September 2008

North Birmingham News

NEWSLETTER

Trent Valley Run

Despite the promise of showers 22 bikes gathered at the Bowling Green in Lichfield for the Trent Valley Run of which 4 were vintage, one was post-vintage and the majority of the remainder classic. The run started promptly at 10.30 following a route of mainly country lanes zigzagging across Cannock Chase to an optional coffee stop at Milford close to the main entrance to Shugborough Hall. Did anyone notice the advertisement for a "Pets and People Show". I have a vision of pets and their owners all meekly standing in cages or pens being critically appraised by serious judges in bowler hats. Perhaps there was a prize for the owner who looked most like their pet!

From Milford we closely followed the Trent, crossing it at Wolsley Bridge and then on towards Colton where the route left the river and turned north to follow the river Blythe to Withington before crossing into the Tean Valley . We then climbed up to Hollington before dropping down into Rocester in the valley of the River Dove. Two miles upstream we came to Doveleys Garden Centre where there was a good choice of food and where we were able to sit outside and enjoy our lunch.

In the afternoon we followed a more direct but still very pleasant route back towards Lichfield following the River Dove as far as Sudbury, passing Sudbury Hall with its renowned Museum of Childhood. We then left the river to climb up to Hanbury passing nearby Hanbury Crater. This 12 acre crater 90 feet deep was formed when 3,500 tons of high explosive stored by the RAF in a disused gypsum mine blew up in 1944. It was the biggest non nuclear explosion of World War II.

The last leg of the run took us past Dunstall Hall and through Yoxall and Kings Bromley to finish at Fradley Junction to sample the excellent ice cream.

At the end of the day we had only seen a very brief shower and plenty of sunshine which showed the countryside at its best. Thank you to all who came on the run; a good turnout makes the effort well worthwhile.

Brian

From the Archives

Problems of Sidecar Steering with some thoughts about Three -wheelers too in the early 1930's

Probably because three is the minimum number of wheels which must be fitted to a vehicle to give stability when at rest, manufacturers from the very earliest days have turned their attention to machines of this type.

The commonest type now made is, of course; the sidecar outfit, which although considered by many engineers, from an academic point of view to be a makeshift mechanical monstrosity, but is nevertheless the cheapest form of passenger – carrying vehicle obtainable.

What Experience Teaches

The clever rider actually takes advantage of the somewhat peculiar layout of his vehicle, with most of its weight and all of its power concentrated on one side, to enable him to negotiate corners much faster than could at first sight considered possible. In order to see how this can be done, it is only necessary to possess a knowledge of the laws relating to the relation of forces in two planes by the exercise of the "parallelogram of forces." These laws demonstrate that the forces acting on the machine, such as the force of gravity (acting vertically through the centre of gravity) and the so-called centrifugal force (acting horizontally through the centre of gravity and along the line joining this point to the centre of the turning circle) can be combined to give the magnitude and direction of the resultant force acting on the vehicle. (See Diagrams 1 and 2).

For the outfit to remain upon its wheels it is fundamental that the line of action of this resultant force should intersect the ground line within the area bounded by the points of contact of the wheels, but it is characteristic of the sidecar that since its C. Of G. Lies very close to the side of this area bounded by the cycle itself, it requires but a small centrifugal force to bring about this result. Thus, provided a constant speed is maintained, a sharp left-hand corner can only be taken slowly.

This effect can be combated in two ways, one being to move the C. Of G. Artificially over to the left, by the passenger leaning as far as possible over the sidecar wheel; the second method is to accelerate round the turn. In order to understand why it is of assistance to accelerate it must be realized that when travelling in a circular path with the sidecar on the inside, the cycle is travelling at a faster speed than the C. Of G. Of the outfit. Hence, if the speed of the cycle is kept constant when entering the corner, the velocity of the C. Of G. Will be decreased, and thus there will be a force set up in a forward direction. This swings the resultant force forwards, and increases its magnitude so that it tends to fall outside the base area, the machine then becoming unstable.

Accelerate for Safety

If, on the other hand, the machine is accelerated, this force is neutralized, and if the acceleration be sufficiently great, a force will be set up in the reverse direction, which will render the outfit more stable; also it will considerably reduce the bending stress in the front forks, and the tendency of the front tyre to slide.

Novice sidecar drivers frequently fail to realize the importance of this method of driving, and when the sidecar wheel tends to lift they are inclined to shut off the power, which is the very reverse of the correct procedure. When cornering fast by this method, however, the rider must utilise the throttle with discretion, for if the corner is fairly long, or, worse still, of increasing sharpness, it may be found that before the corner is negotiated there may be no acceleration left so to speak, and a capsize becomes imminent.

Of course, even if the sidecar wheel does lift, all is not lost, because the machine then becomes in affect a two-wheeler, and can be ridden in that state for a considerable distance, although tremendous side stresses are put on the cycle frame and wheels.

The speed of the left-hand cornering can still further be increased by the use of the sidecar wheel brake, as application of this increases the tendency of the outfit to swing to the left by setting up a "couple," thus giving rise to the inertia force through the C. Of G. (as shown in diagram 1).

When using this fitting, a corner maybe negotiated in the least possible time by approaching it at the highest safe speed and using all three brakes to slow down what is considered a reasonable pace to enter the corner. The front and rear brakes are then released and the throttle opened out gradually all the way round, the sidecar brake being eased off.

Effect of Chairobatics

When cornering to the right, the inherent stability of the outfit is much greater than to the left, but nevertheless it is quite possible to turn it over, more particularly on a sharp bend, where the front wheel is on a nearly full lock. The reason for the latter fact, as the diagram illustrates, is because the resultant force is swung around to the narrower portion of the wheelbase area. Again, moving the C. of G. By the passenger's alteration of position -as is the racing man's practice - helps considerably, but it is important to note that merely climbing up over the back wheel does not assist very much: for although this does move the centre of gravity inwards, at the same time the weight is raised, which fact may nearly cancel out the effect of the former.

Thus the racing passenger's best method is to climb around behind the wheel, as the centre of gravity is thereby brought lower and farther rearward, which are both desirable points. The danger in fast right-hand cornering lies in the fact that there is no preliminary warning of impending capsize, and once the back wheel lifts, it usually continues to do so, unless the steering can be immediately straightened up, which considerations of road space often forbid.

Avoiding Front Skids.

Getting the sidecar wheel well forward of the back-axle centre considerably increases right-hand stability by bringing the widest part of the track up forwards the C. Of G.

If, however, the sidecar wheel is brought too far forward, particularly on a short wheelbase machine, a secondary adverse effect is introduced, in that the front wheel is rather inclined to leave the ground when accelerating out of a right-hand bend, and front-wheel skids come somewhat easily at such times.

With regard to other side steering problems, it is a pity that the combination has always been regarded as an attachment to a machine which is designed mainly to be used solo, because the outfit presents totally different design problems. The solo machine must possess auto-stability, so that it can be steered round ordinary curves purely by the rider banking it over.

A sidecar outfit, on the other hand, must be consciously steered, and steep head angle and very little trail are desirable, as attention to these two factors gives much lighter steering. Also it decreases the tendency to front-wheel shake, which can sometimes become so pronounced as to be dangerous.

Space considerations make it impossible for me to do more than merely touch the fringes of the problems affecting sidecar stability, but nevertheless I would like now to touch upon two other forms of three-wheeled vehicle. First, I will take the best known type—that having its single wheel at the rear.

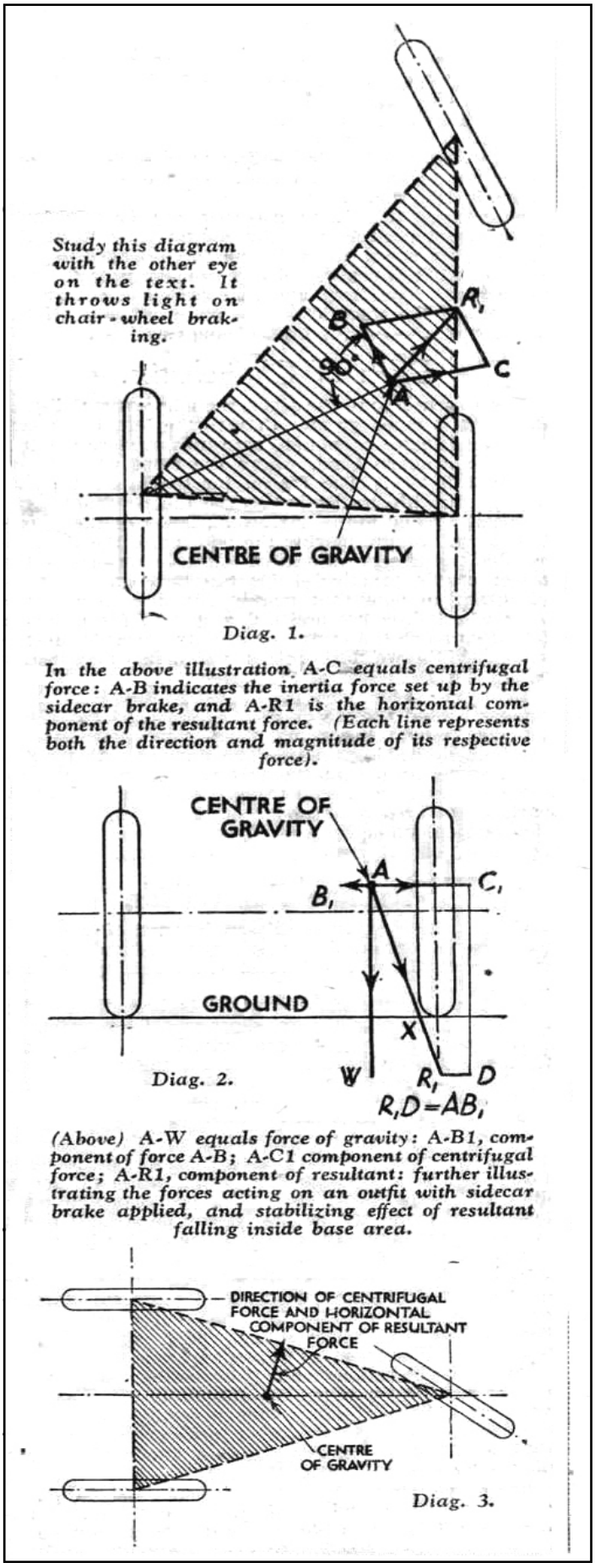
This type differs from the sidecar combination in that, being symmetrical about its centre line, the cornering stability is identical either to right or left, except for the slight difference introduced when the driver only is occupying a two-seater vehicle. Apart from this, the C. Of G. Lies on the centre line, and it is possible, and very desirable, to keep its position low, and preferably fairly well forward.

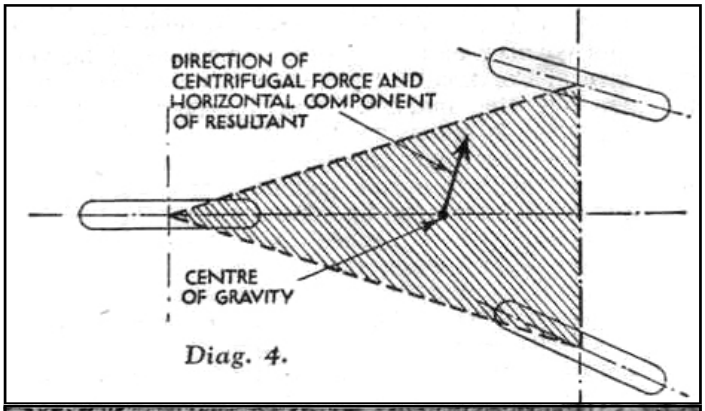
It is obvious that is the C. Of G. Lies very far back, it also lies over the narrow part of the wheelbase area, and consequently quite a small transverse centrifugal force will cause the resultant o fall outside this area, with consequent over-balancing. This can be counteracted by placing the C. Of G. Very low indeed, but if this is overdone, the vehicle will exhibit a tendency to slide on corners, and the front wheel swill tend to aviate if not sufficiently weighted.

For maximum stability, of course, the weight should be concentrated at the forward end—i.e. At the widest part of the base—but rear-wheel adhesion would suffer if this were carried to extremes. Consequently, a nice balance must be aimed at in distributing the weight to combine maximum stability with the best all-round wheel adhesion and road holding. By putting on paper a diagram representing the layout of the machine when cornering in either direction, it will be seen that the resultant force, obtained by compounding the weight and centrifugal force, tends to swing round towards the wide part of the base area. This explains why this type of vehicle is more stable on corners than it appears to be a first sight.

A Balanced Layout.

Being symmetrical, no complications are introduced—as is the case with the sidecar—y additional forces due to the momentum of the machine; and no balance corrections can be obtained by braking or accelerating, unless individually controlled brakes were fitted to the front wheels. Front-wheel-drive three-wheelers differ somewhat in their behaviour from the rear-wheel-driven species; for the power being applied tangentially in the former case, the front of the vehicle is pulled around the corner, and the centrifugal force is partially counteracted by the component part of this tangential force resoled in a direction parallel to the radius drawn through the C. Of G.





Diag. 4.

This gives greater stability up to the point at which the inner wheel lifts sufficiently to lose traction. When this occurs, the power at both wheels ceases, due to the action of the differential, and consequently the partial counteraction of the centrifugal force ceases also, with the easily imagined consequences.....unless the wheels are straightened up.

With this type of vehicle the weight has to be disposed well forward in order to maintain sufficient tyre adhesion to prevent slip when hill-climbing; but again this is a matter of compromise, because if it is overdone, the rear wheel adhesion will be poor, with consequent danger of side-slips on a steep camber.

A Coming Type ?

Taking, lastly, the three-wheeler having two wheels at the rear and one in front—this type is represented in this country mainly by small goods carrying vans, but several continental "pleasure vehicles" so constructed are on the market. The inherent stability when cornering is not as good as in the case just dealt with, as the resultant force, obtained as before, swings around to the narrow portion of the base area. This can be counteracted by concentrating the weight at the rear, but with rear wheel drive the front wheel tends to "go light" when the power is applied; and if the C of G is too far back , the front wheel skids may be expected when accelerating out of a corner.

As with normal three wheelers the stability is identical when turning in either direction, and can be determined graphically in exactly the same way. A minor disadvantage of this type lies also in the necessity of using a differential and live axle, which assembly is necessarily fairly heavy and tends to keep the C of G rather high. Also without going to considerable expense, it is not possible to utilise independent wheel suspension all round, which is a very desirable feature.

Here's a sidecar steering problem for you : what do you get when the front wheel climbs? Answer : wait until it climbs down again.

FORTHCOMING ATTRACTIONS FOR 2008

	CLUB NIGHTS
AUGUST 27th	Arrive on Your Bike Night
SEPTEMBER 24th	Talk by Johnny Brittain on life as a trials rider
OCTOBER 29th	Talk by Geoff Brazendale on early vehicle lighting
NOVEMBER 26th	Bring and Buy evening
DECEMBER	No Meeting

CLUB RUNS

DATE	RUN	ORGANISER	Tel No
August 17th	Picnic / Concours Run	Peter Ashen	01562-882854
September 7th	Flight of Fantasy Run	Trevor Bull	01905-778917
September 14th	Levis Cup Road Trial	Paul Harris	01902-842732
September 28th	Severn Valley Run	Bill Danks	01562-67103
October 12th	Autumn Run	Andy Briggs	0121-544-5938