MOTOR NOTES FOR MEDICAL MEN.

LESSONS OF THE LIGHT CAR TRIALS.

By H. MASSAC BUIST.

THE wet and windy weather experienced during most of the time the Royal Automobile Club's 1,010 miles six days light car trials were in progress in Yorkshire at the beginning of this month was a circumstance particularly suitable to testing and proving the degree to which these vehicles are practical machines in the manner in which they are being produced to-day. Having been through these trials, as well as the small car trials at Hereford in 1904, which are the only sort at all comparable with this year's effort, I was able to appreciate that not only has the distance of the daily runs been 50 per cent. greater throughout the week, but the hills and the descents have besides been at least three times as severe on the cars as the conditions provided at Hereford. In the attempt to compare results, therefore, we must have in mind that the factor of price is about the only thing that can be considered as common to the two cases, for the speeds have been greater, the routes more difficult and often heavy by reason of the wet, and the total amount of climbing, also braking work in the descents, has been very much more than in the case of the small car trials, as they were called ten years ago.

SUCCESS UNDER COMPARATIVELY SEVERE CONDITIONS.

The competition this month, of course, represents the initial one of its kind in Britain. As 80 per cent. of the competing vehicles were made at home, it is remarkable to observe that no fewer than nine of the thirty-two starters have been granted gold medals by the Royal Automobile Club for having made non-stop runs throughout the period of the test, while two-thirds of the total number of starters completed the whole stage, several of those that failed to score non-stops throughout having no worse mark against them than changing sparking plugs that had become foul, as, for example, one of the two Hillman machines, which stopped for a total of one and three-quarters minutes during the whole week for a sparking plug to be changed, and thereby lost a gold medal.

It is particularly important to bring out the point that the results of these trials should be read in detail, in that so slight a thing can spoil one competitor's non-stop run, whereas other competitors might lose a total running into hours' delay in the course of the week's tour and still be able to finish in time. In point of fact no competitor did spend a lengthy time over any repairs in the course of the whole week's tour, while the club's rigid rule that the machines had to run in the daily stages to average between 17 and 19 miles an hour, including the hill climbs, resulted in the cars collectively running more absolutely up to time than I have ever known in the case of any reliability trials for large machines. It was necessary to go over the routes to appreciate the stiffness of the climbs, the heavy nature of many of the surfaces, the strength of the driving wind and rain, and the other conditions, to realize that this average meant that the cars could not be spared from start to finish. Though the arrangements in connexion with the timed hill climbs were admirable, in that the competitors were never halted, but ran straight through as though touring in the ordinary way, nevertheless, in the touring nearly every day there was such an amount of hill climbing work that the low gears were constantly in service, while the tortuous and slippery nature of many of the descents required them to be negotiated in very cautious fashion.

TWO WAYS OF MAKING THE TOURS.

The club is unable to return the speeds on the timed hills in terms of miles an hour. But those who witnessed the climbs cannot have failed to come away with the impression that there was a vast difference in the strains to which the various machines were submitted in the course of the tour. This can in some measure be appreciated by studying the intervals of time between the performances of the various cars on the hills. Some of them—like the Swift, which achieved the remarkable record of sending through the only team of three cars

that finished without a single mark against any one of the machines—climbed the hills comparatively slowly, but always without any hesitation and with the full load. On the other hand, there were machines—such as, notably, the Singer and the A.C.—that climbed the hills at a racing pace, revealing a turn of speed that was quite astonishing, and which represented submitting the mechanism to very severe strains. Two points stand out in connexion with the hill climbing. The first is that, as the trial was worked from a fixed centre, Harrogate, whence the routes were mapped out in radial fashion, there was no necessity for those engaged in the tests to take their luggage with them every day. Therefore each car carried merely its driver and the club's official observer, the weight of the two men being brought to a minimum, so that an average was struck.

SOME CARS GEARED TOO HIGH FOR HILL-CLIMBING.

Nevertheless, though in this single particular the machines were running somewhat lighter than the ordinary owner might find necessary, certain of the cars failed to climb several of the hills with two men aboard and had to shed the passenger, particularly on the two ascents of Sutton Bank and Brownstay Ridge. This is to be accounted for, not because there were insufficient numbers of gears—the trials in general proved quite conclusively that three forward speeds is quite enough for these light cars, even in hilly districts—but because they were geared far too high for work in the average conditions which light cars are needed to fulfil in this country. The little Peugeot—one of the lightest cars, as well as that with the smallest engine in the trials—was notably unequal to taking all the hills without shedding its passenger. I noticed that on the steepest part of Sutton Bank on the opening day it shed not only its passenger, but also its driver, who walked beside it while it kept going. No machine that calls on those who use it to walk in the very circumstances in which the saving of human energy is most appreciated can nowadays be called really practical for the medical man. One of the chief results of these trials, therefore, will be to cause manufacturers to pay less attention to making striking performances on the flat and more to rendering their vehicles practical touring machines and suitable for the daily needs of medical men and others resident in hilly districts. In the past many manufacturers have not taken their machines over a sufficiently wide variety of routes when testing the initial examples of each type, for factories are rarely in the near neighbourhood of hills, while the desire to make use of speed competitions as a means of drawing attention to the given make has added another temptation to shirk the real business of gearing light cars for touring work.

THE BEST AVERAGE CLASS.

Even so, the majority of the vehicles engaged proved equal to taking the hills, as instance notably the Morgan-Alder in the dearest class, which did not show up conspicuously on them in point of making rapid ascents, but which appeared always to have an ample margin in reserve. The best average class was undoubtedly that for machines costing between 175 and 200 guineas, as instance not only the very fine performance of the two Singers that finished and of the third of that make that fell out through the breaking of a valve spring (no spare being carried, else it would have been possible to remedy the trouble in a quarter of an hour or less), but also the two Hillman cars, the A.C., and the Standard, the last-named running as though by clockwork from start to finish of the trial. In the cheapest class of all, the notable performance of the two-cylinder Swift team has already been referred to, and merits additional attention by reason of the remarkable consistency of behaviour of each of the three vehicles in the team. This was the finest example of standardization in manufacturing and in obtaining uniform powers of performance furnished by the trials. At the summit of Brownstay Ridge I saw the little Swifts coming up steadily, each slightly boiling, but no one to a greater extent than its companions. Throughout the trials, in fact, they did everything alike. Further, in face of the very difficult conditions under which that climb was made, of its great length, of the wind being a following one, of the wet and heavy nature of the roads, and of the slippery

take-off, it is not remarkable that they boiled in a manner so slight as to be of no account, but that they did not seriously overheat.

THE QUESTION OF OVERHEATING ON THE HILLS.

In point of fact, among the cars in general comparatively very few did overheat. Yet it would have been scarcely surprising if 50 per cent. of them had developed trouble of that sort. About 20 per cent. showed comparatively defective cooling and lost water. But in the case of those machines that came through with non-stop runs, it was remarkable that none of the conditions they encountered appeared to affect their conduct adversely in any way, the gold medals being secured by the three gear-driven Swifts and one of the friction-driven, two-cylinder G.W.K. machines in the class for cars costing not more than 150 guineas in the condition in which they competed in the trial; by two Singers, one Hillman, and the Standard in the class costing between 175 and 200 guineas complete; and by the Salmon in the class costing between 150 and 175 guineas, it being noteworthy that none of the machines costing over 200 guineas succeeded in making a non-stop run. Apart from the three Swift cars, the Standard, and the Salmon—each of which makes were represented by one example only—alone provided instances of firms all of whose products were successful.

LOOSE JOINTS AND CONNEXIONS CAUSE FAILURES.

A considerable amount of looseness of joints and connexions appeared to be occasioned by travelling over the rough road surfaces, and this was a frequent cause of loss of marks through involuntary stoppages. It is interesting to observe that all the machines had gear-boxes either separated from or incorporated with the back axle, save three, of which the two G.W.K. cars, that were driven by friction disc contact, caused no trouble at all, whereas on three days the friction drive of the Pilot car had to be adjusted, and that machine failed to climb Sutton Bank on the Saturday without dropping its passenger. Choked jets, punctured carburetter floats, the opening of radiator drain taps with resultant loss of water, looseness of the clutch couplings, over-heating of the engine, sooting-up of the plugs, broken valve springs, choked oil pipes, two cases of gear trouble and one of internal shorting in the magneto, constitute the story of the causes of either temporary or final failure experienced in the course of the trials; there were besides two sister machines the leather couplings of both of which failed at an early stage on the first morning's run, putting the cars out of the competition right away. In some cases it would seem that foul plugs were caused from defectiveness of design.

THE MATERIAL SUBMITTED TO TRIAL.

The thirty-two starters represented twenty-two different makes of light cars, half a dozen of which makes had two-cylinder motors, and the remaining sixteen four-cylinder engines. The volume ranged between 855 c.cm. in the case of the four-cylinder Baby Peugeot, to 1,357 c.cm. in the case of the Hillman. Of the cars equipped with gear-boxes, only one had four forward speeds, the rest having three, of which one had a final drive by chain to the road wheels. Twelve employed a bevel gear live axle, and half a dozen a worm-driven back axle.

Undoubtedly, in too many cases looseness of connexions and parts proved a weak point of these cars when driven over country roads of this sort for the distance in question, it being observable that certain other examples of light cars not officially engaged in the trials ran through them without developing looseness of any part. Under this head two points fall to be observed. The first is that, while not representing the easiest touring conditions possible to discover in these islands, nevertheless from start to finish there were no freak road surfaces or hills in the routes selected, which were such as the average user has a right to expect his vehicle to carry him over without trouble. Indeed, throughout the week we encountered locally light car owners touring all about these parts as a matter of course on their daily vocations. The other point is that the medical man acquiring any one of the light cars which went through this 1,000 miles run without falter would, nevertheless, be foolish to treat it with that comparative neglect which necessarily results from a condition of competition in which the organizing body

endeavours to obtain full information as to precisely how much attention each vehicle engaged requires in the course of journeying through the trials.

PUTTING A PREMIUM ON HARDIHOOD.

Thus, though I have never known vehicles finish in finer fettle than those that came right through the trials, nevertheless there were examples here and there of machines that were very squeaky, and which had been in that condition for two days and more. When starting in the morning, too, one could discover from the struggles which some of the drivers had to get these miniature engines going that a little attention—which in a test of this sort would cause loss of marks because it is precisely these points which trials of this sort aim at bringing out—would have obviated all the stiffness. These tests, in fact, are the natural antidote to the motor salesman's statements of how machines merely need to have petrol and oil poured into their reservoirs and can then be driven indefinitely. The stitch in time principle of glancing over the car each morning and spending two or three minutes doing any little job that seems needed is what any of the competitors would have acted on had they not known that such attentions would have been recorded against them. Therefore their sole endeavour was each man to get his car through in comparatively neglected condition, though it is noteworthy that certain of the vehicles went through the tour none the worse for that treatment, the trial conditions therefore rightly putting a premium on hardihood. Thus next year it may be taken for granted that in the test in the Highlands in Scotland, that has already been planned for light cars, there will be at least a couple of score, if not over 100 starters, and it will be surprising if any of the makes that have been represented in Yorkshire this month fail on account of developing looseness of joints and connexions, such as has been comparatively a frequent cause of failure in the recent trials, and such as marks a car as unsuitable for doctors' use.

TYRES MUCH MORE RELIABLE.

Quite the most remarkable feature of the trials has been the immunity of machines from tyre troubles. As has been indicated already, the surfaces were by no means favourable, and, of course, cars that made the most prominent showing were not spared in the least when climbing the hills. The conditions allowed each competitor a total of half an hour during the thousand odd miles tour for paying attention to tyres, the returns being set out on a separate sheet each day. Less than half a dozen of the thirty-two starters gave any attention to tyres, few of them spent more than a dozen minutes on the business, and only one had occasion to exceed the half-hour allowed, and that by a margin of fourteen minutes only. This is particularly interesting in face of the fact that one of the troubles of light cars has undoubtedly been, and is supposed still to consist of insufficient adhesion of the driven rear wheels, with the result that comparative extravagance of tyre wear should be occasioned by the grinding away of the rubber and fabric due to slip. It was notable, therefore, that on Brownstay Ridge, which was the second most difficult hill climbed, and probably equal to the worst by reason of the weather conditions obtaining at the time, a large and powerful six-cylinder car used by the officials proved more difficult to keep going on those treacherous surfaces than did the little machines, which time and again in the course of the hill climbs in wet weather went over stretches of greasy surface and runnels across the route without any apparent difficulty. It would appear, therefore, that on the average the makers represented in the test have been giving more attention to the question of weight distribution than they have so far been accorded credit for.

WEIGHT, ENGINE SIZE, AND POWERS OF PERFORMANCE.

As to the weights of the cars in the order in which they ran, the competition fixed the limit at 1,500 lb., which is certainly a sufficiently generous allowance for the light car if we are going to evolve a new style of vehicle under that name. In the dearest class all four machines that started were close up to that limit, whereas in the class for machines costing not more than 150 guineas complete as run in the trials, with the single exception of the Pilot, the cars scaled only a few pounds more than 1,000 apiece,

one of them, the Warne, being only 908 lb. The Singer cars in the 175 to 200 guineas class ran at about 1,250 lb. weight each, the Hillmans averaged 1,463 lb. each, the Standard 1,424 lb., and the A.C. 1,244 lb., the Charronette being 1,204 lb. There is thus a considerable difference between the weights generally estimated for light cars and their actual running weights. We may take it, however, that the quest for efficiency will soon result in a considerable average reduction in the weight of the light cars marketed.

As to engine volume, the rules allowed this to be anything up to 1,400 c.cm., advantage of which was taken only by machines of the most expensive class. These were either up to or very near the limit, though this was not the class that came out most conspicuously on the hills. In the class costing less than 200 guineas, the Hillman vehicles had a volume of 1,357 c.cm., the A.C. 1,327 c.cm., the Singer 1,096 c.cm., and the Standard 1,088 c.cm. These volumes and the car weights have to be considered in conjunction with the hill-climbing performances to arrive at an estimate of relative merit, a remark which also applies to the important question of fuel consumption.

EXTREMES OF FUEL CONSUMPTION.

Here the figures are particularly interesting, though returns have been made only in the case of the machines which completed the last day's stage, when the sufficiently formidable climb up Sutton Bank had to be made while snow was falling on the summit. The Gordon car in the cheapest class did 53.98 miles to the gallon, and made third fastest time on the hill in its class; while the G.W.K., which made the fastest time in that class, did 36.17 miles to the gallon. The fastest time up Sutton Bank, irrespective of class, was made by the Singer driven by Rollason, which did a petrol consumption of 35.74 miles to the gallon. That is quite a remarkable performance when it is had in mind that this vehicle developed the speed of a racer, and of course the Claudel-Hobson carburetter was not readjusted. It would be an easy thing to do a fast hill-climb, then adjust your carburetter and do an economical petrol consumption. Again, it is comparatively easy to climb hills in leisurely fashion and do an economical consumption.

Altogether the petrol consumption returns come somewhat in the nature of a surprise, for whereas the traditional 40 miles to the gallon is exceeded by an astonishing margin in the single case of the Gordon car, and is easily confirmed by the three Swift machines, which did respectively 43.36, 40.82, and 38.78 miles to the gallon, the other cars were all distinctly below that figure which popular imagination seems to have seized on as the standard of consumption by which light car performances are to be judged. Thus in the cheapest class the friction driven Pilot's performance worked out at 25.49 miles to the gallon, the Arden's at 31.03 miles; while in the second class, costing not more than 175 guineas, the Alldays did 27.16 miles, the Salmon 29.39 miles, the A.C. 34.03 miles, and the Baby Peugeot 34.07 miles to the gallon. In the dearest class, costing over 200 guineas, the La Ponette did 22.98 and the Morgan-Adler 34.03 miles to the gallon. Lastly, in the class for cars costing between 175 and 200 guineas, the Hillmans did respectively 26.85 and 26.84 miles to the gallon, the Singers 35.74 and 34.80 miles to the gallon, the Standard 31.41, the A.C. 30.23, and the Charronette 27.56 miles to the gallon.

SOME GENERAL CONCLUSIONS.

Those are all the figures returned. It will be seen that the average reveals the light car to consume considerably more fuel than is generally supposed when driven up hill and down dale across country. In one or two cases the consumptions are as heavy as those of ordinary medium size cars weighing a ton or more apiece, and in other examples where the consumption is proportionately high no equivalent hill climbing ability was revealed. It would seem, therefore, that while the average of reliability revealed in this first important light car trial is exceedingly satisfactory in face of the comparatively early phase of this movement, nevertheless several of the vehicles are built heavier than the ordinary idea of a light car, and too many of them are unduly extravagant of fuel.

Not the least satisfactory feature of the trials was that a quarter of an hour was allowed during the week for

adjusting brakes for wear. Use was made of these conditions in fewer than half a dozen cases, and in none of them was the time used up. The manner of making returns under this head was somewhat confusing, in that in some cases the time was multiplied by five, owing to the figure being carried forward column by column every day, so that it appeared as though adjustments were carried out each day to the extent specified, and not once or twice only.

TEN YEARS' ADVANCE.

In considering the results of the trials in general as indicating development in motor manufacturing, one may recall that £200 represented approximately the limit of the vehicles engaged in the small car trials at Hereford in 1904, and for all practical purposes 200 guineas is the limit of price of machines that made any notable showing in the light car trials at Harrogate this month. At Hereford, ten years ago, the most consistent performers were one-cylinder machines of about 6 actual horse-power, capable of travelling more or less coarsely along the level at from 22 to 26 miles an hour, and of ascending hills of any appreciable gradient at a good walking pace, in which connexion there were certain walking-pace hill climbers in evidence at Harrogate this year. But for the most part the recent trials have shown that three times the power is being provided for the money; that not less than two cylinders, and mostly four, are being used, with consequent great gain of refinement; and that the speed powers alike on the level and on the hills have been enormously increased, which incidentally puts the whole mechanism of the vehicle under test to vastly severer strains, including, notably, vibrations sustained by the steering connexions, and so forth.

We must still consider that in the main the machines under review represent merely the beginnings of the latter-day movement for the production of light cars. They show that the industry has started on sound lines, and is capable of things that are really great in proportion to the age of the movement, for these have not been easy trials, but really practical ones. The speed powers of the machines are in many cases out and away beyond what any one had imagined practicable; the economy of running does not appear to be greater or less than well-informed professional estimates made before the trials; and the net result is to prove that there are on the market to-day light cars quite suitable for the needs of the medical man, provided he will look after his machine and always pursue the policy of effecting that stitch in time which saves nine.

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SECTION OF OBSTETRICS AND GYNAECOLOGY.

In his presidential address Sir DAVID HARDIE, after some introductory observations on the word "gynaecology," which should, he considered, be understood to include all specially female disorders, and not only pelvic disease, dwelt on the recent changes of practice in the treatment of retro-displacements. Twenty years ago and less, pessaries were numerous; to-day they were conspicuous by their rarity, but to-morrow it would probably be thought that they had their use in certain cases. For retro-deviation in early pregnancy postural treatment was preferable to pessaries, but if retrodisplacement existed before pregnancy it was advisable to apply a "Hodge" during the puerperium, before the heavy fundus had fallen back. The postural treatment, where the patient was placed alternately in the right and then in the left semi-prone posture, was rational but hard to carry out in practice, and ought to be supplanted after the third week by the application of a pessary. As retroposition began about a fortnight after delivery, a routine examination of the pelvis was desirable then rather than later. Speaking of the subject of gonorrhoea, Sir D. Hardie said that the prevalence of tubal gonococcal infection was sufficient proof that the treatment of gonorrhoea was highly unsatisfactory, nor could it be otherwise until begun at an early stage and vigorously carried out. In view of obvious difficulties, supplementary treatment by autogenous vaccine should be specially applicable for women. Medical treatment would no doubt replace surgical at no distant