Discussion.

Mr. FRANK SAUNDERS, in moving a vote of thanks to the Author, expressed regret that he had not arranged for his paper to cover "more ground." Mr. Boult had given them some excellent hints as to how a motor vehicle should be handled, etc., but he had neglected the question of what—in his opinion—would represent the ideal commercial motor.

Quite a lot of interesing matter for discussion could be found in such items as carburettors, ignition systems, engine design generally, transmission gears, &c., &c., whilst the question of the accessibility of all working parts should also be given a prominent place.

Mr. Boult stated that the greater part of the trouble experienced with Commercial Motors was due largely to overloading, but he (the speaker) did not find himself in accord with that opinion, as he believed that faulty design was more often to blame than anything else.

Many of the Engines fitted to the so-called Commercial Motors that were on the market to-day, were practically identical with those fitted to the average pleasure car, and as other parts of the outfit were built in proportion, the vehicle as a whole failed entirely to stand up to what the owners required of it.

The speaker had not had an opportunity of going very deeply into the question of Commercial Motors, but he had always held the opinion that the successful vehicle of the future would be found in one possessing an Engine more of the heavy duty, slow speed type, with accessories built in proportion.

Possibly his experience with Commercial Marine Motors would largely account for this opinion, as he

had found that Engines of this type could be fitted to run continuously for several days and nights, without giving any trouble whatsoever, even when placed in the hands of inexperienced operators. Within his own knowledge there were hundreds of this type of engine handled by native boys in the South Sea Islands, with remarkable success.

The Marine Engine was called upon for a full load, and very often—owing to bad weather— the course traversed was as rough as it could possibly be, and whilst the conditions on land were not altogether identical with those at sea, still there was a certain affinity, which would justify one in coming to a decision that a type of engine or motor that was known to give good results in the one sphere, might reasonably be expected to do so in the other.

Referring to the question of fuel, Mr. Saunders believed that it was only a matter of a short time when 75 per cent. of the Motor Vehicles which now used petrol or benzine, would be compelled to adopt the heavier oils, such as commercial kerosene. He could not see any great difficulty whatsoever in the way of adapting the average petrol engine for the use of kerosene, and in this connection he had recently come across a device, which while simple in design was very effective in operation.

It consisted of a vaporiser placed on the exhaust pipe, and the kerosene was drawn through an inner chamber and brought into intimate contact with heat accumulating elements, which immediately vaporised the fuel.

The design of the vaporiser was such that only a minimum quantity of air was passed through it, and that at a very low velocity the charge was brought up to the right quality by an automatic air valve in close proximity to the throttle valve of the engine. By this means it was possible to take a charge into the cylinders at a low

temperature, consequently there was no falling off in power of the engine whilst running on kerosene.

A number of these vaporisers had been fitted to Commercial Motors and pleasure cars in England, and a 4000 mile run with a car so fitted gave excellent results, whilst the engine on completion of the test was found to be as clean as when it was running on the higher priced fuel.

Another advantage possessed by the vaporiser referred to was, that it retained sufficient heat to permit of the engine being started on kerosene after a stoppage of several minutes.

He would like to have heard an expression of opinion from Mr. Boult as to the value of iron tyres as compared with rubber ones. He could see no reason why, with the heavier motor lorries, iron tyres should not give satisfaction, although he realised that there would necessarily be more vibration than whilst running on wheels shod with rubber. He had tested a 3 ton lorry fitted with iron tyres—carrying a load of nearly 4 tons on the Botany Road—when the same was ankle deep in slush and mud, and the results were in every way satisfactory.

In conclusion, he would say that, whilst Members of the Association did not, of course, always find themselves in accord with the ideas expressed in the papers read before them, they fully realised that the time devoted to such deserved their grateful thanks, and he had pleasure, therefore, in moving accordingly.

Mr. W. H. GRIEVE, in seconding the vote of thanks to Mr. Boult for his interesting and instructive paper, said that the cost of petrol had been mentioned. Only a comparatively few years ago, and before the introduction of the automobile engine, petrol was a waste product and treated as such.

He was afraid that when the oil Companies found that kerosene was taking the place of petrol they would adjust the price accordingly.

He thought that as the size of the motor lorry increased some system of petrol electric power transmission would have to be adopted.

One of the large Motor 'Bus Co.'s in London were, he understood, experimenting with this system with very satisfactory results. In the system under consideration —Thomas Transmission—a dynamo was driven by the engine which supplied power to a motor. The control was very gentle and extremely variable; at full power the whole of the electrical gear was thrown out of commission, and a direct mechanical drive adopted. It seemed impossible to go on increasing indefinitely the power that could be transmitted in motor lorries by the means that had proved quite satisfactory in ordinary motor cars. A system which had proved so successful in lighter work would not, and could not, to his way of thinking, be extended ad lib.

He would like to hear the author's opinion about this type of transmission.

Mr. PETER MCINTOSH (Visitor) said that there was no doubt in his mind that steam was fast losing ground against petrol, more especially where speed to a moderate degree was required, and in these days of hustle, time meant money in nearly every following. For traction of from six to twenty miles per hour, steam had no chance of competing, as the great extra weight that was necessary on account of the boiler, water and fuel, put it out of the running beyond doubt. In America and Europe there were a number of steam wagons still running, and they had done good work where slow traction and trailers suited. But a keen observer would at once notice that the wagons in use were from four to ten years old,

and where additions were made to plants, petrol was installed in nearly every case, because petrol wagons did the same work quicker, and at a less ton rate per mile, than steam.

In Canada and the U.S.A., where large tracts of farming land were ploughed yearly, some exhaustive trials had been made with oil pull tractors, against steam, and in almost every case petrol had won in all respects, and there was no class of work more trying on hauling capacity than ploughing, as it was a dead pull all the time.

The only case in which steam could be considered with any chance of possible success, would be where the roads were so bad that more than four or six miles per hour could not be travelled, and the duty was such that one or two trailers could be drawn, and where water and fuel were easily obtained.

A petrol engine would do everything that a steam engine could, excepting perhaps pull a trailer out of a bog, and this could be overcome by the use of a winding gear placed on the petrol wagon, which would be much lighter than steam, and only a small cost, say £30 to £50, at most. This could be constructed to haul anything within reason, and even pull itself out of a bog, or lift its load on and off.

Petrol wagons could be used to advantage in all possible places where horses could do the work; where the roads had a hard and passable surface, and where they could be kept running. Any distance from one mile up to 100 could be done cheaper by petrol traction than by horses, providing that loading and unloading could be done quickly on short trips. It did not pay for any vehicle to stand about for hours for the chance to load or unload. They paid only by keeping them going fairly continuously. Carter Patterson and Co., of London, who were the largest carriers in the world, and who

had all kinds of haulage to deal with, were using nearly 200 "Leyland" Wagons, mostly of the three-ton size, and run them up to 100 miles from the depot. They had proved that they could shift stuff, and make deliveries, cheaper and to more advantage, with petrol traction, than any other way,—in many cases they had beaten the Railways in both cost and time. From London to Margate, a distance of about seventy-four (74) miles, a three-ton waggon did the trip there and back—148 miles each day—and the work was being done cheaper and quicker than by rail, as there was no loss of time shifting and waiting at Railway Stations. This Company had proved that petrol wagons could do every class of work cheaper than horses, or most other means, where they could be kept running with small loss of time.

Motor 'Buses in England had displaced some 30,000 horses. Taxi-cabs had displaced nearly 10,000 horses, and at a profit to the owners and users, to the former by saving money, and to the latter by time-saving. This estimate did not include the many thousands that had been displaced from Municipal Services, the Army and Navy, stores and equipment, general carrying, and other transit services, as well as private carriages. He would say that upwards of 50,000 horses had been displaced by motor traction, within the last ten years in England alone, and at a profit all the time. He would repeat that this did not take into account Europe, America, and other parts of the world, where enormous strides had been made by motors of all classes.

He agreed with the Author that, unfortunately, in this country they were suffering through want of knowledge in the care and treatment of waggons. It was a remarkable statement to make, but nevertheless true, that many men would pay from £500 to £1000 for a motor waggon, and would put a gardener, or a knock-about

man, to look after it, and in some cases to drive it. No other class of machinery was treated in this manner, notwithstanding the fact that the motor vehicle had the worst possible conditions to face. When the average man bought any other machinery, he would see that it was set properly, and got into thorough working condition, and he would not dream of letting anyone near it, unless he was an engineer, or at least an experienced man. But the poor motor vehicle had to take all comers to look after it,—travel over all sorts of roads,—twisted and turned,—up and down hills, sidings, holes and gutters,—run dirty with sand, mud, and water, getting into its bearings and joints,—suffer overloading, overdriving, and overrunning, overheating and racing of engine; in fact, every abuse that it was possible to think of. If it did not come through all these ordeals, it was discarded in many cases without consideration of the abuse it had met with.

The vibration caused by fast driving over bad roads was fatal to waggons, more especially those of heavy capacity. Therefore it should be avoided, 10,000 miles in Australia, with fast driving, would take more out of a waggon than 25,000 miles in England at the same pace. Any good waggon should do 100,000 miles and have something left in it after, with good attention and care.

Although the Author had not dealt very fully with the matter of construction, he (the speaker) thought that for Australian conditions, quite a large number of special features were required. Stronger axles, frames, brakes, and wheels were necessary, and greater engine cooling capacity. Also larger engines with governors, and lower gearing, four speeds forward, dual ignition, two entire separate installations, wooden wheels should not be thought of in a climate like that of Australia, tyres should at least be one size larger in section than used in

England. Suppose a 2 ton waggon in England had 4in. tyres, here they should be at least 4¼in., and better 4½in. Wheels should be of steel, not less than 36in. diameter for 2 tons, and 40in. for 3, 4, and 5 tons; this was for driving wheels. Extra large petrol tanks, and auxiliary water tank connected with radiator to insure a cool engine in this hot climate. A live axle was preferable, if properly constructed; it had fewer wearing parts, and was a safer job in every respect than chains and sprocket wheels. Worm drive or crown and pinion were desirable up to the 2 ton size, over this size a crown and pinion with intermediate wheels were best. Grease cups instead of oil caps on all small wearing parts, such as springs, steering gear, brakes, etc. In a hot climate, grease was better than oil, as it would not run out. He did not recommend steel tyres at all for any speed beyond four miles per hour, as the upkeep was greater than the tyre bill for faster travelling. This had been proved beyond doubt, as with steel tyres the vibration was too great for the machinery. Slow, careful driving over bad roads saved a lot of money and trouble. Pivoted front axles were the best.

In his opinion the most profitable waggons for general purposes were 2, 3, and 4-tonners. For long distances and heavy loads, 5 and 6-tonners were advantageous in most cases, and of course for light delivery, all sizes from ½ to 2-tonners were useful, according to the nature of the business and requirements.

He considered that nearly all engines gave good service. He had never seen one worn out yet. In the transmission was where the trouble nearly always arose, and it was mostly brought about by one of three things, want of knowledge and care in driving, overloading, or fast driving over bad roads, the last of which was the worst of the three.

The writer had gained much experience in the handling of heavy goods. Last year he had visited every country in the world where motor vehicles were built to any extent, and had visited all the important factories. He had gone deeply into the results obtained in all countries where motor traction was used extensively, and after all this he had come to the conclusion that petrol waggons were the most satisfactory, practical, and cheapest means of dealing with heavy transit, that the world had up to the present time produced. All that was required to make them successful, was reasonable care and intelligence in the operating of them; and to purchase the right vehicle for the work required of it. Too often "a pony was bought to do a horse's work," and the result was failure. It was far better to go to some decent man who had had practical experience, ask his advice, purchase his machine, and ask him to back it to do what he had promised, carry out his instructions, and failure would not follow.

Mr. T. D. CHAPMAN (Visitor) remarked that as he was the pioneer of Commercial Motors in the State of N.S.W. he had listened with considerable interest to the Author's paper, and also to the remarks made by the several other speakers following him.

Idealism was, of course, responsible for the origination of many designs, but in the construction of the motor vehicle, as in many things, it was impossible for the designer to foresee how his plan would turn out in actual practice, no matter what his engineering gifts might be, because of the many elements which tended to make the matter one in which actual trial alone could be the means of ensuring success. Idealism, in so far as the Commercial Motor was concerned, had too often been a very expensive matter for many motor engineers. It was better to leave it to the designer and