LETTERS TO THE EDITORS

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Effect of Weather on Traffic Flow

In order to estimate trends in road traffic, censuses were held, in conjunction with the Ministry of Transport, at twenty-one selected points over Great Britain during the weeks August 15–21, 1949, and August 14–20, 1950. In general, the weather was fine during the 1949 census week and wet during the 1950 one. A comparison of the traffic flows for the two Sundays (1949 and 1950) showed a very marked reduction in the flow for 1950, when, owing to the lifting of petrol restrictions, it would have been expected to show an increase. It seemed likely that this observed reduction was due to weather conditions, and examination of the traffic and weather data has shown that a high negative correlation exists between rainfall and traffic. For example, if we compare the total number of solo motor-cycles observed on each of the days Monday to Friday in the 1950 census with the daily rainfall (the average of the rainfall recorded at the meteorological stations nearest the census points), the coefficient of correlation is $-0{\cdot}91$ (significant at the 5 per cent level). For the two Sundays, we must use a different method; we compare the percentage change, between 1949 and 1950, in flow of solo motor-cycles at each of the twenty-one points with the amount by which the rainfall at each point in the week in 1950 exceeded that in 1949. This gives a correlation of $-0{\cdot}72$ (significant at the 1 per cent level). Results of calculations such as these are summarized in Table 1. As the two Saturdays were both fairly fine, no direct method was available for determining the weather effect; but for the purpose of Table 2 it has been assumed that it will lie between that for Monday to Friday and that for Sunday.

In view of these values, it is necessary to adjust the census figures obtained in 1950 to allow for the effect of the rainfall during that census week, before comparisons of traffic can be made. The magnitude of this adjustment can be judged from Table 2.

It will be noted that, had it not been for the correction for rainfall, the results of this one-week census would have suggested that Sunday traffic was less in 1950 than 1949, in spite of the de-rationing of petrol in May 1950. The corrected figures indicate that mechanically propelled traffic was greater on Sundays as well as on other days, although pedal-cycle traffic was lower in 1950, even when corrected. It is possible that other factors, not yet investigated, have similar effects, and evidently considerable caution must be used in making comparisons between the results of traffic censuses carried out over such short periods as single weeks.

Table 1. Reduction in Traffic caused by Rainfall

Type of vehicle	Monday to Friday		Sunday	
	Percentage reduction in traffic flow per mm. of rain	Standard error	Percentage reduction in traffic flow per mm. of rain	Standard error
Solo motor-cycles	5·5	1·4	5·7	1·3
Motor-cycle combinations	6·0	1·7	6·3	2·7
Cars and taxis	1·3	0·2	3·1	0·8
Public service vehicles	0	—	1·4	0·6
Goods vehicles, etc.	0	—	1·1	1·1
Pedal cycles	2·9	0·1	6·3	1·3
Total, excluding pedal cycles	1·0	0·1	3·2	0·7
Total	1·2	0·1	4·0	0·7

Table 2. Comparison of Traffic Flows in August 1949 and August 1950, showing the Effect of Rainfall

Type of vehicle	Traffic in August 1950 as a percentage of that in August 1949			
	Observed : corrected for effect of rainfall			
	Monday to Friday	Saturday	Sunday	All days
Solo motor-cycles	134 : 160	128 : 132	77 : 111	120 : 143
Motor-cycle combinations	127 : 155	129 : 133	69 : 105	110 : 135
Cars and taxis	125 : 130	124 : 125	101 : 122	121 : 128
Public service vehicles	101 : 101	102 : 102	95 : 102	101 : 101
Goods vehicles, etc.	103 : 103	107 : 107	101 : 107	103 : 103
Pedal cycles	80 : 88	85 : 87	42 : 64	75 : 84
Total, excluding pedal cycles	113 : 117	117 : 119	97 : 117	112 : 117
Total	108 : 111	113 : 114	86 : 109	106 : 111

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A New Determination of the Velocity of Electromagnetic Radiation by Microwave Interferometry

The free-space phase velocity of microwaves of length 1·25 cm. and frequency 24,000 Mc./s. has been measured by a new method.

In essentials the apparatus used is equivalent to the well-known Michelson optical interferometer. Microwave energy at constant frequency from a stabilized klystron oscillator is transmitted by means of a hybrid junction ('magic-T'), acting as beam divider, along the two arms of the interferometer. The beam in one arm passes through a transmitting horn into a very large room, over distances up to 21·5 m., towards a movable metal reflector. Here the radiation is reflected back along its path to the horn, through the beam divider, and into a detector. The other arm is enclosed in a short length of wave-guide carrying attenuators and terminating at the face of an adjustable shorting piston. Here also the energy is reflected back to the beam divider, and interference between the two beams takes place at the detector. The detecting device records the energy minima as the movable reflector is displaced. The distance between consecutive minima is nominally equal to half the wave-length of the radiation in the prevailing atmospheric conditions.

To make an observation the movable reflector is displaced through an exact integral number of minima by means of accurately calibrated end-gauges and a micrometer. The total displacement used was