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The Endurance Run.

The death of the President, as reported elsewhere, resulted in a premature termination of the Endurance Run at Rochester, thus eliminating the last stage of the course. The contestants were thus unfortunately deprived of the benefits of an impressive finish at Buffalo, which, weather conditions permitting, would certainly have been witnessed by large crowds.

Nobody will deny, however, that even without the last stage the test of the vehicles has been an exceedingly severe one.

The Endurance Run was the first contest of its kind held in this country, and it might therefore have been expected that some flaws or defects in the conditions

would manifest themselves during the progress of the event, as they did.

To allow unlimited repairs without keeping track of them largely defeats the object of an endurance contest, for under such conditions a very poor machine can be kept running indefinitely. Of course, all contestants had the same right to make all the repairs required, but the number and importance of repairs actually made differed greatly for the various machines. This factor, the extent of repairs required, which is really the very best by which to judge the suitability of a vehicle for touring, has been left quite undetermined.

To show the differences in the provisions made for repairs it may be stated that many two passenger vehicles carried one representative of the manufacturer and one reporter; others carried a driver and a machinist from the factory; the French racer, which usually led the procession, was accompanied by three machinists, and we are informed on good authority that one manufacturer, who had entered a number of vehicles, had twelve machinists and repair men on the road.

Another feature which deserves criticism is the entire disregard of speed rules. True, the Contest Committee issued a warning at Hudson that racing must cease, and they may have done all in their power to stop it. The blame may be laid to the individual drivers, but with two of the club's officers leading the race after Hudson the club will hardly escape blame.

Racing, as always, was responsible for many of the more or less serious accidents of the first days, and it is a question, if the rain had not set in and dampened the ardor of the participants, whether the accidents would not have been greater in number than they were with the frightful condition of the roads. The racing indulged in reduced the total showing made by the vehicles, and undoubtedly some individual contestants found to their sorrow that their vehicles were not capable of

competing at such speeds, when they might have made a satisfactory run at a reasonable gait.

With three days' rain out of five, the hilly nature of the country and the bad state of the roads, the conditions under which the vehicles had to operate were considerably more severe than the average in touring. In pleasure touring the best and least hilly roads are usually selected, and such a tour is naturally discontinued in case of rainy weather. The defects brought out by the continued wet weather therefore stand out more prominently here than they would in ordinary touring. Among these is the unreliability of

THE JUMP SPARK IN WET WEATHER.

All the carriages equipped with this type of ignition gave a good deal of trouble during the last days of the contest, as might have been expected under the circumstances. It requires only the slightest conducting surface of moisture between the secondary leads of a high tension coil for the leakage to assume such proportions that the spark at the terminals fails to ignite, and it seems to be impossible to so perfectly insulate these leads that moisture will not reach them when the carriage is operated during successive days of rainy weather and on muddy roads. The trembler, too, when insufficiently protected, is likely to become short circuited through splashing mud or running water, and the advantage which in many cases has led to the adoption of the jump spark, viz., the location of the movable contacts outside the cylinder, instead of inside, becomes a disadvantage. This latter trouble, however, can be remedied.

WHEEL STEERING AND MUDDY ROADS.

As our report shows, during the last days of the run, when the roads were covered with a considerable depth of mud, quite a number of vehicles got out of their track, were run into the ditch, etc. It has been observed that among the vehicles which met with these incidents a large

majority were provided with wheel steering. One explanation of this fact is that large machines are naturally less easily handled, and that these are now usually steered by an inclined hand wheel. The point is of sufficient importance, however, to lead to a reconsideration of the relative merits of lever and wheel steering for touring vehicles on average American roads. High speed on hard, rough roads makes an irreversible steering gear necessary, which form of steering gear generally, though not necessarily, is operated by means of a hand wheel. When the roads are soft, there is less transmission of jerks and shocks from the wheels to the operating device in the driver's hand, and an irreversible mechanism in the gear is of less value. The direct acting steering lever arrangement has less backlash and can be operated quicker than a wheel steering device, and for this reason it would seem preferable to rely on a rational construction of the steering pivots to protect the operator's arm against vibrations transmitted from the steering wheels and to operate these wheels directly by a powerful (long) tiller, than to use the conventional irreversible wheel steering.

Public fancy has perhaps played a considerable role in the substitution of the hand wheel for the steering lever. This is a part with which the operator has continually to do, and he therefore feels himself competent to select the most suitable device, more so than in matters relating to the power equipment. The problem of devising a reliable and all around satisfactory steering arrangement is, however, as difficult as any connected with the motive power, and for some time to come, at least, the purchaser's fancy in this matter should stand behind the manufacturer's experience.

AMERICAN CONSTRUCTION BEST SUITED FOR AMERICAN ROADS.

Only five vehicles built by foreign manufacturers started in the contest, against seventy-five built in this country, but from their behavior and that of American machines built on French lines it is safe to deduce that for touring on American roads the characteristic American type of vehicle with low speed engine is the most suitable. Manufacturers naturally direct their efforts along lines indicated by the conditions with which they are surrounded, and as the road conditions are so different in France and America, progress in the two countries has followed different paths.

Just as much as our machines are unable to compete against the French in races on perfect highways, the French machines are unable to compete with American vehicles in an endurance test on rough and muddy roads.

The Hill Climbing Contest.

The results of the hill climbing contest afford considerable room for speculation. The length of the hill between controls was nearly one-half mile, and the average grade nearly 10 per cent. The steepest part of the grade measured 16.15 per cent. It might be expected that any touring vehicle carrying only its regular quota of passengers would be able to climb such a hill, provided the road surface was tolerably hard and no special difficulties were thrown in its way.

There were two factors which worked to reduce the showing made by the vehicles in this test. In the first place, most of them were loaded considerably beyond the load they normally carry, with spare parts and extra supplies, as may be seen by comparing the weights of some of the stock vehicles given in the list of entries with the weights given for these machines in the manufacturers' catalogues. Then the interval of starting was probably too short for the length of the hill and the narrow width of the road. The crowded condition of the road forced many of the vehicles to stop on some of the steepest parts, and, as is well known, a start from rest on a steep hill is a very difficult feat for a gasoline machine. The steam vehicles, as one of our correspondents pointed out, indirectly profited from this condition of affairs. A stop caused by the congestion of the road undoubtedly saved some of them a voluntary stop to raise steam.

The results are, of course, not at all unsatisfactory, but they may have the effect of putting a check to the unreasonable claims that are frequently made. Grades of 25 and 30 per cent. are frequently claimed to be within an automobile's climbing powers. These claims are as a rule not made with the intention to deceive, but are the result of inaccurate estimates of gradients. Sixteen per cent. is a very stiff grade, as those who took part in the contest will agree, and any vehicle that surmounted Nelson Hill satisfies all the hill climbing demands ordinarily made of a touring vehicle.

A hill climbing contest of this nature, it appears to us, is not entirely in keeping

with the programme of an endurance contest. What determines success in such a contest is the amount of power available at the wheel rims per unit of weight of the vehicle—a quantity which is also the most important factor in a racing vehicle. The racing vehicle has consequently the greatest chances of success in such a trial, and that only in Class C the prize was won by a racer is due to the fact that racers were entered only in this class. It is generally admitted that the entry of racers in endurance contests is to be discouraged, and one method of discouraging it is perhaps to either entirely drop the hill climbing contest or to alter the conditions to conform to those for the Endurance Run; that is, to fix a maximum time to be occupied in mounting the hill, and awarding all those who perform the feat within the time limit hill climbing certificates, regardless of the actual time.

It is really not easily seen why a special hill climbing test should be necessary when the run to Buffalo is almost one continuous hill climbing contest. The English 1,000 miles trial of last year comprised such a contest, and as this trial has apparently served as a basis in organizing the New York-Buffalo contest, the hill climbing contest has also been incorporated in the latter event. We notice that while the hill climbing contest has been retained in this year's reliability trials of the British Automobile Club, the awards will be made according to a formula including the price of the vehicle, the number of occupants, and the time consumed in climbing.

Horizontal vs. Vertical Motors.

The question is sometimes asked, Which is the best disposition of gasoline motors for automobiles, horizontal or vertical? Considering that in this country the horizontal motor is far in the lead and in Europe the vertical motor, it appears that there is no great advantage in favor of one or the other, and that preference for one or the other is mainly a question of taste. It is nevertheless interesting to compare the two forms of construction from the standpoints of compact arrangement, accessibility and vibration of the vehicle.

The form of motor employed depends to a great extent upon its location on the vehicle frame. Motors located in front of the carriage, under a bonnet, are in a large majority of cases vertical; when placed in the body of the vehicle they are nearly