H. A. ELLIOTT:—If you test just a few out of a lot there is no indication that the others are good, because in the heat treatment it is possible that some parts will not have the same heat as others. Mr. Nusbaumer recommends that you test all the pieces subject to shocks and vibrations, such as knuckles, axles, etc.

WHAT THE CYCLECAR HAS TAUGHT

BY WILLIAM B. STOUT

(Member of the Society)

The future of the cyclecar is that of the light car. The cyclecar movement was to develop the cheapest possible motor vehicle, the lowest cost of motor transportation possible. In Europe the start was made with so-called simpler mechanisms, with belt drive, friction transmission, etc. American makers followed along the same lines, making the track anything from 36 inches up.

After a season's trial, from the standpoints of road work and sales, a number of things were learned. The little vehicles caused surprise as to certain things they would do and as to certain things they would not do. The condition in America is very different from that in Europe. Here we can buy a four-cylinder water-cooled motor more cheaply than an air-cooled motor. We can buy a real transmission at a lower price than a make-shift transmission. A shaft drive and rear axle with differential are less costly than the average belt drive and axle therefor. Therefore, a light car can be built at as low a cost as a so-called cyclecar.

In using the word "cyclecar" I mean a car with a motor of less than 71 cubic inches displacement and of a weight under 750 lbs. A four-cylinder motor of the said displacement has very small cylinders, and would ordinarily not have the same volumetric efficiency as a twin cylinder motor of the same displacement. The twin cylinder motor has uneven torque, a relatively light flywheel, a lack of flexibility, carburetion difficulties, and a number of other characteristics which militate against it for the class of work under discussion.

WEIGHT AND COMFORT.

The comfort of a car with a very light axle and a very low unsprung weight, sometimes not over 50 lbs., has been the big surprise of the cyclecar. I have taken as deep holes as 8 inches without slowing up, at 25 miles an hour. We can run up with one wheel on a 9-inch curbstone and down again without throwing the passengers out of the seat. That cannot be done with the ordinary big car. This is due to the distribution of the weight. A five minutes' ride in the lighter type of car will demonstrate that its comfort does not depend on maximum weight but weight distribution. The light car means more than mere reduction to a small size, for the small car must meet the same road bumps as the big car. If we

need 4½", 5" or 6" vertical spring action in a big car, we need a similar range of action in the smaller car.

MOTORS

Engine development will be along conventional lines. Motors will probably be capable of 4000 r.p.m., with a well-sustained power curve, and probably around 2½" bore, with stroke under 4". The mechanism can be built to stand the new conditions. Springs will probably seem to be of extreme size. I believe that the light car of the future will be luxurious. We can afford to build it with the best upholstery, and with all dashboard equipment, with starter-generator sets, detachable wheels, etc., and yet come within the price which the public will pay for that kind of outfit, provided extra road qualities can be shown.

DISCUSSION

SMALL HIGH-SPEED MOTORS

L. V. SPENCER:—This year's races at Indianapolis proved that a big motor is not necessary to develop speed. The little Peugeot was probably the biggest eye-opener we ever had. The motor has a piston displacement of 183 cubic inches, about 6 inches more than the Ford, and at about 3,000 r.p.m. turns up nearly a hundred horsepower. The car in its time trial showed over 90 m.p.h. I never heard a more beautiful running machine in my life. Of course, its great showing was due as much to the fact that it did not have to stop at the pits for tire trouble because of its light weight, as to its remarkable speed.

The races constitute a triumph of the high-speed motor for continuous service under very trying conditions.

CHAIRMAN E. T. BIRDSALL:—There is no question that the high-speed motor is coming, but the public must first be educated to pay a little more for it. If we are going to get a real high-speed motor, it is going to be very difficult to produce it in the average factory at the rate, say, of a hundred a day, and have it right.

ERIC WAHLBERG:—Ultimately the automobile will have to fill the same requirements as any common carrier. It should be able to carry the biggest load in the shortest space of time, with the greatest economy and adequate comfort to the passengers. The high-speed motor is unequalled in this regard. It will go uphill and downhill, maintaining the speed of the car. One of the conditions for comfortable riding is this *maintenance* of average speed. A car having a large motor with small valves and short stroke has to attain very high and uncomfortable speeds on the good level stretches in order to keep up a decent average, whereas a car equipped with the small high-speed motor performs nicely and smoothly, and the car can actually run all the time at the desired average speed. This fact has been recognized abroad, and has made the small high-speed motor very popular.

ERNEST WOOLER:—The development of the high-speed motor in England was due in part to the Government tax. The tax varies according to the size of the bore.

I think that American firms are rather inclined to let somebody else do the experimenting and spend the money, and then try to produce the desired article from the other fellow's experience. I think they cannot do that. They must get the experience themselves before knowing all the points.

ERIC WAHLBERG:—The favorable performance of a high-speed motor is not confined at all to good road conditions. It has the "lugging" motor beaten altogether on heavy roads, on account of its steadiness and absence of vibration. While driving you feel that in shifting you have plenty of power available at any time without abusing the motor. With the "lugging" motor the driver knows that if he has to use his second or low gear he will progress very slowly or seriously rack the motor.

CHAIRMAN E. T. BIRDSALL:—The straight power curve of the high-speed motor approaches more nearly the power curve of a steam engine, and of course the nearer we get to the steam engine the more ideal the motor will be.

ADOLPH SCHREIBER:—I think from my experience in Europe during the last few years that if gasoline could have been had over there at 12 cents a gallon the long-stroke motor would never have been seen. The Government tax is a very great consideration in Holland, Germany and England. The long-stroke motor business was started to get more power out of a certain quantity of gasoline. If they could get gasoline at 12 cents a gallon in Europe several well-known American cars would be standard cars there.

ERIC WAHLBERG:—If we design high-speed motors for touring cars the public will not buy the cars, because it has been educated in the other direction. That is why I suggest that we awaken interest in this question, and then try to work out commercially some touring cars with motors of high-speed type but modified design. Increasing the price of gasoline or a high tax on the bore of the motors would probably make the buying public change its mind. But I think that racing is a simpler and more agreeable method of development.

CHAIRMAN E. T. BIRDSALL:—The main thing is to make the high-speed motor fashionable and popular. Then everybody will want it.

WIRE, WOOD AND STEEL WHEELS

BY MAX BACHEM

(Associate of the Society)

Steel wheels are nearly 200 per cent. stronger than wood or wire wheels. They are practically unbreakable and everlasting. I have some figures of tests of wood wheels, wire wheels and steel wheels