must be something different from what it had proved to be in my first adventure. The year from 1902 until the formation of the Ford Motor Company was practically one of investigation. In my little one-room brick shop I worked on the development of a four-cylinder motor and on the outside I tried to find out what business really was and whether it needed to be quite so selfish a scramble for money as it seemed to be from my first short experience. From the period of the first car, which I have described, until the formation of my present company I built in all about twenty-five cars, of which nineteen or twenty were built with the Detroit Automobile Company. The automobile had passed from the initial stage where the fact that it could run at all was enough, to the stage where it had to show speed. Alexander Winton of Cleveland, the founder of the Winton car, was then the track champion of the country and willing to meet all comers. I designed a two-cylinder enclosed engine of a more compact type than I had before used, fitted it into a skeleton chassis, found that I could make speed, and arranged a race with Winton. We met on the Grosse Point track at Detroit. I beat him. That was my first race, and it brought advertising of the only kind that people cared to read. The public thought nothing of a car unless it made speed -unless it beat other racing cars. My ambition to

build the fastest car in the world led me to plan a four-cylinder motor. But of that more later. The most surprising feature of business as it was conducted was the large attention given to finance and the small attention to service. That seemed to me to be reversing the natural process which is that the money should come as the result of work and not before the work. The second feature was the general indifference to better methods of manufacture as long as whatever was done got by and took the money. In other words, an article apparently was not built with reference to how greatly it could serve the public but with reference solely to how much money could be had for it - and that without any particular care whether the customer was satisfied. To sell him was enough. A dissatisfied customer was regarded not as a man whose trust had been violated, but either as a nuisance or as a possible source of more money in fixing up the work which ought to have been done correctly in the first place. For instance, in automobiles there was not much concern as to what happened to the car once it had been sold. How much gasoline it used per mile was of no great moment; how much service it actually gave did not matter; and if it broke down and had to have parts replaced, then that was just hard luck for the owner. It was considered good business to sell parts at the highest possible price on the theory that, since the man had

already bought the car, he simply had to have the part and would be willing to pay for it. The automobile business was not on what I would call an honest basis, to say nothing of being, from a manufacturing standpoint, on a scientific basis, but it was no worse than business in general. That was the period, it may be remembered, in which many corporations were being floated and financed. The bankers, who before then had confined themselves to the railroads, got into industry. My idea was then and still is that if a man did his work well, the price he would get for that work, the profits and all financial matters, would care for themselves and that a business ought to start small and build itself up and out of its earnings. If there are no earnings then that is a signal to the owner that he is wasting his time and does not belong in that business. I have never found it necessary to change those ideas, but I discovered that this simple formula of doing good work and getting paid for it was supposed to be slow for modern business. The plan at that time most in favor was to start off with the largest possible capitalization and then sell all the stock and all the bonds that could be sold.

Whatever money happened to be left over after all the stock and bond-selling expenses and promoters, charges and all that, went grudgingly into the foundation of the business. A good business was not one that did good work and earned a fair profit.

A good business was one that would give the opportunity for the floating of a large amount of stocks and bonds at high prices. It was the stocks and bonds, not the work, that mattered. I could not see how a new business or an old business could be expected to be able to charge into its product a great big bond interest and then sell the product at a fair price. I have never been able to see that. I have never been able to understand on what theory the original investment of money can be charged against a business. Those men in business who call themselves financiers say that money is "worth" 6 per cent, or 5 per cent, or some other per cent, and that if a business has one hundred thousand dollars invested in it, the man who made the investment is entitled to charge an interest payment on the money, because, if instead of putting that money into the business he had put it into a savings bank or into certain securities, he could have a certain fixed return. Therefore they say that a proper charge against the operating expenses of a business is the interest on this money. This idea is at the root of many business failures and most service failures. Money is not worth a particular amount. As money it is not worth anything, for it will do nothing of itself. The only use of money is to buy tools to work with or the product of tools. Therefore money is worth what it will help you to produce or buy and no more. If a man thinks that his money will earn 5 per cent, or 6 percent, he ought to place it where he can get that return, but money placed in a business is not a charge on the business - or, rather, should not be. It ceases to be money and becomes, or should become, an engine of

production, and it is therefore worth what it produces - and not a fixed sum according to some scale that has no bearing upon the particular business in which the money has been placed. Any return should come after it has produced, not before. Business men believed that you could do anything by "financing" it. If it did not go through on the first financing then the idea was to "refinance." The process of "refinancing" was simply the game of sending good money after bad. In the majority of cases the need of refinancing arises from bad management, and the effect of refinancing is simply to pay the poor managers to keep up their bad management a little longer. It is merely a postponement of the day of judgment. This makeshift of refinancing is a device of speculative financiers. Their money is no good to them unless they can connect it up with a place where real work is being done, and that they cannot do unless, somehow, that place is poorly managed. Thus, the speculative financiers delude themselves that they are putting their money out to use. They are not; they are putting it out to waste. I determined absolutely that never would I join a company in which finance came before the work or in which bankers or financiers had a part. And further that, if there were no way to get started in the kind of business that I thought could be managed in the interest of the public, then I simply would not get started at all. For my own short experience, together with what I saw going on around me, was quite enough proof

that business as a mere money-making game was not worth giving much thought to and was distinctly no place for a man who wanted to accomplish anything. Also it did not seem to me to be the way to make money. I have yet to have it demonstrated that it is the way. For the only foundation of real business is service. A manufacturer is not through with his customer when a sale is completed. He has then only started with his

customer. In the case of an automobile the sale of the machine is only something in the nature of an introduction. If the machine does not give service, then it is better for the manufacturer if he never had the introduction, for he will have the worst of all advertisements - a dissatisfied customer. There was something more than a tendency in the early days of the automobile to regard the selling of a machine as the real accomplishment and that thereafter it did not matter what happened to the buyer. That is the shortsighted salesman-on-commission attitude. If a salesman is paid only for what he sells, it is not to be expected that he is going to exert any great effort on a customer out of whom no more commission is to be made. And it is right on this point that we later made the largest selling argument for the Ford The price and the quality of the car would undoubtedly have made a market, and a large market. We went beyond that. A man who bought one of our cars was in my opinion entitled to

continuous use of that car, and therefore if he had a breakdown of any kind it was our duty to see that his machine was put into shape again at the earliest possible moment.

In the success of the Ford car the early provision of service was an outstanding element. Most of the expensive cars of that period were ill provided with service stations. If your car broke down you had to depend on the local repair man -when you were entitled to depend upon the manufacturer. If the local repair man were a forehanded sort of a person, keeping on hand a good stock of parts (although on many of the cars the parts were not interchangeable), the owner was lucky. But if the repair man were a shiftless person, with an adequate knowledge of automobiles and an inordinate desire to make a good thing out of every car that came into his place for repairs, then even a slight breakdown meant weeks of laying up and a whopping big repair bill that had to be paid before the car could be taken away. The repair men were for a time the largest menace to the automobile industry. Even as late as 1910 and 1911 the owner of an automobile was regarded as essentially a rich man whose money ought to be taken away from him. We met that situation squarely and at the very beginning. We would not have our distribution blocked by stupid, greedy men. That is getting some years ahead of the story, but it is control by finance that breaks up

service because it looks to the immediate dollar. If the first consideration is to earn a certain amount of money, then, unless by some stroke of luck matters are going especially well and there is a surplus over for service so that the operating men may have a chance, future business has to be sacrificed for the dollar of to-day. And also I noticed a tendency among many men in business to feel that theirlot was hard - they worked against a day when they might retire and live on an income - get out of the strife. Life to them was a battle to be ended as soon as possible. That was another point I could not understand, for as I reasoned, life is not a battle except with our own tendency to sag with the downpull of "getting settled." If to petrify is success all one has to do is to humour the lazy side of the mind but if to grow is success, then one must wake up anew every morning and keep awake all day. I saw great businesses become but the ghost of a name because someone thought they could be managed just as they were always managed, and though the management may have been most excellent in its day, its excellence consisted in its alertness to its day, and not in slavish following of its yesterdays. Life, as I see it, is not a location, but a journey. Even the man who most feels himself "settled" is not settled - he is probably sagging back. Everything is in flux, and was meant to be. Life flows. We may live at the same

number of the street, but it is never the same man who lives there. And out of the delusion that life is a battle that may be lost by a false move grows, I have noticed, a great love for regularity. Men fall into the half-alive habit. Seldom does the cobbler take up with the new-fangled way of soling shoes, and seldom does the artisan willingly take up with new methods in his trade. Habit conduces to a certain inertia, and any disturbance of it affects the mind like trouble. It will be recalled that when a study was made of shop methods, so that the workmen might be taught to produce with less useless motion and fatigue, it was most opposed by the workmen themselves. Though they suspected that it was simply a game to get more out of them, what most irked them was that it interfered with the well-worn grooves in which they had become accustomed to move. Business men go down with their businesses because they like the old way so well they cannot bring themselves to change. One sees them all about - men who do not know that yesterday is past, and who woke up this morning with their last year's ideas. It could almost be written down as a formula that when a man begins to think that he has at last found his method he had better begin a most searching examination of himself to see whether some part of his brain has not gone to sleep. There is a subtle danger in a man thinking that he is "fixed" for life. It indicates that the next jolt of the wheel of progress is going to fling him off. There is also the great fear of being thought a fool. So many men are afraid of being considered fools. I grant that public opinion is a powerful police influence for those

who need it. Perhaps it is true that the majority of men need the restraint of public opinion. Public opinion may keep a man better than he would otherwise be - if not better morally, at least better as far as his social desirability is concerned. But it is not a bad thing to be a fool for righteousness' sake. The best of it is that such fools usually live long enough to prove that they were not fools - or the work they have begun lives long enough to prove they were not foolish. The money influence - the pressing to make a profit on an "investment" - and its consequent neglect of or skimping of work and hence of service showed itself to me in many ways. It seemed to be at the bottom of most troubles. It was the cause of low wages - for without well-directed work high wages cannot be paid. And if the whole attention is not given to the work it cannot be well directed. Most men want to be free to work; under the system in use they could not be free to work. During my first experience I was not free - I could not give full play to my ideas. Everything had to be planned to make money; the last consideration was the work. And the most curious part of it all was the insistence that it was the money and not the work that counted. It did not seem to strike any one as illogical that money should be put ahead of work - even though everyone had to admit that the profit had to come from the work. The desire seemed to be to find a short cut to

money and to pass over the obvious short cut - which is through the work. Take competition; I found that competition was supposed to be a menace and that a good manager circumvented his competitors by getting a monopoly through artificial means. The idea was that there were only a certain number of people who could buy and that it was necessary to get their trade ahead of someone else. Some will remember that later many of the automobile manufacturers entered into an association under the Selden Patent just so that it might be legally possible to control the price and the output of automobiles. They had the same idea that so many trades unions have - the ridiculous notion that more profit can be had doing less work than more.

The plan, I believe, is a very antiquated one. I could not see then and am still unable to see that there is not always enough for the man who does his work; time spent in fighting competition is wasted; it had better be spent in doing the work. There are always enough people ready and anxious to buy, provided you supply what they want and at the proper price -and this applies to personal services as well as to goods. During this time of reflection I was far from idle. We were going ahead with a four-cylinder motor and the building of a pair of big racing cars. I had plenty of time, for I never left my business. I do not believe a man can ever leave his business. He ought

to think of it by day and dream of it by night. It is nice to plan to do one's work in office hours, to take up the work in the morning, to drop it in the evening - and not have a care until the next morning. It is perfectly possible to do that if one is so constituted as to be willing through all of his life to accept direction, to be an employee, possibly a responsible employee, but not a director or manager of anything. A manual labourer must have a limit on his hours, otherwise he will wear himself out. If he intends to remain always a manual labourer, then he should forget about his work when the whistle blows, but if he intends to go forward and do anything, the whistle is only a signal to start thinking over the day's work in order to discover how it might be done better. The man who has the largest capacity for work and thought is the man who is bound to succeed. I cannot pretend to say, because I do not know, whether the man who works always, who never leaves his business, who is absolutely intent upon getting ahead, and who therefore does get ahead - is happier than the man who keeps office hours, both for his brain and his hands. It is not necessary for any one to decide the question. A ten-horsepower engine will not pull as much as a

twenty. The man who keeps brain office hours limits his horsepower. If he is satisfied to pull only the load that he has, well and good, that is his affair - but he must not

complain if another who has increased his horsepower pulls more than he does.

Leisure and work bring different results. If a man wants leisure and gets it - then he has no cause to complain. But he cannot have both leisure and the results of work.