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The Guildsman

OFFICIAL MAGAZINE OF THE FISHER BODY CRAFTSMAN'S GUILD
An educational foundation sponsored by General Motors Corporation through the Fisher Body Division

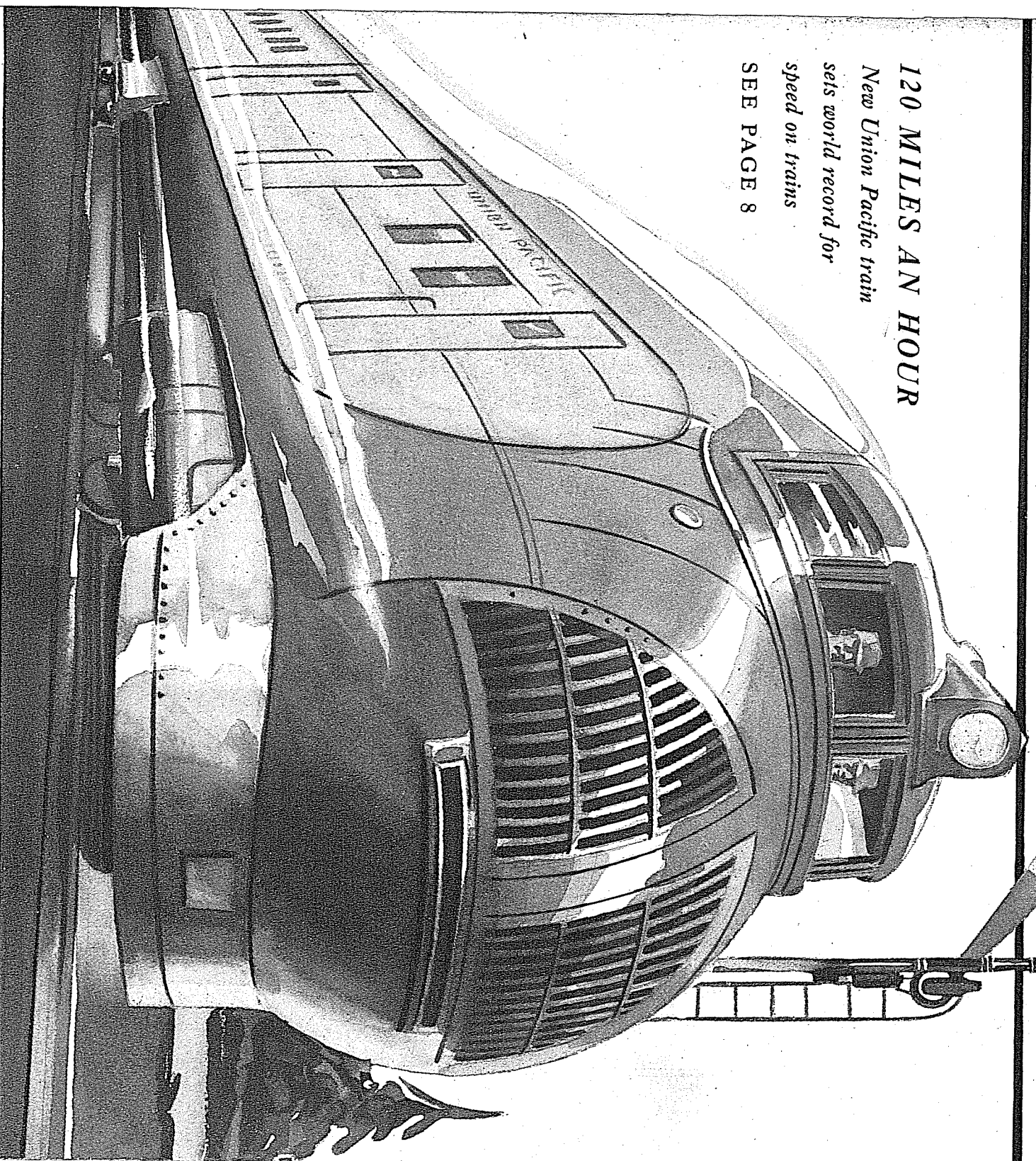
120 MILES AN HOUR

New Union Pacific train

sets world record for

speed on trains

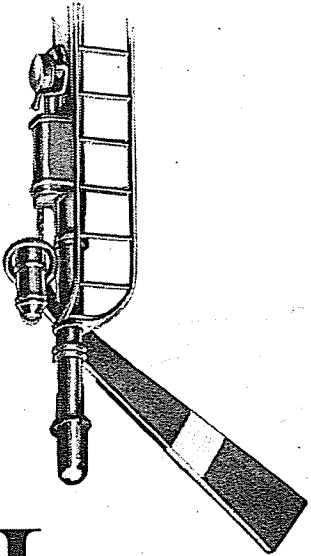
SEE PAGE 8



**Diesel Trains Flash By ~ A Lively Dog Story ~ Hall of Fame
Head Lamps and Safety ~ Special News for Guildsmen, Page 15**

Right of Way for the Diesel

Will the type of power plant that stalked the Lusitania to its doom be assigned to speed the Overland Limited to new records?



IF YOU should be stopped at a grade crossing tomorrow to let the limited thunder across, look closely at the steel giant as it rushes by.

That train probably weighs as much as 2,000,000 pounds. Its engine alone accounts for some 350 tons and possibly costs \$80,000 or more. Every week, it consumes its weight in coal and water. It is huge and mighty, yet wonderfully built. So fine are its bearings that you would need the help of only one or two pals to push its tremendous bulk along the rails.

As it roars proudly by, that locomotive embodies the power that built America into a single nation from sea to sea. The train behind it is one of the safest, most luxurious means of transportation that man has created.

Yet it may have served its day. Its power is seriously challenged. IF YOU chance to live along the line of the Burlington in the vicinity of Omaha, you may see another train—the *Zephyr*—on its daily run. Its total weight does not exceed 200,000 pounds. Today, it has replaced eight times that weight in standard equipment. It is faster than the trains it replaced. It operates at lower cost. It is a champion, holding the record from Denver to Chicago with a total of 785 minutes for the 1,017 miles.

Or go to the Omaha station when the Union Pacific's streamlined train is in. You will see another champion that crossed the continent for a new speed record, using only \$83 worth

of fuel oil for the entire 3,300 miles. If your home is in New England, watch the new *Flying Yankee* dash by. They are new—amazing. Are they pioneers of a new age in railway transportation?

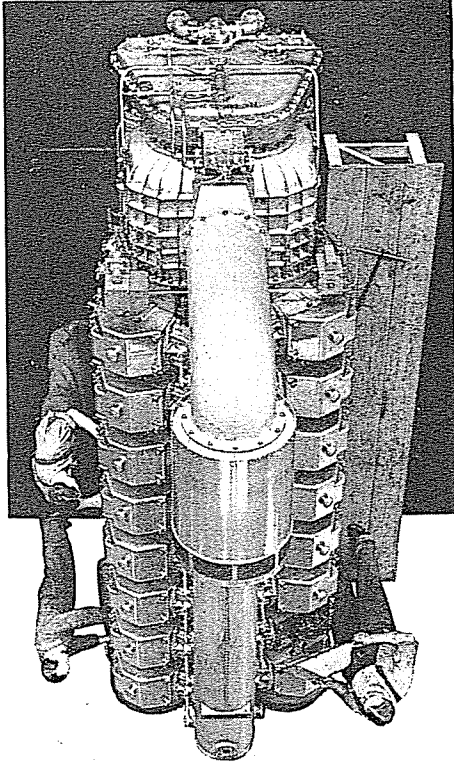
THE generation to which your grandfather belonged was sure that the motor car could never replace the horse in highway travel. But your father watched that change come about.

Is the iron horse now to be relegated in its turn to the limbo of outdated things? No man today actually knows. You may someday know. Before you are middle-aged, the change may be complete.

It is granted to you, too, to see craftsmanship tackle a problem that is of immediate, world-wide moment. You, too, may see a fundamental transformation wrought by the skill of human minds and hands.

TWO things are happening in the railroad world, both of great potential importance to mankind. First, new equipment is being built of new, high-strength alloy metals which permit scientific weight distribution and remarkable savings in total weight.

Rolling stock for the railroads was developed into its present form before the modern science of metallurgy achieved its triumphs. Railroad builders and suppliers had none of the new alloy steels and aluminum alloys to work with. Their sole method



Assembling a Winton-Diesel for railway service

of increasing strength and safety was to use more metal, which meant a greater mass of dead weight to carry. Passenger trains became veritable safety vaults on wheels. Locomotives had to be massive to handle the trains. Tracks and bridges had to be strengthened again and again to support them. Today, much of this excess weight is being stripped off, with great gains in facility and economy of operation. The change is coming about independently of any change in the motive power. The Baltimore & Ohio, for example, is building one of its new streamlined trains specifically for operation with a steam locomotive. It will weigh less than half as much as a standard present-day train, yet have

somewhat larger cubic content, and will be pulled by a rebuilt locomotive that has been fully streamlined for the purpose.

There is little doubt that passenger trains of the future will be lighter in weight than present equipment. They will, none the less, be stronger. Whatever the motive power, passenger trains at least are due to be re-equipped.

The other change that is affecting the railways is the advent of a new type of motive power for main line train operation—the Diesel electric—the very type of power plant that made submarines the terror of the seas during the World War.

THE Diesel is admittedly the most efficient of all engines, attaining a thermal efficiency of 37 per cent as against 25 per cent for the gasoline engine. It is an internal combustion engine which operates on fuel oil. It can, in fact, be made to operate on almost any hydrocarbon fuel—powdered coal, for example, the residue from oil-bearing shale, alcohol from cornstalks—even butter.

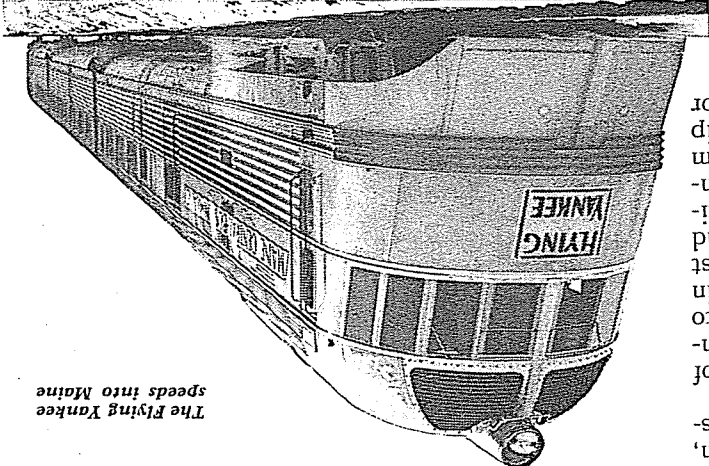
In addition to its economy, it is rugged, a mule for work, and notably long-lived.

Various differences distinguish the

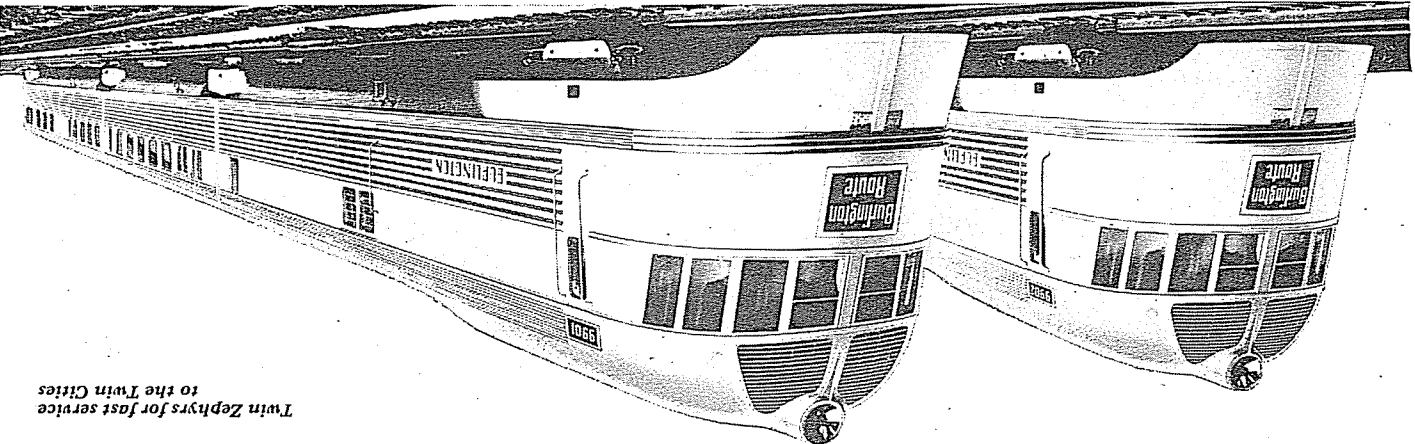
The problem of vaporizing and injecting the fuel into a Diesel cylinder in a split second against this pressure and temperature constitutes a difficult engineering problem which craftsmanship has mastered for

oline engine. The result is a push, as in a steam or gas-engine.

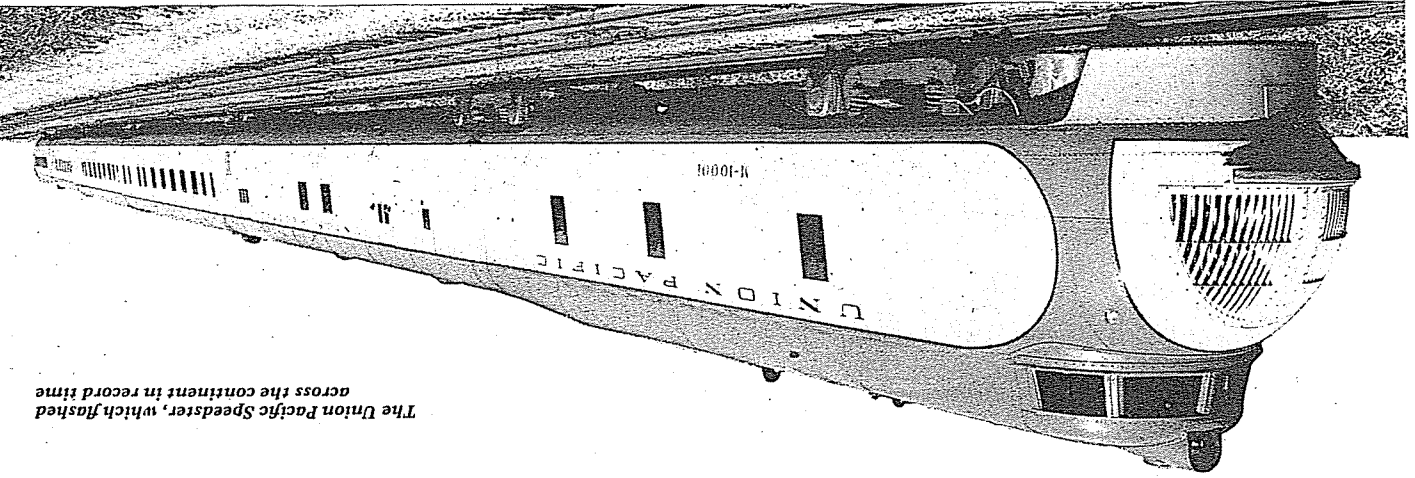
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The Flying Yankee speeds into Maine



Twin Zephyrs for fast service to the Twin Cities



The Union Pacific Speedster, which flashed across the continent in record time

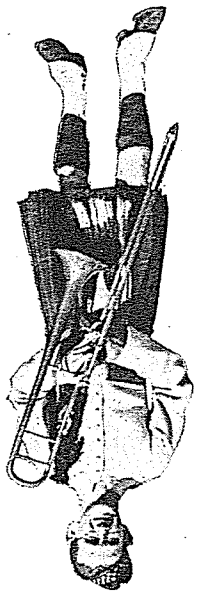
AFTER its introduction in the closing years of the last century, the Diesel was highly developed for use in powerhouses and on ships. Especially in Europe was constant effort devoted to its improvement. As early as 1903, a ship on the Caspian Sea, the *Wandal*, was Diesel powered with an electric drive. The motor ship *Selandia*, commissioned in 1913 by the Danish East India (Continued on page 21)

ALUMNI Recount their College Adventures

Guild grads are making good in class and campus activities

"The finest bunch of fellows in America,"

says Raymond A. Smith



IF YOU are so fortunate as to hear the Carnegie Tech Kiltie Band this fall, that smooth lyric note from the trombone section will be Guild Alumnus Raymond A. Smith doing his bit of finished craftsmanship for dear old Alma Mater. Raymond admits that the band is pretty good, but confesses that the wind blowing up those kilties on a cold day is bad for a young man not born in the highlands nor raised on hagsis.

Raymond has just reported to headquarters that he made the scholastic honor roll in the first semester this year. High among his ambitions for the coming school year, he lists his desire to go out to Purdue and show Don Burnham how football is played by crack craftsmen at the game. He goes right along with all the other Guild Alumni in advising every coach builder to set perfection as his goal. And he cites his own experience in support of the point:

"Very vividly, I remember entering a coach in the first annual competition of the Guild, way back in 1930-1931. I didn't win a scholarship that year, but I came back the following year with a coach that won for me a grand award of \$5,000.

Frank Hines talks to the Lions Club

ONE aspect of his work at West Virginia University that greatly impresses Frank W. Hines is the opportunity he finds to use the craftsmanship which he learned as a member of the Guild. Here is how he puts it: "I am studying mechanical engineering, which contains several shop courses, such as machine shop, pattern making, and mechanical drawing. De-low plans play an important part in these courses. Many of the things I did in miniature as a member of the Guild I now do on a larger scale. I believe the Guild offers very valuable training, especially to boys who plan to follow technical work."

The Guildsman believe the Guild offers very valuable training, especially to boys who plan to follow technical work."

R. W. Strauss leads his college class

Charles is one of the Guild Alumni who will tell you that winning a scholarship is only the beginning. In his own case, he found that he had not taken as much college preparatory work in high school as he should. Here is his account of his work in catching up, with a brief review of college life:

"Not having planned seriously for college while in high school, and having spent some time on two coach models only with the thought of winning a scholarship still very faint, I did not take as much college preparatory work as I otherwise would have. However, I did enroll at W.S.C. just after receiving my scholarship, and by taking extra work in mathematics, the basic subject of engineering, was able to enter M.I.T. as a sophomore last fall. Although still behind in certain subjects, I intend to catch up this summer. Incidentally, I think I will enjoy this work during the summer very much, since it consists mainly of physics—my favorite subject.



Bob Strauss Dean A. A. Potter Don Burnham DOWN at Purdue University, Alumni Bob Strauss and Don Burnham live only a few blocks apart and are in several classes together. Incidentally, both of them are setting a fast pace scholastically for the rest of the student body.

Bob admits that his biggest thrill in college came at the end of the first semester of his sophomore year, when he received the highest possible grade in all his subjects. His scholastic index is the highest in his class, with six "A's" and twenty-four "H's". "H" is the highest grade given at Purdue and "A" the next highest.

The picture, snapped one sunny day on the Purdue campus, shows the two Guild Alumni with Dean A. A. Potter, of the College of Engineering. Don appears in his uniform as a member of Scabbard and Blade, the national honorary military fraternity.

Charles Gadd goes right on working

CHARLES GADD has been hard at work on a full-time sophomore schedule at Massachusetts Institute of Technology and is planning to put in the summer there on a course consisting chiefly of physics. But he is still ing irons, and suchlike equipment are beginning to clutter up his room.

Charles is one of the Guild Alumni who will tell you that winning a scholarship is only the beginning. In his own case, he found that he had not taken as much college preparatory work in high school as he should. Here is his account of his work in catching up, with a brief review of college life:

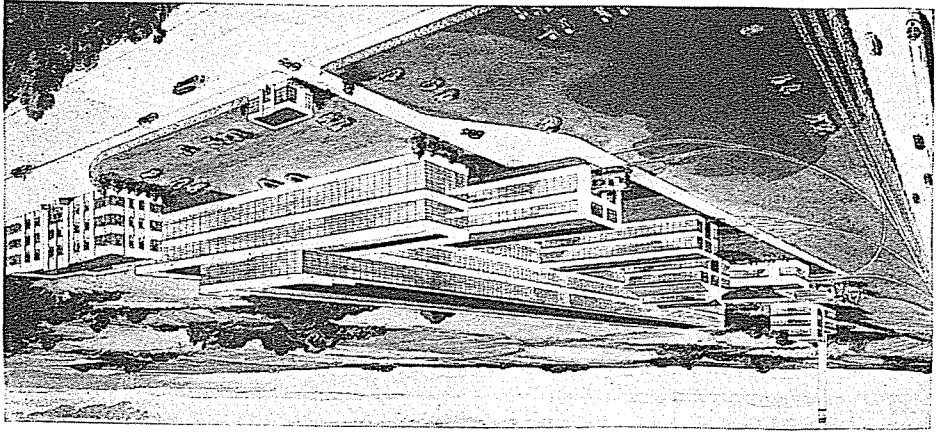
"My activities here at M.I.T. have thus far been confined to playing in the school orchestra, a good method of relaxation from lessons. I plan to do a little track work this spring too. This, however, I am doing mainly because I enjoy it, rather than in the hope of 'getting someplace' in it.

"Here in Cambridge, I am of course too far from home to see it during the school year, but nevertheless have had a good time during the free periods of the year, particularly while down at New Britain visiting Franklin At-water during the Christmas vacation. (Visit-ing is not just the word for it, since we are here together at M.I.T.) While I do not have the time to do a great deal of the hobby type of work here, I have amused myself lately by constructing a small apparatus for integrating, a process of calculus. Some of the operations I can do in one of the school machine shops, while others can be done here in my room."

Right of way for the Diesel!

(Continued from page 9)

Company, is still running and has been a success. The largest motor ship in the world in 1928 was the 32,000-ton *Augustus*, of the Italian line. Today, Diesel-powered ships are known in every seaport of the world.



This new home of Diesel electric is under construction in Chicago

While Europe was thus applying these power plants extensively, American engineers were not neglecting it. To Alexander Winton must go major credit for its development here. He was one of the pioneers of the motor car who, in 1912, organized the Winton Engine Company in Cleveland to build marine engines. Here, in the fall of 1913, he completed the first all-American Diesel. He followed, in 1915, with the first twelve-cylinder V-type Diesel ever built. His company constructed gasoline and Diesel engines of every type for marine use. Since 1918, the Diesel end of his business has increased greatly from year to year.

MEANWHILE, American rail-ways began to seek the means for better, more economical service. They ventured into terminal and main line electrification. They invested heavily in gas-electric units for switching operations, for suburban service, for feeder lines. They improved their motive power in many significant ways. The better locomotives of today have double the thermal capacity of those of fifteen years ago. Freight train schedules have been greatly expedited up and are regularly maintained as strictly as in the passenger service.

But the troubles of the railroad companies continue. Automobiles, buses, trucks, airplanes are still cutting seriously into their business.

DURING the 1920's, the research facilities of the automotive industry have been intensively engaged upon the adaptability of internal combustion engines to the problems of railway transportation. General Motors has been particularly active in this work and in 1930 acquired the Winton Engine Company and the Electro-Motive Company, both of Cleveland, as an avenue for the introduction of improved railway equipment. There is now building in Chicago a new and

ship over the facts of the case. Truly, we may be on the eve of a mighty transformation in travel and transport. Your eyes, perhaps, will witness one of the great dramas of time—another triumph by craftsmen-

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JULY-AUGUST 1935

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**Guild Winners Will Have Gala Days in Montreal and Quebec
How to Pack and Ship Your Coach ~ First Guildsmen Graduate**

All these star in major roles in the dramatic annals of the motor car

A. B., M. A., Litt. D., Dean, University College
of Arts and Pure Science, New York University

SUNDL

SOMEONE has asserted that if the rate of speed of freight transportation were to be made only one half of what it is, the effect would be more profound than that of a world war. It would wreck our financial, industrial, and social systems. Few of us realize how intimately our everyday life is dependent upon the carrying trades. We sit down to breakfast with never a thought of the milk truck, the refrigerator train, the fruit steamer that had to come through on time before the table could be set for us. Once we stop to think, we begin to

MEANWHILE, motor car builders found themselves deluged with orders for passenger cars. Their meager production facilities were far from equal to the demand. For fully a decade, the commercial vehicle remained a side interest, while the passenger car absorbed the energies of the infant industry.

After 1910, however, trucks began to attract their due interest. Business began to realize that deliveries could be handled more economically and dependably by motor than by horse-power, and "teaming" began to pass out. Truck registrations increased 100 per cent in 1911 over 1910, 107 per cent in 1912 over 1911. By 1914, Packard, Pierce-Arrow, White, Reo, and General Motors Truck were all actively cultivating truck construction and operation.

And it was in this department that the stimulating effect of wartime demand first made itself felt. Hardly had armed men started to march in

THE war years had also taught industry and business to use these vehicles. While business was pushing, while the railways were overloaded, motor trucks came into use for carrying freight from manufacturing concerns to distant communities.

SATISFACTORY operation of automobiles and trucks alike is directly dependent upon one essential factor. There must be a suitable highway. The creation of a nation-wide system of fine roads is as significant in the annals of the motor car as any refinement in car design could possibly be. If you plan a motor trip to some dis-

state. These maps are marvels of detail. They show federal highways, state highways, most of the local roads. The various routes are clearly marked by numbers. On major routes, the distances are indicated. And when you start on your journey

country by fine highways. MANY agencies co-operated to bring about this extensive development. The Federal Bureau of Public Roads had been established in the Department of Agriculture, in 1893, and has always been active in the movement for good roads. When the

Pioneers of a new era in railroading, Diesel-powered trains are providing swift, smooth, luxurious transportation on many famous runs

To step into a luxurious air liner and speed across the continent has come to be routine experience for thousands of busy travelers

built up since that time.

It has often been said that real roads simply did not exist in America when the motor car was introduced. Not until 1921 was a federal road system tentatively laid out. As planned then, it comprised 170,000 miles of highway. By the end of 1933, there were 920,000 miles of improved high-

Often the swift, economical door-to-door transfer of goods, the modern truck has established itself as an essential factor in modern transportation

A stylized, textured illustration of a house. The house has a chimney on the left side and a large window with a white frame. The background consists of stylized, fluffy clouds. The entire illustration is rendered in a grainy, stippled style.

(Continued from page 13)

Trucks, Airplanes, Streamlined Trains

observe many of these applications. One that comes instantly to mind is the navigation of the air. And here again we must turn back to the war years for our real beginnings. Following the successful flights of the Wright brothers, in 1903, the evolution of aircraft had gone on consistently but slowly. Public interest was limited to the novel aspects of these achievements. Few, indeed, were those who believed that any practical use could ever be made of the flimsy contraptions that took off in those days. A few enthusiasts labored toward commercially practical results; the world as a whole was indifferent.

Then came the intense interest of the war years. Not only did men develop aircraft that were effective fighting instruments but men were trained to fly them and to fight with them. In the stress of the war years, the fact was driven home to people everywhere that young men abundant in the world who could readily be taught to navigate the air. Ships were ready, and men were ready to man them. Air transport was obviously a practical possibility.

IN THIS development, the automotive industry was an active agent. It was engineers from the motor car and modern construction and they carried their task through to a triumphphant conclusion. Not until the trunk line highways of the nation were all combined into the present plan of numbered routes did they cease to agitate for truly national roads.

Today, the highways sponsored by these organizations are broken down into segments reorganized into the federal system of numbered highways. But the romance of their activity must be recorded. To these associations must go major credit for awakening America to a sense of the true value of fine highways;

IT IS to be expected, in these days, that any mechanical development in one line will quickly be adapted to other fields of endeavor. The automotive industry has been a powerful tonic to the machine tool industry, which supplies its equipment. In the other direction, the automotive industry supplies its equipment to meet the needs of modern aircraft and a nation-wide system of air transport. Transcontinental routes were charted, elaborate signaling equipment set up for them, emergency landing fields established, and scheduled operation of planes definitely inaugurated. In this development, the air mail was a powerfully stimulating factor. Larger and larger planes have been created to meet the needs of the traffic. Multi-

When war demand ceased, the commercial development of air transport continued and extended. There was a fever for building airports in all parts of the country. Many of these were little more than pasture land and were quickly abandoned. Others were extensively developed to meet the needs of modern aircraft and a nation-wide system of air transport. Transcontinental routes were charted, elaborate signaling equipment set up for them, emergency landing fields established, and scheduled operation of planes definitely inaugurated. In this development, the air mail was a powerfully stimulating factor. Larger and larger planes have been created to meet the needs of the traffic. Multi-

THE most recent demonstration of automotive influence in modern civilization has been in railway transportation. There, the research facilities and methods of the automotive industry have opened the way to new achievements of astounding moment. The application of Diesel engines to rail transportation is no new thing. Several of the railroad companies have

(Continued on page 30)

July-August 1935

Comfort

(Continued from page 20)

highway is never perfectly smooth. It may look all right from the driver's seat, but it is really a succession of long waves. These tend to set a speeding car to bouncing up and down, and continued mile after mile this movement becomes very tiring.

An early attempt at better riding pension permits the use of springs that are properly balanced on all wheels, that have only one function to perform, and that really cushion the car without violent recoils.

Thus, Knee-Action wheels, as you have seen them in General Motors cars, greatly improve riding comfort. In addition, and as a direct result, they are an important contribution to safety. They promote the driver's ease and comfort, and thus help him to remain wide-awake and alert every minute of every drive.

IT ALSO became apparent, early in the history of the motor car, that fatigue came from other causes than the bouncing of the car. There were other vibrations to be considered and controlled.

A running motor car has a vast number of moving parts, all of which operate at high speed and every one of which will, if left to itself, set up a vibration of its own. Here again, the designers who were seeking true riding comfort found lots of work to do. They have done really remarkable work in eliminating noise and vibration.

Today, in the truly modern car, the crankshaft, drive shaft, axle shafts are balanced. The clutch is balanced. The fan, the generator, the water pump, even the tires, are balanced. A car salesman may not discuss these parts in detail in making a demonstration, but only because they are all taken for granted in present-day car design. Research and engineering progress have gone along together to control vibration at all these points. They have smoothed out performance to promote the bodily comfort of driver and passenger.

In modern Knee-Action suspensions, a soft coiled spring assures comfort

Double-acting hydraulic shock absorbers controlled all spring movements

Snubbers were the earliest curb on severe recoils in the interest of comfort

In the interest of comfort

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