Many riders who have adopted the nickelled rim in connection with the rim brake, complain of the rust which follows when the nickel has worn off. A good plan is to keep the rims slightly greased, which not only prevents the rust forming, but makes the action of the brake easier.

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The committee of the World's Championships for 1905 are, according to "Cycling" (England), already commencing to make arrangements for the classic events. This year they will be held much earlier, the dates fixed being July 16, 21, and 23, the venue selected being the Zurenbork track at Antwerp. The 21st is the National Fete Day in Belgium, and the other two dates being Sunday the receipts promise to be good. It is very probable that, contrary to the usual custom, the heats, semi-finals, and final of the professional sprint championship will all be decided the same day, namely, July 21, which falls on a Friday. This alteration is in order to allow Major Taylor to compete, as it is well known that he never races on the Sabbath. With the probability of a meeting between Kramer, Lawson, Fenn, Major Taylor, Mayer, Ellegaard, Rutt, etc., the title of world's champion in 1905 will be a very deserving one.

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A writer in a London paper says he has been informed on the best authority that "Major" Taylor and Frank Kramer are each to receive the handsome sum of 5000 francs (£200) for their match race at the Parc des Prince track, Paris, on June 1. This speaks well for the state of professional cycle racing in Paris; in fact, the coming year throughout Europe promises to be an exceptionally brilliant one. Many of the best amateurs are turning professional, in fact, Germany has said good-bye to amateurism altogether, the rulers claiming that there is little distinction between "pot hunters" and "pros."

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The New South Wales Championship, one mile, was won on Monday evening by Megson, by inches from Horder. It was a very close thing, and the decision of the judges did not meet with approval from the crowd. The men eligible to start were Goodson, Megson, Brook, and Horder. In the first round Horder was on the pacers' wheel, with Megson second, Goodson third, and Brook last. At the bell the pace quickened until opposite the scoring board, when Horder made a burst away, with Brook almost level, while Megson on the inside looked to be pocketed. Rounding the last turn a desperate effort by Horder got him a length ahead, but Megson, coming up strongly, gradually lessened the distance, and both crossed the line apparently together, though Megson got the verdict by inches.

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The final of the big "Sydney Thousand" Wheel Race was decided on Monday night on the Sydney Cricket Ground. The race was a very fine one, the winner turning up in the Victorian rider, W. Lear, who was on the 140yds mark. The Sydney cyclist, Horder (90yds) was only a few inches away, while the Danish rider, T. Ellegaard (scratch) who finished very fast, was a bare length off, third. The time was 1min 56 1-5sec, which was frequently beaten in the qualifying heats. Some 30,000 people attended to witness the race.

The Motorist.

(By "Petrol.")

MAKING A MOTOR.

Now that motor cars are becoming so popular, a short description of the method of developing the power and delivering it to the road wheels should be of interest to the public. I have, therefore, endeavoured, in as few words as possible, to indicate the general principles which apply to the engine and gears of most motor cars.

The average motor car will do an ordinary day's journey of 120 miles, without refilling either the water or petrol tanks, though by carrying spare petrol very much larger journeys may be accomplished in a day. Some cars are driven by electricity or steam, but by far the most popular and most successful is the petrol-driven car, owing to its greater efficiency and range, and to the ease with which its control may be mastered, many people only requiring one or two lessons to enable them to drive successfully.

Experience gained by the expenditure of a large amount of money, both in experiments and manufacture, has led to the almost exclusive adoption of the petrol motor working on the Otto cycle principle. These motors are merely commercial gas engines. They certainly run much faster, the object of the higher speed being to obtain the greatest possible amount of power for the least possible weight. Care is, of course, taken that the requisite amount of metal is used in the construction of the cylinders, to insure against bursting. Such a thing is practically unknown to the petrol engine, and in this respect, as well as in the ease of manipulation and simplicity, the up-to-date petrol engine leaves its old rival, the steam engine (with its necessary boiler) a long way in the rear. The question often addressed to the motorist by the uninitiated spectator, "Will she blow up?" may, therefore, be answered with an emphatic "No!" For the benefit of those to whom the working of the petrol engine is unknown, I will briefly describe the Otto cycle as follows:—

This cycle consists of four periods, viz., 1.—The induction stroke, during which the charge of gas is drawn into cylinder by the downward stroke of the piston. 2.—The compression stroke, during which the charge is compressed by the upward stroke of the piston. 3.—The working stroke, during which the charge is fired, and the piston driven downward by the force of the explosion. 4.—The exhaust stroke, during which the burnt gases are discharged through the exhaust valve. These four strokes comprise two complete revolutions of the crank shaft.

From the above it will be understood that, to enable the charge to be drawn into the cylinder, and afterwards compressed, some description of the inlet valve must be provided. This inlet valve usually takes one of two forms, viz., the automatic or the mechanically operated. The former is held up to its seat by a light spring, the pressure of which is overcome by the vacuum created in the cycle on the downward induction stroke of the piston. The mechanically operated inlet valve is operated by means of a cam, driven at half the speed of the engine. The opening and closing of this class of inlet valve is, therefore, independent of the vacuum created in the cylinder, and may be timed to take place at the same point during every induction stroke. The exhaust valve is in all cases mechanically operated by a cam, also driven at half the speed of the engine.

The successful working of the engine is largely dependent on the proper proportions of gas and air being obtained. Although this proportion may vary largely, and the engine still run, yet the nearer the approach to the correct proportion the greater will be the efficiency of the engine, and the greater power will it develop with the least expenditure of petrol. A carburetter is provided for the purpose of forming the gas. It usually consists of two chambers, one containing a float-controlled valve, which maintains the petrol at a constant level in the other, or spraying chamber. The explosive charge is formed in this chamber by the air being drawn past a nozzle through which the petrol sprays. The charge having been compressed in the cylinder is fired by means of an electric spark, for which purpose sparking-plugs are provided. This spark may be produced in several ways. The method most usually adopted is by means of a storage battery and induction coil, though both low and high tension magnetos are coming somewhat into use. The spark is caused to take place at the correct moment by means of a commutator, which completes the electric current at the moment when the spark is required. This commutator is capable of movement, so that the spark may be made to take place earlier or later, as required. In all motor cars it is the universal practice to water-jacket the engine. A small quantity of water is carried for this purpose, being kept cool by circulating through a radiator having a large surface exposed to the air.

The power having been developed by the engine, it is necessary to transmit it by some means to the road wheels. A friction clutch, operated by a foot pedal, is provided, so that the engine may be disconnected from the transmission gear with rapidity and ease by merely depressing the foot-pedal. The friction clutch is connected with the primary shaft in the gear-box, and by means of a train of gear-wheels, the teeth of which slide into mesh with one reverse are usually obtained. With all sliding pinion-gears care is necessary to prevent damaging the teeth when changing the speed.

From the gear-box the power is transmitted by an arbor shaft to the back axle in most cars of moderate power, though in the case of very large touring and racing cars the power is frequently transmitted from the gear-box by means of side driving-chains. The rear wheels on gear-driven cars are fixed to the axle, which, in the better cars, run on roller bearings.

For the purpose of silencing the noise made by the gases discharged from the engine, a silencer is provided. This is simply a hollow cylinder with baffle plates in it.—Captain Harley Tarrant, in the "Australasian."

The motor cycle contest held in connection with the recent Dunlop Reliability Contest from Sydney to Melbourne, emphasised one very important feature of the motor cycle (writes "Auto"). Over the hilly N.S.W. section of the course the high-powered engines gave considerable trouble from ever-heating, which generally resulted in the rider having to dismount and push his 160 or 180 pounds up the mountain sides, which is harder work than one would wish his worst enemy, or the taking of a spell until the engine had cooled. Pedalling was of very little assistance up long, stiff hills, and could not keep the engine going at sufficient speed to develop even half the declared horse power. With the lighter-powered engine, and lighter cycle, far better progress was made over the hills—in many instances the 2 h.p. engine out-pacing the 3½ h.p. motor. Again, on the rough roads the lighter machine was easier held up, and was not nearly so severe as the heavier-powered cycles.

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The fact that the motor at twenty miles an hour is more tractable than a horse-drawn vehicle at eight miles per hour is very generally disregarded. To absolutely rule that the motor must not proceed at a faster rate than the horse travels is to render the value of inventions void, and to restrict advancement and development. And twenty miles per hour is only a moderate speed for the automobile; yet at all times the speed should be governed by the existing conditions, for while ten miles may be the limit in the city, there are times and places when a speed above five miles is absolutely dangerous.

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When the first annual report and balance-sheet was placed before the members of the Automobile Club of Victoria a very encouraging state of affairs was disclosed, the roll totalling 170 members, whilst the balance-sheet showed a profit of £107. Good work was accomplished by the club during its first year, and there is no doubt that the A.C.V. has a very prosperous career before it if is is conducted on similar lines to that laid down during the association's first year.

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The motorist can help himself, and must do so, in order to steer clear of the worry and discomfort consequent on punctures and on undue wear and tear, with their accompanying expense. Increased wear and tear are bound to ensue owing to the employment of tyres much too light for the engine power and load placed on them. The overloading of a tyre has precisely the same effect as deflation. The increase in width of the tyre surface on the road increases friction, and generates more heat, to the injury of its wearing qualities. In addition to this, more engine power is required to move the wheels. The tyre is a passive resister, and supports the overload and overstrain until worn out and exhausted, when it collapses, receiving curses instead of praise for its heroic efforts to achieve the impossible. It may be stated as an