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THE PUBLIC HEALTH ASPECT OF MOTORING.*

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THE influence of bicycles upon the public health during the past twenty-five years has never, I think, been sufficiently realized. Not only have workmen and those whose daily work is in crowded localities been able to live some distance from it and therefore in healthier districts, not only have shop assistants and others who are compelled to live near their work been able to get more easily into the country, but in the actual administration of the Public Health Acts the bicycle has played a most important part. I venture to think that long before the end of the next quarter of a century we shall acknowledge our indebtedness in the same direction to the motor car. It is true that a vast amount of useful and permanent work has been carried out in the past by Medical Officers of Health who have used neither bicycles nor motor cars, but it is being realized year by year that the duties of a Medical Officer of Health are becoming more and more closely associated with purely epidemiological inquiries, and less and less with actual sanitary work. This has been rendered possible in great measure by the improved technical training of Sanitary Inspectors; and although the Medical Officer of Health must always remain the actual controlling head of the Sanitary Department, he is able to rely much more than formerly upon the powers of observation of his inspectors, though he himself must be competent to supervise, to detect obvious omissions, and to draw correct inferences from their reports. But as regards investigations of an exclusively epidemiological character, a medical training is absolutely essential; and if any advance is to be made in our knowledge of the methods of the spread

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of disease, and therefore in our efforts at prevention, these investigations will have to be carried out by Medical Officers of Health and upon general and systematic lines. In towns this can readily be done, and indeed is being done at the present time, but in the rural districts, where there is a large mass of material still to be dealt with, the population is scattered over such a large area that it has been found next to impossible to carry out any work of the kind indicated.

There are in particular two directions in which the Medical Officer of Health who has the control of a large rural district finds himself handicapped against his colleague in a town. First of all, in the investigation of an outbreak of an infectious disease which may be due to school influences. If these outbreaks are to be successfully combated, we must search out the "missed" cases. In the case of diphtheria we are able to call to our aid the bacteriologist, but with whatever disease we are concerned, it is of the first importance that we should make our inquiries and conduct our search at the earliest possible moment. In a town this can easily be done, but in a large country district, where the Medical Officer of Health may have to travel ten or fifteen miles to a school, he finds his difficulties almost insurmountable, and the outbreak which he might have checked is kept alight. On one occasion, I myself had information of an outbreak of scarlet fever sixteen miles from Hereford. Within an hour and a half I was at the schools concerned, and in a few hours had discovered in their homes two convalescing children, whose parents had no idea that they were ill at all. We had no more cases of the disease. In carrying out this investigation I had to travel between fifty and sixty miles, a journey which it would have been impossible for one horse to have accomplished without a rest, but I managed it by motor without appreciably affecting my routine work.

The second direction in which the motor will materially assist the Medical Officer of Health in rural districts is in the investigation of the surroundings of all persons who die from consumption or from cancer. With the ordinary means of travel at our disposal this is quite a hopeless task, but it is one which ought to be performed, and if carried out upon proper lines might lead to the most important results. In my districts in Herefordshire I have tabulated the deaths from consumption and cancer for each of the 126 parishes which have been registered in the past sixty years, and I want to know why it is that in some parishes these diseases are almost unknown while in others they appear to be endemic. I can only obtain an answer by investigating the cases as they occur now, and on the spot.

But the administrative side of the public health aspect of motoring is by no means the only one, though it appeals to me personally.

Consider the effect upon the housing question in large towns of taking away from the centres of those towns all horses and carriages and carts and wagons. I do not refer altogether to the advantage of doing away with the huge mass of offensive material which is inseparably connected with horses, but I mean that if every horse with its appurtenances were taken away, say from London, you would have set free an amount of ground space which would enable you to house that large class of persons who, either from lack of means or from other causes, are compelled to live within easy reach of their work. It may be said that a motor takes up as much room as a carriage. But not so much as a horse and a carriage. Moreover, a horse must be stabled within a reasonable distance of its work; a motor can be stabled ten miles away.

I can quite imagine some persons saying that no increase in the facilities of administration, no indirect solution of the housing question, no lessening of the stable nuisance in towns, and no decrease in the expenditure upon scavenging in towns, can compensate for the intolerable amount of dust which appears to be inseparably associated with motoring. I think we can very well leave the solution of this dust question to the engineers and to the chemists. The motor engineers are now, I believe, paying particular attention to the design of cars with a view to lessening the enormous amount of draught created by a car; road engineers are at last realizing that roads can be made in a costly, unscientific manner, and that they can also be made scientifically at little or no extra cost, but with the production of a highway which will not be slimy mire in wet weather and pulverized horse manure in dry. With the aid of the scientist they are discovering what class of stone can bear the greatest stress, and that there is to be found binding material which is infinitely superior to the finely ground dust which has been carefully swept up to the sides of the road, and there left until such time as it can be utilized as a "top dressing," to undergo still further pulverization. They have long admitted that the destruction of a roadway is accomplished chiefly by the hammer hammer of the iron-shod horse, and some of them are beginning to appreciate that the horse droppings, and especially the urine, are an important element in effecting the disintegration of the best made macadamized road. This brings me to what is to my mind the most important effect which motors are to have upon the public health. I mean by the lessening of disease which is caused by the wholesale dissemination of organic material contained in horse manure. Professor Delépine has made most exhaustive and painstaking investigations into the cause of extensive outbreaks of diarrhoea in Manchester, and he has shown that one of

the principal vehicles of infection is manure. To quote his own words, "Epidemic diarrrhœa of the common type occurring in this country is apparently, in the great majority of instances, the result of infection of food by bacilli belonging to the colon group of bacilli, and which are derived from fæcal matter." "Milk," he says, "which is the most common carrier of the cause of epidemic diarrrhœa in infants, is very frequently infected at the farm, or (through vessels) in transit. It may also be infected at the retailer's, or at the consumer's house." The preventive measures against epidemic diarrrhœa advocated by Professor Delépine are such as to secure cleanliness of cows, dairy hands, cowsheds, milk vessels, etc. Similar measures, he adds, are also needed in other places with regard to all things and persons coming in contact with milk or any other article of food, manufactured or not. In the same connexion Dr. Arthur Newsholme advocates "Greater domestic and municipal cleanliness ; involving as this will the reduction of dust both in houses, courts, and streets, and the substitution, both domestically and municipally, of wet cleansing and more frequent cleansing for the dry and infrequent cleansing now in vogue." With these opinions of two such recognized authorities in mind, is it too much to say that one result of the replacing of horses by motor cars would be the reduction of the amount of the appalling amount of fatal infantile diarrrhœa which is recorded year by year in our large industrial centres : the solution, or partial solution, of a problem which seems to some of us well nigh insoluble ?

I think I have shown that the advent of the motor car is to have an appreciable effect upon the public health of this country in a most direct manner. Medical Officers of Health will be able to carry out more extended investigations, and administer the Public Health Acts more thoroughly than they can do at present, when three-fourths of their time is being spent in travelling about their districts ; the housing of the poor in towns will be rendered easier by the closing of the town stables ; not only the comfort but the healthfulness of those obliged to live in towns will be increased by the improved sanitary condition of the streets, which at present are fouled by horses to such an intolerable extent ; and lastly, the improvement in the surface of the roads which engineers will be compelled to make cannot help but be beneficial. We have put up with bad roads long enough, and if motors had not come we should have continued to put up with them. As it is we shall not be satisfied to allow them to remain unaltered. Of the indirect influence of the motor much might be said. It will take the rich or the comparatively rich man to his house in the country, ten miles away from his business, thus releasing ground space for the poorer town dwellers, and it will enable

perishable commodities to be more readily distributed, to the advantage of the small farmer as well as to the consumer. Motor cars are going to be of quite as much benefit to the country districts as they are to the towns.

DISCUSSION.

DR. E. SERGEANT said the roads between Lancaster and Preston were really as good as modern science could make them. Motoring was a luxury on a day like the one on which they met. His opposition to motoring had been considerably reduced by the pleasant drive he had had from Preston. He did not think that surveying science could effect much improvement upon the roads he had that morning had a charming run over. Still, motoring covered people with dust, which they inhaled, and which covered vegetation forty or fifty yards on each side of the road. Such dust must be a distinct danger. We could not possibly keep roads free from manurial deposit. Cars had a cyclonic action, and the dust from the roads had a bad effect upon human beings, as well as upon animals and vegetation that were within forty or fifty yards of the roads. Vegetation was distinctly depreciated in consequence of the immense deposits of dust. He was of opinion that at the present time motoring was distinctly dangerous, although science might come in to modify the danger in future. Until roads were made fit for motor cars, both as to their surface and width, he must maintain that motoring was dangerous to health. That motoring as some people indulged in it was dangerous to life and limb could not be denied, and he had some sympathy with the Marquis of Queensberry, who thought he would be justified in carrying a gun and shooting some motorists at sight. The whole subject was well worth watching. If they could remove or reduce the disadvantages of motoring to a minimum they might in a few years be convinced that motors had come to stay, and wonder why they had been so suspicious. There might be some slight advantage in motoring in respect to public health, if the Medical Officers did not scorch, and if the comfort and convenience of other people were considered. There were advantages and disadvantages no doubt, but he considered the disadvantages were greatest.

DR. J. J. WEAVER said the dust question was very much a question as to the make of the cars, and road engineers and car makers would in time remedy that evil. He deprecated the crusade against the police and their methods, and said there were many reckless and careless motorists who ought not to be on the road. It would be an advantage if the police cleared the roads of such men. There was no sense in a man summoned for driving at 30 miles an hour saying he was only travelling at the rate of 10 or 15 miles an hour, because anyone ought to be able to tell the difference between the two speeds. His sympathies were with the police, and he hoped they would succeed in clearing the roads of the unmannerly men who drove motors to the discomfort of others on the road. The indirect advantages of motoring were to his mind greater than the direct effects. If horses were partially abolished some men who went to agricultural shows would spend less time in drinking bars, some of the evils of racing would disappear, and the half-drunken cabman would be superseded by a much smarter fellow. Motors sharpened the wits and improved the intellectual type of men engaged in locomotion. To take an unreasonable objection to motors was useless and childish.

DR. WILLIAM BERRY said he liked to ride behind something that had

life, that he could touch up with a whip; and that he could rely on his horse better than some of his medical friends with cars could be relied on. Nevertheless, he believed that motors had come to stay, though engineers must minimize the damage to the roads. The amount of dust, too, which caused irritation of the chest, must be lessened.

Dr. J. H. WILSON advocated the use of motor cars for Medical Officers of Health, and declared that breakdowns would become less rare as people became more used to the cars. He found that by using a motor car for his public work he had more time for recreation and for attention to other work. His own health was considerably improved, and he believed motoring, by finding something for the leisured classes to do, would contribute much to their general health.

Dr. C. B. HEWITT, Chairman of the Public Health Committee of the Cheshire County Council, spoke from the point of view of the public. He considered the discussion a valuable one, because it had been shown that a great responsibility rested upon engineers and others to devise means to diminish the amount of dust on the roads. He hoped that medical men possessing cars would set an example to other motorists in managing them. Undoubtedly a motor car was a rich man's luxury at present, though many medical men told him they found a motor car cheaper than a horse.

Dr. MEREDITH YOUNG said: Motors have done good by drawing serious attention to the dust problem. To deal effectively with this in these days of limited water supply, one must adopt a more lasting and cheaper method than dust-laying by water. The amount of water requisite for efficient dust-laying is greater than many persons imagine, and its effects are in the main injurious rather than beneficial from a public health point of view. One ton of water (224 galls.) will lay the dust over 400 square yards of macadamized road, or over 600 sq. yds. of paved streets. Taking a 24 ft. road this means that for one mile of it we require about 8,000 galls. of water to lay the dust on a macadam road, and about 6,000 for a paved road. With water it is necessary to use it on an average on 120 days per year. This means that we must use for macadam close upon a million galls., and for paved roads 700,000 galls. per mile yearly. Large numbers of preparations consisting of dust-binding oils emulsified with some watery solution have been introduced for the purpose of road watering and dust laying. The application of these is costly, owing mainly to the high cost of the preparation. Although the oil contained in the preparations costs little, the necessity of preparing the emulsion in a special works with sufficient care to render it stable, the necessity of transporting the emulsion and of providing special receptacles, makes the preparation costly to apply. The drawbacks connected with the high cost have been overcome in patents recently obtained by a Manchester man, who attaches to the watering cart a simple appliance through which water and oil in regulated proportions are allowed to pass before distribution over the road surface. This appliance consists simply of a small emulsifying machine driven from the axle of the watering cart, and which has the effect of reducing the oil to a very fine state of sub-division and forcing it out on to the road by the aid of a stream of water. The same effect, namely, the application of an emulsion of oil and water to the road surface, is got by the use of this cart, as by the application of any of the ready-made dust-laying preparations. But the necessarily considerable cost of these is, by the method I have alluded to, reduced to the mere cost of the crude oil applied. The cost of this new process for materials is thus only about one-third of those in which a ready-made dust-laying composition is used. Water of course

has to be used as a medium, but the amount required is less, and the number of applications can be reduced to nearly half: seventy applications yearly as compared with 120. The importance of these methods of dust-laying is likely to be emphasized in view of a recent outbreak of typhoid fever at Bridgend, stated by the Medical Officer of Health to be largely due to the dissemination of infection by dust. We all know of course of the large part probably played by dust in the causation of zymotic enteritis. The dust problem leads us still further and compels us to think of the more extended application of paved roads instead of macadam. The hygienic advantage of the paved road over the macadamized is sufficiently appreciated in a gathering of this kind. Sir Douglas Galton many years ago insisted upon this most strongly. The initial cost may be roughly put as follows (and I may say I have taken the trouble to have the figures verified by a Surveyor of considerable standing): Macadam, 21 ft. wide, 4s. per sq. yd. Tar Macadam, exclusive of foundation, 2s. 6d. per sq. yd. Tar Macadam, including foundation, 5s. per sq. yd. Granite setts depends on the locality: in Manchester district, including foundation, 10s. The life of the various types of road named are with average traffic: Macadam, 3 or 4 years; tar macadam, 3 to 10 years, and granite setts 15 to 30 years. The annual cost of maintenance is roughly: Macadam, 2½d. or 3d. per sq. yd.; tar macadam, 4d. to 9d., and setts ½d. to 1½d. The cost of scavenging in Stockport is: Macadam about 21s. per mile weekly, and setts 17s. This includes cost of sweeping, watering, removal and disposal of refuse, men's wages, horses, keep of horses, carts, etc., etc., everything included. I maintain therefore that though the paved road is greater in the initial cost, its reduced cost of maintenance, its smaller expenditure in scavenging, its freedom from dust, and its capability of being washed free of potentially dangerous microbes, is a better investment from the public health point of view than a macadam road, and that motors by drawing our attention forcibly to the dust problem have done us a real service, by bringing Sir Douglas Galton's day nearer, when washable, impervious paving will be the rule and not the exception. Just a final word on the ridiculous inefficiency of many water carts, practically all those at present on the roads. The water is delivered from a height of about two or three feet above the road, or whirled in a spray over a distance of five or six feet before it strikes the surface. The consequence is that the dust-laying water raises a cloud of dust as big as is done by a fast-running motor car. Many times I have had to close the windows of my hansom when driving about Stockport in the wake of a water cart to avoid being smothered with dust. The sensible water cart will deliver its water not more than one foot above the road, and will not spray it out at the sides as many do now. On a paved road the fall of water from a height on to the setts washes the jointing material loose in many cases, one of the reasons why many Surveyors object to the watering of paved streets.

DR. HALL (Lancaster) said since he took to motoring three years ago he had never missed an appointment and had never been able to do his work better. He had suffered from bronchitis and asthma, but he had found considerable relief by motoring. He considered the cost was not greater than the keep of a horse.

MR. W. FRENCH, M.A., F.I.C. (Principal of the Storey Institute), asked by the President if he had anything to say on the chemical side of the question, said he believed the idea of the laying of dust by chemical solutions was more or less of a myth. To his mind the question was not so much the laying of dust as the prevention of its being raised by motor cars.

DR. SETTLE offered the strongest opposition to motor-cars and motoring. He did not know how the distinction of "road hog" came to be conferred upon the motor-car, but he thought it distinctly appropriate, and the awful grunt they gave when they swooped down upon one showed that the word was not misapplied. They covered people with dust and poisoned them with fumes. He had often thanked heaven that he was born in an age of bicycles, but he had never thanked heaven for the coming of the motor car. By all means let them have balloons and aerial navigation, but let them draw the line at these infernal dust-raising and death-dealing engines.

DR. MARTIN (Gorton) pointed out the advantage to the public which the cycle and motor had produced, because their competition with the railway companies had induced the latter to offer cheap fares and greater facilities for people to travel about. They would see a similar advantage in agricultural traffic. Whereas in times past farmers had suffered from preferential rates given by railway companies to foreign goods, the effect of motor traction in agricultural districts would have an effect upon the rates charged by railway companies to farmers. The displacement of the breeding places of flies by the removal of manure heaps would be one of the beneficial indirect effects of the coming of the motor. Flies were a fruitful source of the dissemination of typhoid fever and diarrhoea. If we could bring about a lower death-rate by doing away with many sources of disease and infection, we need not much fear the lowering of the birth-rate of the country. He had looked up the statistics, and found that the accidents from horse conveyances were far more numerous than those from motors. He was prejudiced in favour of motors, and he could see a great advantage to public health if motors became more and more prevalent all over the country.

The PRESIDENT said that with the displacement of the horse would come the improvement of roads, and this after all was the basis of the whole thing; it must be recognized that a railroad was only an improved form of road. The dangers of motoring were two-fold: to life and to health. To life, due to excessive speed or to want of sobriety; to health, due to fumes and dust which affect the respiratory system, and to noise and anxiety which affect the nervous system. Excessive speed was largely a question of regulations, sobriety, and self-control. The objectionable fumes would soon be a thing of the past, for fuel would be so altered or adapted that they would be got rid of. The dust question was a more serious matter. Riddance of dust meant both improved roads and improved cars; the improvement of the material of roads rather than the laying of the dust after they had been made. If then we could get rid of the dust-making machine, that is the horse and cart, our greatest difficulty would be removed. The horse demanded a rough surface, and in destroying that rough surface made the dust which the motor car raised. The motor car required a smooth surface which could be made dustless. We must all recognize that motor cars have become a necessity of modern life, and that those who have become accustomed to use them are not at all likely to give them up; so the result will be cumulative. To those who would wish to stop the progress of motors he would say, be wise in time, and "Learn of thy necessity to reason thus, there is no virtue like necessity."

DR. HERBERT JONES, in replying, said that whether we had the motor car or not, we had the dust, and the organic matter it contained was intolerable. No one would argue that we should keep the dust as it was at present. Motoring was making the roads so bad that road engineers

were being compelled to make the roads better. A huge amount of infantile mortality was due to dust. Milk was often decomposed through dust getting into it, and the dust caused the decomposition because it contained organic matter. Much cruelty would be done away with by the advent of the motor, and the moral sense of people would be improved. Busy Medical Officers of Health in rural districts would also be able to do three days' work in one, and that would be an advantage. He referred to the action of the Medical Officer of Health who said he was in the habit of standing in front of all motor cars, waving a red flag, till their speed was reduced to seven miles an hour; then they might pass, because he had established his right to the King's highway.

THE AUTOMOBILE AND TUBERCULOSIS.—A French physician, M. Blanchet, advises the use of the automobile by consumptives. He claims that the rapid movement in the open air reduces the tendency to cough and improves the appetite. It causes refreshing sleep, the motion acting as a sedative to the nervous system, and the increased oxygenation assisting to the same effect. The dangers of the automobile are dust, which should be avoided, chilling the cutaneous surface, and over-doing the exercise by excessive speed. Great speed induces anxiety and enervates the patient.

TUBERCULOSIS OF FOWLS.—A. Weber and H. Bofinger (*Tuberkulose-Arb. K. Gesundheitsamte*, 1904, No. 1.—*Exp. Sta. Rec.*—A series of experiments was made for the purpose of gaining additional information concerning the identity or non-identity of mammalian and avian tubercle bacilli. Inoculation experiments were made with fowls, rabbits, guinea pigs, and mice, by the feeding, intravenous, hypodermic, and inhalation methods. The results of the authors' investigations may be summarized as follows: The avian tubercle bacillus, as a rule, shows morphological and cultural characters, which distinguish it clearly from the mammalian tubercle bacillus. Occasionally, however, the organisms appear to be identical in these respects. It appears that under natural conditions, tuberculous infection in fowls takes place through the alimentary tract. The avian tubercle bacillus is pathogenic to some extent for rabbits, mice, and guinea pigs. In guinea pigs, however, the progress of the disease is quite limited. The tubercle bacilli obtained from fowls retain their original pathogenic properties unchanged, after passage through the body of mammals. In the authors' experiments these organisms could be recognized readily after being cultivated in guinea pigs and mice for a period of from 1 to 2 years. A typical culture of mammalian tubercle bacilli was obtained from the organs of a parrot affected with tuberculosis. The authors also succeeded in obtaining a typical culture of avian tubercle bacilli from the caseified mesenteric glands of a pig, which otherwise showed no symptoms of tuberculosis. Under natural conditions, therefore, the authors were unable to find any tendency of the mammalian tubercle bacilli to become modified into the avian form in the body of fowls, or of the avian bacillus to become modified into the mammalian form in the body of mammals. No indication was found from their own experiments, or from the literature of the subject, that fowls suffer from tuberculosis of the ovaries, and it is therefore concluded that infection is not transmitted by means of the egg, but chiefly in the feces.