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THE R.A.C. RATING.

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The Royal Automobile Club's Rating, known as the R.A.C. Rating, $\frac{D^3N}{2.5}$ where D represents the diameter or bore of the cylinder in inches, and N the number of cylinders, is inaccurate, as no account is taken of pressure, engine speed, or length of stroke. The Rating is fairly accurate for strokes between 90 and 110 mm, but the inaccuracy increases materially with increased length of stroke. Horse powers relating to steam and gas engines previously took into consideration the regular supply of steam or gas from a certain receptacle, such as a boiler for the steam plant, the power of expansion contained therein, and the number of units of energy stored in the vapour providing the motive power. In the gas engine certain standards of gas were used, and these were ignited over metal blocks or pins, at a reasonably steady temperature, and with the result that certain exact data could be derived. It was possible to calculate the intended horse power of such an engine from the amount of standard gas it was intended should be consumed.

The internal combustion engine getting its source of power from liquid fuel cannot have its horse power arranged for it in exactly the same way. Considerable variations in the quality of the fuel used, and in the heat of the igniting spark, to say nothing of the varying compression, leave the Manufacturer various ways of calculating his nominal horse power. This opportunity left the way open for the practice of much abuse, especially by the Agents of foreign makes of cars, who prepared and printed their catalogues in English.

Some Manufacturers rate their cars after ascertaining the actual B.H.P. at full speed; others adopt a normal speed, while others again calculate from certain standards of their own.

Further discrepancies arose through the much-abused variable gear, which made it advisable to allow the engine to exceed the speed to which it was governed. This led to the adoption of the variable, or two horse power standard, which was intended to show the minimum and maximum developed under respectively ordinary road conditions, and at top speed. One firm rated its cars thus: 16—24, 24—40 and 40—60.

Reverting to the matter of unscrupulous Agents, it obviously assisted in obtaining a high price for a car, to rate its power as high as possible. Numbers of frauds were practiced on the public in this way, and these were of such a character that it was impossible to prove anything, owing to the fact that no public knowledge existed as to how the Rating of the engine had been originally calculated.

This condition of affairs led to sittings of the Technical Committee of the R.A.C., which evolved the mysterious rating which it is intended to briefly discuss to-night. To do the Gentlemen of the Committee justice, it must be said they emphasised the fact that the Rating determined upon was merely a "Rating," and after many tests it averaged out slightly below the actual B.H.P. of engines tested on the block at normal speed. At this time (some six years ago), the compression rarely exceeded 85 lbs. per square inch, and it was almost invariably constant about that figure, whilst the stroke of engines varied but very slightly, and practically never exceeded $4\frac{1}{2}$ inches. It was anticipated at the time that alcohol would become more generally used as fuel, and this would necessitate increased compression to about 120 lbs. If it had done so, then some fresh Rating for alcohol-fed engines would probably have

been necessary. However, alcohol has not come to the fore as was then anticipated, owing largely to the adaptation of carburettors to suit heavier spirit.

The adoption of the R.A.C. Rating served its purpose, namely, that of standardisation, and it has been adopted by the British Government as the standard for taxing cars by their horse power. The tax has had an unexpected effect, but one which has been welcomed by many, including the writer, of leading to a general decrease in the speed of engines, an increase in the working pressure, and in the length of stroke. To-day the writer believes it will be generally found that compression varies between 95 and 100 lbs. per square inch, whilst 6 and 6½ inch strokes are far more common than formerly. The result is that whilst in 1906 the R.A.C. Rating was never far out, to-day it is decidedly inaccurate, and has led to conferences being held with a view to its modification.

The Automobile Club of Australia adopted a different Rating for its contests, and one with which the writer made a number of calculations in 1907. It is $\frac{D^2 S N}{10}$. Taking as a standard, cars varying in horse power between 12 and 20, it was found that there was very little difference between these two Ratings when the stroke, between 90 and 110mm, varied with the horse power, but where a longer stroke is used a discrepancy immediately became apparent.

$\frac{D^2 S N}{10}$ is, however, a far better Rating than that of the R.A.C., although the writer really hopes, and believes, that a far more comprehensive and scientific one will be finally adopted.