

THE
Ford
INDUSTRIES

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FACTS ABOUT
THE FORD MOTOR COMPANY
AND ITS SUBSIDIARIES



Ford Motor Company

DETROIT, MICHIGAN, U. S. A.

1926

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FOREWORD

IN its expansion to the point where it can sustain a production equal to that of all other automobile manufacturers combined the Ford Motor Company has grown to be one of the largest industrial institutions in the world, if it is not actually the largest.

Its activities are conducted on a colossal scale, reaching to every corner of the civilized world.

Yet the Ford Motor Company has been organized only since 1903.

This book is published as an outline of the Ford industries, in which some of its outstanding features are set forth. It is not a history, nor does it pretend to tell the complete story of the Company, for that would take volumes. So rapidly is the Company expanding and developing that a complete picture of its activities which will be accurate six months hence is impossible. This book presents a bird's-eye view of the organization and its methods at this writing.

The reader's indulgence is asked if superlatives and the phrase "largest in the world" occasionally creep in. When this is done it is merely because there is no other adequate description.

The Ford organization is such an amazing thing that even the bald truth about it is apt to seem overcolored and exaggerated.

HENRY FORD
THE MAN AND HIS WORK



The First and the Ten-Millionth Ford Cars

AN institution is the lengthened shadow of a man. Within these pages the Ford Motor Company is described in all its vast extent, but the narrative properly begins with the man whose vision and labor it incarnates and by whose spirit it is led.

Henry Ford was born on July 30, 1863, in the old homestead which still stands in Springwells township between Dearborn and Detroit. His father, William Ford, besides being one of the substantial farmers of the community, was also Justice of the Peace and warden of the village church.

Whence come the gifts which differentiate a man from his fellows, is a matter of much speculation. The origin and conditions of genius are still veiled in mystery. Only the fact can be stated that, living the life of an average farm boy in a period when machinery of any kind was seldom found on a farm, Henry Ford early gave evidence of interests beyond the routine of fields and stables.

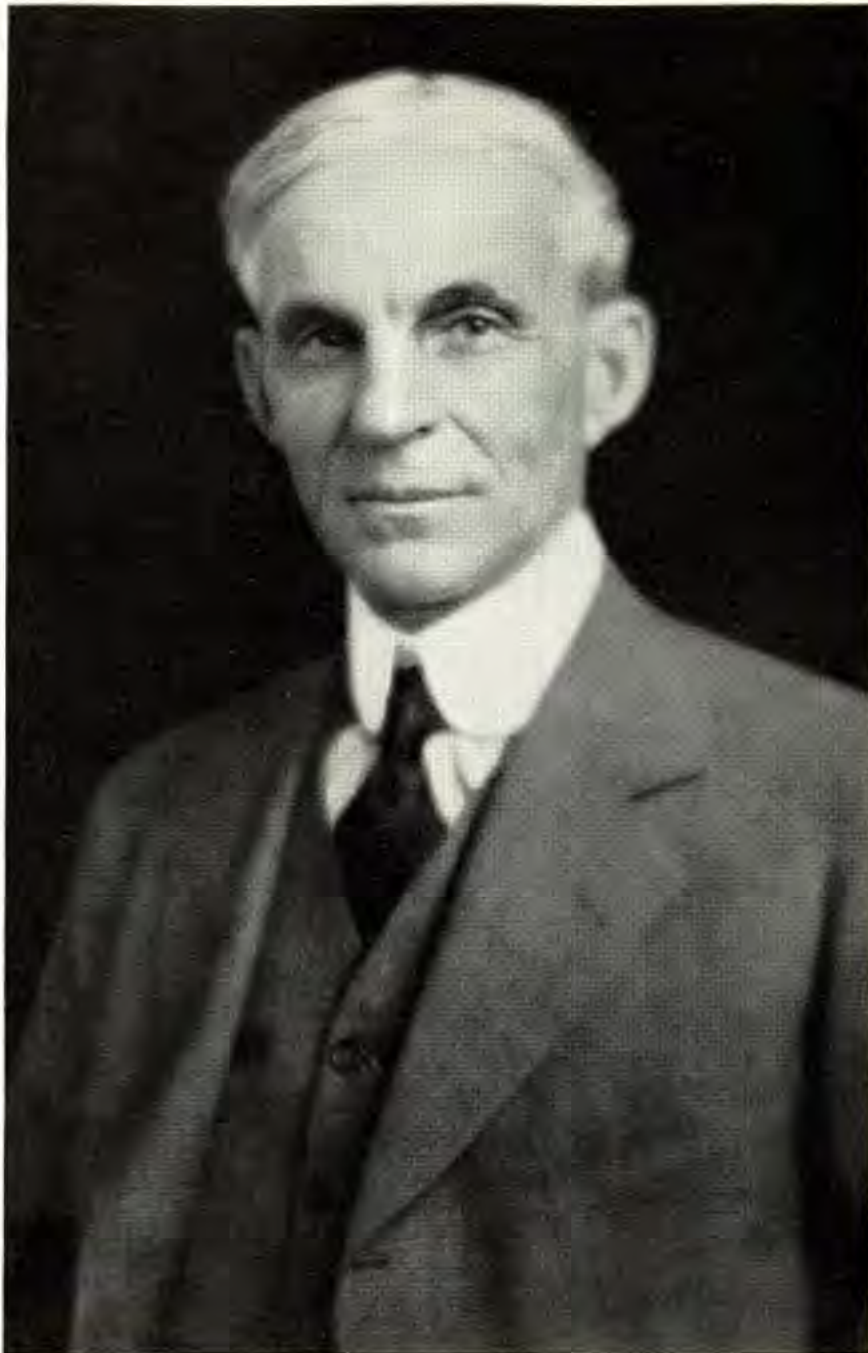
His childhood experiments, curiously enough, foreshadowed his later achievements. First it was a miniature water-wheel which he set up in the drainage ditch near the

country schoolhouse. A watch fascinated him as an example of automotive power. He took one apart and easily put it together again. It was instinctively easy for him. An inborn affinity for mechanics, impossible to suppress, drove his mind every waking moment.

One of Henry Ford's earliest impressions was that of too much work on the farm, too much hand labor, too little attention to possible methods of lifting the burden and releasing the farmer's energies to higher forms of endeavor.

With his entrance into the field of mechanics first as an apprentice boy in an engine works and then by fast stages up the scale to the position of Chief Engineer of the Detroit Edison Company, Henry Ford never lost his dream of supplying power for the farm.

Because this narrative proceeds at a much faster pace than life itself, it would be a mistake to assume that Henry Ford reached his goal at a single bound. He was forty years old before he offered the Ford car to the world. His first car was completed in 1892. The young inventor had strength of character and engineering conscience sufficient to invest his years between twenty-



MR. HENRY FORD



Henry Ford's Birthplace at Dearborn

eight and forty in bringing his product to the highest degree of simplicity and durability then possible before offering it to the world. It was not until 1903 that the famous "999" shot across the motor horizon.

With the Ford Motor Company launched on the small amount of \$28,000 paid in capital, it began to meet the accumulated errors of the current business methods. Henry Ford decided that the results of mechanical engineering were not enough; there must also be sound moral engineering in the management of a concern's relation to society. It is necessary to take account of this fact in evaluating what afterward transpired in the history of the Ford Motor Company.

Against the current practice of charging all that the traffic would bear, the Ford Motor Company adopted the policy of building the best quality of service for the least money. Whereas, it was commonly held at that time that purchasers of motor cars should be charged exorbitant prices for replacement parts, on the theory that having bought the car the owner had to have the parts. The new Company was quite revolutionary in holding that it was morally bound to supply its customers with needed parts at lowest prices. What this policy did to establish confidence in a new form of transportation against which

the public suspicion was strong, it is impossible to compute. Such a policy could have been conceived only in a mind more intent on helping the public to see the value of the automobile than on making profits. The car itself, as a car, as a helper of the people, has always been the first interest in Henry Ford's mind.

Toward this end all of Mr. Ford's energies were directed to perfect the model which should best serve the people, the model which should be easiest and most dependable to operate, which should best combine the cardinal mechanical virtues of durability, simplicity and inexpensiveness. That model appeared in 1908—the famous Model T. Thus standardization was reached, which means finding that combination of qualities which is of most use to most people. And with that point attained, the unparalleled production growth of the Ford Motor Company began.

Counting from the first car Henry Ford made it required thirty years to produce the first five million Ford cars. But the second five million cars were built in 3 years, May, 1921—June 4, 1924, when the ten millionth Ford car chugged briskly out of the shop to join its 9,999,999 forerunners. Just 381 days later (June 20, 1925) the twelve millionth Ford car was com-

pleted. Most of them are still running; many of the first motors are still in use.

The profound effect which the development of the Ford automobile has had on human society has its counterpart in the equally profound effect upon industry of Henry Ford's ideas of social justice and responsibility. First the car was the thing—its perfection, its manufacture at lowest cost, its use by millions, its spread over the inhabited earth. Then came the deserts of those that made that possible. "The Ford Idea" of industrial relations begins here and seems to have no end in maintaining harmony within the organization. The Company has never had a strike nor even a threat of one.

Right relations with employees, however, do not exhaust a great concern's moral obligation to society; there is also the consuming public to be thought of. Every economy in manufacture, every advantage due to increased production, has been shared with the buying public. Numerous cuts in prices which have given Ford Products a phenomenally low price, are in effect a sharing of profit with the public.

While Ford products are low priced they are never cheap. The best quality of every material is used in them. The low prices are accounted for not only by the Ford

method of manufacture, but also the Ford method of finance. This latter gives the public a benefit which does not publicly appear, because it is in the very grain of the business.

From these instances the initial sentence of this chapter may be better understood—for the Ford Motor Company is indeed the lengthened shadow of a man.

The Ford policies are secure for the future. This has been determined by two events: first, the inclusion of all the stock in the holdings of the Ford family; second, by the succession of Mr. Edsel B. Ford to the Presidency of the Ford Motor Company. The fundamental principles of the father have the assent and co-operation of the son, and all this in such unmistakable reality as to satisfy those social and economic observers who feel that a successful continuance of the ideals of the Ford Motor Company is essential to the emergence of a better social and industrial era in this country.

This linking of family names leads naturally to the latest of the Ford developments, the Fordson Tractor. The first going machine that Henry Ford ever built was a farm tractor; the latest he has perfected is the same.

The dream of the Dearborn farm

boy of lifting burdens off men and placing them on motors, of releasing men from drudgery and giving them more of the freedom of life is being realized. As you stand in the fields where the boy dreamed you may lift up your eyes and see the giant industry in which the dream has come true.



Trying Out One of the First Reapers



Airplane View of the Highland Park Plant

HISTORY AND DEVELOPMENT OF THE FORD ORGANIZATION

The Ford Motor Company was incorporated on June 16, 1903. The capital originally subscribed in the Company was \$100,000, of which only \$28,000 in cash was paid into the treasury. There were twelve stockholders, including Henry Ford who held 25% of the common stock. Later, in 1906, Mr. Ford acquired sufficient stock to bring his holdings up to 51 per cent, and shortly thereafter purchased an additional 7½ per cent. In 1919, Edsel B. Ford, who had succeeded his father as president, purchased the remaining 41½ per cent of the outstanding stock. On July 9, 1919, the Ford Motor Company was re-organized under the laws of Delaware, for an authorized capitalization of \$100,000,000. The Company is chartered to build automobiles, trucks, tractors, air craft, internal combustion engines, ships, locomotives and all allied products.

The Company is probably the largest manufacturing enterprise in the world and an accurate valua-

tion of its properties is difficult. But enormous though they may appear, they are small in comparison with the value of the methods of manufacturing which the Company has worked out during the last twenty years with the active assistance of Henry Ford. It might be possible to construct a series of plants and to duplicate the Ford organization in size, but no amount of money could duplicate the value of twenty years of constructive experience and Henry Ford's personal talents applied during that period.

The Ford organization of today represents a complete industrial chain in which every link is strong. Raw materials, transportation and manufacturing are entirely under the Company's control. The Ford industries are independent of strikes, price fluctuations or shortage of raw materials. Manufacturing cycles have been worked out with such precision and the transportation element is so well in hand that the



Airplane View of the River Rouge Plant

Company requires only small inventories. Thus enormous sums of money are released for other purposes including, for example, experimental work conducted on a large and efficient scale hitherto unheard of. Few institutions could risk a million dollars on the manufacture of a single power unit, heretofore untried, or spend a quarter of a million dollars in developing one single type of productive machine as the Ford Motor Company has done.

The wide range of activities and the broad scope of interests which mark the Ford Motor Company for its unique place in industry are mentioned in the following pages.

The Company operates thirty-five branches in the United States of which thirty-two are assembly plants. Foreign branches and associated companies are located in nearly every civilized country.

The cycle of Ford manufacture begins in the iron and coal mines, follows Ford-owned transportation routes and includes the conversion and fabrication of the materials until completed Ford products are placed in the hands of the customer.

The Ford Motor Company employs approximately 150,000 men in the United States and about 8,000 abroad exclusive of Canada.



The First Factory of the Ford Motor Company



THE HIGHLAND PARK POWER HOUSE



The Highland Park Plant Runs at Night

HIGHLAND PARK CRADLE OF THE FORD INDUSTRIES

The Highland Park plant of the Ford Motor Company is one of the show places of the world. Thousands of visitors are conducted through it every year. In point of production it is the largest automobile plant. It covers 278 acres of which 105 are under roof.

From this plant the present world-wide Ford organization sprang. Here the methods and policies later to become famous were originally worked out.

Today more than 50,000 men work at the Highland Park plant, not counting the office force of some 800 men and women. Different departments change shifts at different hours so that streets will not be overcrowded and public transportation facilities swamped. A field of approximately ten acres is set apart for parking cars owned by Ford men who drive to and from work.

While the River Rouge plant deals primarily in raw materials, Highland Park may be likened to a gigantic machine shop. There are dozens of departments which

set apart by themselves would be considered sizeable industries. Two hundred and forty carloads of raw material enter this factory every twelve hours and two hundred and sixty cars of finished parts leave it in the same period.

In addition to being the machine shop of the Ford Motor Company, Highland Park is the scene of glass making, artificial leather manufacture, the making of a rubber compound called Fordite, and the weaving of textiles. Here too one finds the largest forge shop, the largest radiator factory and departments turning out huge supplies of steel bars, copper wire, roller bearings, generators, magnetos, storage batteries, etc.

There is a fire department, hospital, drugstore, auditorium, butcher shop, grocery, blacksmith shop, photograph gallery, shoe store, power plant, post office, telegraph and telephone exchange, a moving picture studio, the Henry Ford Trade School for boys, and two factory apprentice schools for adults.

TWENTY-ONE YEARS OF PRODUCTION

Price of
Model T
Touring
Car

Year	Production	Price of Model T Touring Car
1903	195	
1903-4	1,513	
1904-5	1,695	
1905-6	1,599	
1906-7	8,759	
1907-8	6,181	
1908-9	10,660	\$950.00
1909-10	19,051	780.00
1910-11	34,979	690.00
1911-12	76,150	600.00
1912-13	181,951	550.00
1913-14	264,972	490.00
1914-15	283,161	440.00
1915-16	534,108	360.00
1916-17	785,433	360.00
1917-18	708,355	450.00
1918—		
Aug. 1, 1919	537,452	525.00
Aug. 1, 1919—		
Dec. 31, 1919	401,982	575.00
1920	1,074,336	440.00
1921	1,013,958	415.00
1922	1,351,333	384.00
1923	2,090,959	295.00
1924	1,993,419	290.00
1925	1,990,995	290.00
Fordson Tractors		
1917	254	
1918	34,167	
1919	57,290	
1920	70,955	
1921	36,761	
1922	68,985	
1923	101,898	
1924	83,010	
1925	104,168	
Lincoln Motor Cars		
1920	652	
1921	2,249	
1922	5,505	
1923	7,825	
1924	7,116	
1925	8,415	

FORD MANUFACTURING METHODS

The record of Ford achievement is illustrated in the accompanying table of products and prices. (See opposite page.)

The development of quantity production on an unheard of scale has made it possible to bring about thousands of improvements and refinements in the Ford car. This has been achieved without sacrificing interchangeability. Quantity production further makes possible reduced costs and extending the market for Ford products through the appeal of lower prices.

Ford manufacturing methods have long been considered near the peak of manufacturing efficiency—a pattern which other automobile manufacturers have not hesitated to follow insofar as they have been able to do so.

THE CONVEYOR SYSTEM

Conveyors which carry the materials and the parts from place to place within the factory enable the men to stand still at their work. The conveyor system was developed by the Ford Motor Company. Its remarkable savings in time and energy have caused other manufacturers to install the conveyor system.

Conveyors are carefully timed and synchronized to insure an even output and govern the rate of production. Careful time study of each operation is required so that the conveyors do not move too slowly, wasting time, nor too fast, crowding the men or machines beyond their efficient capacity.

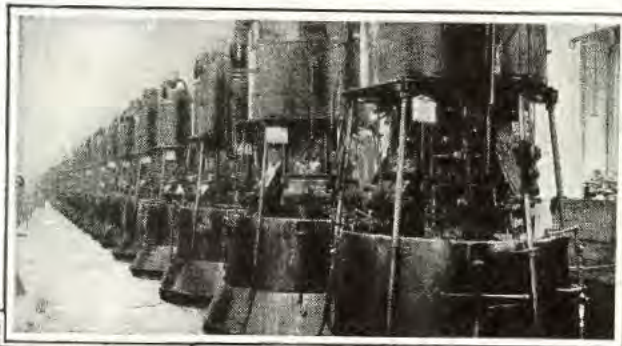
Order, cleanliness and system are insisted upon. Everybody is busy, yet nobody is rushed.



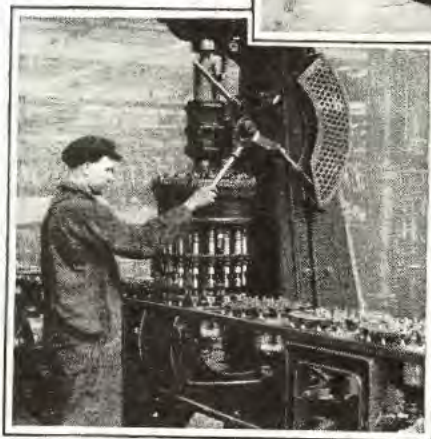
THE FORD CONVEYOR SYSTEM
Above and below you see Conveyors at work, bringing parts and materials to the men who stand still at their work. This departure from previous practice saves both time and the energy of the workmen.



SPECIAL FORD MACHINERY



Standard Machines Originally Designed to Make Ford Parts



Setting all the Magneto Screws at once



Boring 48 Holes at a Single Operation



The Disc Piercing Mill.



Spring Forming and Hardening Machine.



All Consecutive Operations Are Placed Adjacent to One Another

Consecutive operations are placed adjacent to one another. The machines being placed in sequence makes it possible for each succeeding operation to be passed on to the next with a minimum of handling and delay.

INSPECTION

Inspections and tests are carried on in Ford manufacturing with extreme rigidity. The vital parts of the car, like the axle, crank shaft, cam shaft, gears, steering knuckles, etc., are given a 100% inspection—i. e., each and every individual part is tested at every stage of its manufacture. When anything is wrong with a part, it is discarded and never used or, where possible, sent back to its source for correction.

Not only the workmanship is checked and inspected but the quality of the material as well is subjected to painstaking scrutiny and the work of the inspectors themselves is constantly checked.

To design a good car is comparatively easy; but to build one economically and efficiently is fraught with tremendous difficulties. Perhaps the most important factor is the designing and building of special machinery which is used in fabricating Ford parts.

More speed, greater precision and less waste are achieved through special machinery designed exclusively to make parts for Ford products—each machine being designed to do one job and do it well.



Ford Final Assembly Conveyors are Standardized the World Over



RADIATOR MANUFACTURE

The Highland Park plant houses the largest radiator factory in the world. It is capable of producing approximately 9,000 radiators a day.

There being a very large number of parts in a radiator and 140 operations required in its manufacture, a production of this volume is no small achievement.



Each Radiator Tested For Leaks

FORDITE

About forty-five parts of the Ford car, including the steering wheel rim and the coil box, are made out of a hard rubber composition called Fordite, manufactured at the Highland Park Plant. The manufacture of Fordite is a unique example of one of the many industries within the Ford Motor Company.



In the Bushing Department



Rubber Compound Is Kneaded Here



Bearings Conveyed Away After Final Inspection

THE ROLLER BEARING DEPARTMENT

In September, 1919, one of the foremen was asked to work out a method of manufacturing roller bearings. With nothing but a shop desk and one or two assistants he started work. At present the daily production of this department is 45,000 roller bearings.

The saving made possible by the establishment of this department amounts to approximately a million dollars annually, while the experience is priceless.



Steam Hammer Forges Crankshafts

THE FORGING DEPARTMENT

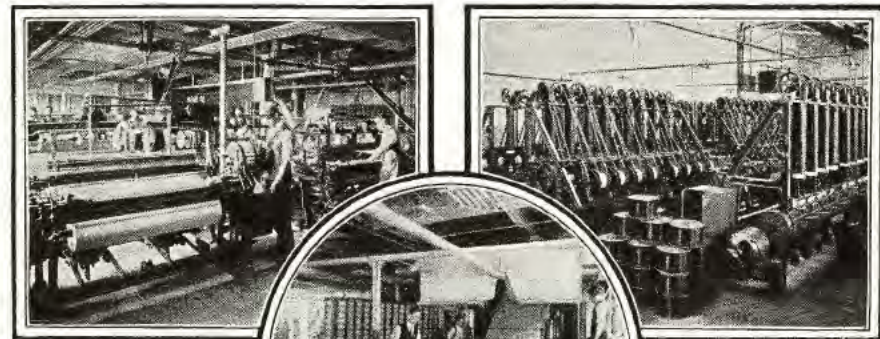
Ford car and truck specifications call for 162 steel forgings, another evidence of the quality built into every Ford product, for this number of forgings is remarkable in any unit selling for as low a price as the Ford car and truck. The production of these forged parts is an industry in itself and the Highland Park plant has built up the largest forge shop in the world. The largest battery of steam hammers in the United States is at Highland Park, there being 99 in one group. Present plans call for a much greater number. Other types of forging equipment are also used.



Forging Press For Shaping Steel



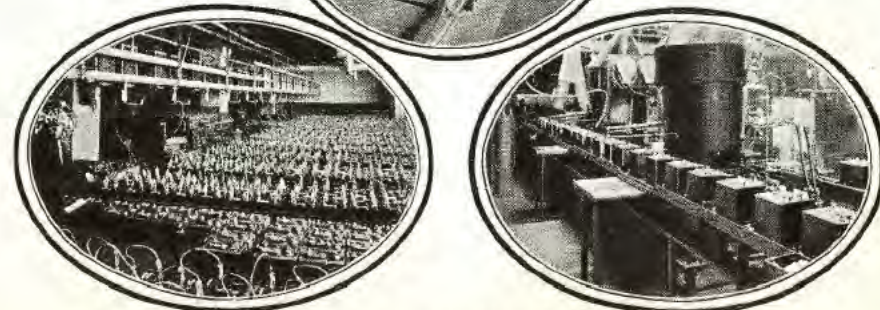
Upholstery Department in Chicago Plant



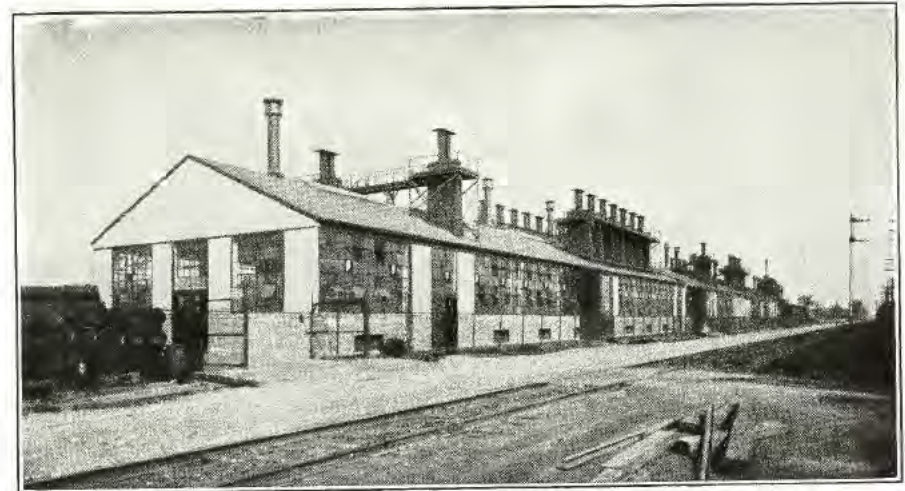
Above: Spinning Top Material

Right: A Sizing Machine

Machines for Winding Wire with Cotton Insulation



Batteries Are Made at the Highland Park Plant



Artificial Leather Plant—Note the Outside Lights and Ventilators

ARTIFICIAL LEATHER

Partly to insure a constant supply and partly to keep the price low, the Ford Motor Company makes its own artificial leather at the Highland Park plant. The completion of the new addition to this building brings the total capacity up to 80,000 yards of leather cloth per day. About fifteen yards are required for the top, curtains and upholstery on the touring car.

One feature of this plant is that it follows the Ford system of manufacturing by continuous process.

All the equipment used in the leather cloth plant was designed and built by Ford engineers. There are no lights within the building, all artificial illumination being furnished from the outside on account of the fire hazard. Every machine is grounded and as many precautions against fire taken as in an explosive factory.

The construction of this plant resulted in the immediate saving of \$12,000 a day, and it soon paid for itself.

MOTION PICTURE LABORATORIES

The Ford educational film library covers 105 subjects. Films are sold to educational institutions. They deal with agriculture, geography, history, industry, sanitation and safety. The subjects have been prepared by prominent educators.

In addition, photographic records of nearly everything the Company does—the progress of new building construction, new machinery, manufacturing methods, the causes of accidents, etc. make up a library of approximately 50,000 still pictures.



Drying Film

SHORTENING THE



1

MONDAY 7 P. M.

1 After a trip of approximately 48 hours from Marquette the ore boat docks at the River Rouge Plant. Hulett unloaders start removing the cargo, which is transferred to the High Line, and from there to the skip car which charges the blast furnace. By continuous process this takes 10 minutes.

TUESDAY 10:55 A. M.

2 Sixteen hours later the ore has been reduced to foundry iron. It is then cast into pigs and sent to the foundry, where, mixed with certain proportions of scrap, it is remelted. This takes about four hours in all. Blast furnace metal is also cast direct, in which case four hours are saved.

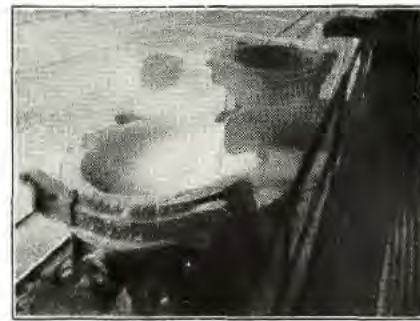
TUESDAY 12:55 P. M.

3 As the conveyor brings the moulds past the pouring station the hot metal is cast into cylinder blocks. These then go to the shake-out station and are taken away to cool and be cleaned. The cooling and cleaning process requires several hours.

TUESDAY 5:05 P. M.

4 The casting now goes to its first machining operation. There are 58 operations in all, all of which are done in approximately 55 minutes. All these are performed in the foundry building—a departure from conventional foundry practice, but in line with the Ford method of continuous operation.

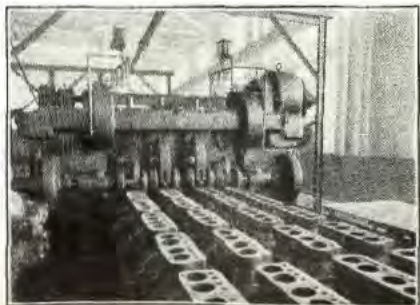
One of the most noteworthy accomplishments in keeping the prices of Ford products low is the gradual shortening of the production cycle. The elapsed time between the receipt of raw material and its appearance as finished merchandise in the hands of the dealer bears strongly on the retail prices. The longer an article



3



4



PRODUCTION CYCLE

is in the process of manufacture and the more it is moved about, the greater is its ultimate cost.

During the period of business depression in 1920, the Ford production cycle was cut from 21 to 14 days. Today the Ford production cycle has been further reduced as here illustrated.



5

TUESDAY 6 P. M.

5 About 6 o'clock the motor block is ready for the assembly line. Ford mechanics have reduced the time required for motor assembly to an average of 97 minutes. This includes everything, even an electrically controlled block test. Except for "running in" the motor to loosen it up everything is done "on the move."

TUESDAY 7:45 P. M.

6 The finished motor coming out over a trunk line conveyor is loaded into a freight car with the aid of the device illustrated and shipped to a branch for assembly into a finished car. A constant stream of freight cars leave the plant day and night.

WEDNESDAY 8 A. M.

7 Arriving at the branch plant the motor is unloaded and sent to its station on the final assembly line. These assembly lines are standardized the world over and represent specialized workmanship at the peak of efficiency. In 4 hours the car is ready to be driven away.

WEDNESDAY 12 NOON

8 By noon the dealer will have taken delivery of the car and paid for it. In the case of drive-aways the dealer often brings his customer to the plant and closes the deal then and there. Here is a conversion of raw material to cash in approximately 41 hours, 12 of which are allowed for shipping between the factory and the Detroit branch when final assembly takes place. When final assembly occurs at any one of the more distant branches, the time is, of course, increased by the number of hours in transit.

6



7



8



THE FORD INDUSTRIES



Receiving Knocked Down Parts at an Assembly Plant—In the Newer Plants the Longest Trucking Distance is 20 Feet

SHIPPING FORD PRODUCTS

One of the basic Ford policies is to manufacture near the source of supply and assemble near the point of distribution. This results in enormous savings in transportation costs and also enables the Company to maintain its manufacturing schedules with extreme accuracy, thus avoiding a shortage on one hand or a surplus of materials on the other.

On the 15th of every month each branch reports its requirements for the coming month. This gives the factory plenty of time to prepare its schedule.

The Company uses over half a million freight cars a year and the annual freight and express paid by the Company and accrued through the instrumentality of the Company is approximately \$150,000,000.

Thirty-two assembly plants located at strategic trade centers throughout the United States receive standard parts from the manufacturing plants and assemble them into finished cars and trucks. This calls for chassis as-

sembly, body building and all the paint, trim and upholstery work. Some of them manufacture cushions, springs and closed bodies. The branches all operate under the same system, use the same standard tools and build cars in the same way. All together they furnish employment for somewhere around 26,000 men.

ASSEMBLY PLANT LOCATIONS

Ford assembly plants are located in the following cities: Atlanta, Buffalo, Cambridge, Charlotte, Chicago, Cincinnati, Cleveland, Columbus, Dallas, Denver, Des Moines, Detroit, Houston, Indianapolis, Jacksonville, Kansas City, Kearny, Los Angeles, Louisville, Memphis, Milwaukee, Twin City, New Orleans, Norfolk, Oklahoma City, Omaha, Philadelphia, Pittsburgh, Portland, San Francisco, Seattle, and St. Louis. There are also service plants, which do no manufacturing, at Washington, D. C., Fargo, N. D., and Salt Lake City.

THE FORD INDUSTRIES



Classrooms Are In the Main School Building

They All Look As If They Were Studying



In the Shop They Need Little Encouragement

THE HENRY FORD TRADE SCHOOL

The Henry Ford Trade School was organized in 1916 for the benefit of boys whose circumstances compel them to leave school at an early age and go to work. It gives them a chance to continue their education and at the same time become self-supporting.

From the start the school has been governed by three cardinal principles: first, that the boy was to be kept a boy and not turned into a premature working man; second, that the academic training was to go hand in hand with the industrial education; and third, that the boy



Baseball Team



Football Team



Ford Service School Students from Mexico

was to be given a sense of responsibility by being trained on articles which were to be used.

The instruction is divided into sections: A week in the class room and two weeks in the shop. The whole Ford Plant at Highland Park is a textbook and a laboratory. Lessons in mathematics become concrete shop problems. Geography is closely allied to export activities and the metallurgical classes have everything from blast furnaces to heat-treat departments to observe and study, in connection with the class-room work. The academic course includes English in its usual branches, mechanical drawing, mathematics, including trigonometry, physics, chemistry, metallurgy, and metallography.

When a boy graduates at 18, he is master of a highly paid trade by which he may earn money enough to continue his education if he so desires. If not, he is good enough to command a good job anywhere, though he is first offered a position with the Ford Motor Company.

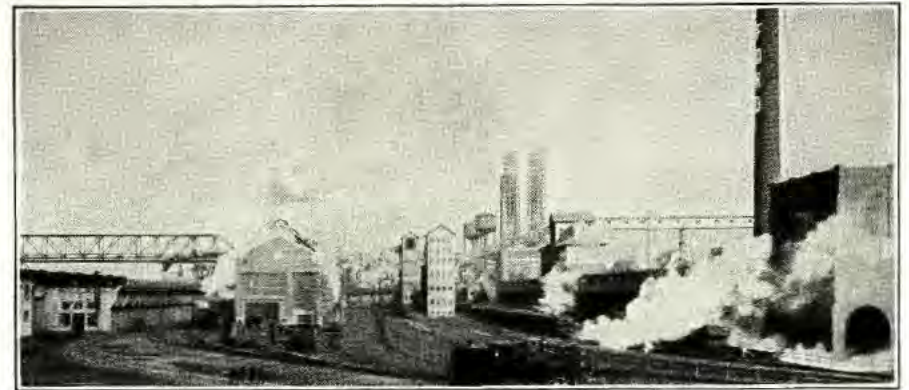


India Furnishes the Largest Racial Group

FORD SERVICE SCHOOL

Scattered through the various plants of the Ford Motor Company may be found hundreds of students from Asia, South America and Europe who are here to study Ford methods and products. These men are under the supervision of the Service School, which pays them while training them to be service executives or for positions of similar responsibility in the foreign field. The students are thus rendered independent and self-supporting.

The Ford Motor Company maintains an apprentice school for training tool makers, 500 being enrolled at Highland Park and 250 at River Rouge. These apprentices put in their eight hours a day in the tool rooms under the guidance of the foremen and one special instructor.



An Interesting View of a Portion of the River Rouge Plant

CONTROL OF PRIMARY NECESSITIES

Years ago Henry Ford realized that the transportation needs of America must be satisfied largely through the production of more motor vehicles, and that this situation would cause an ever-increasing demand for Ford cars. Even when the Company was breaking all records with a production of 200,000 cars a year, Mr. Ford appreciated that ten years hence nine or ten times as many Fords would find a ready market. This, however, would render necessary a better control over the sources of raw materials, particularly the primary necessities—coal, iron, wood and glass, as well as more complete protection against non-supply from any source or for any reason—high prices, transportation difficulties or labor troubles resulting in non-production.

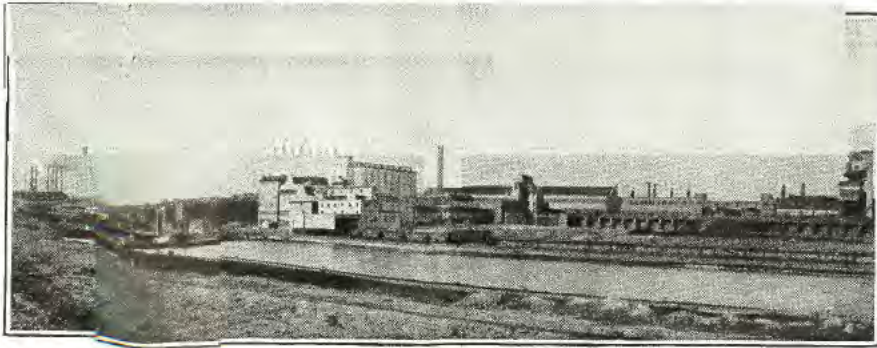
With this in mind Henry Ford visualized the gigantic River Rouge plant with its coke ovens and blast furnaces, which would convert raw materials into finished products with the minimum waste and expense. This plant was to be the enormous machine which would perpetually insure low prices for Ford products. But before long it was found that the Company would have to go even further in its control of raw material.

Iron and coal form the backbone of the automotive industry; iron because it is the principal component of a motor car and coal because it is necessary both in the manufacture of iron and the production of power. The cost of iron and coal delivered at a plant largely governs the selling price of the product. No matter how efficiently or economically a manufacturing organization may be operated, the fluctuating market prices of raw materials are beyond its control. The only way to avoid price fluctuations is to control the source of raw material.

The Ford Motor Company protected itself against outside market influences besides rendering itself and its customers independent of price fluctuations, by acquiring vast coal reserves, iron properties and timber lands. These are co-ordinated under one general management and the materials meet at the River Rouge plant where they are converted into finished products.

The coal properties lie in Kentucky and West Virginia. The iron and timber lands are located in Northern Michigan. The River Rouge plant lies midway between them.

THE FORD INDUSTRIES



A Panoramic View of the River Rouge Plant

THE RIVER ROUGE PLANT

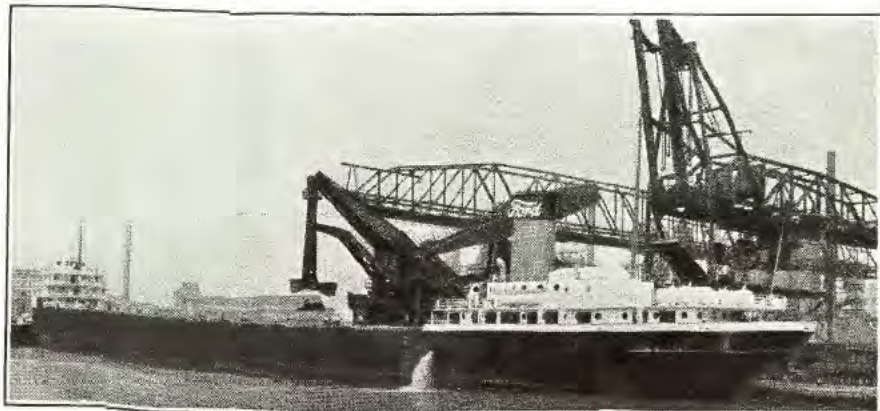
Stretching out for a mile and a quarter in length and covering over 1100 acres the River Rouge plant presents such a panorama of towering stacks, enormous structures and monolithic towers that most visitors pronounce it the most impressive industrial unit they have ever seen.

River Rouge is primarily a plant for the conversion of raw materials. Being a Great Lakes port and navigable to the largest freighters, iron ore, limestone and lumber are hauled to the plant docks by the company's own ships. Here is a large saving in transportation, for Great Lakes

shipping is probably the cheapest in the world.

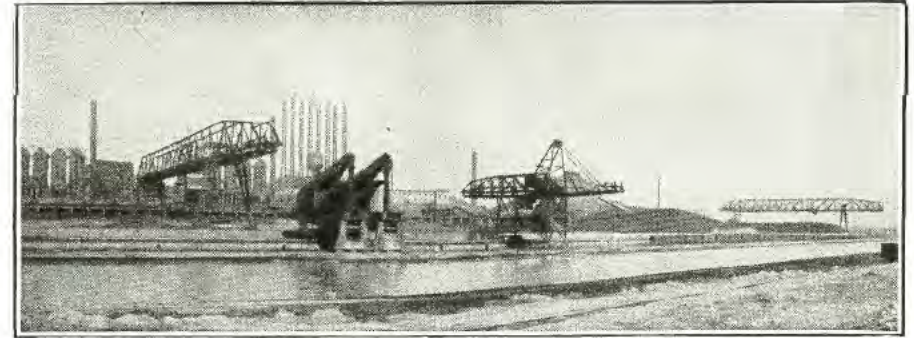
The coke ovens, the blast furnaces, the steel plant with rolling mill and open hearth furnaces, the by-products plant, the electric furnaces, the cement plant, the glass factory and the paper mill deal with raw materials in their crude state; while in the foundry, the body shops, the saw mill, the tractor factory and various machine shops the materials are fabricated.

Each of these units has an interesting story in itself, as each bears some touch of the Ford idea, original and efficient.



Unloading Ore from a Ford Boat in the Turning Basin

THE FORD INDUSTRIES



Taken Across from the Shipping Channel.

THE BLAST FURNACES

The blast furnaces are not radically different from other blast furnaces, but they are unique in their efficient relation to the other

units. Only a handful of men are required for the manufacture of 1,000 to 1,200 tons of iron a day. Nothing is wasted in the process.



A Blast Furnace Seen from Inside the Building: Below: Tipping a Hot Metal Ladle.





Filling a Ladle at a Cupola.



Pouring Castings on a Moving Conveyor.



Hot Blast Furnace Metal Brought to the Foundry Before Cooling.

THE FOUNDRY

In the foundry, which is the largest in the world, conventional foundry practice is reversed. Here the molds are brought to the metal instead of the metal to the molds,

and all pouring and core-making is done on the move.

The machining of castings takes place in the same building, another unique departure.



A Fine View of One of the Blast Furnaces as Seen from the High Line.

The By-Products Plant.
Below: Coke Ovens



THE COKE OVENS

Coal which costs the Company approximately \$5.00 a ton delivered at the Rouge is converted into from \$12 to \$13.50 worth of coke and by-products. (Coke ovens show at the left; above, the by-products plant.)

THE POWER PLANT

Powerplants are one of Henry Ford's hobbies and whenever he visits a factory the power plant usually comes first on his list. This keen personal interest taken by Mr. Ford in the efficient production of power has been responsible for a most progressive program in this respect; and in the River Rouge power house can be found one of the most noteworthy achievements of that particular phase of engineering.

The building program calls for eight turbo-generators each with a capacity of 62,500 horsepower. The ultimate goal is a production of 500,000 horsepower. The plant will be perhaps the largest steam turbo-generator power house in America.

Each boiler burns about one hundred tons of coal per day. There is a negligible amount of ash, and no smoke at all.

For miles away the eight lofty stacks, rising 333 feet in the air and fully 13 feet across the top, serve to identify the River Rouge factory, not only from their size but also because they are practically smokeless, due to the efficiency of the furnaces. Each stack represents a boiler 84 feet high and so large that eight Ford cars may be parked on one level at the combustion point of the furnace.



The Furnace Room.
Left: 62,500 H. P. Turbo Generator





The Rolling Mill at the River Rouge Steel Plant.



Electric Furnace Tipped for Pouring



Note the Comparative Size of the Man

THE ELECTRIC FURNACES

The tremendous production of steel at the River Rouge is accompanied by the salvaging of more than 500 tons per day of steel scrap. Electric furnaces are particularly adapted to the reclaiming of scrap steel. For the manufacture of alloy steel, the electric furnace has no equal.

At River Rouge a fifty-ton unit produces ingots and castings from which are cast locomotive frames and wheels, grinders for the glass house, cyanide pots, machine frames, furnace doors, turbine castings and hundreds of other special steel castings used in the Ford plants.

PLATE GLASS MANUFACTURE

In the glass plant one sees the Ford method of casting plate glass in an endless, unbroken strip, something the experts of the glass industry declared impossible. Grinding and polishing are also done by the continuous process — a method worked out by the Ford engineers and its machinery designed and built by Ford men.

Over 21,000,000 feet of glass a year are required by the Company. More than 12,000,000 square feet a year are produced at River Rouge. Highland Park produces 2,500,000 square feet annually. There is also a large plate glass factory at Glassmere, Pa., which can produce over 7,500,000 square feet of glass a year.



A Sheet of Rough Plate Glass



Glass Grinding Machines Made of Standard Ford Parts. Note the Ford Steering Wheels and Gears.



This Building—a Third of a Mile Long—Is Where Fordsons Are Made

FORDSON TRACTOR MANUFACTURE

The tractor factory represents a production cycle of amazing brevity. It takes 28 hours and 20 minutes for raw ore to be manufactured into iron, then cast and machined into a tractor motor block. This starts down the assembly line in the tractor factory and two hours and a half later emerges as part of a freshly painted, smoothly running Fordson tractor moving off under its own power to a line of waiting freight cars. The total time from raw ore to finished product has been 30 hours and 40 minutes, a record which has fathered the joke to the effect that they are delivered before they have had a chance to cool off. Between 3,000 and 4,000 parts enter into the construction of a tractor.

Fordsons are built in a structure a third of a mile long, 300 feet wide and two stories high. The factory has a capacity of 1,000 tractors a day and is an excellent example of synchronized production. Considerably less than 30 days' supply of stock is necessary to maintain production schedules. The Fordson is built complete at the River Rouge

plant, no branch assembling being done. The reason for this is that the tractor is a very compact unit, the motor and rear axle assemblies making up the greater part. Their assembly and incorporation into the finished tractor is accomplished with less expense at the main factory than it could be done if the parts were shipped knocked-down to the branches.

On May 21st, 1925, Fordson production reached the half million mark. At 4:23 o'clock, just a few minutes before the close of the day's work, Fordson No. 500,000 came off the assembly line.

On January 1, 1921, 48% of all the tractors used on American farms were Fordsons. By May 1, 1923, this figure had increased 78% and today it is even greater.

The industrial use of Fordsons is also increasing rapidly. Equipped with trailers they are supplanting the heavy-duty truck for everything but long hauls. Their particular advantage lies in their remarkable adaptability either as mobile or as stationary power plants.

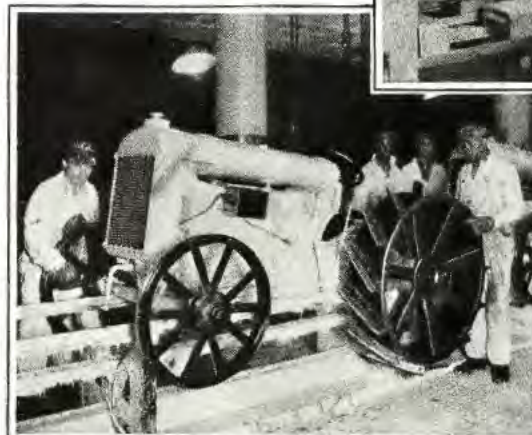
ALONG THE TRACTOR ASSEMBLY LINE



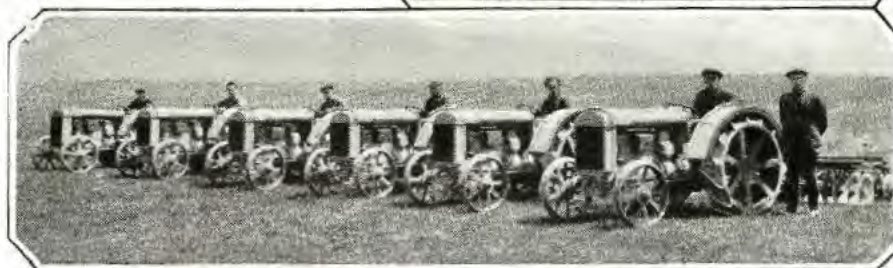
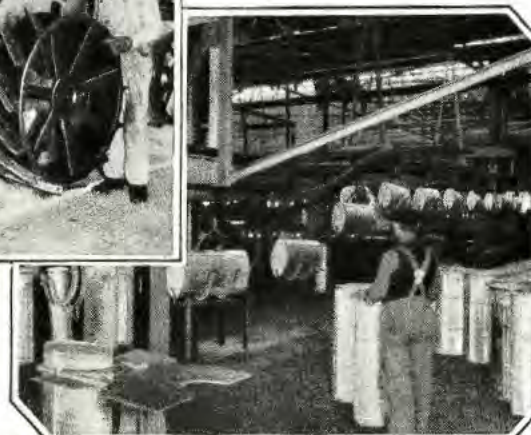
Putting on the Axles



Installing the Motor



Freshly Painted—The Paint is in the Trough Below Right: Fuel Tanks on Their Way to the Assembly Line



A Fleet of Fordsons on a Western Ranch

BUILDING FORD BODIES AT RIVER ROUGE

In certain respects the building of Ford bodies has always been more of a production problem than building the chassis, for there are five body types to one chassis model. Over twelve million Model T chassis have been built with but little variation in the basic design, but the bodies have changed again and again and are constantly subject to further refinements. The demand for small enclosed cars brought many new problems.

The body is the bulkiest part of the car and the amount of floor space needed to take care of a production of over 7,000 cars a day would reach

fantastic figures. The freight car requirements would be enormous. Under the present system of shipping knocked-down bodies to the various branches for final assembly it is possible to get 60 sedan or over 130 touring car bodies in a single box car.

The various panels, the cowl, the dash and a host of minor parts entering into the make-up of the body are fabricated in huge presses. The fabricated wooden parts and the sheet metal parts meet in the paneling department. These are shipped to the branches, together with all the necessary parts to complete the body.



Panels on Their Way to the Freight Cars.

Painting Bodies by the Gravity Flow Method.



Finished Bodies on a Branch Assembly Line.



Adjusting a Machine with the Aid of Johansson Gage Blocks.

THE STANDARD OF STANDARDS

Under present production methods especially in the manufacture of Ford products, every part must be made exactly right or it is worthless. There is not time to fit and adjust parts that are even slightly out of the way. Every Ford part must conform to specific dimensions before it gets to the assembly line. This calls for machine work of extreme accuracy and requires many gages and master gages specially designed for precise measurement and precise workmanship.

Johansson gage blocks are recognized throughout the world as the most accurate precision instruments known, being accurate to the millionth part of an inch, and have earned the proud title of Standard of Standards.

In 1923 the Ford Motor Company purchased the American manufacturing rights for Johansson gages. More important still, Mr. Carl E. Johansson himself joined the Ford organization as a member of the engineering staff to develop further the precision instruments for which he is justly famous.

At the present time all Johansson gage blocks are being manufactured in the Engineering Laboratories of the Ford Motor Company at Dearborn, Mich. Here Mr. Johansson, working with the finest facilities to be found anywhere in the world, continues to carry on his labors.

While the Ford Motor Company controls the manufacture of these gage blocks, its first move after acquiring American rights was to improve the manufacturing processes so that the output might be increased and the prices reduced so that these gage blocks would be within the reach of every machine shop and tool maker. American manufacturers, and particularly the automotive industry, have been quick to take advantage of this opportunity.

While the Ford Motor Company leads the world in quantity production, it also leads in the manufacture of the finest precision instruments known to science. It may be truthfully stated that accuracy finds its source in the Ford industries.



A View of the Plant of the Lincoln Motor Company



Testing a Wrist Pin for Precision.



Testing Gears in the "Quiet Room"



Anti-rattle Test Conducted on Eccentric Rollers.

THE LINCOLN MOTOR COMPANY

The Lincoln Motor Company was acquired by the Ford interests in 1922 and became a division of the Ford Motor Company.

From the very start it was the ambition of Henry Ford and Edsel B. Ford to make the Lincoln the best automobile that modern engineering genius and the best equipment can produce. No effort or expense has been spared in bringing the Lincoln up to this ideal.

Always a good car in every respect and noted for the precision of its workmanship, it is remarkable how many noteworthy improvements have been added to the Lincoln under Ford management, and how new standards of precision have surpassed the old ones, excellent though they were.

The world-wide Ford service organization is closely allied with Lincoln service, a situation that gives Lincoln owners unusual advantages in every country.

Lincoln precision is best illustrated by a recital of some instances of the close limits to which parts are machined. There are several thousand operations in which the deviation from standard is not permitted to exceed one-one-thousandth of an inch. There are numerous other instances where toleration of one-half of one-thousandth is observed. In many other cases, the camshaft and crankshaft, for example, Lincoln tolerances are held to a quarter of one-one-thousandth. There are still other cases in which the tolerance is held even lower, as in the case of selected ball bearings, where the limit is one-tenth of one-one-thousandth of an inch.

These limits are determined by the most delicate precision instruments. With the celebrated Johanson gages a ten-thousandth of an inch is as easily measured as a full inch.

The Lincoln car receives as rigid inspection as it is possible to give it. Every part is inspected and tested at every stage of manufacture. The crankshaft receives no less than 66 inspections and the finished car 177 special inspections and four visual inspections, each of the latter by a separate department.

The Lincoln car is ready to run "wide open" the day it leaves the factory. It requires no breaking in because all parts bearing on one another are given a glass-like finish, as in the case of the cylinder block walls, which are honed with oil stones.

With all of the Ford resources and equipment at their disposal, Lincoln engineers have every opportunity and every incentive to make the Lincoln what the Ford Motor Company intends that it shall be—the finest motor car in the world.



Testing Bearings in the Silent Room



FORD SHIPS BRING IRON ORE TO THE RIVER ROUGE PLANT

The first of the Ford ore ships was launched March 1, 1924, and the second took the water on April 26, 1924. These ships were named "Henry Ford II" and "Benson Ford" after the two sons of Mr. Edsel Ford. They are more than 600 feet long and have a capacity of 12,500

tons of iron ore. They represent the latest achievement in marine engineering for their purpose.

Their most distinctive feature, however, lies in the fact that they are the first Great Lakes freighters to be driven by Diesel oil-burning engines.



Iron Ore Dump at the Imperial Iron Mine

THE IMPERIAL IRON MINE

At present the Company is operating only one of its iron properties, the Imperial Mine at Michigamme, Michigan, eighty miles north of Iron Mountain. This property produces about 625 tons of foundry iron ore a day. The Company owns valuable mining rights throughout the Iron Range and while the Imperial supplies only a part of the company's ore requirements, it is a distinctly valuable asset. What is learned about mining in the Imperial will greatly benefit subsequent mining activities.

The first step the Company took upon acquiring the Imperial, was to clean it and install all the necessary improvements for safety and efficiency. Unlike most industrial plants, the Imperial mine presents few opportunities for waste. There is no

stock to spoil and no scrap to account for. Only in power, transportation and labor saving does the management have a chance to demonstrate its efficiency, and in this respect the mine is up to Ford standards.

Ford wages and industrial relations prevail in all the Ford industries, and there has never been a suspicion of labor trouble among the Ford miners. An unusually high class of men have flocked to the Imperial Mine and they have come to stay. Some 225 men are employed at the Imperial. Ore is mined the year round and shipped either to Menominee or Marquette where it is transferred to the Company's ships and taken to the primary storage bins at the River Rouge. Ore mined during the winter is stored until navigation opens.



A Trainload of Ore Being Dumped into the Skip.



A Good Wide Seam in a "High" Coal Mine.

A PERMANENT COAL SUPPLY

When the Ford Motor Company began manufacturing its own iron direct from the ore it also started making its own coke, and the coal situation took on new importance. The practice of buying coal in the open market was soon discovered to be anything but satisfactory. Price fluctuations cost the Company a great deal of money, while the supply was periodically threatened by car shortages and labor troubles. It was also difficult to secure a uniform quality of coal and this is almost imperative where metallurgical coke is the main requirement.

These and other considerations led the Ford interests to buy and develop their own coal properties.

The first coal property taken over was the Banner Fork Coal Corporation at Wallins Creek, Ky., with a daily output of 3,000 tons of high volatile by-product coking coal and a reserve of 8,000,000 tons. The next property purchased was the low volatile coal mine at Nuttallburg, W. Va., after which the Pond Creek Coal Company at Stone, Ky.,

was acquired. This is the largest of the Company's mining properties, the reserve being estimated at 180,000,000 tons of exceptionally good by-products coal with a lower sulphur content than any other coal in either Kentucky or West Virginia.

The purchase of the Dexcar Pocahontas Coal Company at Twin Branch gave the Company more low volatile coal holdings. These various companies were then consolidated into the Fordson Coal Company.

The Company also owns some 120,000 acres in the Red Bird River section of Kentucky, containing some 700,000,000 feet of hardwood timber, besides valuable, though undeveloped, coal deposits which increase the coal reserve to 600,000,000 tons.

When the Fordson Coal Company got under way the first step was to clean up everything in all the properties. While most of them were already in excellent shape, having been better managed than the average, the company started putting



Mining Camps 4 and 8 at Pond Creek

all the needed improvements into effect without delay. All the buildings were repainted, new machinery installed and new buildings erected. Wages were adjusted all around, the greatest difference being felt in the case of men who worked by the hour, as the piece workers who got paid by the carload were already getting a satisfactory rate of pay.

Many mining camps are located in remote communities where the mountainous nature of the country, together with bad roads, renders transportation and outside

communication difficult at certain seasons of the year. The operating company is therefore forced to provide many of the things found in an outside community. The Fordson Coal Company finds itself in the position of being a storekeeper, a landlord and the proprietor of a number of amusements, including a moving picture theater. Most mining companies own all the dwelling houses, as they own all the ground, and the quality and condition of the dwellings reflect, in a measure, a company's interest in its men.

1000 FORD-OWNED COAL CARS INSURE A CONSTANT SUPPLY OF COAL

Soon after taking over the ownership and supervision of the coal properties which are now included among Ford resources, the company purchased one thousand coal cars which are used in transporting coal from the Ford mines to the River Rouge plant.

This was done in order to insure an even supply of material from a given source, a privilege enjoyed when privately owned cars are constantly on hand. This eliminates the inconvenience of car shortage and results in savings which are reflected in the low cost of Ford products.





THE FORD LUMBER INDUSTRIES



Trainload of Logs from Sidnaw.



This Fordson does the Work of Six Teams and Never Tires



CONVEYOR taking Lumber to Yards. Below: Unloading Lumber at the River Rouge Plant. At bottom: Making Ford Body Parts out of the Best Selected Hard Wood.



The Ford Motor Company ranks as one of the world's largest consumers of timber, as its requirements reach 1,000,000 board feet per day. The Company has protected itself against possible timber shortage through the acquisition of approximately half a million acres of timber land in Northern Michigan. The company also regulates every state of manufacture from the standing timber to the finished body part, a cycle embracing four basic industries, each of which is ordinarily a self-supporting and independent line of business. These are: (1) Logging; (2) Saw Mills; (3) Dry Kilns and (4) Body Plant, to which may be added a fifth, Wood Distillation, a salvage process, where valuable by-products are retrieved from scrap lumber which otherwise would be wasted.

Under the Ford system the activities of all are co-ordinated in the interests of efficiency and economy. Instead of four profits being taken there is only one profit and that on the complete car.



The Wood Distillation Plant—the Largest and Most Complete of Its Kind.

WASTE ELIMINATION

Among the distinct advantages enjoyed by the Ford Motor Company on account of its size and resources are the unusual opportunities for effecting economies. To a company less strongly financed or operating on a smaller scale many of these are impossible.

An almost inconceivable economy was made when the Rouge plant was complete enough to permit shortening the production cycle. The by-products plant raised the value of every ton of coal brought to River Rouge by nearly \$6. The new power house enabled the Highland Park plant to save \$600 a day. The process of making direct castings from blast furnace metal saves a quarter of a cent a pound—\$10,000 a day on the basis of 2,000 tons. The sintering plant reclaims 50 tons of blast furnace dust every twenty-four hours. Slag is converted into Portland cement. Power and heat are conserved until further savings are next to impossible. The reclamation and reworking of various materials used about the plant reduce the expenditures for new material and save a large amount in haulage charges.

Whenever a new plant is erected its location is largely determined by the cost of its power and the price at which it may make and ship goods to a given territory. The saving in freight rates of a fraction of a cent per part often decides the location.

The General Salvage Department at Highland Park shows some of the more obvious methods by which waste may be eliminated. Thousands of broken tools and damaged plant equipment come in for reclamation every twenty-four hours. The value of the belting sent to the salvage department amounts to over a thousand dollars a day. This is all repaired and reworked, the smaller scraps going to make life belts for window washers or to the cobbler shop to be used for soles or patches.

Two men spend most of their time in repairing mop gails. Pipes, valves, joints and other steamfitting apparatus are reconditioned. Waste paper is sent to the River Rouge to be made into cardboard. Old paint is reclaimed to the extent of 500 gallons a day and is used for rough work. The salvage of oil and cutting compounds from steel shavings amounts to 2,100 gallons a day.

Metal scrap, such as copper, brass, lead, aluminum, babbitt metal, solder, steel and iron roll in by the ton.

Steel shavings and sheet steel scrap are baled and often sent back to the steel company which made them. The Wood Salvage Department saves about 90,000,000 feet a year.

There are literally thousands of other economies religiously practiced in the Ford organization. In



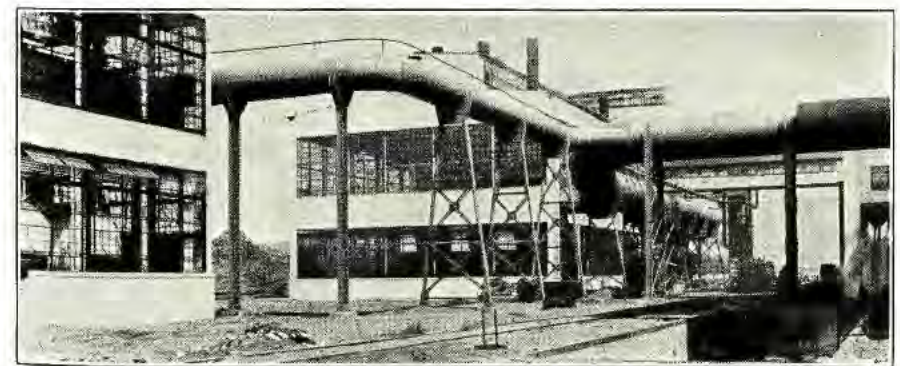
Thousands of Dollars Saved by Carefully Sorting Metal Scraps.

the Photographic Department the silver salts are recovered from the developing solutions and the saving amounts to nearly \$10,000 a year.

The Highland Park Salvage plant turns back to the Company over a million dollars a month; the traffic department many million dollars a year. This is what economy means outside of the conservation of natural resources. In the Ford Motor Company waste is regarded as almost criminal.

HUMAN SALVAGE

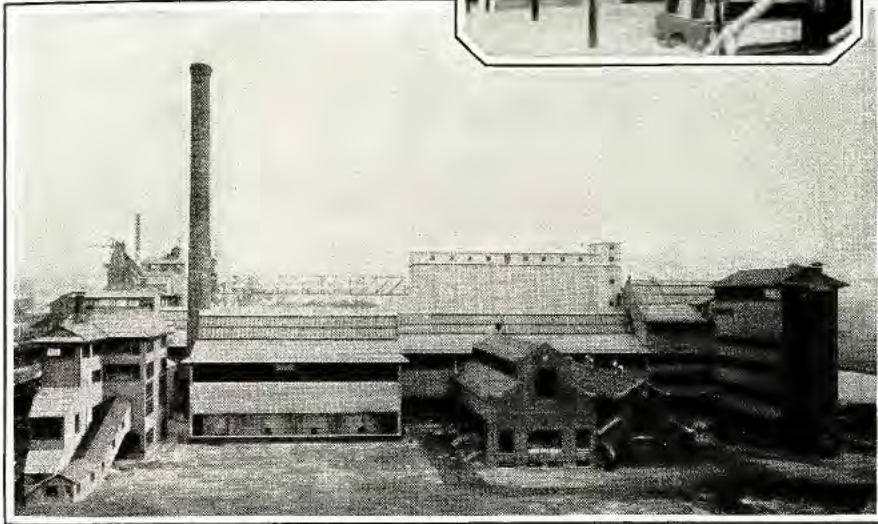
One of the features of the General Salvage Department is its salvage on men. Nearly every one of the 800 men employed in salvage work at Highland Park is sub-standard, a number being sufferers from nervous and mental complaints. There are many here who have lost an arm or a leg, are deaf or blind—yet each is happy and self-respecting, holds down a good job and does his work well.



This Horizontal Smoke-stack is 600 feet long and 10 feet in diameter. It is built of steel and lined with fire-brick. Every bit of heat and stack gas is conserved by conducting the gas from the power-house to the wood-distillation plant where it passes through rotary kilns, drying chips and waste wood before distillation. From the driers the wood gases are reconducted back to the power plant where they serve as fuel.

THE CEMENT PLANT

The cement plant which reclaims and works up blast furnace slag into high quality Portland cement is the only one in the United States using the wet process. It has a capacity of 1200 barrels a day.



The Cement Plant—Above: One of the Huge Rotary Kilns

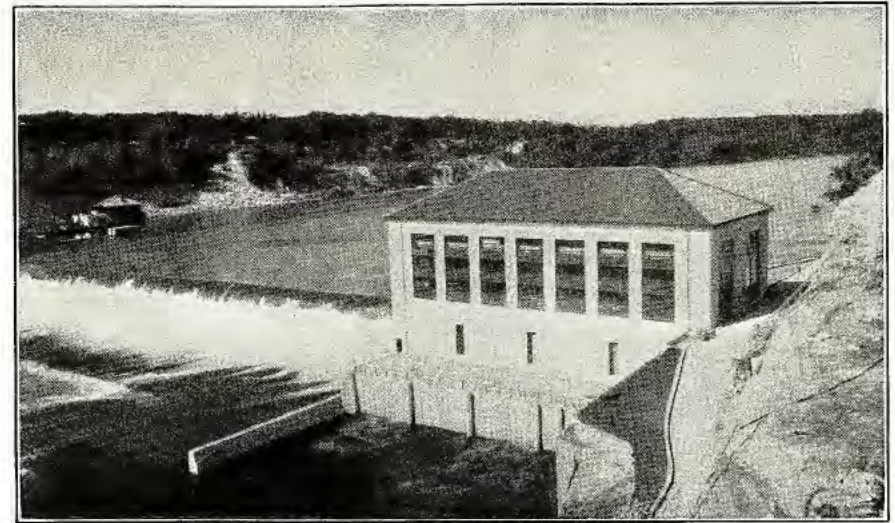
MAKING PAPER



Paper Comes in Large Wet Sheets. Drying is Done in Long Ovens.

Paper making at the River Rouge plant is a demonstration of how waste is not only stopped but turned into profit.

Waste paper and rags that accumulate at various Ford plants are baled and sent to the paper mill. The result is a strong binder which is practically oil-proof and water-proof.



Damming the Mississippi at St. Paul.

THE HYDRO-ELECTRIC PLANTS



Waterford Dam on Rouge River.

One of the latest developments of the Ford Motor Company is its utilization of water power. Already eight Ford factories utilize water power, the largest of these being at St. Paul, Minnesota, where the Mississippi spins the Ford turbines. The use of water power effects large savings in manufacture and these are conscientiously passed on to the Ford buyer.



Green Island Plant—This Power was Wasted before Mr. Ford Developed It.



INDUSTRIAL RELATIONS

Henry Ford believes that every man is entitled to high wages, reasonable hours, safe and healthful working conditions and a chance to rise if he has ability above the average. The Ford industries offer every man an opportunity to show his qualities.

The industrial relationship between the Ford Motor Company and its employees is purely individual and every policy is designed with the intention of keeping it so.

Shop committees, unions or labor leaders are unnecessary because



One of Three Safety Bridges for Ford Employees.

there is nothing to argue about except in individual cases and these are settled man to man.

The Ford Motor Company wishes to make a Ford job so attractive that every man will put forth his best efforts to keep it. The Company offers high wages, ideal working conditions and permanent employment, preferably of the type for which a man is best suited. There is no fear of unemployment. As long as a man works honestly and well he may feel pretty sure of his permanency. The employees work conscientiously and with dependable regularity, recognizing responsibility to the customer and thereby working to maintain the quality of the product as well as its low price.

The main issue back of every industrial dispute is the desire for higher wages and better working conditions. In 1914 Henry Ford resolved to eliminate any trouble of this kind before it even got started so he startled the world with his announcement that thereafter Ford employees would not be paid less than \$5 a day, regardless of what they did in the plant. Total ruin was freely predicted not only for the Ford Motor Company, but for the entire nation as well. Notwithstanding this the plan has worked out so well that the minimum wage has been increased to \$6 a day and the hours of labor shortened from nine to eight per

day. Over 60% of the employees earn more than the minimum.

Mr. Ford believes that anybody who works for the Company in any capacity is entitled to a good living wage. There are no exceptions.

REPETITIVE WORK

The monotony of repetitive work has often been discussed as an unfortunate phase of factory life. It is true that repetitive work would almost kill some men, but others prefer it to anything else. Several years ago an executive order that every man was to change his job every three months was put into effect. To the surprise of everybody this order was fiercely resisted by the majority of the men on these monotonous jobs. As a matter of cold fact the majority of men dislike working their brains more than is absolutely necessary and if they find that a job may be done almost automatically a surprisingly large proportion prefer sticking to it than to learn something new.

One branch of the employment department does nothing but attend to transfers, and if a man finds the monotony of his job getting on his nerves he asks to be transferred and this is done as soon as there is an opening. When they find an able and ambitious man who wants to work in as many departments as possible in order to learn the business, he gets enthusiastic cooperation.



THERE are Thousands of Homes Like These, Owned by Ford Shopmen Whose Savings Made Purchase Possible.

SOCIOLOGICAL DEPARTMENT

Industrial welfare organizations are too frequently associated with an annual gift of a turkey and a picnic in the summer as a substitute for good wages and working conditions. Fortunately the Ford Sociological Department is free from this sort of thing. There is no charity, no red tape and no "uplift" connected with it. The mission of the department is to extend help and protection, not charity. Ford men are well enough paid to provide their amusements and uplift. Mr. Ford believes in helping people to help themselves, by offering them opportunities rather than doles.

But there are always situations which even a good job cannot remedy, and in these emergencies the Sociological Department is always ready to render prompt assistance,

not with the air of conferring a great benevolence, but with the idea that here is a Ford man in trouble and we are going to see him out of it.

Sometimes the breadwinner of a large family is taken sick. Sometimes the medical or surgical attention required for a crippled child will eat up most of the weekly pay. Perhaps the financial burden at home is too heavy for one man and work must be found for another member of the family. Maybe a loan will help out. In any event the department makes an investigation and renders help whenever necessary and as long as it is needed.

The Sociological Department employs a real estate expert who advises employees on land contracts, mortgages and real estate investments. Medical and dental exami-



Winter Skating on the Ford Athletic Field.

nations are given gratis. Emergency loans are made to employees. Briefly stated, the department tries to act as a link between employer and employee where they may meet on a common ground and settle any real or fancied injustices.

SAFETY AND HEALTH

No development in all the Ford industries has been a greater source of satisfaction than the reduction of industrial accidents to the point where their total elimination may be visualized.

"Production without safety is inefficient," says Henry Ford. "Accident prevention is absolutely an essential part of the industrial program."

The Safety and Health Department was organized in 1914 and since then its fight against accident and disease has been unceasing. As Mr. Ford believes there is no reason on earth why a factory should be dangerous, there is nothing left un-

done in any Ford plant to make it safe.

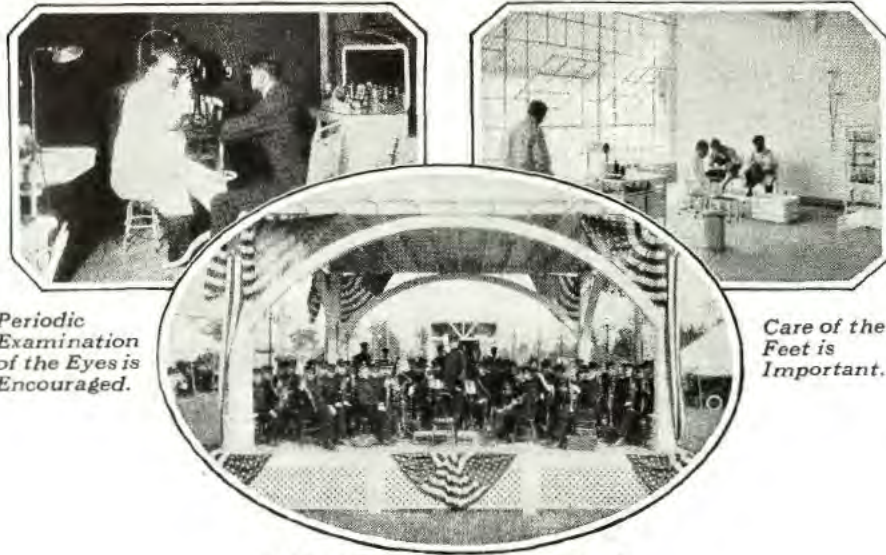
A large force of safety inspectors circulate through every plant, keeping constantly on the alert for menaces to health and safety.

All floors are kept scrupulously clean from nails, scrap, refuse or oil puddles. They are scrubbed at least once a week to remove accumulated oil or grime. Cleaners keep every corner free from dirt. They sweep behind the radiators, under the machines and wherever dirt is likely to accumulate.

The sanitation squad cleans the drinking fountains twice a day and is constantly on the lookout for sources through which disease might be transmitted.

The general cleanliness of any Ford plant and its yards is far ahead of the average public park.

The air is kept purified by the most modern ventilators and dust collecting apparatus. Every machine or piece of apparatus where



Periodic Examination of the Eyes is Encouraged.

Care of the Feet is Important.

Public Concert by the Ford Band.

metallic dust, splinters, fumes, or chips are given off is equipped with suction pipes.

The plant hospitals are large enough to take care of any kind of a case, but fortunately are seldom obliged to deal with serious accidents. The rules, however, require that even scratches or minor cuts

must be brought in for treatment, and these help keep the doctors busy.

First aid stations are located at frequent intervals throughout the larger plants, and the distance to one of these is so short that there is no excuse for neglecting to report for dressings.



A Building Where Wood Working is Carried On.—Note the Dust Collectors to Keep the Air Clean.



One of Several Parks Provided for Ford Employees' Cars.

EMPLOYEES' WAGES AND INVESTMENTS

Wages paid to Ford employees are notably high. Men entering the service of the company receive \$5 a day at the start and after a 60-day probationary period the pay is automatically increased to at least \$6 a day.

Furthermore, employees of the Ford Motor Company and its subsidiaries have invested more than \$25,000,000 in Ford Investment Certificates.

These certificates, which are non-negotiable and non-assignable, are

issued in denominations of \$100 and multiples thereof. They are guaranteed to return 6% per annum, and additional payments may be made at the discretion of the Board of Directors. These additional payments have sometimes brought the return on the investment to as high as 16%. Yet there are some employees who prefer get - rich - quick investments, and there are many instances where the holder of Ford investment certificates have cashed them in at the insistence of some stock salesman and put the money into highly speculative and often worthless shares.



Ford Employees at the Highland Park State Bank.

TYPICAL
FORD DEALER
ESTABLISHMENTS

*Establishments
Like These Are
Found All Over
the World.*



*There Are Over
9,000 Authorized
Ford Dealers.*



*Authorized
Ford Dealers
Employ Over
30,000 Ford
Salesmen.*



Kearny, N. J.



Twin City



Chicago, Ill.



Charlotte, N. C.

*A few of the typical
Ford Branch As-
sembly Plants of
which there are 32
strategically lo-
cated throughout
the United States.*

MARKETING THE DAILY OUTPUT

When a person reads that the Ford Motor Company is building 2,000,000 cars a year it is only natural to ask, "Where do they all go? Who buys them? How can the Company market so many?" This is easily explained. The Ford Motor Company has a sales organization fully as remarkable as its manufac-

turing organization. The market is the whole world. There are over 52,000 sales and service dealer connections throughout the world, 38,000 of which are in the United States. There are over 30,000 retail Ford salesmen in this country alone.

Mr. Ford's aim is to keep all his



Louisville Ky., Assembly Plant (Interior View).

plants running the year around, with no lay-offs or shut downs. This can be accomplished only if sales keep pace with production. The Ford sales program is as carefully planned as any other work in the Ford industries and the same general principles are followed all over the world.

The amazing celerity with which Ford products are sold almost as soon as they come off the assembly line is due to a combination of circumstances, the major three of which are: the quality of the product, universal service throughout the world and the far-reaching selling organization. The appeal of the Ford justifies its old slogan, "The Universal Car." It reaches all classes of society in every civilized country. People buy Fords because they are good, not only because they are low in price. There are many Ford owners who can easily afford much more expensive cars, yet they never consider making a

change, because the Ford gives them everything they want.

The owner knows that the car is built of good material, that he can get service anywhere and without much expense, that the Ford has the lowest depreciation of any car built, and that it is the policy of the Ford Motor Company to give him the most for his money.

Over eighty per cent of all Ford owners replace their cars with other Fords. Here is a vast market in itself that helps explain why one-half the total number of cars in the United States are Fords.

No company watches its operating costs more closely than the Ford Motor Company or strives more constantly to eliminate waste in time, labor, material and transportation. The benefit of all this economy and efficiency is passed on to the Ford owner. Is it any wonder the car has such a following? This is the answer to the question, "Where do they all go?"



The Ford Branch at Louisville, Ky.

THE FORD MOTOR COMPANY OF CANADA, LIMITED

The Ford Motor Company of Canada, Ltd., which has its parent plant and headquarters at Ford, Ontario, is by far the largest single producer of automobiles under the British flag. Its annual capacity is in excess of 100,000 cars a year and over 5,500 dealers distribute the product to nearly every part of the vast British Empire except the United Kingdom and Ireland.

This is purely a Canadian enterprise, manufacturing nearly all of its parts and importing from the United States only such material as Canada is unable to produce at a reasonable price, or in dependable quantities. The Canadian Company enriches the Dominion treasury by millions of dollars every year and furnishes employment to thousands of men at a minimum wage of \$6 a day. The Ford City plant alone employs more than 4,000 men.

THE WORLD MARKET FOR FORD PRODUCTS

Simple in design, light in weight, and built to stand up under severe conditions, the Ford car best fits the requirements of the majority of people in every country. For this reason it is always to be found on the frontiers of civilization and the outposts of commerce.

Ford products and Ford service may be found the world over. Every civilized country has its Ford representatives. It is hard to point out a country where a Ford dealer cannot be found.

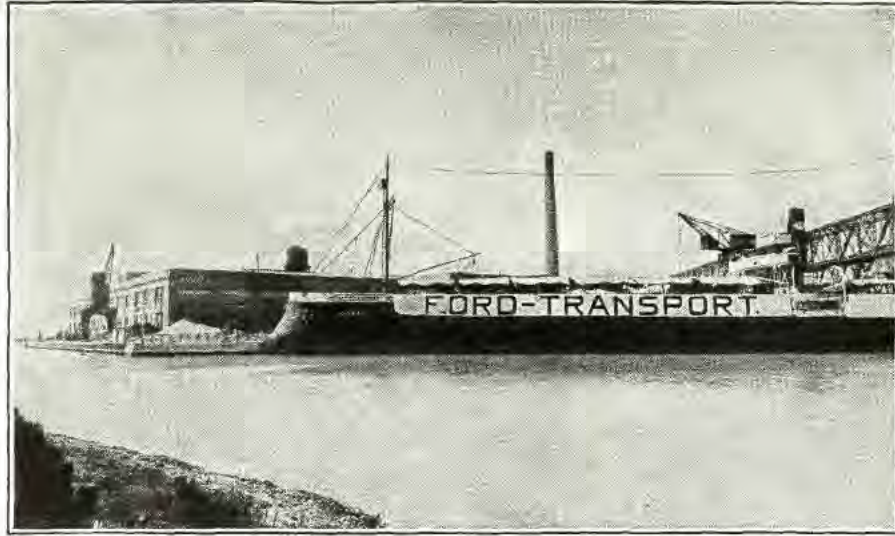
Ford business outside of the United States is handled on the principle of direct representation through large organizations located at strategic trade centers. These are in no sense transplanted American branches, but separate com-

The Company supplies Ford cars, trucks and tractors to Canada, Australia, New Zealand, India, Burma, Dutch East Indies, Newfoundland, Union of South Africa, S. W. African Protectorate, Zanzibar, Rhodesia, Kenya Colony, Gold Coast, Nigeria, Sierra Leone, Gambia, British Borneo, British Samoa, Mauritius, Reunion, Fiji, New Caledonia, British New Guinea, Aden and Nyasaland.

Branches and assembly plants are located at Calgary, Montreal, Regina, St. John, Toronto, Vancouver, and Winnipeg, Canada. The most recent assembly plant is located at Port Elizabeth, Cape Province, Union of South Africa. Recently an announcement was made that a large assembly plant with several branches will be established by this Company in Australia.

panies organized in accordance with the laws of the country in which they are located, and a distinct part of its business and economic life. Naturally the Ford manufacturing methods, by which such wonderful economies have been effected, are in force, but in the main each Ford organization abroad is an independent unit. It is not Mr. Ford's desire to take wealth out of a country but rather to reinvest it as far as conditions permit. Directly and indirectly Ford factories benefit the country in which they are located through promoting transportation and providing steady employment at high wages for many people.

The advantages of this direct representation cannot be overesti-



Shipping Cars from Ford Copenhagen Plant on Former German Cruiser.

mated. The mistakes common to export organizations operating from a point thousands of miles away are eliminated. The personnel are citizens, familiar with the laws, customs and markets of their respective countries and the psychology of their countrymen as well.

Ford dealers abroad enjoy an advantage in handling Ford products by reason of the fact that delivery of cars, parts, accessories, etc., can be

quickly secured from a near-by branch, eliminating unusual delay and consequently reducing the amount of money which would otherwise be tied up in large stocks.

Every country in which the Ford is marketed presents a different sales problem. There are many things to be considered: topography, road conditions, foreign exchange, wage standards, automobile taxes, fuel prices, import duties,



Unloading Ford Cars for the Export Market.

transportation charges and the general social, political and economic situation.

In the United States a workman by saving one day's wages a week is soon able to own a car. In some countries his total income for several years would not buy one. There is keen competition too from cycle cars and the small, light cars of low horsepower, designed only for good roads and light work but which will run many miles on a gallon of fuel. In countries where the motor car tax is based on horsepower the Ford is under a handicap in comparison with the 8 to 15 horsepower cars in common use.

Nevertheless Ford sales continue to increase steadily, a striking proof that Fords are bought because the public realizes the inherent quality of the product and appreciates its low upkeep costs. Fords are bought because motorists know them to be thoroughly reliable, not merely be-

cause the price is low. The method of establishing sales and service dealerships, and the merchandising organization of the various Ford companies abroad is very similar to the scheme followed in the United States except that national boundaries are sometimes crossed. In every country the Ford wage scale is considerably above the average.

Ford assembly or service plants are located in the following countries: Argentina, Belgium, Brazil, Chile, Cuba, Denmark, England, Finland, France, Germany, Holland, Ireland, Italy, Japan, Mexico, Spain, Sweden and Uruguay. The American factory branches at Houston, New York, Los Angeles and San Francisco also care for a certain amount of over-seas trade. With the exception of the Mexico City, Sao Paulo and Santiago branches all the Ford plants abroad are located at seaports and shipments may be made by boat.



Ford Motor Company at Barcelona, in Spain.



Ford Service Branch at Rotterdam, Holland.



FORD SHIPS IN OCEAN SERVICE

Another link in the chain of units which make up the self-contained Ford organization, is the fleet of ships engaged in foreign and coast-wise shipping flying the standard of the Ford Motor Company.

Three big steel freighters, the Oneida, Onondaga and East Indian, operating from New York as the home port, carry shipments of Ford products which were made in the factories in Detroit to company branches abroad and on the Pacific coast.

These boats have been specially fitted with racks to hold such articles as Ford engines, etc., without the use of boxes or containers. Such a

method effects a further economy in Ford production by eliminating the cost of crating and packing, which in foreign trade shipping runs into a considerable amount of money.

Exceptional facilities for loading and unloading have likewise been installed. This greatly expedites the handling of freight and places the burden of labor on machinery, thus releasing man-power to higher service.

Returning, the boats carry miscellaneous cargoes which are consigned to American ports along the Atlantic coast.



Cork Plant of Henry Ford and Son, Irish Free State.

OTHER FOREIGN PLANTS AND ASSOCIATED COMPANIES

England, Scotland and Wales are supplied with Ford Products by an all-British plant at Manchester, England. The Irish Free State is handled by the plant at Cork, known as Henry Ford and Son, Ltd.

The French Ford Company, now known as "Automobiles Ford," is located at Asnieres, near Paris, France. This plant distributes Ford products in France, Algeria and Tunisia, the last two being in North Africa.

Copenhagen, Denmark, one of the most important of all Ford foreign companies supplies Ford Products to Russia and to all the states bordering upon the Baltic Sea including Norway and Sweden, Iceland, Faroe Islands, Danzig, Poland and most of Germany.

Argentina and neighboring territories in South America are supplied by the Ford Plant at Buenos Aires.

The United States of Brazil is one of the world's largest and richest countries. So rapidly did the popularity of Ford Products increase in Brazil that large plants have been built at Sao Paulo and Pernambuco.

The Ford Motor Company D'Italia, located at Trieste, is the most unique of the Foreign Ford Companies for it does business on three continents and crosses dozens of national boundary lines in carrying out its program. The following countries comprise the territory under supervision of the Trieste plant: Italy, Austria, Czecho-Slovakia, Hungary, Jugo-Slavia, Roumania, Bulgaria, Albania, Georgia, Greece, Turkey-in-Europe, Turkey-in-Asia, Mesopotamia, Palestine, Persia, Syria, Arabia (except Aden), Oman, Afghanistan, Bahrein, Abyssinia, Egypt, Egyptian Sudan, Eritrea, Italian Somaliland, Tripoli, Azerbaijan, Djibouti, Crete, Cyprus, Malta, Rhodes, Sardinia and Sicily. The combined population of these is reckoned at 173,375,814. It has been estimated that 75% of all the motor cars in this vast region are Fords.

At Barcelona, Spain, the Ford Motor Company, S. A. E., operates an assembly plant. The territory includes Spain, Portugal, Gibraltar, the Canary Islands, the Azores, Madeira and the Balearic Islands in the Mediterranean Sea.



Entrance and Part of Office Building of the New Ford Plant at Asnieres, near Paris, France.

Belgium, Switzerland, Luxemburg and the Rhineland are served by the Ford Motor Company of Belgium, located at Antwerp.

Ford service plants have been opened at Rotterdam, Holland, to look after Ford interests in the Netherlands, and at Stockholm and Helsingfors, Finland, to relieve the pressure at Copenhagen by caring for Ford interests in Sweden, Lithuania, Finland, Esthonia and Latvia — a territory of nearly 14,000,000 people.

A new company has been organized in Japan to handle Ford busi-

ness in the Orient, having an assembly plant in Yokohama.

The Ford business in Germany is taken care of by the Ford Motor Company A/G with an assembly plant in Berlin.

The continued popularity of Ford products has made it necessary to establish a large service plant at Havana, Cuba, giving the motoring public the advantage of a direct factory connection in the interest of good service.

Santiago, Chile, also boasts of a new factory branch, and will devote its energies to marketing and servicing Ford products in Chile,



A Good View of the Ford Plant at Buenos Aires, Argentina.



The Ford Headquarters at Havana, one of the world's best markets for American automobiles.



Administration Building of the new Plant at Stockholm, Sweden.

Peru and Bolivia, on the West Coast of South America.

In addition to all of Uruguay the Montevideo branch controls Ford business in the State of Rio Grande do Sul, Brazil, which is geographically more accessible from the Uruguayan capital than Sao Paulo.

Territory not specifically under the supervision of a foreign Ford branch or associated company is handled by the Home Office at Detroit, or by one of the American branches. Hawaii and the Philippine Islands, for example, come under the San Francisco Branch.

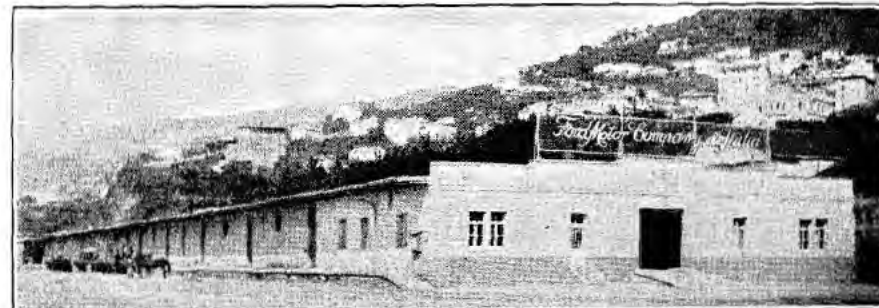
Like Trieste, the Home Office extends its operations into a multitude of countries. China, Indo-China, Belgian Congo, Equatorial French Africa, Dahomey, Senegal, Manchuria, Siberia, Portuguese West Africa, Togoland, Colombia, Ecuador, Venezuela, Guatemala, British Honduras, Nicaragua, Honduras, Salvador, Costa Rica,

Panama and the West Indies are included in the territory, which has a population of 500,000,000. Many of the large dealer establishments are equipped to do their own assembling.

A new assembly plant has recently been opened in Mexico City. The building includes 48,000 square feet of floor space and is regarded as a show place and one of Mexico City's foremost industrial enterprises.

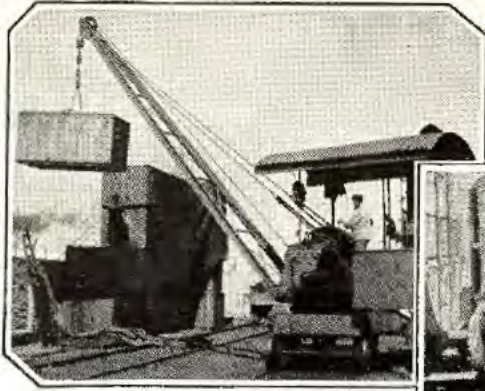
By the time the next edition of this book is published it is probable that other Ford plants in foreign countries will have been established.

Mr. Ford is particularly interested in promoting the use of automobiles abroad, for he feels that the more people are able to travel, the more liberal they will become in their attitude towards foreign peoples, and with this better understanding the national prejudices and hatreds will gradually disappear.



At Trieste, Italy, where Ford Cars are Assembled for the Near East.

IN THE FOREIGN FIELD



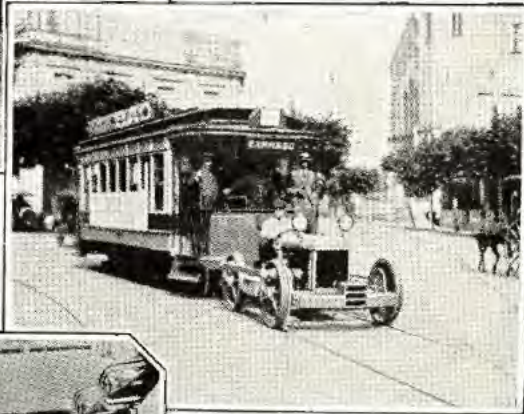
Incoming material is handled in this manner.



Ford wages bring the company Argentina's best workmen.



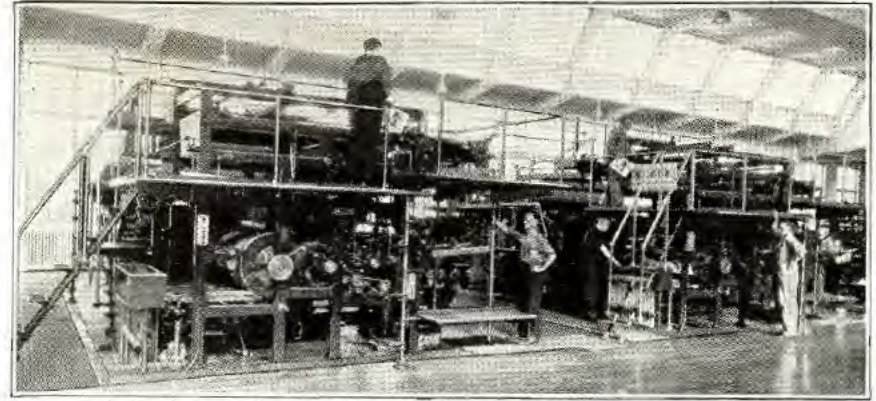
A Ford dealer's headquarters in Aleppo. The gentlemen wearing fezzes are salesmen.



During one of Montevideo's Ford exhibitions it was proved that pulling a street car was a very easy job with a Fordson.



The final assembly line is the same as in America.



A Section of the Press-room Where the Independent is Printed.

THE DEARBORN INDEPENDENT

The Dearborn Independent came into existence in 1901 and continued for seventeen years as a country weekly newspaper of local circulation. The Independent was purchased in November, 1918, by Mr. Henry Ford, who retained its name but enlarged its scope to that of an international weekly.

The Dearborn Independent is neither a trade paper nor a house organ; nor does it press-agent Mr. Ford or any of his interests. From the first, it has served solely as "Chronicler of the Neglected Truth," to furnish dependable information upon important matters often avoided by the press and to assist serious readers in the formation of sound opinions on vital issues.

It is significant that today the weekly paid circulation has passed 600,000. The immediate goal is 1,000,000 subscribers.

The editorial policy of The Dearborn Independent is both radical and conservative: radical in the sense that it seeks the truth, regardless of consequences—conservative in that it sets up defenses for the meritorious, of whatever age, in what-

ever field. It is the constant aim of the editorial staff to avoid prejudice and partisanship by an insistence on constructive frankness and the setting of an inclusive goal of good for all concerned. The ultimate effect of truth must be the good of all.

Special contributors and staff writers are in all parts of the world, seeking material. Since the spring of 1925 when the installation of new equipment made possible the adoption of a magazine form 8 3/4 x 12 inches with a colored cover, a greater variety and quantity of reading matter finds its way into the pages of this fearless magazine. All type setting, electrotyping, stereotyping and printing are carried on in the magazine's own plant. Three presses have been installed, each with a capacity of twelve thousand 32-page magazines per hour.

Although one of the younger papers in the field, The Dearborn Independent has with one exception the largest circulation of any non-fiction magazine.





Maiden Dearborn I and II, first of the Ford air transport fleet

COMMERCIAL AIRPLANE SERVICE

The Ford Motor Company operates a fleet of airplanes and is the first large corporation to make use of air service for inter-plant transportation of mail and freight.

The flying activities center at the Ford Airport in Dearborn, Mich., one of the finest aviation fields in the country, which, besides having every facility for handling heavier than air machines, also has a large mooring mast for dirigibles.

The Ford air service started on April 13, 1925, when the *Maiden Dearborn I*, the first Ford airplane, made its initial flight to Chicago, carrying more than 1,000 pounds of freight from the Detroit plants to the Chicago branch of the Company. Since that time daily trips have been maintained between Detroit and Chicago.

The second Ford air line was opened on July 1 between Detroit

and Cleveland. It also operates on a daily basis. Other air lines are planned and will be opened soon.

On February 15, 1926, Ford airplanes began carrying U. S. air mail from Detroit to Cleveland and Chicago under government contract. The schedule calls for daily trips to and from Cleveland and Chicago, thus connecting Detroit with the trans-continental air mail lines. In addition to the mail the airplanes carry freight between Ford plants.

While the manufacture of all-metal airplanes is at present carried on in one of the buildings of the Dearborn laboratory group, a new manufacturing plant having a floor area of 60,000 square feet is to be erected at the Ford airport within the next few months.



Unloading the Maiden Dearborn I



The Engineering Laboratory at Dearborn.

FORD ENGINEERING RESEARCH

Continual expansion typifies the progressive spirit of the Ford organization. A wider use of power and transportation, benefiting a still greater percentage of the world's population—that is the Ford program of service.

In 21 years, the Ford Motor Company has produced more than 12,000,000 motor cars, trucks and tractors, thus making available for man's use 230,000,000 horsepower. This is 25 times the total water power developed in the United States, and is a significant contribution to present-day civilization.

With manufacture maintained on such a scale, and future growth planned, the organization is looking beyond immediate demands for efficient transportation and is anticipating and preparing for the developments of the years to come.

To carry on its research and experimentation under most satisfactory conditions, the Ford Motor Company has erected an Engineering Building at Dearborn, Michigan, that is both an experimental workshop and laboratory.

Here the design and construction of Ford products are subjects of untiring, constructive effort. Here metallurgy is an exact science, specifying the many metals and combinations of metals to best function in Ford Products.

Here factory production, shipping, railroading and agricultural research is conducted. Here are carried on constant experiments with various products related to automotive manufacture: fuels, lubricants, rubber, fabric, glass, electrical devices—almost an endless list.

In addition to the experimental laboratory at Dearborn many departments throughout the Ford organization have their own laboratories where special tests are being constantly conducted.

No factor or element has been overlooked to further expand the scope of Ford activities so that in the years to come the Ford purpose may be realized—to make the application of motive power to human needs more general, more effective and more economical.

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