

# Is the Motor Car a Non-Essential?

How Conditions in the United States Differ from Those in England

By A. Russell Bond, Managing Editor of the "Scientific American"

IT is sufficiently easy to answer the question in the title by an explosively emphatic "No!" But something more than a fierce partisanship attitude is necessary to convince those legal powers that be who have, to a large measure, the future of the American automobile industry in their hands.

It has been falsely argued by many—and one would be willing to wager much that those who so argue have little personal experience or need of the services of an automobile—that because Great Britain has found it necessary almost wholly to eliminate her automobile industry in favor of munitions making, therefore we of the United States should do the same. It is but another variation of the same argument to quote Germany, where the motor car except in war work has disappeared, or France, where the use is extremely restricted and the manufacture almost entirely stopped except for trucks and war cars.

But the conditions confronting the two principal foreign Allies, and the enemy of civilization, and those which we of America face, are so radically different that to quote their action and necessities as a reason why we should pursue a similar policy is about on a par with saying that because Germany bombs hospitals, so should we, or that because Germany finds the submarine her greatest comfort, so should we depend upon it for winning the war!

## British vs. American Conditions

Great Britain is a huge country. But the British Isles, where most of her motor car factories have been located, is a very small territory, indeed. It is well covered with railroads, and is besides thickly settled. There is infinitely less economic need of the swift transportation of the motor car in England than in a country like this, where we have single states larger than all England, and with less population than one small sized British city.

Again, the size of Britain's automobile industry, great as it is, is hardly to be mentioned with that of the United States. England, for instance, has no parallel for three huge American concerns, which turn out cars comparatively inexpensive, in quantities quite amazing. We have been exporting a great many more cars to England than we have been importing, which is itself a sufficient indication that her industry was not large enough for her people. As a consequence, when the vital need was munitions factories, it was natural to swallow all or practically all of her manufacturing plants

devoted to cars, in molding that industry to the point of supplying her army with shells and guns.

Had we had to depend exclusively on remade automobile factories to supply our munitions, we would still have a surplus left over to produce cars.

England has to import her gasoline. We produce it. What she could get she had to conserve for war trucks, for airplanes, for submarines. We have plenty of it, if consistently used.

Germany, of course, needs every pound of steel she can get, every ounce of rubber, every drop of gasoline, for her armies. There is no possible parallel between her situation and ours. France finds a large part of her productive territory in the enemies' hands, and has necessarily to convert her remaining factories as rapidly as possible to war production, to make her industrial power of manufacture fit her situation.

The United States, though possessing the greatest steel industry in the world, finds only one real reason for cutting down automobile production—and that is shortage of steel! The reasons of course are the enormous demands being made upon us not only by our allies for steel for war purposes, our own military, naval and shipbuilding program, but the sore need of a certain amount of steel for strictly peace purposes, to deny which is to halt industry, cripple finance and upset the economic balance already sufficiently disturbed by war.

## A Fighting Industry

No one, as far as can be ascertained, is doing any protesting that the American motor car industry is compelled to cut down its output and put up its prices. There is no other industry in the country which does not similarly suffer, unless—and here is the cardinal argument—unless it is a non-essential one. Those industries which are not essential to war, and which do not hook up with the war program, could probably run along as usual, if it wasn't for sufficient wisdom in high places which will make them "work or fight."

But the motor industry is already fighting. It was the motor industry which produced the Liberty Motor. It was the motor industry which produced the several sizes of war trucks. It was the motor industry which has produced the thousands of motor cycles and side cars used by the army. It is the motor industry which is engineering hundreds of coast patrol boats. It is the motor industry which has made possible the modern war front transportation of supplies, food, munitions, men, wounded and fresh troops.

But the motor industry has further claims to consideration as an absolute essential to American economic life than its contribution to war work. It is not the motor plant which has been transformed to a shell making plant or a gun making plant or other strictly war supply plant which is to be regarded as its bulwark against extinction. It is, first, the work it accomplishes as a finished entry, and second, the inter-dependence of a hundred allied industries on the motor industry, which makes it as absolutely an essential to American financial stability and economic progress as the coal, steel and railroad industries themselves.

## Magnitude of the Automobile Industry

As a car must be made before it can be used, let us look first at the size of the American industry. In the first place, it is not a mere collection of factories housing machinery, and working on steel. It buys and pays for the products of many mines—iron, copper, aluminum, zinc and lead. It uses the product of many chemical makers. It draws upon the ranch for hair and hides and glue and keeps canneries busy. Through textile mills it lays toll on the sheep ranch, and the wadding and the thread makers, the tire makers and the cover makers demand much of cotton plantations and rubber plantations. The lumber camps supply the planing mills and the planing and paper mills get paid large amounts by the automobile industry. Sand pits, oil wells, stone quarries, clay pits, glass works, oil refineries, cement works and brick kilns, are all selling to the automobile plants. Take those plants out of the economic system and you disrupt the whole fabric of this country's balanced industry.

It is idle to say "England did it." England had to do it. We could get along without anything if we had to—but when we do, we are by so much less efficient. And we don't want to be less, but more efficient, in the winning of this war.

In the United States last year there were very few if any less than one million workers engaged in automobile making, parts making, body making, accessories making. There were probably another million—at least a huge number—in repair shops, garages, service stations, oil distributing stations, etc. The wages paid in the factories which make cars only, amounted to \$275,000,000, more than a third of the entire capital invested in car factories—\$736,000,000. If all these people and all this money are engaged in a non-essential industry, we

(Concluded on page 198)

# Tricks and Acrobatics of the Air Fighter

What a Pilot is Taught at the French Finishing School

WERE speed the only criterion by which to judge the most likely winner of an aerial combat, then the aviator mounting the fastest machine would always be the victor. And that is as much as to say that the Allied aviators would always win, because of late their machines are almost always faster than the German ones. But speed and climbing ability are only two factors in aerial combat; besides, there are marksmanship and maneuvering skill. It is safe to say that the last-mentioned factor, maneuvering skill, is by far the most important in aerial combat. Both when on the offensive and on the defensive the aviator who knows every trick of his profession stands the best chance of winning or escaping.

It is due to the fact that tricks are an indispensable part of the air fighter's training that only the best of aviators are chosen for combat work. Indeed, as the training progresses from the safer to the more dangerous trick machines, more and more students drop out and are used in other branches of the air service, such as for reconnaissance and bombing work. The pick of the men—the daredevils, if you please—remain.

In the French flying service the combat or *chasse* pilots are sent to a finishing school at Pau, after graduating from preliminary flying schools. At Pau, under the direction of none other than Lieut. René Simon, who will be recalled as the daring exhibition flier of the early days of aviation in the United States, the pilots who have already mastered flight on slower mounts are put on diminutive but speedy Nieuport biplanes. From the Nieuport with a wing area of 18 square meters, the pupil advances to the 15-meter and finally to the 13-meter. Needless to say, the diminishing wing surface makes for greater speed, but at the same time the machine becomes more difficult to fly because of its poor gliding qualities. Such a machine lands at a terrific speed, and not as the larger planes which can volplane gracefully with their motors barely turning over.

Individual instruction is given at the Pau school of aerial acrobatics. Lieut. Simon explains the "stunts" one at a time to each student, who must repeat the instructions until every movement is committed to memory. Then the student takes the air with his diminutive biplane and performs the "stunts" with the instructor and other pupils watching on.

Now the greatest of all "stunts" appears to be the so-called "vrille," which is a sort of twisting or corkscrew tumble as of a machine falling out of control. It used to be the practice to teach the "vrille" last, but now it is taught first. For once the student has tried to master the "vrille" he no longer has fear for other "stunts."

To make his first "vrille," the student ascends to a height of over 800 meters and after flying on a level course for a short while, he switches off his engine and at the same time pulls the control stick back towards him and towards one side, while pushing on the rudder bar either right or left with his feet, depending on

which side the control stick was directed. As a result the biplane swoops upward, loses its speed, stalls, and then falls over to one side with a twisting or corkscrew movement like a falling leaf. The sharpness of the movement can be varied according to the rudder pressure being utilized.

To come out of a "vrille" the pilot replaces his control stick in the center position and brings the rudder bar back to normal, and then pushes the control stick forward a few inches. The machine soon ceases to corkscrew, points forward, and dives straight down. It is then by reversing the control stick that the pilot brings the machine to an even keel again and switches on the engine. The "vrille" is done to the right and the left, while the ever-watchful Lieut. Simon waits for the pilot to land, in order to comment on the performance. Only one machine is in the air at a time.

The "renversement" comes after the "vrille." This trick is a change of direction without loss of height and, in the case of a skilled pilot, without reducing speed. The pilot ascends to above 800 meters and after flying on a level keel for a few minutes, he points the machine slightly down so as to bring the speed up to maximum. Then he brings the control stick back about half way and reduces the motor speed in order not to perform the "stunt" too rapidly. Then, when the machine appears to lose some of its speed the rudder is turned sharply to one side and the machine immediately falls to that side. When in the vertical position the airman brings the rudder to the center position, opens the engine wide, and returns the machine to a level keel. It will be noted that in the "renversement" the ailerons are not employed, as contrasted with the "vrille."

When being pursued a pilot sometimes resorts to the trick known as the "changement de direction" in French aviation circles. As in the instance of the "renversement," this turning maneuver can be executed without loss of speed or height. In describing this "stunt" in a recent issue of *Flying*, Lieut. Granville A. Pollack, U. S. A., late of the Lafayette Corps, states that it is a valuable but rather rare maneuver.

Flying level at full speed, the necessity to return suddenly is met by throwing the control stick very quickly to one side, as far as it will go, and then immediately pulling hard back toward the pilot, accompanied by a very slight pressure of the opposite foot and only just sufficient to hold the tail level, or it will be inclined to fly forward. The result is very startling for the first time, for the pilot feels as though he were being forced through the seat, so strong is centrifugal force acting, yet in reality he makes a comparatively wide bend, not unlike a hairpin. This "stunt" is also done three or four times and either to the right or to the left, at the acrobatic school for airmen.

A wing slide follows, which is done by throwing the control all the way to one side, and accompanying it by pushing the opposite foot sharply ahead, sufficient to hold the nose of the machine up, and at the same time

slightly pushing forward the control stick, which gives the effect of traveling on the "outside" of the circle, and the machine descends sidewise at a terrific speed, much faster than it goes ahead, but with the pilot following practically a straight course forward.

A fifth trick, that of "retournement," is performed, very similarly to a "renversement," but instead of coming out in the opposite direction the movement is continued until one is again on the original course. To commence, the pilot does as in the "renversement," pulling the control stick back, the machine mounting sharply, and giving the rudder a kick. Then the tail goes up as the machine starts to fall to one side; but now, as the position approaches the vertical, the foot is only partly recovered, while the control is pulled moderately to the same side, as used by the rudder, which produces a half spin sufficient to bring the machine back to the former direction. It is important that the aileron should be used here, for if the rudder alone is used the movement will be too slow to be of value in a fight, and will result in loss of considerable height.

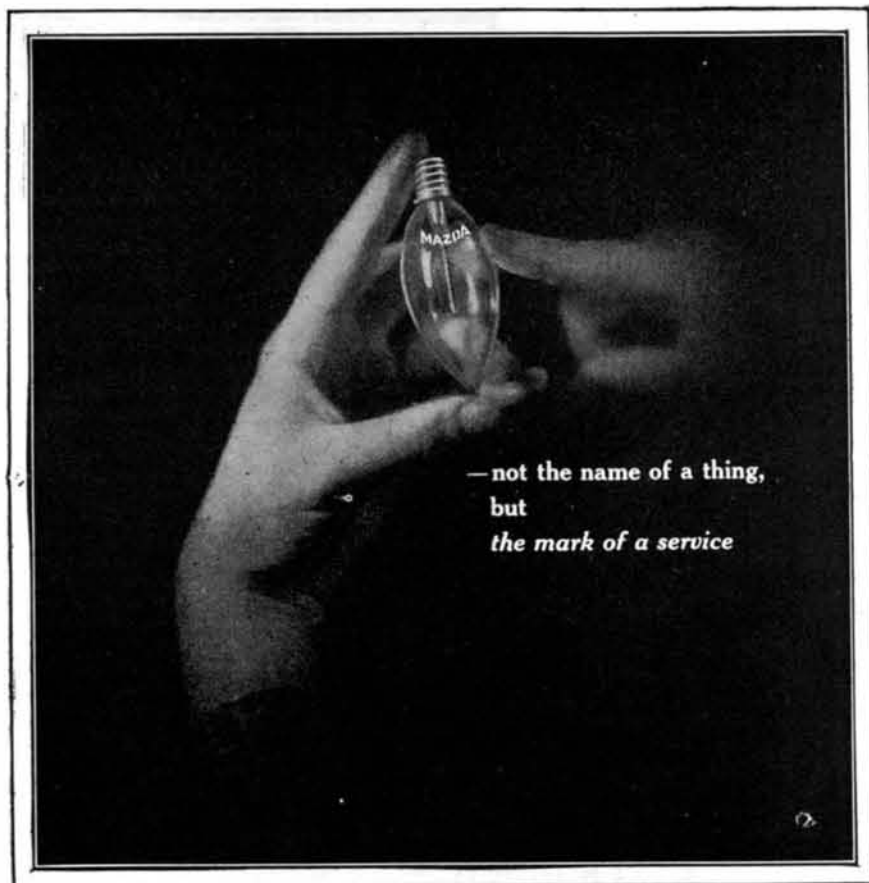
Here it should be understood that, when done properly, all these maneuvers, excepting the wing slips, should be done without appreciable loss of height, and therefore quickly; and so as an indication of the development of a pilot's "reflex" aerial acrobacy is beyond doubt conclusive evidence.

Last, and by far the most difficult to execute, is the horizontal "vrille" or barrel roll, as it is often called, which is very spectacular but the use of which in combat is questionable. This is usually started by slightly reducing the speed of the engine, pulling the control stick well towards the pilot, and giving a very quick push at the rudder—to the full extent, in fact—and at once replacing all controls in the center. The machine starts to mount suddenly, but the full effect of the rudder swings the machine up on one wing, over complete sideways, which follows with a wing slip and a flattening sidewise. The whole presents a most striking effect, and unless the pilot is quick it generally results in a loss of speed and a "vrille."

Looping is not encouraged in military aeronautics, for the reason that as long as the machine is inverted the pilot is helpless and presents a good mark to his opponent. Furthermore, the machine guns are apt to jam as a result of the maneuver.

A "stunt" frequently employed at the front is the upward swoop followed by a tail slide. When a machine is being pursued by another which is blazing away at the tail of the first, the usual maneuver for the first pilot is to pull the control stick backwards, heading his machine straight up until it attains a vertical position. Here it "hangs" by its propeller for just an instant, as is strikingly shown in our cover sketch, when it slides back and is finally brought into the level position again. Now it is behind the opponent and possesses the advantage.



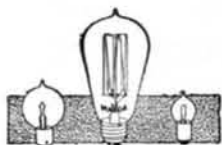


# MAZDA

"Not the name of a thing,  
but the mark of a service"

MAZDA is the trademark of a world-wide service to certain lamp manufacturers. Its purpose is to collect and select scientific and practical information concerning progress and developments in the art of incandescent lamp manufacturing and to distribute this information to the companies entitled to receive this service.

MAZDA Service is centered in the Research Laboratories of the General Electric Company at Schenectady, New York. The mark MAZDA can appear only on lamps which meet the standards of MAZDA service. It is thus an assurance of quality. This trademark is the property of the General Electric Company.



A MAZDA Lamp for every purpose

RESEARCH LABORATORIES OF GENERAL ELECTRIC COMPANY

## Low Cost of Upkeep

ROTH MOTORS

Successful More Than 20 Years

are built for work, not for idleness in the repair shop. So they give steady, day-after-day service at a low cost of operation. Twenty years' success is their best recommendation. Write for full facts.

Roth Bros. & Co.  
198 Loomis Street  
Chicago, Ill.



## ECONOMY

renewable  
FUSES



Replace the Link—  
Renew the Fuse

cut annual fuse maintenance costs 80%. Can be used over and over. An inexpensive "Drop Out" Renewal Link restores a blown Economy Fuse to its original efficiency.

ECONOMY FUSE & MFG. CO.  
Kinzie & Orleans Sts., CHICAGO, U.S.A.  
Sole Manufacturers of "ARKLESS"  
the Non-Removable Fuse with the  
100% Guaranteed Indicator.  
Also made in Canada at Montreal

## ELIMINATE NECESSITY OF GASLESS DAYS

WITH PROPER CONSERVATION NOW

Conserve fuel—  
insure adequate supply  
for any war-time emergency—  
liberate every possible penny  
for patriotic investment.  
The New Stromberg will back  
up to the limit your efforts to serve  
the Nation through strictest of fuel  
economy.  
Write for literature. State name,  
model and year of your car.  
Stromberg Motor Devices Co.  
Dept. 916, 64 E. 25th St.  
CHICAGO, ILL.

## New STROMBERG Does it! CARBURETOR

tion from the fees collected from the Government."

Here we get a line on the magnitude of the thing. In peace time our greatest building concerns are busy when they have from twenty to thirty millions dollars worth of work on their hands. A great corporation will sometimes build fifteen to twenty million dollars worth of structures in a year. To do this it has a well established administrative organization built up through the years of its growth. Somewhat different from the Government's problem where we are spending over a billion dollars a year with an administrative organization that is hardly a year old. And the end is not yet. Since the issuance of Secretary Baker's statement, above given, which indicated about \$1,300,000,000 worth of work, requests for about \$500,000,000 worth of additional work have been made and this does not include the construction abroad nor does it fully provide for the further enlargements that will undoubtedly become necessary with the increase of the army due to the proposed extensions of the age limit. Perhaps a round figure for the present and prospective building needs of the Army in this country would be two billion dollars. To the above the overseas demands must be added but, granting that they are not so great, we are still dealing with a program of such stupendous proportions that we need have no fear concerning our laurels as the world's greatest nation of builders.

### Is the Motor Car a Non-Essential?

(Concluded from page 188)

are, indeed, wickedly at waste when we should be at work. But will some one who knows kindly advise how we could reinvest this capital and reemploy this skilled labor to better advantage in something else than making cars?

Again the answer comes, "Why, making munitions, of course." But the reply to this is two fold. First, "We don't need and cannot use so many" and second, "Not all auto plants and certainly by no means all auto workers, are transmutable into munitions plants and workers in a time sufficiently short to make their services of value equal to the economic loss of the time that would be spent in change and instruction."

### A Self-Delivered Product

There are only so many tons of shipping available to ship men and munitions abroad. True, we are increasing that tonnage by leaps and bounds, but so far we have been able to fill every ship to the guards. We are not suffering from a lack of production, but a lack of transportation. The Government is doing a wonderful job with its railroads, but even it has had to limit the making of new manufacturing plants in certain areas, because the railroads simply cannot transport the war material already manufactured, let alone take care of the product of new plants.

The product of the automobile factory need not—and in many if not most cases now does not—make any demand upon the railroad to deliver it. It delivers itself on its own wheels under its own power.

Out of a partisan clamor from a thousand throats that this, that and the other thing "will win the war" it is difficult to choose the right answer. But whoever is right, it is obvious that the war can't be conducted, let alone run, without money and plenty of it. That money can come only through taxes and through mortgaging the future (bonds). But where is the money to pay the taxes and buy the bonds to come from?

Money, in the last analysis, is nothing but an easily transferable form of labor. Indeed, the great bulk of our business is accomplished without any physical money at all—merely by the transfer of credit, the use of paper and promises to pay. But hard experience has shown that there must be a moneyed foundation behind credit, and that the promise which cannot be redeemed, if necessary, is valueless as a commercial medium. The paper money of the Confederacy, or, more recently, of Mexico, illustrates the point—"flat" money won't purchase!

Now 2,000,000 wage earners, supporting from seven to ten million people, cannot be summarily thrown out of jobs without a volcanic upheaval of credit. To say "make them make munitions" is easy enough, but practically, the change—were it contemplated—would take years, and during those years, especially during the present, immediate now, the Government needs the wage earner to earn, that there may be money to pay, for the war which is being fought now—not a decade hence when the change from automobiles to cannon and shells might be completely accomplished. To put the automobile industry out of business because it makes what is falsely called a "luxury" would be to invite disaster if only because of the disruption of the earning power and thus the responsiveness to the taxing power.

Consider for a moment what the automobile industry does with money; it uses about \$250,000,000 worth of iron and steel; \$150,000,000 of lumber; \$20,000,000 of

brass; \$32,000,000 of copper; \$25,000,000 of cotton fabrics; \$20,000,000 of coal and coke; \$26,000,000 of tin; \$16,000,000 of lead; \$42,000,000 of electrical equipment, and \$24,000,000 hides and hair, to mention the value of only a few items. There are over 300,000 trucks and 4,000,000 passenger cars in operation in this country. The advertising bill runs well over \$23,000,000 annually, to say nothing of the money spent for advertising tractors and other gas-engined machines, which may be properly classified as belonging to the industry.

Suddenly kill an industry of that magnitude and it takes no vivid imagination to see what the result would be to our commercial fabric.

But now let us look at the other side of the shield—the automobile as a necessary aid to transportation, not as an industry. Leaving out of all consideration the motor truck, which even the "luxury fighters" from the backwoods recognize are as essential as railroad trains—consider the 4,000,000 "pleasure" cars of this country.

### Wrong Interpretation of the Word "Pleasure"

In the first place, they are not, of course, "pleasure" cars at all. Originally any motor made to ride in, as distinguished from one made to haul goods in, was a pleasure car. So was the first railroad car, the first Pullman, the first trolley. Does any one buy a berth in a "pleasure Pullman" today? Or ride to work in a "pleasure trolley"? Do we have "pleasure telephones" and "pleasure electric lights"? Undoubtedly the vast majority of the 4,000,000 passenger automobiles are used part of the time for pleasure, but the rest of the time they are as truly business adjuncts as the truck. Is the doctor's runabout a "pleasure car" because he takes his wife joy riding in his leisure hours? Is the car the business man uses to go from city's end to city's end in the pursuit of the elusive dollar a "pleasure car" because it also takes him to the theater?

It is not an argument to say, "Well, let those that have 'em, run 'em, but don't make any more," because when anything has become woven into the economic fabric of a people, it must be supplied, renewed, kept going, or the fabric itself suffers materially with the disintegration of its part.

Those 4,000,000 cars have grown into our lives. We have made them important factors in our entire program, business, pleasure, health, vacation, labor. The cars wear out, they need repair, they need replacement. If we cannot repair and replace, we must remake our lives accordingly, and while, as England has demonstrated, it can be done, it is a fearful wrench. And if it was a wrench for the "tight little isle" what a cataclysmic disturbance it would be in this huge country!

This is no argument that we don't stand ready to do it, if the need can be shown. But it is a very potent argument against creating the need by ill-advised talk, by hasty legislation or snap judgment in high places. If we can't make enough war material without calling on every automobile factory and every automobile workman to help, then by all means kill the motor industry. But if—and the facts show that we can—we can make more than enough without doing more than curtailing the industry which is third largest in the United States according to old figures, and which would certainly be second if not first in size by now were it not for the war—then to dodge the facts and eliminate from our commercial, economic and business life so vital a factor as the passenger car, would be to invite a widespread economic calamity not the less great that our comforters would point to England and France and say, "They did it first!"

### Teaching the Worker to Feel the War

(Concluded from page 181)

This attitude of confidence and affection on the part of the masses of our citizenship towards these three leaders in our ship program is in itself a striking comment upon the dignity and value of democracy.

When one undertakes to visualize the vastness of this enterprise the imagination falters. We have undertaken to expend \$3,800,000,000 in the production of ships. This is as much money as the Government of the United States ever expended in the three most expensive years of its history.

This vast program is being carried forward in nearly 150 shipyards dotted around the entire coast-line of the United States. Scores of these shipyards a year ago did not exist. The three great fabricating plants, the Submarine Boat Corporation, the Bristol Yard, and the Hog Island Yard have all come into existence within the past 12 months. Not only have these vast plants been built, but they have already begun to produce ships. A few months more and these three yards alone will eclipse in their output the entire energies of the nation before the war. In the great Fore River