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Our City Streets.

FEW will doubt the fact that the average man in the present age enjoys greater comforts and a distinctly higher standard of life than his predecessors in the past. Generally speaking, science has made it abundantly possible to prolong human life, which is now less subject to disease, and its discoveries have been used to place amusements and light instruction practically within the reach of all. Transport has now become rapid and fairly safe, and the increasing appreciation of such amenities by the public supports huge industries, which provide employment both for skilled and unskilled labour. But it is equally manifest that the mechanical inventions which have rendered all these things possible have also introduced certain grave and objectionable features into our lives. It must be remembered that every material device, which distinguishes the present age from the last, is invariably noisy and sometimes even fraught with danger to the public when incautiously handled.

The streets and roads in Indian cities are becoming noisier every year, but there is still no general complaint that the noises have begun to affect human nerves and health. In India the street noises are comparatively a milder nuisance, but the danger to public health, produced by the insanitary conditions of the streets and the dust raised by the fast-moving vehicles, is always grave, and is not mitigated though most of the principal thoroughfares are asphalted. Indian towns and cities which were built in ancient times satisfy neither the principles of modern town planning nor the hygienic requirements of efficient and healthful urban life. The chief concern of the early builders was obviously to ensure protection for the towns against the aggressions of invaders, and with this object the houses were built contiguously and the roads were purposely made narrow and tortuous. In the early centuries when public life in India was frequently disturbed by the conflicts of rival parvenu chieftains, the mortal anxiety of the people was to protect their person and property in thick mud houses with small doors and smaller windows, and all built as near to each other as possible. Whether this mode of defence secured immunity from the raids of lawless criminals and free-booters might be doubted, but it is certain

that these types of buildings which effectually shut out air and light, laid the foundation of recurring epidemic diseases. The establishment of peace and security in the country under the British Rule has stimulated the expansion of trade and favoured the rapid multiplication of population, but till recently it has not affected the physical structure of towns and cities. The European community, which lived beyond the city limits from the time of Company Administration, could hardly visualise the unsatisfactory conditions under which the native population flourished, and even to-day the administrators of the country have only a vague apprehension of the squalor and maladies which afflict the extremely insanitary and congested quarters in the heart of towns. The intention underlying the transfer of municipal administration to local self-governing bodies is certainly entitled to praise, but the successful accomplishment of the task confronting the municipal commissions demanded knowledge, training, experience, imagination and financial resources which the councillors did not possess. In spite of such inadequate equipment, Indian municipalities have done a great deal towards improving the conditions of areas in their jurisdiction, but if more has not been done it is not their fault. The civic population has to co-operate and appreciate the efforts of municipalities in securing the amenities which make life enjoyable.

The introduction of motor cars, buses, lorries and trams into Indian cities without previously replanning them to receive these fast-moving vehicles, must naturally be attended by danger to public safety. This danger is two-fold. Modern traffic in the cities and towns has created a new environment to which the Indian population was not accustomed, and adaptation to it must be a question of time and long usage. The users of these new types of powerful automobiles only see in them machines made to give them comfort and speed, and hardly realise the potential damage they are capable of inflicting on the unwary public. Accidents under such conditions are bound to occur. Till the use of motors became general, the dust problem of large cities and towns used to assume menacing proportions only periodically just about the months when heavy winds continually swept over them, bringing in their train all manner of diseases. The recent preparation of certain roads for motor traffic has not, however, abated the acute-

ness of the problem, but on the other hand, the trouble has become more or less chronic. The tarred roads are always covered by a thin or thick layer of dust according to weather conditions; and the droppings of stray animals and the human defilement of streets and roads constitute a source of perpetual danger to public health. The unfortunate pedestrians are practically compelled to inhale the air heavily charged with them when disturbed by the passing cars, buses and trucks. What with the congestion in the towns and a continuous shower of unhealthy dust raised throughout the day, it is no wonder that the public health of large cities and towns is unsatisfactory all the year round. If every citizen will only take the minimum trouble, he has the means of protecting himself and his family from the dangers arising from dust on the one hand and from accidents on the other.

Almost every Hindu household in India used to observe till recently the custom, amounting almost to a religious practice, of washing with water the section of the road immediately in front of the principal door, both in the morning and in the evening, and to decorate the washed portion with elaborate decorative patterns with rice flour or quartz powder. The practice at one time was so general that even traders and merchants used to sprinkle the roads in front of their shops with water. This simple practice which was universal had the desired effect of mitigating the dust nuisance and cooling the air, but it has now almost disappeared. If it could be revived and the washing of the street could, with charity, be extended to the limits of the neighbouring houses, real public service of immense hygienic value would be rendered by every household, and the sanitation of the whole town would thus easily be secured, at least in part. The habit of throwing into the open streets offal and other rubbish, and the commission of nuisance in the close proximity of residential places at night and sometimes during the daytime as well, have developed recently to a tormenting pitch, and this is almost entirely due to the fact that the sense of decency and a correct knowledge of the harm done to public health by such acts do not form part of the mental equipment of the average citizen. People have to realise that these acts are deadly sins whose effects are visited on the residents of the whole street, and, that food thrown into

the drains supports the unwanted population of stray animals which contaminate the surroundings, besides being a nuisance in other ways. A street reeking with evil smell and full of fermenting heaps of rubbish must necessarily make life intolerable, and ultimately destroy æsthetic sense. Disposal of city refuse must, at all times, be a big problem for municipalities, but if every house sets apart a place where it is burned every day the hygienic condition of the street is easily and automatically secured. This must eventually lead to the diminution of the numbers of stray animals, and if simultaneously the beggar problem is solved by the combined efforts of the Municipalities and Government the dust on the city streets will undoubtedly become less offensive and dangerous. It is a duty which every citizen owes to himself and to the community at large to keep his premises absolutely sanitary, and it is almost fatal to suppose that it is his privilege to defile the streets and that it is the work of the municipality to tidy things for him. Every sanitary offence committed is an offence against humanity.

Schools and colleges have to develop this municipal sense in the minds of the younger generation. Large factories and business organisations which employ numerous workmen should insist on the strict observance of sanitary rules by the mill hands. The police constables on traffic duty and others whether in uniform or mufti should be warned to keep an eye on likely offenders, and the health officers of municipal corporations should be extremely vigilant in the exercise of the powers vested in them to prosecute people misconducting themselves from the viewpoint of decency and public health. But every one of these preventive and punishable measures can be evaded by the people if they choose, and if they are not deeply convinced that the health and the well-being of the town are their own making. If by a determined effort every householder in the town were to take measures calculated to keep his premises clean and wholesome, then he has a right to ask for protection against the noise and accidents due to reckless and negligent motor traction.

It is true that the volume of motor traffic in Indian cities has not assumed alarming proportions, but already the noise from this source is as acutely disturbing to the nerves as its speed is causing anxiety for public safety. Noise is to a large extent a subjec-

tive phenomenon, and reaction to it must be temperamental. Responsible medical opinion is agreed that, in general, noise is bound to produce serious effects, especially in the case of mental workers, young children, the nervous, the fatigued and the sick. The investigations of the Industrial Health Research Board in Britain have obtained conclusive results in regard to the effect of noise on industrial output. We cannot accept the statement usually made that the human system may become so accustomed to noise that we may cease to regard it as a nuisance. Noise is always distracting and may even become nerve-racking. It is a real menace to the efficiency of labour in every field, and the public is entitled to demand protection. In Indian towns and cities the road noises are bound to become troublesome in view of the peculiar type of structural material employed in the building of houses which are generally continuous. To judge by the evidence obtained by the National Physical Laboratory, the structure-borne disturbances travel to the buildings from the source for great distances, manifesting themselves on meeting resonant walls and rooms. Indian homes built on the old style, by their position with regard to each other in the same row and to those on the opposite, seem to be exquisitely adapted to receive every kind of noise and transmit it to the contiguous and opposite structures. Street noise has always been one of the minor horrors of Indian life, which, through ages of its insidious influence, has slowly undermined the physical and mental efficiency of the general public; and the problem assumes a grave aspect in view of the aggravating causes introduced by motor traffic.

The statistics of mortalities, published periodically by the Ministry of Transport, due to motor accidents even in European cities which have been replanned for this new mode of locomotion, and where generally people are alive to the dangers of indolence on the roads, must cause grave anxiety; and in the streets of Indian towns which are narrow and full of ruts and pot holes, and in which people move both slowly and incautiously, automobiles are capable of inflicting greater damage. The causes which are capable of producing accidents in India are far more numerous than in any country in Europe or America. The streets teem with a variety of stray animals which sometimes effectually barricade the road, and some of them have an inveterate habit of going off to

sleep right in the centre of thoroughfares. On account of the extremely congested quarters, children make use of the streets as their playground, and they generally become reckless to traffic conditions in their enthusiasm to pursue their games. School boys and college students ride their bicycles four or five abreast or walk in large bunches absorbed in discussing metaphysical problems, and totally oblivious of the traffic dangers through which they are passing. Vendors, hawkers and beggars, generally blind and defective in other respects also, are always in evidence tending to augment the general confusion. People from the villages, ignorant of traffic rules and intent more on admiring the interesting sights of cities which they visit occasionally, than on protecting their persons, are a grave menace to motor traffic. The vehicles drawn by animals such as bullocks and horses which ply on the narrow streets, are another cause of frequent accidents. In the larger cities like Calcutta, Bombay and Madras traffic has gradually come under the control of the police, but in the towns the offending public is prone to discuss matters with the traffic directors.

Motorists are not saints. The greatest danger to pedestrian traffic arises from nervous drivers and young people in charge of the wheel. The nervous motorist is always caught between two minds as much as the confused pedestrian in a critical situation, and the youthful drivers do not recognise the fact that spare parts of the human body are not procurable. The number of motor vehicles on the Indian streets and roads has not yet reached saturation point, but nevertheless the annual increase of cars, buses and trucks must directly aggravate the menace to public safety and well-being, unless steps are taken to protect the people.

It seems to us that the Road problems both in their magnitude and importance are sufficiently complex and serious to warrant the creation of a Ministry of Transport in

each Province to deal with every aspect of traffic. These problems are at once scientific and psychological. The existing practice of dealing with them partly through the police department and partly through the municipalities must be empirical. This new Ministry of Transport must be attached to the Noise Abatement Commission and Industrial Health Research Board, staffed by physicists, psychologists, physicians, lawyers and engineers. It may be said that proposals of this nature are premature, because in Indian cities the problem is not so serious as in London, New York, Paris and Berlin, but the level of noise and accidents is bound to rise year by year, and wise statesmanship should not wait till the torment becomes ungovernable.

The efforts of Government alone will not be adequate to grapple with the road problems, and the co-operation of the people is indispensable for their satisfactory solution. Every town should have a People's Health League for securing protection of the public against noise, dust and accidents. The league when established might find it advantageous to work in collaboration with the educational institutions. It is the younger generation who stand in most need of imbibing the principles of public health and cultivating road courtesy and a cheerful adherence to law. It ought to be the imperative duty of Scout and Rover corps to utilise every opportunity of assisting the deformed beggars and unsophisticated village folk whenever, either out of ignorance or incapacity, they trespass the rules of traffic. Every member of the Health League and all the Scouts and Rovers should be invested with power by Government to bring to justice offenders of traffic regulations and public decency. A clean and wholesome street implies sweet and hygienic homes and both are an insurance against epidemic diseases. The task of fighting them is largely in the hands of the people themselves.

"Physica."

THE new Dutch Scientific Journal *Physica* has entered upon its second year and we have received the first number of the second volume of this valuable publication. It was started with the object of giving greater publicity to the work of Dutch physicists

and the articles are published in English, French or German. The Board of Editors consists of such well-known physicists as P. Zeeman, D. Coster, W. J. de Haas, W. H. Keesom, L. S. Ornstein and H. A. Kramers. As is to be expected from such a list of names,

the articles appearing in the Journal are of great importance and interest. Particular interest attaches to the results obtained in the cryogenic laboratory in Leyden. the measurements of intensities of spectral lines initiated by Ornstein and the X-ray studies of D. Coster and his pupils. In the issue before us we have accounts of X-ray studies from D. Coster's laboratory and of

low temperature research carried out at Leyden. The Utrecht School is also represented. J. P. Schouten has an interesting note on a theorem in the operational calculus. We may confidently say that the high standard reached will be kept up in succeeding numbers. We wish the Journal a long and useful life.

Frost Hazard in India.

By L. A. Ramdas, M.A., Ph.D.,
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THE farmer knows how dependent his crops are on weather conditions. A good yield is dependent, amongst several factors, upon a sufficient quantity of rain, suitably distributed, during the growing season, as well as upon a favourable sequence of air temperature, humidity, soil temperature, etc. Experience tells us that there are optimum values for these factors and that excessive rain or drought, intensely hot or cold waves, extremes of humidity or dryness, are all equally dangerous to a growing crop. In the present note we shall confine our attention to the adverse effects* of cold waves in India and the frosts which occur during their incidence.

It may be pointed out that the phenomenon of frost is essentially a radiation† phenomenon during clear nights and occurs about the epoch of minimum temperature. In lower latitudes like ours the soil is usually warmer than the air layer above it so that the latter has to cool by radiation to the colder air masses in the upper atmosphere. If there is air movement at night the stratification due to radiative cooling is upset with the result that the air temperature will not fall as rapidly as when the air is stationary. During winter at most places the mean air temperature at sunset is too high for nocturnal cooling even during

favourable nights to cause frost on the next morning. This is, however, possible on days when the temperature at sunset is sufficiently low, e.g., when the country is invaded by a cold wave from the north.

The northern parts of India are visited by cold waves during winter. The cold waves usually come in the wake of the western depressions which enter India, at intervals of about a week across the north-west frontier and Baluchistan and move eastwards through the Indo-Gangetic plain towards the north-east frontier of India. The origin and structure of the winter depressions have been the subjects of many investigations, notable contributions having been made by Hemraj,¹ Walker and Kameswara Rao,² and recently by Banerji.³ It is now an established fact that the winter depressions which invade India are associated with the family of depressions which originate at the partition in the Atlantic regions between the warm and moist equatorial air and the cold air of the higher latitudes.

The approach of a winter depression is heralded in North India by the appearance of high clouds, and the rise of air temperature associated with air movement from the south. Later, the clouds lower and drizzling weather ensues. So long as a place lies in this "warm" sector of a depression there is no likelihood of a conspicuous fall in temperature. The passage of the "warm" sector eastwards is followed, however, by the "cold wave" during which northerly

* For two interesting accounts of the damage to crops during frost please see Bulletin No. 165 of 1930 by K. V. Joshi, Department of Agriculture, Bombay, and an article on "The Effect of Frost on some crops at Pusa" by R. D. Bose, *Agriculture and Live-stock in India*, 1933, 3, 555.

† The loss of heat by radiation experienced by a layer of air during the night depends upon the amount and distribution of water vapour in the atmosphere. This problem is being discussed in a forthcoming paper.

¹ *Indian Meteorological Memoirs*, 21, Part 7.

² *Ibid.*, 24, Part 2.

³ *Meteorology of the Persian Gulf and Mekran*, by B. N. Banerji; special brochure published by the Indian Meteorological Department.