(b) those who elect to go for trial, respectively. Relevant figures for the years 1953 to 1957 have very kindly been provided for the County of Lancashire by the Chief Constable, Colonel T. E. St. Johnston. These are summarized below:

	Electing to be Dealt with by Magistrates (1)	Percentage Convicted (2)	Electing to go for Trial (3)	Percentage Convicted (4)	Percentage of Total Charged who Elect to go for Trial (5)
1953	115	92	8	38	6
1954	161	94	20	35	11
1955	166	92	13	46	7
1956	197	89	30	33	13
1957	193	91	37*	35	20

* Excluding 10 who elected to go for trial but not yet tried.

It might be argued that those electing to go for trial are in fact less culpable. If this is not the case, the more or less constant differences between columns (2) and (4) require some explanation. From column (5) it may be seen that there is a tendency for an increasing proportion of the total charged to elect to go for trial. This is not surprising if it is becoming more widely believed that trial by jury, other things being equal, carries a higher probability of acquittal. But it is hardly credible that an increasing proportion of those less culpable are being apprehended by the police and electing to go for trial. These figures bring to light what appears to be a serious discrepancy in the administration of the law. We are faced with one of two conclusions: if both groups (columns 1 and 3) are equally culpable, which may well be the case, either a large number of people are wrongly convicted by the magistrates or wrongly acquitted by the jury.

We should like to express our gratitude to the Manchester Corporation Transport Department, and in particular to Mr. J. F. J. Webb, personnel officer, and Mr. G. Walker, chief instructor, for their most valuable help in making this investigation possible. Our thanks are also due to Dr. R. I. Johns and Sister E. West for taking the blood samples, and to the local branch of the Transport and General Workers' Union and the volunteer drivers for their helpful co-operation.

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The American Heart Association (44, East 23rd Street, New York) has issued a booklet summarizing, in easily understood diagrams, various mortality statistics for the U.S.A. As elsewhere, deaths from rheumatic heart disease have fallen sharply in the last two decades, though it still causes 31% of the deaths from cardiovascular disease among young people aged 5-24. A comparison of death rates from cardiovascular disease in different countries among men aged 45-64 in the year 1954 shows it to be greater in the U.S.A. than in most of the countries of Europe, including the United Kingdom, and about double the rates in the Scandinavian countries, France, Italy, the Netherlands, and the German Federal Republic.

URINE-ALCOHOL TESTS AND "DRUNK-IN-CHARGE": SURVEY OF 312 CASES

BY

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This laboratory has during the past few years made several hundred alcohol determinations on blood and/or urine samples taken from allegedly intoxicated drivers. This number seems to me large enough for a statistical examination of the results to be of interest.

TABLE I

Concentration in Urine* (mg./100 ml.)	No. of Cases	Circumstances			Medical Opinion†			Result of Proceedings				
		Accident‡	No Accident	Not Driving	Unfit	Borderline‡	Fit	Convicted	Pleading Guilty	Acquitted	Convicted of Other Offences	No Action Taken
Under 100	1	1			2	1		1			1	1
101-120	3	3			3	1		4			2	
121-140	6	3	1		3			1	1			
141-160	2	1	1		2							
161-180	4	4			2			1	1			
181-200	9	5	1	1	1	3		2	1	3		3
201-220	15	7	4	2	5	1		4	4	2	2	3
221-240	26	11	7	4	20			12	6	3	3	2
241-260	24	12	7	4	14	1		12	6	3	1	2
261-280	29	5	13	6	17	4		17	7	5		
281-300	47	20	15	6	35	4		18	17	8		1
301-320	25	14	3	6	14	2	2	12	6	6		1
321-340	24	4	11	2	14	1	1	11	7	5	3	1
341-360	31	8	11	8	23	4		12	13	3	1	1
361-380	22	6	7	3	14	1	1	11	8	2	1	
381-400	19	7	7	1	14	1		7	7	4		
401-420	14	4	3	4	7			10	1	2		1†
421-440	4	2		1	3			1	1	1		
441-460	3	1		2	2	1		3				
461-480	2		1	1	1			2				
481-500	1		1		1			1				
Over 500	1	1						1				

* In the few cases in which only blood samples were analysed the blood concentrations have been included here after multiplication by 4/3.

† Incidents involving personal injury, damage to other vehicles, driving off the road so as to be unable to proceed, motor-cyclists falling off, etc. Mere temporary mounting of road verge, etc., not counted as accidents.

‡ Inconclusive opinions such as: "recovering from effects of alcohol at time of examination," "unable to distinguish between effects of alcohol and shock," etc.

§ Conviction of other traffic offences in which element of intoxication does not enter.

|| Defendants convicted in spite of medical opinion.

¶ Defendant committed suicide.

** Defendant certified insane.

The Investigation

In all, 312 cases are considered; the details are summarized in Table I. The figures under the headings "circumstances," "medical opinion," and "result of proceedings" are based on information supplied by the police forces which submitted the samples. Where the sum of the numbers under each of these headings is less than the total number of cases in the same concentration range, that signifies in most cases merely that the relevant information could not be obtained. In a small number of cases, however, the defendants were not medically examined.

Over 90% of the samples consisted of urine only. Where both blood and urine samples were submitted, only the urine figures are included in Table I; they are probably in general more significant than figures for blood taken, usually, at least an hour after the defendant was arrested. Where only blood samples were submitted, however, the figures have been included in the table after multiplication by 4/3.

The ratio 4:3 (1.33:1) for urine: blood alcohol appears to be generally accepted (*Taylor's Medical Jurisprudence*, 1957), although Elbel and Schleyer (1956) suggest that the

true figure may be slightly lower—namely, about 1.25. In the few cases considered here in which both blood and urine samples were submitted, the ratio found never fell significantly below 1.33 (the lowest being 1.27), but sometimes considerably exceeded it. This could reasonably be attributed in all cases to an unusually long interval, without the passage of urine, between drinking and collection of samples. In such circumstances the concentration in the urine will depend (neglecting reabsorption), not on that in the blood at the time of sampling, but on the average in the blood over a period of falling alcohol concentration; this average will of course be higher than the concentration at the end of the period.

It will be seen from Table I and Fig. 1 that the peak of "police attention" occurs at a concentration of about 0.30% w/v (300 mg./100 ml.). This is in complete agreement with the result found by Nickolls (1956) in a series of 1,000 cases. The mean figure for all the cases considered here is in fact 0.300% precisely, and the median 0.294%; 84% of the cases lie within the concentration range 0.20–0.40%. Although the cases cover a period of 10 years, the means for successive shorter periods within the whole show no significant differences or apparent trend.

If only the cases in which the defendant was actually driving are considered, one could on common-sense grounds expect the mean concentration in accident cases to be lower than that in no-accident ones. The obviously drunk driver is most commonly stopped before he has gone very far—that is, there is a good chance that he will be stopped before he has hit anyone or anything. On the other hand, the driver who shows no gross signs of intoxication is not so liable to attract the unfavourable attention of the police unless he is involved in an accident.

Table II and Fig. 2 show that this expectation is borne out. It is also confirmed by statistical calculation. The mean concentration in 116 cases in which accidents occurred is 0.284%; that in 91 cases without accidents is 0.308%. The standard deviations are 0.082 and 0.064 respectively, and the standard error of the difference 0.010. As this last figure is less than half the difference between the means (0.024), the difference is significant at the 0.05 level of probability (Chambers, 1952a)—that is, the odds in favour of the difference being real, and not simply the result of random variation, are at least 19 to 1.

As is only to be expected, the proportion of drivers definitely considered unfit on medical examination rises with increasing alcohol concentration (Table II). A 2 by 6 contingency table of the medical opinion figures in Table II gives $\chi^2 = 10.3$. This is significant at the 0.10 level of probability, but not at the 0.05 level. The figures in Table II, however, suggest that above a certain critical concentration the proportion of drivers pronounced unfit remains approxi-

FIG. 1.—Urine-alcohol concentration at which the peak of "police attention" occurs.

FIG. 2.—Percentage of accidents in relation to urine-alcohol concentration.

FIG. 3.—Showing that the proportion of drivers convicted rises with increase of alcohol concentration.

TABLE II.—Distribution of Cases Among Various Categories

Concentration Range (mg./100 ml.)	Circumstances			Medical Opinion			Result of Proceedings		
	Accidents	Driving Without Accident	Accidents/Total Driving Cases (As percentage: to nearest 5%)	Unfit to Drive	All Others	Unfit/Total Cases (As percentage: to nearest 5%)	Convictions (Including Guilty Pleas)	All Others	Convictions/Total Cases (As percentage: to nearest 5%)
Under 200	17	3	85	10	7	60	12	12	50
201-250	23	16	60	32	10	75	35	17	65
251-300	31	29	50	59	9	85	67	17	80
301-350	22	22	50	43	7	85	48	20	70
351-400	18	18	50	36	7	85	44	9	85
Over 400	8	5	60	14	1	95	19	5	80

The totals in the second and third categories are: 194 unfit to drive in 235 cases (83%), and 225 convicted or pleaded guilty in 305 cases (74%).

mately constant, and possibly depends on factors other than an objective assessment of the defendant's condition. A series of 2 by 2 contingency tables, using the numbers of cases above, and below, various concentration levels, gives the greatest values of χ^2 when the dividing line is taken at 0.220% (χ^2 then = 24.3, applying Yates's correction (Chambers, 1952b)). This suggests that the critical concentration mentioned above lies at about this level. It may be noted that it is close to the blood-alcohol level of 0.15% which, following the pre-war investigations in the U.S.A. (Committee to Study Problems of Motor Vehicle Accidents, 1937), is widely held to be an average dividing line between possible and certain unfitness to drive.

The proportion of drivers convicted also naturally rises with increasing alcohol concentration (Fig. 3). An attempt was made to discover whether there is any direct connexion

TABLE III

	Range of Urine-Alcohol Concentrations (mg./100 ml.)			
	Under 250	251-300	301-350	Over 350
Cases convicted after pleading not guilty (mean concentration 0.301%)	21	31	16	26
Cases not convicted (mean concentration 0.307%)	6	8	10	8

between these two variables by considering only cases which were medically considered unfit to drive and in which "not guilty" pleas were entered—that is, cases in all of which the medical evidence was unfavourable to the defendant and the courts had to reach a decision on the evidence before them. The figures for these cases are given in Table III.

A 2 by 4 contingency table of the figures in Table III gives a value of χ^2 which is not significant even at the 0.50 level. (It will also be seen that the mean concentration for the cases not convicted is in fact slightly higher than that for those convicted; the difference is, however, statistically not significant.) That is, the results available suggest that

the courts, in reaching their decisions, were not influenced at all by evidence of urine-alcohol concentrations. Clearly, however, this conclusion can only be tentative at this stage. To test it more strictly, more account would have to be taken of other factors influencing the decisions; to do this it would be necessary to consider a much larger number of cases.

Finally, attempts were made by constructing 2 by 2 contingency tables to find whether there was any relationship between the occurrence of accidents on the one hand and the plea of the defendant or the decision of the court on the other. Again only cases medically pronounced unfit to drive were considered. There appeared to be no significant relationship whatever. That is, whether or not an accident had occurred appeared to have no bearing on the probability of the defendant pleading guilty, or on the decision of the court if he pleaded not guilty.

All of the cases considered here came from south-west England. It would be interesting to see a similar analysis for a comparable or, preferably, larger series of cases from the whole country, or at least from other regions of it.

Summary and Conclusions

The urine-alcohol concentrations of persons arrested for driving whilst under the influence of drink appear to be normally distributed around a mean value of 300 mg./100 ml.

The mean figure for cases in which accidents occurred is significantly lower than that for cases in which the defendants were driving without accident.

The probability of the defendant being medically pronounced unfit to drive rises with increasing urine-alcohol concentration up to a figure of about 220 mg./100 ml., but above this figure appears to be about the same for all concentrations.

The statistical evidence available suggests that the decisions of the courts are not influenced at all by legal evidence of urine-alcohol concentrations.

The statistical evidence available also suggests that there is no relationship between the incidence of accidents and the pleas of the defendants or decisions of the courts.

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Nursing for Men is a new title in the "Choice of Careers" booklets issued by the Central Youth Employment Executive. It describes nursing for men in and outside hospitals, training, conditions of service, and openings and prospects. Mental and mental deficiency nursing were the first branch of the profession in which men could qualify, and these still offer the best opportunities for the male nurse, states the booklet. The first male nurse was accepted for general training in 1930, and now there are many hospitals where they can receive training. This booklet is prepared by the Ministry of Labour and National Service and the Central Office of Information. It is obtainable from H.M.S.O., price 1s. 6d. net.

EXPERIMENTAL INVESTIGATION OF THE RELATIONSHIP BETWEEN METHOD OF TREATMENT AND SUBSEQUENT IMMUNITY*

BY

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Although children with acute respiratory infection respond well to a single large dose of penicillin or sulphonamide (Platt, 1940; Lauria, 1947; Wilken-Jensen, 1948; Friderichsen and Walther, 1950; Jersild *et al.*, 1956; Joseph, 1958), it is not known whether the immunity following this method of treatment differs from that following repeated chemotherapy. This treatment with a single large dose has been called stoss therapy by Gaisford (1951), a name originally given by Harnapp (1938) to a method of treatment of rickets with a single massive oral dose of vitamin D.

Good immunity in rabbits and mice developed following sulphapyridine treatment of pneumococcal infection (Whitby, 1938a; Larson *et al.*, 1939; Curnen and MacLeod, 1942). This immunity was the same in quantity, quality, and speed of production as that created by orthodox active immunization (Whitby, 1938b), and the degree of immunity was related quantitatively to the size of the infecting dose (McIntosh and Whitby, 1939).

The action of penicillin, however, differs from that of sulphonamide, and immunity following treatment with penicillin may be different. McIntosh and Whitby (1939) showed that sulphapyridine exerted its bacteriostatic action only after a lag of several hours, thus allowing time for the formation of antibody, whereas MacLeod and Stone (1945) have pointed out that by contrast the action of penicillin was immediate and might be independent of an immune response. Thus Harrison (1946) showed that, when penicillin was given to rabbits four hours after infection, no antibody response could be detected; when he reinfected his survivors all the animals previously saved by penicillin died in five to six days as compared with controls, which died in 36 hours. By contrast, rabbits saved by penicillin given 24 hours after infection, when reinfected, survived and showed a high titre of antibodies. Harrison (1946), with mice, and Skinsnes and Woolridge (1948), with protein-depleted rats, obtained similar results.

Present Investigation

White male mice of Parkes A strain were used. They were infected with a known dose of type I pneumococci (NCTC 7465), and divided into three groups: (1) single dose (stoss), (2) repeated doses, and (3) untreated. Ten days after the original infection, the survivors in groups 1 and 2, and a new control group, were each infected with a challenging dose of pneumococci, and the degree of immunity was measured by mortality.

My preliminary experiments showed that the optimum interval between infection and treatment was 10 hours, which agrees with the findings of Harrison (1946) and Skinsnes and Woolridge (1948). Too high a mortality resulted if the mice were left untreated for longer periods.

*Based on M.D. thesis for University of Cambridge, 1957.