may cause the valve-lesion. The evident chronicity of the cardiac condition, even assuming that it was not congenital, would seem to point to the renal disease being secondary in this case; but, when established, it would react on the heart, causing hypertrophy of its left ventricle.

W. P.'s history favours congenital malformation of the heart. He had always had cardiac symptoms. He had never had any sudden onset of severe symptoms, such as mark communications between the two sides of the heart from ulcerative perforation or the giving way of a segment of the aortic valve. The renal disease doubtless increased the cardiac embarrassment, and probably was the penultimate cause of death. The murmurs, which were very loud, and the purring tremor, which was intense, were characteristic of a communication between the aorta and pulmonary artery; they were probably due in this case, in chief part, to the to-and-fro current of blood through the aperture of communication between the aorta and pulmonary artery; the systolic murmur being heightened by the flow of blood through the septal aperture; the diastolic by regurgitation from the aorta into the left ventricle.

I have to thank Mr. Harvey Smith for assisting me in taking notes of this case.

CASE III. *Communication between the Two Ventricles of the Heart: Two Aortic Segments.*—W. S., aged 8, was brought to the hospital May 27th, 1880, in a moribund condition with enteric fever, of which he died shortly after admission. His mother said that, up to the time of the fever, he had been a strong boy, and had had no illness except an attack of bronchitis the previous winter. He had always complained of coldness of the hands and feet.

Post mortem, the heart weighed seven ounces. On laying open its left side, the ventricle was seen to be dilated and hypertrophied; the mitral valve was sound; the aorta free from disease. The aortic valve had but two segments; these were greatly dilated and one was a third larger than the other. The larger one showed no signs of subdivision. A small portion of both segments was thickened; the thickened portion was at their attached margin, where they formed part of the boundary of an aperture in the septum ventriculorum. The rest of the segment was sound. In the aortic sinus corresponding to the larger segment was the origin of the two coronary arteries. In the septum ventriculorum, between and below these two segments, was a smooth, round, membranous aperture, around which were some small vegetations; one, resembling a polypus, arose on the rim of the aperture, and permitted of being pushed to and fro from one ventricle to the other. On laying open the right side of the heart, the ventricle was seen to be slightly dilated and hypertrophied. The tricuspid and pulmonary valves were sound. The aperture in the septum was half an inch below the pulmonary valve. On the inner surface of the wall of the ventricle, over an area the size of a sixpenny-piece, was a cluster of vegetations; they were situated exactly opposite to the septal aperture. The ventricle elsewhere was free from vegetations. The spleen was enlarged and soft; the intestines ulcerated; the other viscera normal.

The explanation I would offer of this case is, that one aortic segment was congenitally absent; that, during fœtal and infantile life, the two segments by dilatation were competent, or nearly so; but that, as the heart and large vessels increased in size, regurgitation took place, causing hypertrophy and dilatation of the left ventricle. The aperture in the septum I regard as a flaw in development, looking upon the septum as an "imperfect septum". The vegetations around the septal aperture, and the thickening of that part of the two segments which helped to form it, were, I venture to think, the result of extraordinary strain on that part, and the loitering of blood about it consequent on the lateral current through the abnormal aperture. Increased tension of the two aortic segments from the absence of one segment would explain the dilatation of these segments. The vegetations in the right ventricle being confined to a limited area, and being situated exactly opposite to the septal aperture, would make it appear that they had been caused by blood driven through that aperture, and impinging on the wall of the ventricle. This case seems to come into the category of those cases where congenital malformations of the heart are followed by morbid changes in that organ. The abnormality of the circulation probably leading to the disease, the morbid changes may take the form of dilatation, or thickening of valves, or vegetations, or aneurysmal dilatation of congenital apertures, or alterations in the walls, or capacity of the chambers of the heart—a class of cases exemplified also by Cases I and II. I would point to certain features common to this case and Case II: 1. The existence of but two segments of the aortic valve; probably the result of defective development. 2. One of the existing segments is larger than the other, and is subjacent to the sinus of the aorta giving off the two coronary arteries. 3. The existence of an aperture in the septum ventriculorum; probably congenital. 4. The presence of morbid changes in the aortic segments and in the heart; probably secondary.

I have to thank Dr. Barling, the pathologist, for an account of the *post mortem* of this case.

THE NEW YORK AMBULANCE SYSTEM.

By BENJAMIN HOWARD, A.M., M.D., F.R.C.S.E.

IN the system for the care of emergency cases within the Metropolitan district of New York, there are observable a promptness, ease, and thoroughness not only interesting, but suggestive. This system unites municipal authority with voluntary effort, and affords an exceptional illustration of the efficiency and harmony possible to such combination.

Although not so designated, practically the Chief of the Ambulance System is the Chief of Police. The principal general hospitals which have been placed at his service, accept the regulations imposed, and thus the hospitals in question supplement the single government "House of Relief," and these together form a circle of hospitals at the centre of which is the office of the Chief of Police in telephonic communication with them all. The Chief of Police at any moment, day or night, can have an ambulance from any or every one of these hospitals, at any given spot, as certainly and as quickly as the Chief of the Fire Department can have a fire-engine from any Fire Brigade station at a designated point in a corresponding emergency. For the sake of conformity in this plan, the hospital-buildings erected since the organisation of this system, have included the most careful adaptation to it; while the older hospitals have received corresponding alterations.

On the occurrence of a surgical or medical emergency, information, whether by a policeman or a civilian, is at once given at the nearest police-station; this is telegraphed to the central head-quarter police-office. The officer receiving the telegram can see a chart before him, in which hospital district the emergency in question has occurred, and telephones the call and address to the hospital to which that district belongs.

While I was talking upon this subject in the office of the superintendent of the recently built New York Hospital, the conversation was stopped by a shrill whistle. A telephonic message having been received, and as quickly answered, the superintendent remarked that the message was an emergency call. Following him on a run down a flight of stairs, and under a covered way across an inner courtyard, a surgeon was seen to step into an ambulance, which passed almost noiselessly along the concrete way under the arch and into the street. As the superintendent had telephoned both driver and doctor, before he had explained to me the nature of the interruption in our conversation, while we were simply putting on our hats, the ready harnessed horses had been put in, the doctor had got the start of us, and I had nearly missed the performance the superintendent had asked me to witness.

The ambulance, on returning, comes in from an opposite direction, and stops under the large *porte cochère* on the opposite side of the court, at the door of the reception or accident ward. This room, is supplied with every surgical convenience: operating table, instruments, dressings, hot and cold water, and beds, while opening into it are bathrooms and small bedrooms, all at a constantly agreeable temperature. According to expediency, the patient may remain a longer or shorter time comfortably where he is, be put into a private room adjoining, or be transferred on the lift direct from the table to an ordinary ward above. If, on the other hand, the case be a trivial one, the ambulance takes him at once, or as soon as he may wish, to his own home.

The ambulance-surgeon, immediately on returning to the hospital, according as the case may be surgical or medical, notifies the house-surgeon or house-physician, who then takes entire charge of the case. Before attending to any other duty, however, the ambulance-urgeon enters in a book, kept for that purpose, time of call, start, arrival, departure, return, and such details of history and diagnosis as a coroner's jury might possibly require.

The ambulance-wagons are drawn by two good horses, with light harness; and on the street the driver, by common consent, has the right of way. The vehicle pretty uniformly adopted is in every particular as light as is consistent with its use. Its floor is very low, and the bed, which is on rollers, is by means of sliding handles used as a stretcher also. The roof and curtains are of white duck, which is so extended as to afford good shelter to the driver. Within is a comfortable seat for the doctor, where, if he wish, he can watch the patient *en route*. In the box of the ambulance are all such stores and appliances as are deemed expedient for possible use.

This system seems to have the merit of great equality of advantage.

1. To the municipality, it offers relief from all care of the cases in question, and without cost for horses, ambulance, or treatment.

2. To the hospital surgeons, it supplies the kind of cases especially desired by those who are teachers.

3. To the patients, it secures prompt help, and the most skilful attendance.

The municipal element in the system maintains in all concerned the consciousness of accountability, while the voluntary element in the system quickens between the several hospitals a lively emulation. Take it all in all, the ambulance system of New York is creditable, both to the medical and to the municipal authorities of the city, presenting an unique example of an efficient and harmonious combination of municipal and voluntary effort, which seems to yield satisfaction to all concerned.

As the city which, for the protection of property, boasts the best fire department in the world, must sooner or later follow its higher instincts and traditions in having a system correspondingly complete for the protection and care of human life also, it is possible that some of the above facts will afford memoranda which may be of service in the organisation of the future Ambulance Department of London.

THE USE OF ELECTRICITY IN EAR-DISEASE.*

By E. WOAKES, M.D.

IN discussing the subject of the use of electricity in diseases of the ear, I shall refer to it—first, as a means of diagnosis; and secondly, as a remedial agent.

As regards the value of electricity for the purposes of diagnosis in ear-disease, you will at once recall the experiments of Dr. Brenner at St. Petersburg, first made known about twelve years ago by the publication of his work on *Electro-Otiatrics*, a very fair *résumé* of which is given in Dr. Burnett's treatise on the *Ear*, and also in Dr. Roosa's last edition. You will remember that this work was the result of ten years of careful study, and therefore the conclusions arrived at are entitled to the weight which such exhaustive examination by a competent observer must always demand. The outcome of this study was, that the auditory nerve could be excited by the electric current, which in the normal state responded to it by certain constant phenomena; and that these phenomena were reduced to exact formulæ for the guidance of others, who would ascertain by means of electricity the state of the nerve of audition.

That Brenner's conclusions should meet with opposition, is only what may have been expected. Without desiring to prejudice the discussion, I shall state very briefly two points which seem to my mind fatal to the sufficiency of the experiments, and therefore to the conclusions deduced from them.

The conditions of the experiment make it probable that the auditory nerve is not reached by the current at all. The reasons for this conclusion are, that, when a nerve is superficially placed, covered only by integument—*i.e.*, when the electrode is applied to it—a very considerable portion of the current is diffused in the surrounding tissues. Bone being a bad conductor, this loss of electricity, de Watteville and Hitzig argue, not taking place, increases the probability of the current reaching the auditory nerve. (The electrode is placed in the external canal, previously filled with water.) But the current must previously affect other nerves within reach—the branches of the fifth—and reflexly excite spasm of the tensor tympani, before it reaches the auditory nerve. Now, the effect of exciting a powerful contraction of the tensor tympani is to make pressure through the stapes on the intralabyrinthine fluid. Dr. Weber-Liel of Berlin has pointed out to me that direct pressure over the stapes, when this bone is exposed by means of a probe, is accompanied by a sound which the patient experiences, resembling "ting-g-g". The correspondence between this sound and that produced by Brenner, and understood by him to imply a normal reaction to galvanism of the auditory nerve, is very significant. At any rate, it leaves one's mind in a state of doubt as to whether Brenner's normal reaction was not the result of inducing contraction of the tensor tympani in a healthy ear, seeing that such contraction, when in excess of what occurs in response to ordinary stimuli, is undoubtedly associated with a sound; that is to say, the sound is due in both cases to mechanical pressure, and not to electric excitation of the auditory nerve.

Another point, which stands somewhat in the light of a corollary to the preceding, is this: the supporters of Brenner's hypothesis attach great importance to the fact that, when the test is applied to a badly diseased ear of long standing, the phenomena do not occur in that ear, but in the opposite one, to which no electricity is applied; or they occur in both ears in a reverse order. The current is here supposed to pass along the partially paralysed auditory nerve of the diseased side, and to be transferred to the other and unaffected nerve by communications at their origin. Now I think there is another explanation, and a more reasonable one. It is very rare for an old-standing case of ear-disease to be free from paresis of the tube-muscles on the affected side. Now, if the conclusion at which I have already arrived hold good—viz., that the sound in question is the result of contraction of the tensor tympani—it is very obvious that, if this muscle be paralysed, or only partially paralysed, on the side to which the galvanism is applied, it will fail to react to the stimulus, or will react partially, or differently from what it would do otherwise. It is not improbable, under these circumstances, that the current would travel to the opposite branches of the fifth nerve; and that contraction of the tensor tympani of the opposite ear would ensue, and give the ordinary result in this, the unaffected side. That such cross action of a stimulus in the case of the fifth nerve does occur, is borne out by the following suggestive fact. A lady about fifty years of age, suffering with deafness and paresis of the tubal muscles of the right ear, not of an extreme type, states that, when she bites a crust or hard substance on her *left* upper second bicuspid tooth, she gets a distinct momentary ringing sound in her *right* ear. She is an intelligent common-sense person, not at all likely to imagine the symptom; and the statement I have repeated was volunteered to me. I need not stay to point out that the connection here can only be through the fifth nerve, and that it was transferred to the opposite side; thus establishing, as far as it goes, the possibility of a sound being excited through this nerve in the opposite ear.

"Professor Hughes's audiometer is an instrument for exactly measuring the power of hearing, and chronicling the progress of recovery from deafness." In the *Practitioner* for May 1880, Dr. Richardson is reported to affirm that it "may be used to differentiate between deafness through the external ear and deafness from closure of the Eustachian tube—throat-deafness; or to determine the value of artificial tympanums in instances of deafness due to imperfection or destruction of the natural tympanum." Others speak of it as an expensive and imposing toy. I cannot say that I am in a position to throw any light upon these extreme views, though I trust the discussion may do so.

I now have to consider the value of electricity in ear-disease, considered as a curative agent simply. I do not know how far the experience of other otologists corresponds in this respect with my own, but I am quite free to confess to a growing recognition of the paramount import of muscle-paresis as a chief factor in the causation of deafness and its concomitant symptoms in a very large proportion of those cases of the disease which occur in adult life. To Dr. Weber-Liel of Berlin is undoubtedly due the credit of having first pointed out this important fact in his work entitled *Progressive Schwerhörigkeit*, published in 1873. Three years ago, before I became acquainted with this work, I had quite independently arrived at the conclusion that paresis of muscle was in some way concerned in the production of the symptoms referred to, because I met with quite a number of cases in which these symptoms were associated with marked paralysis of the palato-tubal muscles. It is true that most of my cases presented some marked divergencies, as regards simply aural conditions, to those described by Weber-Liel; and I presented the first *résumé* of them to this Section in a paper which I had the honour of submitting to it last year at Cork. It would be beside my duty on this occasion to occupy your time with further details on this subject; suffice it to say that there appear to me two distinct phases of paralytic affections of the auditory apparatus—viz., that described as "progressive" deafness by Weber-Liel, and that which I have elsewhere described as "paretic" deafness. Now the importance to our present purpose of these observations, resides in the fact that it is in these paretic aural affections that galvanism will be found of essential service. That is to say, it is in the treatment of deafness in adult life, when this acknowledges a more deeply seated constitutional lesion of the nervous system, that the true province of electro-therapeutics, as it relates to otology, will be found to lie. Speaking strictly within the limits of my own experience, I have to regret that, even in this large class of cases, the use of electricity is essentially a limited one. The reason of this resides in the fact that we seldom meet with uncomplicated cases; for it is inherent in the nature of any affection which interferes with the function of the Eustachian tube—as paralysis of its muscles does—to induce a greater or less degree of passive congestion of the middle ear. Now it has been conclusively shown by the experiments of Morant and Destre, a detailed account of which will be found in the *Comptes Rendus*, 1878, that, after galvanising motor nerves, there follows considerable hyperæmia in the tissues to which the branches are distributed, which condition

* Read at Cambridge to introduce the discussion on this subject at the Otological Section, August 1880.

"It's first-rate cologne," answered Gray, "although it's pretty strong."

Ammonia was placed to his nostrils, and he was informed that it was water. He poured some on his hands, smelled the liquid, and said it was undoubtedly water. A number of other experiments illustrating this condition were made.

Chemical Examination of Drinking Water.

We quote the following from the *Bulletin* of the National Board of Health:—

A careful study of the chief methods in use for the chemical examination of potable water, so far as organic matter is concerned, has been undertaken by order of the National Board of Health. It is particularly requested of the correspondents of the Board, of medical men throughout the country, and of others interested in sanitary matters, that any well-marked case of disease which may seem, on medical grounds, fairly attributable to organic impurities in drinking water be promptly reported to Dr. J. W. Mallet, University of Virginia Post Office, Albemarle County, Virginia, with a few lines stating clearly the medical nature of the case, and the character of the evidence on which the water in question is suspected of having actually caused disease in persons who have used it.

It is further desired that a sample of each such water be forwarded for examination, but not until notice has been received from Dr. Mallet that the analysts are ready to proceed with it, since it is important that no useless delay should occur between the shipping of the sample and its investigation in the laboratory. In notifying any one who may be able to furnish specimens of suspected waters that may be forwarded, clear instructions will be sent as to the quantity of water required, and the mode of collecting, packing and shipping it.

It is particularly desired that no case be presented on doubtful or vague evidence, since one important object of the inquiry demands that all such be rejected, and only those cases examined which involve the strongest grounds for believing that mischief has really been caused by organically foul drinking water.

The cost of packages and transportation for samples will be borne by the Board of Health.

The Medicine of the Talmud.

A French writer gives some curious extracts from the medical portion of the Talmud. Most of the opinions expressed by its authors indicate, as might be expected, very imperfect observations. For instance, they believed that the urethra presented throughout its length a fine septum which divides it into a spermatic and a urinary canal. They believed that by long retention of urine this septum might be rent, and a fistulous opening between the two canals result—a "spermatico-urinary fistula"—which would render a man sterile. Hence they drew the useful lesson that there should be no avoidable delay in micturition.

The physiology of the Talmud is grotesque enough in some particulars. "The kidneys give advice, the heart understands, the tongue produces articulate sounds, the mouth completes them, the œsophagus receives and rejects food, the trachea produces the voice, the lungs absorb liquids, the liver is the seat of rage, and the gall-bladder throws bile upon it and calms it, while the spleen is the seat of laughter." Among other duties of the learned doctors was the superintendence of the slaughtering of animals. Arguing from their physiological knowledge that the trachea and œsophagus are the structures most essential to life, they ordered that all animals should be slaughtered by the division of these only. A certain Rabbi, having observed that this was not a very speedy mode of death, suggested the division of the blood vessels of the neck, but his advice was overruled.

The therapeutics of the Talmud consist almost wholly of hygienic rules, although one sage recommended bleeding every thirty days, as a preventive of disease, and he also indicated certain days of the year and week on which venesection was most advantageous. The opinion ascribed to Rabbi Banaah may, perhaps, have been general. He said: "Wine is the best of remedies; it is only where there is no wine that drugs are necessary."

The Night Medical Service in New York City.

Dr. Henri Nachtel, to whom is due the night medical service in New York City, has just addressed the Academy of Medicine, in Paris, in regard to our system of ambulances. Dr. Nachtel, who has thoroughly studied the method of transporting those suffering from accidents in New York to the hospitals, is loud in his praises of the rapidity and efficiency with which the system is carried out. In France, the method of transporting the wounded through the streets seems to be of the most primitive kind. In Paris, when a wounded or ailing man is found, policemen take charge of the person, and he is carried to the nearest apothecary. Though Police stations abound in Paris, a person suffering from an accident is never carried there. A litter has to be hunted up, and then porters found, who transport the person either to his house or to the hospital. Before all this can be accomplished, minor accidents, for want of immediate attention, become of the most serious character. Dr. Nachtel thinks even that deaths frequently occur in Paris from want of celerity in the transporting of patients. In dwelling on the many advantages of the New York ambulance system, Dr. Nachtel expressed the hope that our method might be adopted in Paris. A commission, composed of MM. Larry, Legouest, Vulpian, and Chereau, was appointed by the Académie de Medicine to study the whole subject. It will be pleasant to know that Dr. Nachtel has been the means of introducing into Paris the New York ambulance system.

Shall We Shave or Not Shave?

It seems, from a note in the *Lancet*, that the tendency in England is to go back to the shaven faces of our ancestors. That journal writes on the hygienic aspect of the question as follows:—

This leads to the question, what is the first essential to one who would make this innovation in behalf of a higher appreciation by the people of the true professional character of the services rendered by the educated, skilled and conscientious dental surgeon?

We will answer briefly. He must present himself as one capable of something higher than a rubber plate maker, tooth puller, or a tooth filler, either as a "new departurist," or as a contourist.

Neither one of these, nor all combined, practiced never so faithfully and conscientiously, can leave other impression upon the patients mind than that dentistry is mechanical and that the dentist is to be held to account for his work just as the plumber or gas fitter.

We regret to say that the great majority of medical men are as little conversant with the aim, object and results of intelligent dental practice, as are the patients, as is evidenced by the frequent cases of blind treatment of facial neuralgia, antral disease, alveolar necrosis, Rigg's disease, and other diseases not so intimately connected with the oral cavity. These cases fall into our hands more frequently by accident than by intention of the medical adviser, and why does he not seek advice or assistance from the dentist? Because not more than one in a hundred of them know that dentistry is not confined to the strictly mechanical treatment of the teeth.

One of the objects of this journal is to bring before the eyes of the medical profession, the full scope of the work of the educated, progressive D. D. S., to bridge the chasm, which now separates us, and thus to establish a sympathy, based upon actual knowledge of dental surgeons' work, which shall make medical men co-workers, instead of depreciators and antagonists.

The good to be accomplished will be reciprocal, for, as expressed in a letter to us by an eminent dental surgeon and educator; "*The peculiar need, both of the medical and dental professions, is just such a journal. The former needs to know about dental matters from the special standpoint. The latter requires that broadening of views which can come only out of an introduction into the field of general medicine.*"

And this opinion has been reiterated by many of our correspondents from amongst the leading lights of our specialty.

THE NEW YORK AMBULANCE SYSTEM. — The New York ambulance system is undoubtedly the most perfect in the world.

It originated about ten years ago, the first one being used at Bellevue Hospital. Previous to that time what were known as "sick-wagons" were used, which were slow, lumbering affairs, not unlike an ordinary grocery wagon, and in marked contrast to the present brightly varnished, gilt-lettered ambulances which may be seen at almost any hour of the day dashing through the streets at what sometimes seems to be a perilous speed. The calls were also much longer in reaching the hospitals then than now, as the present perfect telegraph system, by which a call can be instantly sent from any police station to any of the larger hospitals, was not in use. If the case be an urgent one the call can be sent from the nearest fire alarm box, by which means valuable time is frequently saved. Under such circumstances it is called a "fire-call," and is transmitted to all of the hospitals, and the ambulance which first arrives claims the case. The ambulance surgeons and drivers are on duty both night and day, and seldom require more than two minutes to get in readiness for the start. A tourniquet, bandages, carron-oil and medicines useful in emergencies are always carried, and important services are frequently rendered before the hospital is reached. About two years ago an ordinance was passed, giving ambulances the right of way "against all persons, vehicles or animals," and since then but little obstruction has been met with, and the efficiency of the service consequently much increased. The introduction of ambulances was an important step in hospital management, and they certainly could not now be dispensed with.

THE AMERICAN PUBLIC HEALTH ASSOCIATION.—In our last issue we promised to recur to the presidential address of Dr. White before the American Public Health Association, with a view of discussing some of the problems that meet us in the consideration of the question: "What constitutes sanitary science?" Dr. White has however discussed the whole subject in such an interesting manner, that we refer our readers to the address itself, which we publish in part in our *Popular Science Department.*

It will well repay perusal for its statements of fact and its keen criticisms of many of our sanitary methods and theories, as well as for the witty and striking manner in which his suggestions are offered. Dr. White is one of the *practical* sanitarians of the country, and in his work in New Orleans, both as president of the Board of Health,

AN ELECTRIC AUTOMOBILE AMBULANCE

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THE FIRST AUTOMOBILE PATROL WAGON.

The town of Akron, Ohio, lays claim to the distinction of having constructed the first automobile patrol wagon ever used. The wagon in question was not made by a horseless carriage manufacturer, but was designed and built by a local mechanical engineer, Mr. Frank P. Loomis.

The vehicle is driven by two four-horse power electric motors, geared in the usual manner with the rear wheels. Current is supplied by an accumulator of 40 cells, stowed beneath the seats of the vehicle in four sets of ten cells each, and grouped as the driver may desire by means of a controller within reach of his left hand. A meter at his right hand indicates the amount of current at his disposal.

The steering mechanism consists of a hand-wheel, the vertical shaft of which is connected by a segmental gear with a fifth-wheel provided with roller bearings.

The braking devices comprise two sets of friction rollers forced into engagement with the tires of the rear wheels by means of a foot-lever, and a band-brake connected with the gearing of the rear wheels and controlled by a hand-lever beneath the steering-wheel in front of the driver.

The wagon body is 10 feet long, 4 feet 4 inches wide, and is supported on rubber-tired wooden wheels carried by roller-bearing axles. The vehicle has a maximum speed of twenty miles an hour, weighs 5,500 pounds, and cost the city of Akron about $3,000. For our descriptive matter and illustration we are indebted to Mr. E. J. Hoskin, of Akron, Ohio.

THE FIRST AUTOMOBILE PATROL WAGON.

A New Variable Star in Algol.

Another remarkable variable star of the Algol class has been discovered by Mme. Ceraski. From an examination of the Draper Memorial photographs of this star, it appears that while the star has its full brightness on 45 of them, on several of the early photographs it is so faint that they must have been taken when the star was near minimum. The Moscow photographs furnish the means of determining the periods from an interval of four years, the Harvard photographs increase this interval to nine years. Five stars of the Algol class, S Cancri, U Cephei, W Delphini, +45°3062, and the star referred to are specially interesting, says Prof. Edward C. Pickering, owing to the large variation in their light, which amounts to about two magnitudes in each case. It is remarkable that two of these were found by Mme. Ceraski, and one by her distinguished husband.

AN ELECTRIC AUTOMOBILE AMBULANCE.

The ambulance service in our American cities is the model one of the world, so that it is little wonder that we are to have what is probably the first electric ambulance, certainly the one we illustrate is the first ever built in the United States. There are many reasons why an automobile ambulance has marked advantages over the horse vehicles. It is capable of greater sustained speed, and when the destination is reached no care has to be paid to the steaming horse, and both surgeon and driver can devote their attention to the injured person. Accidents to ambulances are of frequent occurrence, owing to their speed and their right of way, but electric vehicles can be stopped in their length, Every second is of importance to an injured person, and speed and ease of riding will undoubtedly soon make them a great favorite among hospital authorities. Another feature of interest is the lower cost of maintenance. An ambulance is usually idle twenty or more hours out of the twenty-four, and this gives ample time for charging the batteries. There is no time lost in hitching up, and the stable may be in the hospital proper, without the dangers of stable odors.

The electric ambulance shown in our engraving was built by F. R. Wood & Son, of New York city, for St. Vincent's Hospital. It is handsome in appearance, being well finished. The openings are all inclosed with beveled plate glass windows which open or close with ease. The vehicle is steered from the front wheels and is propelled by two 2-horse power motors, which are suspended on the rear axle. The current for the motors is supplied by 44 cells of storage batteries and it is managed by a controller placed under the seat entirely out of view. This controller permits of three speeds ahead, 6, 9 and 13 miles per hour, and two speeds to the rear, 3 and 6 miles per hour. The radius of action of the ambulance is 25 to 30 miles.

The Wood pedestal gear is used, making it possible to have the body low, which is essential in an ambulance, and adds to its appearance. All the fore and aft bending strain on the springs is relieved by the pedestals sliding vertically up and down on the pedestal box. The driver is in immediate communication with the surgeon by the aid of a speaking-tube. The inside trimming is of leather, and the bed slides out, and being caught by irons, stands out parallel with the sidewalk, thus enabling a patient to be placed upon the bed without the necessity of being jolted, which is inseparable to the use of stationary beds. The inside and outside electric lights are of ten-candle power each. The mountings are all of brass.

NEW ELECTRIC AMBULANCE FOR ST. VINCENT'S HOSPITAL, N. Y. CITY.

Experiments With Decimal Instruments in the French Marine.

The experiments which were commenced last June on several vessels of the French navy at the Naval School at Brest, and in several hydrographic schools, for the purpose of studying the advantages of the employment in navigation of the decimal measures of angles, will, according to the original programme, close at the termination of February, 1900.

The correspondent of The Moniteur de la Bijouterie et de l'Horlogerie says:

We are happy to recall the fact that the instruments, maps, sextants, compass roses, decimal chronometers, etc., which are employed, appeared at the exposition of the apparatus for the measure of time and angles, graduated according to the decimal system.

This exposition was organized on the occasion of the congress of the scientific societies at Toulouse by the Geographical Society of this city, at the instance of M. De Rey-Pailhade, ex-president, and the promoter of this important reform, of which the success is now certain. The numerous instruments exhibited forcibly drew the attention of all interested, and particularly of General Sesmaisons, commander of the 17th Army Corps. The experiments are under the direction of Captain Guyon, a prominent member of the Bureau of Longitudes, who was appointed by the Ministerial Commission on Decimalization.

Each experimenter will present a detailed report to the Bureau of Longitudes on the employment of the new decimal units of angles. That learned body will publish a resumé of the experiments for submission to the decision of the International Congress, specially charged with the consideration of this subject.

The scientific societies of our city which, during the revolution, was one of the first to adopt the decimal division of time, will follow with interest the results of this truly scientific event, this effort for the extension of the work of the immortal creators of the decimal metric system.

The following incident shows the value that was attached to the decimal time:

Antoine Alric, a watchmaker of Toulouse, was arrested and imprisoned on December 7, 1793, for having "uttered his aristocratic opinions on all occasions." Alric had devoted time to the decimal hour, which had been encouraged by a decree of the National Convention on the 21st Pluviose of the year 2, establishing a public competition of decimal watches. The Toulouse Committee of Safety, of whom the watchmaker had demanded his liberty, reported to the national agent: "We do not think that Alric, watchmaker, deserves to be set free; but we will engage him to execute his plan as to the decimal watches." Alric was discharged on the 10th Fructidor, year 2, as more talkative than dangerous.

At the congress of the societies there was a beautiful clock, which, through the ingenuity of M. Raffy, presented simultaneously the ordinary hours and the decimal time by means of divisions and bands in two colors; every body understood the decimal time at the first view. This remarkable timepiece realized the wish expressed by the municipal authorities of Toulouse, at the sitting of the 15th Fructidor of the year 6, that, "The clock of the capitol should indicate both the decimal and the duodecimal hours, in order that the public should understand their relations to each other."

It is interesting to remember that the new experiments take place at exactly a century after the establishment of the metric system. It was on April 23, 1799, that the commission of the national convention, charged with the preparation of the meter, completed its work. On June 22, 1799, the meter and the kilogramme in platina were presented to the united legislative body. On December 10, 1799, the second law constituting the decimal metrical system was enacted, fixing definitely the values of the meter and the kilogramme.

Our Coal Production.

The fact that the United States has become the world's greatest producer of coal, and at a cost for production far below that of any other part of the world, is attracting great attention, especially from British producers and consumers of coal. The present output of the United States is larger than that of the United Kingdom, and coal can be bought in America at the pit mouth at $1.18 a ton as against $1.36 paid in Great Britain. The result is that people in Lancashire are talking about bringing coal from America to Lancashire. In 1870, the United States produced 86,806,560 short-tons, and in the same year the United Kingdom produced 123,682,935 short-tons. In 1880, our production of coal had risen to 71,481,569 short-tons, while that of the United Kingdom was 164,605,738 short-tons, and in 1899 the total amount of coal produced in the United States was 244,000,000 short-tons against 234,000,000 short-tons of the United Kingdom.

THE last remaining relic of the first railway in London has just disappeared. In 1801, an act was passed authorizing the construction of a railway from Wandsworth to Croydon, the sleepers being of stone and motor power was provided by horses. The scheme included a dock at Wandsworth and it is the ancient wooden crane connected therewith which has just fallen into the waters of the Wandle.

MEDICAL RECORD:

A Weekly Journal of Medicine and Surgery.

GEORGE F. SHRADY, A.M., M.D., EDITOR.

PUBLISHERS

WM. WOOD & CO., 51 Fifth Avenue.

New York, January 6, 1900.

NEEDED REFORMS IN OUR AMBULANCE SYSTEM.

OWING to the fact that of late the oft-time and much discussed question relative to New York's ambulance service and the seeming inhumanity of some of our hospitals in subjecting patients to apparently unnecessary transfers from one institution to another has received considerable attention at the hands of the daily press, it is time to look at the question in its practical bearings as to possible reform.

Of the various charges brought against the ambulance surgeon by the laity, impugning his capability as a physician and criticising his general conduct, we would suggest that the many complaints harbored by the public are the result not so much of wilful shortcomings of the young surgeon as the outcome of a system which is palpably inefficient. To expect that a man but recently graduated from a medical college, and having had at the best but six months' experience in practical medicine, should be capable at all times of rendering a diagnosis absolutely correct and permitting of no doubt, would savor of the miraculous. That he might, however, without injury to himself cultivate a little more of the "*savoir faire*," and likewise be appreciative of the fact that an ambulance surgeon does not of necessity constitute the pivotal point around which the rest of mankind ought to rotate in silent admiration, is a bit of advice which, if followed, might tend to make the relations between himself and the general public of a more genial nature.

Mistaken diagnoses have been, and probably will continue to be, made, and we much doubt if there be a single practitioner who during some time of his career has not been guilty of an error; "*errare humanum est.*"

When any doubt exists, however, be it ever so slight, it should be accorded the patient, for it were far better that one hundred cases not demanding treatment were taken to the hospital than that one case diagnosed "drunk" should be for hours locked in a cell, and that later examination should disclose a serious injury or illness.

By making this a rule the opportunity would be denied the daily press of presenting, as was recently the case, a table of cases in each of which "intoxication" had been the verdict, while subsequent examination revealed serious injury; though in so large a metropolis as New York, in which hundreds of ambulance calls are daily answered, the fact that seven errors have been committed during a period extending over eighteen months, should not be accounted sufficient to prejudice the public at large.

If those of our hospitals equipped with an ambulance service would descend from their throne and revise some of the existing rules and regulations, it would benefit both their reputation and the public's safety, and tend to obviate future criticism. As we have before remarked, it is absurd to exact from a novice that which can be the result only of experience. The ambulance surgeon of the present day, when summoned to a case, has no opportunity for calling a consultation, but has to rely solely upon his own knowledge. Would it not be better, as a furtherance toward preventing mistakes, to constitute his duties the closing ones of his hospital career instead of the opening ones? During a space of one and a half years much valuable experience should be gleaned.

Transferring of patients from one hospital to another, save where it can be accomplished without the shadow of a risk to the life and health of the patient, is an unjustifiable act, and, if done to further an ulterior purpose, becomes criminal. A low mortality rate is a result to be desired, but fair means should be employed to obtain it. Only a few days ago a coroner's jury had occasion to denounce this practice and censure the hospital authorities for permitting repeated transfers, which ultimately resulted in the death of the patient concerned. Citizens of Greater New York are as a whole but little interested in hospital statistics, and the fact that one institution can, at the end of the fiscal year, boast of a lower mortality rate than some other, is a matter of but little import to them. What the individual desires, who when ill has to seek hospital treatment, is the feeling of assurance that he will be accorded all the care and attention necessary to his health and comfort, irrespective of the hospital receiving him. The fact that a mortally injured or sick person dies after admission to a hospital is not going to diminish the standard or injure the reputation of the institution concerned one whit. Every person of even mediocre intelligence realizes that wonders cannot be performed at the present day.

Poverty has from time immemorial been deemed a crime, and frequently treated as such; but surely in so noble a profession as that of medicine, one calling perhaps for more arduous work and unrewarded self-sacrifice than any other, the lowliest and most humble of our brethren should not be subjected to indignities which would never fall to the lot of his brother more blessed with worldly goods.

The needed reforms in the present system are obvious enough. There should be no such thing as questioning the fact whether or not a given patient is a suitable one for any particular hospital. Every institution having an ambulance should take any and every case presenting itself. In case of accident every victim is a suitable one for every hospital professing to care for emergency cases. If there is doubt as to the seriousness of the injury, the patient should be taken to the hospital for necessary diagnosis and treated there until he recovers or dies.

published in 1828, vol. ii., page 240: "Electricity is applied medicinally under the form of the stream or continued discharge of the fluid, under that of the sparks, and under that of shock; the first being the most gentle, the second being more active, and the last being much more powerful than either of the others. At the introduction of electricity as a remedy, it was highly celebrated for its efficacy in a number of diseases. It is usually applied under the form of sparks; the spark is communicated, etc., from the machine while the machine is being worked. The shock is given by discharging the Leyden phial." Again from "Braithwaite's Retrospect," 1845, part xi., page 33: "The second fact is, that if the nerves of a living animal be submitted to the passage of the electric current, renewed at short intervals (static induced current), tetanic contractions are excited."

C. L. SQUIRE.

March 24, 1900.

PURE FOODS AND DRUGS.

TO THE EDITOR OF THE MEDICAL RECORD.

SIR: Apropos of your editorial upon the adulteration of food in your issue of March 10th, it is of further interest to note that the Senate committee upon manufactures in its recent report suggested that a board be appointed by the Department of Agriculture to have full control of the standards of foods, drinks, and drugs, and that the board use the "United States Pharmacopœia" as its guide. Thus a step has been taken to secure legislation of a national character, as suggested two years ago by the National Pure Food and Drug Congress. The object and intent of such a board would be to protect the right of the individual to obtain in foods, drinks, and drugs, exactly what he requires, not alone from the standpoint of obtaining his money's worth, but also to protect him from injuring his health. "Patent medicines," as well as drugs, would, therefore, come under the control of this board, at least to this extent: A patent medicine would have to be harmless to any individual, and could not be sold for more than its true valuation. Thus the sugar-and-water preparations, as well as the "cures" containing injurious amounts of opiates and alcohol, would no longer be allowed on the market, unless, perhaps, a true formula accompanied each package. Every well-informed physician knows that it would be better for the public to continue using pepper of which sixty per cent. is cocoanut shells, than for one individual to take a patent medicine. Who of us has not seen the ruined intestinal tract from the free use of cathartics, or does not know of the consumptive dying of cirrhosis, or the neurasthenics—yes, and maniacs—from the employment of headache cures, "pain killers," etc.?

If I am correct in my opinion that the jurisdiction of this board would extend over the control of patent medicines, would it not then be well for the various medical societies to lend their influence to the immediate passage of such a bill? I would suggest that resolutions indorsing this committee's recommendations to the Senate be forwarded to Washington immediately.

JOHN JOSEPH NUTT, M.D.

SAN DIEGO, CAL.

REFORM IN THE AMBULANCE SYSTEM.

TO THE EDITOR OF THE MEDICAL RECORD.

SIR: In an editorial upon "Needed Reforms in Our Ambulance System," of your issue of January 6th, you suggest that the ambulance service be undertaken as the closing duties of the surgeon's hospital career. A serious objection to such a change would be the impatience of the surgeon to launch himself out into the world, and his great temptation to resign his position. It is the promised reward of house-surgeonship which keeps the interne, and especially the ambulance surgeon, contented. After one month of first and second ambulance call at Bellevue Hospital the surgeon has had practically all there is to be gained from the service. After that each week—each day even—may bring to him some new experience, but he does not learn enough to repay him by any means for his long hours and hard work. There occur to me two ways in which the ambulance service might be changed to advantage. One is that the hospital surgeon should do his ambulance duty during his last six months, as you suggest, but that he should receive a salary during that time. Most of the surgeons would be glad of the opportunity to make a little money at the end of so many years of hard study and work in the colleges and hospital, and as experienced surgeons and salaried officials they would indeed reform the ambulance system. My other suggestion is that every hospital or dispensary receiving any moneys whatsoever from the city should be required to keep one or more ambulances in service and a sufficient number of beds to care for all the emergency cases they may receive. This would divide the city up into such small districts for ambulance service, that its adoption with a rule that all patients are to be brought to the hospital, would lessen to a minimum the dangers from a wrong diagnosis upon the part of the surgeon.

JOHN JOSEPH NUTT, B.L., M.D.,
Late House Surgeon, Bellevue Hospital.

SAN DIEGO, CAL., March 19, 1900.

Surgical Suggestions.

Duodenal Ulcer should be treated on the lines laid down for gastric ulcer. Operation is indicated in repeated and exhaustive bleeding with symptoms of acute perforation. Perforation usually takes place in the peritoneal cavity. The symptoms are either those of generalized sepsis, suppuration, or perforation of the gall-bladder, peritonitis, etc. Differential diagnosis from ulcer of the stomach is, as a rule, impossible. Bleeding is an almost constant symptom, the blood appearing both in the stools and vomited matter. The mortality is high—there were twenty-four deaths in twenty-eight cases of perforation treated surgically.—PAGENSTECHER, *Deutsche Zeitschrift für Chirurgie*, Bd. 52, Hft. 5, 6.

Surgical Hints.—IN phlegmonous conditions affecting the hand or forearm, long-continued baths in mild antiseptic solutions are of great usefulness. The ordinary elongated fish-boiler is very convenient for this purpose, as the whole hand and forearm may be placed in it, and allowed to remain in it for hours at a time.—IN making plaster-of-Paris bandages, or in using those that are ready-made, see if the plaster appears to be damp. If so it will not set well, but may be greatly improved by placing it in the kitchen oven for a short time.—PAIN occurring symmetrically about both shoulders in children should lead to examination for cervical caries. In rheumatism the pain is of a very different character, and practically never affects both sides so evenly.—IN concussion of the brain death often takes place through paralysis of the respiratory centres. The prompt use of artificial respiration may tide the patient over his danger. If the heart centres appear to be involved we must stimulate, and for this purpose there is nothing better than heat applied to the precordial region, together with

ASEPSIS AND AMBULANCE SURGERY.

To the Editor of the Medical Record.

Sir: It is a recognized principle in surgical practice, that a wound should be treated by clean hands and clean instruments in a clean place.

This principle is known and followed quite generally from great cities to rustic hamlets. In the war with Spain, our hospital corps and our soldiers were instructed to put on a clean dressing at once, and bring the wounded as soon as possible where they could be treated in a clean place by clean instruments in clean hands. The result of this immediate dressing of wounds with subsequent "clean" treatment was eminently satisfactory—many a seemingly mortal wound healed kindly because of that first dressing. Now that this surgical axiom has reached the uttermost parts of the earth, is it not about time for it to reach our New York ambulance surgeons?

To-day the ambulance surgeon, intent on his "diagnosis," primarily ignores the first principle of surgery—cleanliness.

Every wound, especially if it involve brain, joint, or peritoneum, must be carefully and thoroughly explored by "that dirty finger"—explored until that ambulance surgeon, with his "totus in illis" expression, is sure that the wound does or does not involve the deeper structures—then his case, made septic by his careful examination, is aseptically bandaged and rushed to the hospital, where the "diagnosis-crazy" surgeon reports "incised wound, involving the right knee joint."

It is time to stop at once and forever such treatment. To-day a physician receives a hurry call to an injured man. He finds a clean cut wound, evidently involving the knee joint; he quickly applies an aseptic dressing, while the policeman orders the ambulance, which brings that "diagnosis-crazy" surgeon.

At once that dressing must be cut off, and that dirty finger must at once explore every nook and corner, while the patient looks on in agony, and the medical men with disgust. It is time to cry a halt to such treatment in this city of surgical progress—it is time for New York hospitals to instruct their ambulance surgeons to keep their unclean fingers out of severe wounds.

R. Ellis, M.D.

211 West Thirty-fourth Street, New York.

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ORIGINAL ARTICLE.

HISTORY OF THE AMBULANCE SYSTEM IN BROOKLYN, NEW YORK.

BY WILLIAM SCHROEDER, M.D.

In some form or other for years past persons found upon the public streets, in a state of sickness, or those who met with an injury by accident or otherwise, were conveyed to their homes or to a place of shelter. In later years this place of shelter was called a hospital. The method by which this was accomplished varied according to circumstances. If a stretcher could be secured that was considered the best; if not, any wagon was put into service without regard to the injury received or the comfort of the patient. This condition of things prevailed in the city of Brooklyn until August, 1873. We desire at this time to present a review of the proceedings of the Common Council, and several papers published in the local press relating to the introduction and establishment of the Ambulance System in the City of Brooklyn; they will tell the story much better than any words of mine.

The first communication on this subject appeared in the Brooklyn Union on July 31, 1871, and was dated July 28, 1871, and signed "M.D." The author of this is our associate, Joseph H. Raymond, M.D., who at the time referred to was an interne in the City Hospital, now the Brooklyn Hospital, and to him the people of Brooklyn are indebted for first calling attention to the necessity of an ambulance system in this city.

The second contribution, which appeared as an editorial in the Brooklyn Daily Eagle, is dated November 18, 1871. Its language in many places is so much like that of the letter published in the Brooklyn Union of July 31, 1871, that we must necessarily conclude that the author is the same.

We are also pleased to record the interest manifested by the members of the Medical Society of the County of Kings, under the direction of Joseph C. Hutchison, M.D.,LL.D., and John T. Conkling, M.D., both ex-presidents of the Society.

The letters and reports herewith submitted are copied from the original as they appear in the public press, and the proceedings of the Common Council of the city of Brooklyn.

HOW PATIENTS ARE TREATED IN THE HOSPITAL.

BROOKLYN, July 28th, 1871.

To the Editor of the Union:

Sir:—I desire to bring to the attention of the public a subject which has for some time occupied my thoughts. No one but an eye witness can begin to comprehend the suffering to which men, women and children are subjected when, after the receipt of an injury, they are carried to the hospital; and to fully appreciate the pain and anguish of these unfortunates as they are hurried over rough streets or handled by unskilled hands, is beyond the power of the most sympathizing and tender hearted.

In a city whose boast it is to be the City of Churches, and, therefore, the City of Charities, where kindness for the brute creation has induced human beings to devote both time and money to the alleviation of their misfortunes, men are left to suffer indescribable tortures before they can be conveyed to a hospital.

That I may not be accused of exaggeration, or misrepresentation, let me narrate an incident which occurred no longer ago than June.

Peter Sherry, a printer by trade, was run over by a horse car in Williamsburg at eleven o'clock in the evening. The wheel passed over his right leg, breaking both bones and mangling the soft parts, so that the connection of the leg to the thigh was little more than skin; the blood vessels were, of course, cut across and their open mouths left unclosed. He was taken to a house to wait until a wagon could be found to take him to the hospital; one man to whom application was made could not lend his horse, as the animal had been at work all day; a second one gave some other reason; and a third was finally found who took the man to the City Hospital, but not until four o'clock the following morning, five hours after the accident. It is unnecessary to add that he died the same day.

Had he been sent to the hospital immediately, the bleeding vessels tied, and his strength sustained by stimulants, who shall say that his life might not have been saved?

J. D. Hunt was run over in Williamsburg on the 30th of April, his thigh bone being broken

and the muscles, blood vessels and all, torn across by the wheel of the horse car; he died the following day.

Studley Stafford was run over by a hand car on May 1st, and died the same day.

These cases are selected because they are recent and because they were severe injuries and because they required careful transportation and the immediate attention of a surgeon. Some of them were carried from Williamsburg to the hospital in furniture or baker wagons, their broken and bleeding limbs lying on a rough board, jolted over cobblestones and handled by men, kind-hearted doubtless, but who could not stop bleeding vessels, and who did not appreciate the necessity of keeping the limbs in a state of perfect quiet.

During the year 1870, there were received in the Brooklyn City Hospital 308 accidents, many of them proving fatal in a few hours, others lingering for days and then dying, while the majority recovered and were discharged.

The variety of conveyances used to transport these patients to the hospital was as great as the variety of injuries received: carriages, boards, stretchers and wagons of all descriptions, none but the stretchers being in any way fitted for the purpose, and besides the suffering occasioned by their use a simple fracture of the bones which would be well in a few weeks was often changed into a compound fracture, the bone breaking through the skin, an injury which requires months to heal, and which sometimes necessitates amputation.

Now, for the remedy for all this evil and suffering. Let Brooklyn adopt the Ambulance System, which in New York has worked so well, and which has saved so many lives.

I would suggest that there be two ambulances, one stationed at the Long Island College Hospital, Henry, corner of Pacific street, and the other at the Brooklyn City Hospital, on Raymond street. These ambulances should each be in charge of an ambulance surgeon, and furnished with a tourniquet and other things necessary for immediate use; a telegraph line should connect police headquarters with the hospitals; the city should be divided so that accidents occurring in the eastern part of the city could be sent to the City Hospital and those in the western to the Long Island College Hospital.

A man run over by a car in Williamsburg, for instance, would be conveyed to the nearest station house, or if badly injured, left where he is; a telegram would then be sent to headquarters, and from there to the hospital; the ambulance always kept in readiness, would convey the surgeon at once to the suffering man, and his wound be dressed so that he could be safely taken to the hospital, and all this done with comparative comfort to the patient and in the shortest time possible.

Hoping that these suggestions will meet with your support and approval, I subscribe myself,

M.D.

The *Brooklyn Union*, July 31, 1871.

LET US NO LONGER ADD MURDER TO MAIMING.

Wanted, Ambulances for the Injured.

No one but an eye witness can begin to comprehend the suffering to which men, women and children are subjected, when, after the receipt of an injury, they are carried to their own houses or to a hospital, and fully to appreciate the pain and anguish of these unfortunate ones, as they are hurried over rough streets or handled by unskilled hands, is beyond the power of the most sympathizing and tender-hearted.

In a city whose pride it is to be the City of Churches, and which should, therefore, be the City of Charities, kindness for the brute has induced philanthropists to devote both time and money to alleviate their misfortunes though human beings suffer indescribable torture while they are being conveyed to places where their wounds can be properly dressed and cared for.

That there are every day in our very midst human beings whose sufferings are as intense as were those of the victims of the Inquisition, will not be a difficult task to show. The instances we are about to give are selected because they are recent and because the injuries are such as any one of us may receive in our every day life.

In June last a printer was run over by a horse car in Williamsburg at eleven o'clock in the evening; the wheels passed over his right leg, breaking both bones and mangling the soft parts to such an extent that the connection between the leg and the thigh was little more than skin. The blood vessels were cut across and their open mouths were left unclosed. He was taken to a house, here to wait until a wagon could be procured to convey him to the hospital. One man to whom application was made would not lend his horse, giving as a reason that the animal was at work all day; after some trouble a vehicle was found, but it was not until four o'clock the following morning that he reached the hospital, five

hours after the accident occurred. It is superfluous to add that he died the following day.

Had he been sent to the hospital immediately the bleeding vessels tied and his strength sustained by stimulants, who shall say that his life might not have been saved?

In April and May two other accidents occurred in which the patients were run over by horse cars, breaking legs and tearing muscles and blood vessels, demanding the immediate attention of a surgeon, and yet hours elapsed before they reached the hospital. Their broken and bleeding limbs lying on the rough bottom of a baker's or furniture wagon, jolted over cobblestones and handled by men, kind-hearted doubtless, but who could not stop bleeding vessels and who did not appreciate the necessity of keeping the injured limb in a state of perfect rest.

Similar cases have occurred and are constantly occurring in the experience of surgeons of all our hospitals, and many a physician in private practice could tell us of lives sacrificed in this inhuman treatment.

The recent case of medical malpractice which was tried in our courts and which resulted in the incarceration of the murderer, Benjamin Perry, brought out very clearly the sentiment of the profession of Brooklyn on this very point. Drs. Hutchison, Crane, Chapman and others gave it as their unqualified opinion that the ride over rough pavements in vehicles not adapted to the purpose is very injurious to sick persons, and undoubtedly brought about great exhaustion and contributed in no slight degree to the death of Emily A. Post.

Every year there are in Brooklyn alone a thousand accidents treated in the hospitals, and many in private practice, of which no record is kept.

The variety of conveyances used in the transportation of these patients to the hospital is as great as the variety of injured received, carriages, boards, wagons of all descriptions, none fitted for the purpose; often a simple fracture of the bone which would be well in a few weeks, is in this transportation converted into a compound fracture, the end of the bone tearing through the skin producing an injury which requires months to heal, and which often necessitates amputation, or is even the occasion of death.

Now, for the remedy for all this evil and suffering:

Let Brooklyn adopt the Ambulance System, which has in New York worked so well and saved so many lives. One ambulance stationed at police headquarters and in charge of a surgeon must always be in readiness, provided with a tourniquet and everything necessary for immediate use.

An accident occurring in any part of the city is reported at once to police headquarters by telegraph, and in less time almost than it takes to tell the patient is seen by the surgeon, his wounds properly attended to, and being placed in the ambulance is under the supervision of the surgeon, conveyed to the hospital or to his house as he desires.

There are some who would desire to count the cost of such a system. To such we say that the expense to the city would be but a trifle more than it now pays for the same service, as follows:

Ambulance, tourniquet, etc.	$300.00
Horse and harness	200.00
Total outfit	$500.00
Two surgeons	$1,000.00
Driver	700.00
Feed for horse and repair	300.00
Total amount of expenses	$2,000.00

The city now pays about $1,000 for its accidents. The Ambulance System would thus add $1,000 to the city's annual expenses. Now it takes from duty two to four and sometimes six police officers for hours together. Under the proposed arrangement the officer is off his beat only long enough to report the accident to the nearest station house, and can then return to duty.

If, however, we consider the subject from a humanitarian standpoint, and we might add from a selfish one, for we ourselves may be the first to need its aid, there is nothing which is so much needed as this reform, and as the severe weather of our northern climate is rapidly approaching when every minute of exposure to the cold and rain endangers life, we cannot too soon prepare for the comfort and safety of our fellow sufferers.

Editorial, *Brooklyn Daily Eagle*, Nov. 18, 1871.

AMBULANCES FOR BROOKLYN.

A perfect Ambulance System, such as in vogue in other well-governed cities of great size and importance, is needed in Brooklyn, and the offer made by the Long Island College Hospital to the Police Board, instead of being accepted as a loan, should be received as a reminder that it is lacking in this essential, and the good suggestion should be immediately acted upon. Conveyances

for the sick, the disabled, or the dead, should not be confined to the City Hospital, or to any other locality, but should be kept at all the station houses, from which in time of need they can be called into service.

In emergencies police officers cannot wait until assistance of this kind is brought from a distance; they must be in convenient proximity to it. Properly authorized persons such as would have necessarily to go to the hospital for a hand ambulance are not always to be found at a moment's warning, and perhaps when there is most necessity there would be least possibility of getting the desired article. Therefore, while the Board of Police officers rightly appreciate the considerate offer of the Hospital Regents, they should only avail themselves of the suggested idea and set to work to supply their force with these indispensable adjuncts of every well-regulated station house.

It is only the departments nearest the hospital that could under any circumstances avail themselves of this kindness, while every precinct should be amply provided.

Horse ambulances are the necessities of the most remote precincts, and the requisition is to be made for them at an early date, and when the Mayor calls the attention of the Common Council to this matter, let him by all means mention the equally important subject of hand ambulances, and in securing the one, let him receive the desired permission for the other, so that in all respects our police system shall be as efficient and desirable as any in the world.

Editorial, the *Brooklyn Union*, January 4th, 1872.

TO RELIEVE THE WOUNDED AND SICK.

A communication from Coroner Whitehill in relation to ambulances and other essentials for the prompt and efficient relief of wounded or sick persons was received by the Common Council. It reads as follows:

FROM THE CORONER.

Coroner's Office, Kings County Court House, Brooklyn, January 8th, 1872.

To the Honorable the Common Council of the City of Brooklyn:

Gentlemen:—At an inquest, held in December last, the following verdict was rendered, and recommendations made, viz: That Adam Hadden came to his death from excessive loss of blood consequent upon injuries received on the 7th instant, by being run over on the South Side Railroad, and we believe that had he received immediate surgical attention his life might have been saved, and we would call the attention of the Common Council to the urgent necessity of some method of caring for the injured, and earnestly recommend that ambulances be provided, properly furnished and superintended by competent surgeons.

All of which is most respectfully submitted,

L. A. WHITEHILL, *Coroner.*

This patient died at the City Hospital, and Dr. Raymond was on the Coroner's jury and wrote the verdict.

About this time Alderman William Richardson was witness to an unsuccessful attempt to resuscitate a man who was drowned in Gowanus Canal at the Hamilton avenue bridge, and became much interested in the ambulance question. He offered the following resolutions in the Board of Aldermen:

Resolved, That the Commissioners of Police be and they are hereby requested to report to the Board, at its next meeting, whether any of the following instruments, articles and appliances are kept on hand, in condition for use, at either of the police stations in the city, and in case any of them are so kept, to state specifically what instruments, articles and appliances, and at which of the stations:

First, ambulances or vehicles of any kind suitable for the transportation of sick or wounded persons.

Second, stretchers or any substitute therefor for the conveyance of sick, wounded or diseased persons by bearers.

Third—Implements or articles for the speedy rescue or assistance of persons who may be in danger of drowning; for the recovery of the bodies of drowned persons.

Fourth—Appliances for the care, resuscitation and restoration of such persons as may be rescued from the water.

Fifth—Instruments and appliances for prompt prevention and staunching the flow of blood from wounded persons until surgical assistance is procured for them, or during transportation.

Resolved, That said Commission be also requested to report what instruments, articles, vehicles and appliances are, in their opinion, necessary or desirable to be furnished for use at the police stations under their charge, for the purpose of aiding in the saving of human life, or the relief

or mitigation of the sufferings of sick or wounded persons while necessarily in charge of the police.

The resolutions were adopted. Unanimous consent was granted.

Minutes of the Brooklyn Common Council, January 8th, 1872.

THE AMBULANCE QUESTION AGAIN.

The ambulance question, which has received the attention of the authorities of late, and which has been noticed by the *Union* more than once, is just now assuming a shape that will likely produce good results in the future.

To Coroner Whitehill is due the suggestion which awakened the Common Council to this glaring defect in the police system of Brooklyn, and to his letter is credited the subsequent resolution of Alderman Richardson, which is published in another column. His assurance that Adam Hadden, who was run over on the South Side Railroad on the 7th of December, died from lack of immediate attention which could have been furnished had there been any means of conveyance at hand, and his urgent request for prompt action have been the means of properly introducing this subject at this time.

But the need has long been felt here; the absence of all such accessories at the station houses is greatly deplored; and more than once have we called attention to the various modes adopted in other large cities for the accommodation of the injured, the sick, or the dead.

Ambulances properly furnished, and under the superintendence of competent surgeons are greatly required, so greatly indeed that the Regents of the Long Island College Hospital, out of pure compassion, tendered the use of their vehicles to the use of the police force; as a kindly one and one worthy of all praise, we noticed this offer, but pointed out at the time the impossibility of making it beneficial or practically useful. Only the precincts nearest the hospital building could be assisted in this way, while the necessity for them is widespread and felt perhaps more keenly in localities remote from this place.

Police station houses should be as liberally supplied with ambulances for the quick transportation of the sick or wounded as they are with the implements or articles for the speedy rescue and restoration of persons drowning or bleeding to death. Stretchers though serviceable are not always available, and by reason of their service render more noticeable the absence of ambulances.

The Common Council should, therefore, repair this radical defect in our police system, which in many other respects is so admirable, and at once respond to the demand of the press and the people, and more than all the expressed requirements of the force, and at once give them the supply of ambulances now called for and so greatly needed.

Editorial, the *Brooklyn Daily Union*, Tuesday, January 9th, 1872.

Long Island College Hospital, Henry and Pacific Streets, Brooklyn, N. Y.

Hon. Daniel Briggs, President of the Board of Police for Brooklyn:

Dear Sir—I am instructed by the Board of Regents of the Long Island College Hospital to inform you that hand ambulances can be at all times obtained at this institution by properly authorized parties, for the purpose of conveying the victims of casualties to the hospital.

Believing that much suffering may be saved to the unfortunate by this mode of transporting them the Board entertains the hope that you will cause such notice to be given to the captains of the proper precincts as will obtain the object sought for.

Very respectfully your obedient servant,

W. J. OSBORNE.

Secretary of the Board of Regents, Long Island College Hospital.

All the other hospitals, it is understood, are and long have been similarly willing and similarly equipped. Let the public make note of it.

We refer to the subject in its entire aspect elsewhere.

Brooklyn Daily Eagle, January 10th, 1872.

Editorial in paper of the same date on the subject of ambulances.

Extracts from the Minutes of the Brooklyn Common Council.

Monday, January 29, 1872.

(Page 188)

By Alderman Richardson:

Petition of George C. Hall and 3,000 other citizens for the establishment of an ambulance system for the speedy conveyance of injured persons to a hospital of the city. In connection therewith Alderman Richardson offered the following: Resolved, The Common Council does hereby approve of the insertion of the sum of five thousand

dollars in the deficiency bill now before the Legislature for the purchase and equipment of at least five ambulances for the conveyance of wounded and injured persons, and other necessary implements and appliances for the rescue of persons from water, their resuscitation, where possible, and for the prompt relief of wounded persons while in charge of the police.

Alderman Clancy moved that the resolution lie on the table for one week.

Agreed to.

Monday, February 5, 1872.

(*Page 236*)

By Alderman Richardson:

Petition of John (Joseph) C. Hutchison, M.D., and 115 other members of the Kings County Medical Society, for the establishment of an ambulance system for the speedy conveyance of injured persons to the hospitals of the city.

In connection therewith Alderman Richardson moved to take from the table a resolution of January 29, 1872, as follows:

Resolved, That the Common Council does hereby approve of the insertion of the sum of five thousand dollars in the deficiency bill now before the Legislature for the purchase and equipment of at least five ambulances for the conveyance of wounded and injured persons and other necessary implements and appliances for the rescue of persons from water, their resuscitation, when possible, and for the prompt relief of wounded persons while in charge of the police.

The resolution was adopted by the following vote.

Affirmative: Aldermen Miller, Dwyer, Ropes, Stryker, Clancy, Dunne, Wylie, Boland, McGroarty, Bergen, Foster, Coffey, Nolan, MacPherson, Rober, Connally, Dawson, Walter, Boggs, Brown, Richardson. Total, 21.

Unanimous consent was granted.

AMBULANCE FOR THE INJURED—A MATTER OF INTEREST TO BROOKLYNITES.

WHAT BECAME OF $5,000 RAISED?

A prominent physician talking to an *Eagle* reporter a few days ago inquired as to the disposition of the ambulance question which was agitated about one year ago by the *Eagle* and which agitation resulted in the Common Council considering the subject and passing resolutions thereon. He said that he believed they (meaning the Common Council) had gone so far toward the establishment of such needed ambulance system as to raise $5,000 in the Deficiency bill, but since then there had not been a word on the subject, and he continued "I would like to know very much how the matter stands for I am deeply interested in the project, as in fact every physician in the city is."

The reporter could not say at first how the matter did stand but promised to inquire into the question, which he did yesterday morning by calling upon the Deputy Collector and interrogating him on the subject. The Deputy said that with the raising of the above sum in the Deficiency bill, the entire subject was dropped, and nothing could come of the matter unless the Common Council officially appropriated the money raised. The reporter visited the Comptroller's office for the above information at the suggestion of Alderman Richardson, who, strange to say, could not tell the reporter anything about the ambulance question; strange, because he was the author of the resolution referred to.

The feeling of the physicians throughout the city on the subject of ambulances is very strong. They think there should be established a better management for the maimed than at present, and it should be done at once. It is absolutely necessary that such a large city as Brooklyn should have a set of first-class ambulances connected with the police stations and hospitals, especially the latter. By-and-by the warm weather will be here prostrating many persons as it did last summer, and there were nearly two hundred persons carried away, and if there was a good ambulance system, so that the persons prostrated by sunstroke could be taken quietly and rapidly where they could get instant relief many lives might be saved. These physicians do not understand why the Common Council does not move in the matter, and they consider it a deep shame that Brooklyn should be so far behind the age in not having a decent way of taking care of the casualty cases that are happening day after day. One of the many physicians interviewed by the reporter tells plainly the whole story of the ambulance question as it was agitated by the *Eagle* a year ago, and in doing so expressed the sentiment of the entire body of physicians.

He says a year or more ago the *Eagle*, ever ready in the cause of humanity, brought the attention of the community to the very great need of an ambulance system, which has worked so well in New York and other cities.

The necessity for ambulances in Brooklyn was urged with forcible logic, that has ever characterized the *Eagle* on all subjects, it went into the work with a whole heart, appealing to the common sense of the community, and the common sense of the community responded back in time, quoting the argument of the *Eagle*, and saying, we want an ambulance system in Brooklyn.

In addressing itself to the subject, the *Eagle* began by revealing the then late casualities which showed the strongest necessity for a better management for the maimed. It cited instances showing the suffering caused by lack of ambulances, and pointed to several cases that resulted in death simply by being jolted over the rough streets in improper conveyances.

The attention given the subject by the *Eagle*, the stress laid upon all points had its effect, and soon there appeared letters from correspondents, heart to heart in the movement with the paper, until at last the question seemed to take root in the feelings and good judgment of the people, and there appeared bright promises of a speedy accomplishment of the object; among those first awakened to the necessity for the establishment and maintenance of ambulances in the city were the physicians, and in the interviews held by the *Eagle* representative at that time with many of them they in a body expressed themselves as glad of an opportunity to contribute toward the awakening of public interest to the importance of the subject, and some of them in their zeal went so far as to promise that if the authorities did not take hold of the question, and bring about the much needed ambulances, they would themselves establish a system of ambulances at their own expense. The board of Fire Commissioners and the Police Commissioners looked with much favor on the subject.

The Health Department believed in and approved the project, and Coroner Jones indorsed the enterprise in the most emphatic manner. At an inquest held at the Brooklyn City Hospital and conducted by Coroner Whitehill in the case of Adam Hadden, an employee on the South Side Railroad, who fell from one of the cars and was run over by four of the wheels, frightfully mangling him, the jury showed by their verdict what were their feelings respecting ambulances.

The verdict was as follows:

"In our opinion Adam Hadden, the deceased, came to his death from excessive loss of blood, after he had been run over, etc., and we believe that had he received immediate surgical attention his life might have been spared, and would most earnestly call the attention of the Common Council to the urgent necessity of better means of transporting the injured, and recommend that there be immediately established ambulances, adapted to the purpose and furnished with tourniquets and all necessary appliances."

In accordance with the verdict, Coroner Whitehill, or Coroner Jones, soon after wrote a letter to the Common Council recommending that that body accept the sensible suggestion of the jury.

The feeling for the need of ambulances had now grown quite strong among the people of all classes, and shortly after the communication to the Common Council above referred to, at one of the meetings of the Board, Alderman Richardson offered the following resolutions, which were approved and passed by the Board:

Resolved, That the Commissioners of Police be and they are hereby requested to report to the board at its next meeting, whether any of the following instruments, articles and appliances are kept on hand, in condition for use, at either of the police stations in the city, and in case any of them are so kept to state specifically what instruments, articles and appliances, and at which of the stations.

First.—Ambulances or vehicles of any kind suitable for the transportation of sick or wounded persons.

Second.—Stretchers or any substitute therefor for the conveyance of sick, wounded, or diseased persons by bearers.

Third.—Implements or articles for the speedy rescue or assistance of persons who may be in danger of drowing; or for the recovery of bodies of drowned persons.

Fourth.—Appliances for the care, resuscitation, or restoration of such persons as may be rescued from the water.

Fifth.—Instruments and appliances for promptly preventing and stanching the flow of blood from wounded persons until surgical assistance is procured for them, or during transportation.

Resolved, That said Commission be also requested to report what instruments, articles, vehicles, and appliances are in their opinion necessary or desirable to be furnished for use at the police stations under their charge, for the purpose of aiding in the saving of human life, or the relief or mitigation of the sufferings of sick or wounded persons while necessarily in charge of the police.

The resolutions received the unanimous assent of the Board.

At this step of the Common Council which seemed to promise good results for the ambulance system high hopes were entertained by the community that their prayer for the better management for the maimed were about to be answered, and their hopes were further strengthened when soon after the passage of the above resolutions, $5,000 were raised in the Deficiency bill for that purpose.

The question of an ambulance system has now assumed a practical shape, said thousands of our citizens, and both the rich and the poor alike thanked the Common Council for their good work; as is usually the case when the public think that they have gained their object, all further action on their part in reference to the matter ceased, and as is usually the case with the authorities when they see that the public have ceased to agitate a subject, they suddenly quieted down, and since the raising of the $5,000 in the Deficiency bill nothing further has been said on the subject of ambulances in our city. A year has passed since the subject dropped, and still the Common Council are dumb.

Why have the Common Council not taken any further steps in the matter, said a prominent physician the other day? All it needs on their part now to end the matter is to officially appropriate the amount raised in the Deficiency bill, and order the construction of the ambulances, he added. Will the Common Council answer for themselves?

During the past year revelations of casualities have gone on unheeded and the mortality list has been swelled by the injured persons who have died from rough handling by unskilled hands in the attempt to remove them to the hospital.

Who shall say that many lives might not have been saved, if there had been a proper ambulance system? Case after case might be cited as expressing the need of ambulances; but it will suffice to narrate only a few of the many incidents.

A Swedish woman, aged thirty-one years, was received into the City Hospital on the 30th of last month, she had become pregnant, and for this reason was turned out of her place. She wandered into a store kept by a Swede, who took her to the hospital in a buggy; labor had already commenced, and a child was born soon after her admission to the institution.

Some time ago a young man was run over in Williamsburg by the cars. His left leg, from the ankle to the middle of the thigh, was horribly crushed; it was three hours before he reached the hospital, where he soon died.

Last August a man was sunstruck at the Fulton Ferry; he was carried to the hospital in an open wagon, with the sun's rays pouring directly upon him; he died soon after his admission.

On the 21st of March, just passed, a longshoreman while working at Red Hook, had his leg badly broken by a barrel of lead falling on it; he suffered great agony and was obliged to wait nearly two hours before reaching the hospital.

Last January, a man working on a lighter had his leg jammed between his boat and a ferryboat, the bones were broken in several places, causing great suffering, and he was obliged to wait over an hour before he could get to a hospital.

"It seemed to me an age," said he. In conclusion, this gentleman hoped that so powerful a friend as the *Eagle* would again take up the cause of humanity by insisting upon the establishment of an ambulance system in Brooklyn, and he felt that every physician in Brooklyn would lend his aid.

Dr. John T. Conkling, No. 143 Remsen St., said that the whole system of removing casualty cases as we do was outrageous for a city like Brooklyn, or any other city, they were carted off without any attention paid to comfort or safety. Let a sick or maimed horse be found on the street and Bergh's men would be on hand immediately with an expressly built apparatus upon which the horse would be placed with gentleness and care, and carried to the stables in Williamsburg, with such ease that it would be a perfect comfort to the poor human creatures that are sent jolting over the hard streets. The great need of the ambulance system was simply a plain fact apparent to all, as two and two make four.

Brooklyn Daily Eagle.

April 5, 1873.

May 12, 1873.

By Alderman Rodman:

Resolved, That the Board of Health be and they are hereby requested to report to the Board the most useful appropriations of the moneys applicable to supply ambulances and appliances for the more prompt relief of wounded persons.

The resolution was adopted.

Minutes of the Common Council, May, 12, 1873.

Brooklyn, E. D., May 12, 1873.

By Alderman Clancy:

Petition of the Eastern District Hospital and Dispensary.

To the Honorable Common Council.

Gentlemen:—The undersigned having noticed in the *Brooklyn Eagle* an article relating to ambulances for injured caused the same to be read before the Eastern District Hospital and Dispensary at a regular meeting of the trustees, and was thereupon requested to communicate with your honorable body upon the subject and to urge the procurement of such ambulances as may be necessary and proper for the removal of sick or injured persons, and to cause one or more of them to be located in the vicinity of this hospital. The necessity for an ambulance corps in this city is admitted on all sides, and the absence of it has been the cause of more than one death of persons injured in the Eastern District.

The large number of manufactories, sugar-houses, machine and boiler shops, stone and brick yards, steam and horse railroads, ferries, coal yards and other establishments in the district, giving employment to thousands of people, afford abundant opportunity for accidents of a serious nature, and requiring careful handling and transportation, and skilful surgical and medical treatment for the individual.

The Eastern District Hospital and Dispensary is now being renovated and fitted up anew, and in a few days will be in readiness to furnish accommodations for all who may unfortunately need the same, and with a corps of skilful surgeons and physicians and nurses expect to take rank equal with any like institution of the same capacity.

The opinion as expressed by the *Eagle* in the article already referred to that the ambulance corps should be connected with the hospitals, meets with our concurrence.

The immediate object of this communication is principally for the purpose of bringing the matter to your attention, and to assure you of the cordial co-operation of this institution in any effort that may be made in this direction.

Respectfully yours,
DEMAS STRONG,
Committee, etc.

Alderman Rodman moved that the matter be referred to the Board of Health, and printed in the minutes.

Agreed to.

Minutes of the Brooklyn Common Council, May 19, 1873.

At a meeting of the Board of Health held May 20, 1873, "On motion, Sanitary Inspector J. H. Raymond, M.D., was instructed to procure (if possible) two ambulances from the Board of Health of the City of New York for the temporary use of this Board, and to ascertain how soon, and for what price two ambulances can be built and report the result of his investigations to the Board or to the Sanitary Commissioners."

On May 21, a "Communication of Sanitary Inspector in reference to ambulances was received and placed on file."

Inspector Raymond reported that ambulances could not be borrowed from New York. He subsequently presented a plan for the organization of the ambulance service which is formulated in the following communication from the Board of Health to the Common Council.

Office of the Board of Health,
Brooklyn, July 12, 1873.

To the Honorable Common Council.

Gentlemen:—At a meeting of the Board of Health, held at its office July 11, 1873, it was decided in accordance with resolution of the Common Council passed May 12, 1873, to recommend the following plan as the most useful appropriation of the moneys applicable to the supply of ambulances and appliances for the more prompt relief of wounded persons.

The purchase of two ambulances, one to be located at a livery stable near the Long Island College Hospital, and the other at a livery stable near the hospital in the Eastern District, the owners of the stables to furnish for each ambulance a horse, harness, and driver, to be at all hours ready for service.

A surgeon at each of the hospitals named above to be ready to accompany ambulance at any time.

This will involve an expenditure for the year as follows:

Two ambulances at $600 each.....	$1,200
The use of horses, harnesses, and drivers for 12 months, at $180 per month.....	2,160
Board for the surgeons at the hospital, each $35 per month.....	840
Expense for connecting hospitals and stables by telegraph.....	300
Outfit, including medicines, stretchers, pocket-cases, fracture-boxes, etc.....	100
Total.....	$4,600

This, it will be seen, leaves $400 for all incidental expenses for the year.

I am yours very respectfully,

HENRY M. CONNELLY,
Secretary of the Board.

In connection therewith, Alderman Ropes offered the following:

Resolved, That the Board of City Works in conjunction with the Board of Health be and they are hereby directed to cause to be organized an ambulance service in such form as need may suggest, and the fund for that purpose admit. The expenses for such service to be made in conformity to the laws and ordinances of the city, and payable from the fund now in the city treasury for that object.

The resolution was adopted by the following vote.

Affirmative: Aldermen Dwyer, Ropes, Daelon, Clancy, Rodman, Wylie, McIntyre, Trawbridge, Douglass, O'Reilly, Nolan, MacPherson, Kiefer, Connolly, Eckert, Zindel, Whitney, Richardson. Total, 18.

Negative: None.

Unanimous consent was granted.

Minutes of the Brooklyn Common Council, July 14, 1873.

Communications from officers. From Mayor and Comptroller.

Brooklyn, July 21, 1873.

To the Honorable Common Council.

Gentlemen:—The Common Council of the City of Brooklyn having by a resolution adopted on the 14th day of July, 1873, directed the Board of City Works in conjunction with the Board of Health to organize an ambulance system in such form as they might deem necessary, and the said Board having decided to procure an ambulance to be located in the Western District of said city, and it appearing that the cost of said ambulance will not exceed $600.

We, Samuel S. Powell, Mayor, and F. A. Schroeder, Comptroller of said city, do hereby certify, pursuant to Section 6 of Title 17 of Chapter 863 of the Laws of 1873, that the interest of the city requires that said ambulance be procured without calling for proposals for furnishing the same.

SAMUEL S. POWELL,
Mayor

F. A. SCHROEDER,
Comptroller.

In connection therewith, Alderman Ropes offered the following:

Resolved, That the Board of City Works in conjunction with the Board of Health be and they are hereby authorized without advertising for proposals therefor, to purchase an ambulance for the Western District at an expense not to exceed $600, which amount is hereby appropriated for that purpose from the fund provided for by the Deficiency bill of 1871.

The resolution was adopted by the following vote.

Affirmative: Aldermen Dwyer, Ropes, Dorlon, Clancy, McIntyre, McGroarty, Trowbridge, Douglass, O'Reilly, Taylor, Nolan, MacPherson, Kiefer, Connolly, Eckert, Zindel, Whitney, Richardson. Total, 18.

Negative: None.

Unanimous consent was granted.

Minutes of the Brooklyn Common Council, October 6, 1873.

On the same date the above was adopted inserting the words Eastern District in place of Western District.

The following are extracts from the annual reports of the Brooklyn Board of Health:

AMBULANCE SERVICE.

The Common Council having been petitioned by numerous citizens to cause the establishment of an ambulance system, obtained from the Legislature, May 24, 1872, a fund of $5,000 for that purpose, and on May 12, 1873, they requested the Board of Health to report "the most useful appropriations of the moneys applicable for the supply of ambulances and appliances for the more prompt relief of wounded persons." This Board thereupon reported in favor of the purchase of two ambulances, one to be located near the Long Island College Hospital for the Western District of the city, and another near the Eastern District Hospital. The Common Council then, July 14, 1873, authorized this Board in conjunction with the Board of City Works, to organize an ambulance service from the fund set apart for that purpose. The necessary arrangements were then made to procure and equip two ambulances; to connect the two stations, located as above recommended, by telegraph, with the central office of the police department, and to appoint surgeons to be ready at all hours to respond to calls for the relief of wounded and persons taken suddenly sick in our streets and public places.

From August 20, 1873, when the first ambulance reported ready for service to January 1, 1875, the number of calls answered has amounted to 770, of which 551 were made by Ambulance No. 1, in the Western District, and 219 by No. 2, in the Eastern District; the total number of cases removed to hospitals or to their homes was 687. As a rule the calls have been attended to with the utmost promptness and celerity. The demands of the service are so constant and growing that a third ambulance should very soon be provided to replace the others when they require to be repaired and to meet emergencies. The accompanying summary is not complete for the earlier months. The following surgeons have served in the order in which they are named: to Ambulance No. 1, Surgeons G. W. Cushing and E. B. Jones; to No. 2, Surgeons H. C. McLean, T. W. Nadal, F. C. Talcott, and O. J. D. Hughes.

Summary of the ambulance service from the date of organization to January 1, 1875.

1873.

Ambulance No. 1.

	No. of calls.	No. of removals.
August 20th to October 1st...	40	40
October....	35	34
November	41	41
December	17	17

Ambulance No. 2.

	No. of calls.	No. of removals.
October	7	7
November	8	4
December	11	4

1874.

Ambulance No. 1.

	No. of calls.	No. of removals.
January	24	24
February	24	22
March	28	27
April	18	18
May	53	51
June	50	50
July	60	56
August	39	32
September	31	24
October	33	26
November	31	25
December	27	18

Ambulance No. 2.

	No. of calls.	No. of removals.
January	7	7
February	10	10
March	15	13
April	5	7
May	13	11
June	18	17
July	28	19
August	11	11
September	20	16
October	21	18
November	26	20
December	19	18

Total number of calls for Ambulances Nos. 1 and 2, 770.

Total number of removals for Ambulances Nos. 1 and 2, 687.

Respectfully submitted,

Jo. C. HUTCHISON, M.D.,

Commissioner of Health and Chairman of Committee on Report of the Board of Health.

The foregoing report, prepared by the committee, and adopted by the Board of Health, is respectfully submitted.

J. T. CONKLING, M.D.,
President.

E. L. LANGFORD,
Secretary.

AMBULANCE SERVICE.

Department of Health, 66 Court St.,
Brooklyn, January 18, 1877.

To the Secretary of the Board of Health.

Sir:—I have the honor to report concerning the ambulance service connected with this department, that there are three ambulances, two of which are in continuous use, one being held as a reserve.

One is stationed at the Eastern District Hospital, the other at the Long Island College Hospital in the Western District. To every ambulance is assigned a competent surgeon and supplied all those medical remedies and surgical appliances requisite for the emergencies of the service.

The invaluable work rendered by the ambulance surgeons connected with this Board, their prompt and intelligent action in the direction of the ambulances under their charge, and their

humane acts while in contact with the injured and afflicted, deserve the highest commendation.

The appointments of surgeons for this service are made only after a careful examination of the candidates and on the recommendation of the Hospital Board.

The rules and instructions governing the service are:

First.—The ambulance, while on duty, is under the entire control of the surgeon.

Second.—Cases that are able to walk are not proper subjects to be carried by the ambulance.

Third.—Before removal, if anesthetics be necessary, great caution is required in their administration.

In order to facilitate the working of this department it is respectfully recommended that parties furnishing horses may be instructed to attach two horses to each ambulance when the traveling may require such addition, and that orders be issued for providing the necessary appliances to this end.

The following table indicates the ambulance calls and the destination of the patients during the years 1875 and 1876:

1875.

Total number of calls	821
Patients removed to:	
Eastern District Hospital	75
City Hospital	168
Long Island College Hospital	167
Homeopathic Hospital	2
St. Catherine's Hospital	2
St. Peter's Hospital	5
Bellevue Hospital	1
Kings County Hospital	1
Commissioner of Charities	1
Fifth Precinct Station House	1
Home	333
Total	756

1876.

Total number of calls	911
Patients removed to:	
Eastern District Hospital	67
City Hospital	193
Long Island College Hospital	197
Homeopathic Hospital	1
St. Peter's Hospital	33
St. Catherine's Hospital	2
Kings County Hospital	1
Jail	1
Morgue	1
Home	366
Total	862

Respectfully submitted,
WM. C. OTTERSON, M.D.,
Sanitary Inspector and Chief of Ambulance Service.

Attention is directed to the report of the Chief of the Ambulance Service, Doctor William C. Otterson. During 1875, the ambulances made 821 calls; in 1876, 911. In the two years 1,618 patients were properly cared for by the surgeons while in the ambulances and removed to their homes or to the various city hospitals for treatment, at an expense of $6,544.83. The Western District ambulance is under the charge of Doctor Willard C. Otterson, and that of the Eastern District of Doctor L. E. Preble. A new ambulance was added to the service in October, 1875. This is kept as a reserve for use when the others are disabled, two being found sufficient, except under extraordinary occasions, to perform all the work of the department. During the season of extreme heat in the summer of 1876, the reserve ambulance was called into regular service, owing to the number of cases of sunstroke which it was necessary to have promptly removed to the hospital.

There is no public service performed in the city at so small an outlay of money more worthy of popular favor than this. By rendering prompt assistance in the case of accidents and furnishing injured persons a speedy and quiet conveyance to the hospital, it prevents hours of pain and suffering, besides being the means of saving many valuable lives.

The city is divided into three districts for the purpose of this service—Eastern, Western and Central; and the cases found in these are conveyed, as far as practicable, respectively to the Eastern District Hospital, the Long Island College Hospital, and the City Hospital.

The ambulance surgeons are appointed upon successful examination as to their fitness for their duties, and are stationed respectively at the Eastern District, and Long Island College Hospitals. They are always on duty, and receive no compensation for their services, except the payment of their board from the Department. They have telegraphic communication with this Department, with police and fire headquarters, with all fire and police stations, and

with the keepers of their ambulances, so that a call can be promptly transmitted to them from any part of the city, and their ambulances as speedily summoned. With such celerity do the officers of this service perform their duties, that after being called seldom does more than one or two minutes elapse before the surgeon is on his way with his ambulance, his medicines and his instruments, to succor and remove the patient.

The following ambulance surgeons have served during the years 1875 and 1876.

Upon Ambulance No. 1, in the Western District:

O. J. D. Hughes, until March 1, 1875; E. B. Jones, from March 1st to July 8th; J. C. Fisher, from July 8th to June 13, 1876; Willard C. Otterson, from June 13th, until the present date.

Upon Ambulance No. 2 in the Eastern District:

Walter Lindley, until August 20, 1875; Henry Hesse, from August 20th to March 1, 1876; Charles H. Wilson, from March 1st to July 5th; L. E. Preble, from July 5th until the present time.

The Board desires to acknowledge its appreciation of the very faithful, skilful and humane manner in which these gentlemen have discharged their arduous and important duties.

The following tables prepared under the direction of Assistant Sanitary Superintendent Joseph H. Raymond, M.D., show the work done by the various ambulances from their establishment in 1873 to June 30, 1902.

LONG ISLAND COLLEGE HOSPITAL.

Ambulance service established in 1873.

Number of calls by years.

1873	133	1888	1439
1874	418	1889	1396
1875	567	1890	1245
1876	662	1891	1276
1877	884	1892	1404
1878	1340	1893	1278
1879	1572	1894	1595
1880	2014	1895	1819
1881	993	1896	1911
1882	1076	1897	2021
1883	1205	1898	*1146
1884	988	1899	1812
1885	1083	1900	1763
1886	1127	1901	1957
1887	1510	1902 to June 30.	915
Total			38,549

*8½ months' service.

The Board of Estimate of the former City of Brooklyn neglected to provide money for the maintaining and operating of ambulance service for the year 1898, so that the ambulance attached to the Long Island College Hospital did not perform any service until after money had been appropriated in April 15th, 1898, by the Board of Estimate under the City of Greater New York.

EASTERN DISTRICT HOSPITAL.

Ambulance service established in 1873.

Number of calls by years.

1873	26	1888	No record
1874	193	1889	No record
1875	254	1890	No record
1876	249	1891	1000
1877	No record	1892	1051
1878	No record	1893	1091
1879	No record	1894	1012
1880	No record	1895	1127
1881	1289	1896	1266
1882	1420	1897	1215
1883	1683	1898	1208
1884	1701	1899	1236
1885	2448	1900	1348
1886	No record	1901	1167
1887	No record	1902 to June 30.	502
Total			22,486

For the years 1877, 1878, 1879, 1880, and for the years 1886, 1887, 1888, 1889 and 1890 a careful search has been made to obtain the reports of the ambulance surgeons who were in attendance at this hospital during this period, with the result of not having found same, therefore the statistics covering this period are incomplete.

ST. MARY'S HOSPITAL.

Ambulance service established Nov. 30, 1883.

Number of calls by years.

1883	24	1893	1124
1884	401	1894	917
1885	469	1895	1209
1886	466	1896	1281
1887	687	1897	1205
1888	713	1898	1331
1889	775	1899	1214
1890	889	1900	1558
1891	971	1901	1516
1892	1129	1902 to June 30.	698
Total			18,577

ST. CATHERINE'S HOSPITAL.

Ambulance service established Aug. 1, 1887.

Number of calls by years.

1887	387	1895	1251
1888	504	1896	1325
1889	850	1897	1480
1890	1053	1898	1495
1891	1265	1899	1529
1892	1184	1900	1725
1893	1110	1901	1608
1894	1160	1902 to June 30.	667
Total			18,593

HOMEOPATHIC HOSPITAL.

Ambulance service established Jan. 1, 1888.

Reopened July 1, 1902, under direction of the Commissioner of Charities.

Discontinued service April 1, 1900.

Number of calls by years.

1888	376	1895	1123
1889	1414	1896	1240
1890	1301	1897	1128
1891	1013	1898	1145
1892	1152	1899	1218
1893	1092	1900	248
1894	1156		
Total			13,606

METHODIST EPISCOPAL HOSPITAL.
Ambulance service established Dec. 30, 1888.
Number of calls by years.

1888	35	1895	1178
1889	725	1896	1280
1890	791	1897	1221
1891	1006	1898	1354
1892	1216	1899	1194
1893	1031	1900	1412
1894	952	1901	1418
		1902 to June 30.	717
Total			15,530

BROOKLYN HOSPITAL.
Ambulance service established May 20, 1890.
Number of calls by years.

1890	971	1896	1777
1891	1465	1897	1559
1892	1569	1898	1516
1893	1503	1899	1601
1894	1649	1900	1980
1895	1693	1901	1948
		1902 to June 30.	1067
Total			20,298

NORWEGIAN HOSPITAL.
Ambulance service established Jan. 1, 1893.
Number of calls by years.

1893	441	1898	512
1894	444	1899	676
1895	586	1900	698
1896	691	1901	698
1897	601	1902 to June 30.	374
Total			5721

ST. JOHN'S HOSPITAL.
Ambulance service established Sept. 27, 1893.
Discontinued service on June 1, 1900.
Number of calls by years.

1893	98	1897	872
1894	598	1898	1254
1895	765	1899	1068
1896	959	1900	390
Total			6004

KINGS COUNTY HOSPITAL.
Ambulance service established July 1, 1898.
Number of calls by years.

1898	159	1900	352
1899	340	1901	421
		1902 to June 30.	189
Total			1461

GERMAN HOSPITAL.
Ambulance service established July 1, 1901.
Number of calls by years.

1901	179	1902 to June 30.	266
Total			445

WILLIAMSBURG HOSPITAL.
Ambulance service established December, 1900.
Number of calls by years.

1900	38	1901	987
		1902 to June 30.	437
Total			1462

CONEY ISLAND RECEPTION HOSPITAL.
Ambulance service established June, 1894.
Number of calls by years.

1894	152
1895	205
1896	206
1897	280
1898	307
1899	302
1900	255
1901	305
1902 to June 30.	85
Total	2,097
Grand total for all ambulances	164,829

If to this grand total were added the calls of the Eastern District Hospital of which no record has been kept, the number of persons relieved by the ambulances in the twenty-nine years which have elapsed since the system was inaugurated would exceed 170,000.

Of the above thirteen ambulances, all save that connected with St. John's Hospital are now in active service.

The ownership and maintenance of the following ambulances are in the hospital authorities and for the service which they render the city in removing the sick and injured they receive respectively $100 a month:

Eastern District, St. Mary's, St. Catharine's, Methodist Episcopal, Norwegian, German, and Williamsburgh.

The above statement is true also for the Brooklyn, except that this hospital maintains two ambulances, for which it receives a monthly compensation of $200.

The ambulances at the Kings County, Homeopathic and Coney Island Hospitals are the property of the city and are maintained and operated by the Commissioner of Charities.

The so-called "Long Island College Hospital" ambulance is located at a livery stable near that institution, and its maintenance is paid for by the Board of Health, the livery stable keeper receiving $83 per month for which he furnishes horse and driver, and the other expenses are also paid by the Board of Health. The ambulance surgeon on duty with this ambulance resides at the hospital.

RULES AND REGULATIONS GOVERNING THE AMBULANCE SERVICE IN THE BOROUGH OF BROOKLYN, IN FORCE JULY, 1902.

All districts have been abolished, and the police have been directed to notify the ambulance surgeon nearest to the case demanding the services of a surgeon.

In order to avoid unnecessary strain upon the horses of the service, the police will notify the surgeon whenever the ambulance is needed for the transportation of the patient. If the services

of the surgeon only are required he may attend the call in a light wagon.

No ambulance is to be sent in response to a call unless it is in charge of a surgeon possessing the qualifications prescribed by law for hospital internes. Ambulance surgeons must be appointed by the Board of Health and must be always on duty unless relieved by properly qualified substitutes.

Although unnecessary delay is to be avoided, ambulances must not be driven through the streets at such a speed as to endanger the lives or limbs of the public. The bell is to be rung only in crowded thoroughfares and as a means of clearing the way, the city ordinances giving an ambulance the right of way as against any person. carriage or incumbrance. It is the duty of the police to enforce this ordinance.

When called to a case, the ambulance surgeon should not attempt to do more than relieve urgent symptoms, after which he must exercise his discretion as to removal, remembering always in case of doubt, that it is better to remove a case that should be left than to leave a case that should be removed. In all cases of apparent alcoholism the possibility of the existence of other abnormal conditions should not be forgotten, and the patient should be given the benefit of every doubt and be removed. If removal is deemed advisable, the patient must be taken to his home, or to the hospital preferred by him if he expresses any choice as to destination, without interchanging; otherwise the patient must be taken to the nearest hospital.

When death occurs in transit the body should be taken home if the residence of the deceased is known; otherwise, to the morgue. When death occurs before the arrival of the ambulance, the body should not ordinarily be removed; but this rule may be violated whenever, in the opinion of the ambulance surgeon, he can serve any good purpose by the removal of the dead body.

In a case of removal to the Borough of Manhattan, the surgeon must arrange by telephone to have an ambulance meet him at the farther end of the bridge, so that the transfer of the patient may be accomplished with the least possible delay. If the appropriate hospital should refuse to receive, or should delay unnecessarily the reception of, a case requiring prompt attention, the ambulance surgeon will telephone to the Department for instructions, or if that office is closed to the residence of the Assistant Sanitary Superintendent. All orders to remove patients from one point to another, other than emergency cases, must emanate from the Department of Health. Such calls must be responded to as promptly as though emergency work. For their services ambulance surgeons are forbidden to ask or accept any fee whatsoever.

Before returning from a call, the ambulance surgeon will write down in duplicate on slips provided for that purpose, the date, time, origin, and location of the call, the name, residence, age, nativity and occupation of the patient, and the diagnosis and disposition of the case. One of the slips is to be signed and given to the police officer in attendance on the case; the other is to be retained by the surgeon, who will add to it later the time of return. As soon as possible after the first of each month, ambulance surgeons will send to the Department of Health, in the Borough of Brooklyn, on official forms, a report of the previous month's calls.

Immediately before leaving in response to a transfer call and immediately after returning from all calls, ambulance surgeons will notify Police Headquarters.

New York's Fire College

Fire fighting and Rescue Work Reduced to a Science

By Herbert T. Wade

FOR many years the New York Fire Department has maintained a training school for firemen where practical instruction was given to those who had passed the civil service tests and had been appointed for a probationary period of one month. This training school not only was indispensable for the New York Fire Department, but served as a model for those of many other cities. To-day the need of thoroughly trained firemen is greater than ever, and their education can not be confined to such rudiments and essentials as may be taught to the probationer, but in addition must involve systematic instruction all along the line up to and including the officers in command of companies and battalions.

In efforts made recently to raise even higher the standards of the New York Fire Department there has been established a Fire College which includes not only the various schools previously maintained by the department, but aims to extend and systematize the instruction in practical fire-fighting, specially in the use of motor apparatus and other modern appliances now so extensively employed. This instruction is given by the best qualified men in the department and promotions to higher grades so far as is practicable are made only from those who have satisfactorily completed the appointed courses.

The chief of the department is the head of the Fire College Board, and the college itself is composed of a probationary firemen's school, engineers' school, officers' school, company school, and a special class in automobile operation. The first of these to be organized was the Probationary Firemen's School, at which all the probationary firemen are required to attend for at least thirty days after their appointment and before they are regularly accepted and permanently detailed to companies. The instruction here as the illustrations show is exclusively practical, being based upon that formerly in vogue in the training school, but amplified as regards its amount and in the apparatus used. The practical work takes place in the rear of Fire Headquarters, where the probationers are marshaled with their scaling ladders of hardwood surmounted by a toothed hook and containing cross pieces up which a fireman may climb after the hook driven through a pane of glass perhaps is firmly placed on a window sill above. A number of scaling ladders in the hands of the firemen trained to their use affords a ready means of climbing up the side of a building and of passing from window to window. The probationers are taught not only the use of the scaling ladder, but to climb ladders of all forms used in fire fighting, to raise and lower them, to straddle and stand on window sills, holding perhaps a companion in search of a point of vantage, or passing along some inmate of the house who has been overcome by smoke.

The large ladders, some of them 50 feet in length and carried on the hook and ladder trucks, also are used in the school, and the life saving rope which is shot up to the roof by means of a gun and shot line. The firemen are taught to haul up hose and ladders by a rope and to lower persons to points of safety when stairways and fire escapes are cut off by the flames or smoke. This means that the fireman must know the various knots employed and the method of using the gun. Then there is the use of the life net, for perhaps no one is left on the roof to lower the fireman and he must learn to jump properly into the net held by his comrades. They, too, must know how to hold the net properly. All of this involves careful training for the muscular men who already have passed a severe physical test, and day after day they raise ladders, climb up and down them to the top of the six stories of Fire Headquarters until they become

Teaching the firemen how to stretch and connect hose and the use of nozzle-holders with high-pressure streams. A three-way connection with cut-off valves is shown in the foreground.

Using the cellar pipe. The platform represents a ground floor through which a hole has been chopped in order to get at a cellar fire with a hose stream.

The play-pipe or deluge set. Used for a powerful stream when vast quantities of water must be poured into a burning building.

NEW YORK'S FIRE COLLEGE

expert. Then also they must learn the use of the hooks and axes for getting directly at the seat of a fire and removing smoldering wood, the use of picks, battering rams, crowbars, mauls, door openers, tin roof cutters, wire cutters, and pinch cutters, all to get into a building or directly at the flames, for a fire may occur at night when a building is tightly locked. Furthermore there are the ordinary connections of hose; to make them speedily is one of the first duties of the fireman, and he must understand the making of siamese connections, taking a line from engine or high pressure hydrant to a standpipe, carrying hose into buildings, and up ladders, connecting with a cellar pipe, and finally the use of hose within tall buildings where the building pumps or the city high pressure may force water far above the limits of the fire-engine in the street below. The high pressure now used in the lower parts of New York city presents many problems and dangers for the hosemen, and this is a modern feature which the new system of instruction aims to make clear. The construction and use of the large special hydrants and reducing valves is demonstrated and the method of connecting hose to and the use of the nozzle holder are explained. There is also instruction in the use of the fire alarm telegraph system so that various alarms, ambulance calls, and other signals can be sent, and finally the Fire Department surgeons give an elementary but practical course in first aid to the injured.

Interesting and important as this work is, it is perhaps exceeded in actual usefulness so far as the New York Department is concerned by other schools for the engineers and higher officers. Thus in the past there has been criticism of the engineers of the fire department that in some cases they did not keep their engines at a high degree of efficiency, and in actual operation they did not get the results that a more intimate and intelligent knowledge of the machinery would have secured. Accordingly a few years ago an Engineers' School was started with beneficial results, and this was made a part of the Fire College with a more extended course and competent instructors. In the high pressure districts the engineer of a company is stationed at the hydrant watching the control and reducing valves, while with the extensive introduction of motor apparatus now in progress he will be concerned with the care and operation of the gasoline engines. In the first place all engineers are required to attend this school, which is open also to first and second grade firemen upon approved application.

Hereafter only graduates of the school will be appointed as engineers. The practical work is being done in one of the machine shops of the department and consists of an extended course in engines and boilers and gasoline motor engineering. Here the engineers and firemen desirous of promotion study the actual machines and their construction and operation.

For many of the engineers, not to mention the firemen, gasoline motors have been a sealed book, but under the administration of Commissioner Johnson much motor apparatus is being added to the New York Fire Department and eventually the entire department will be on a motor basis, so the importance of the work is evident. In fact so immediate is the demand for properly qualified chauffeurs belonging to the uniformed force and men competent to operate and repair gasoline

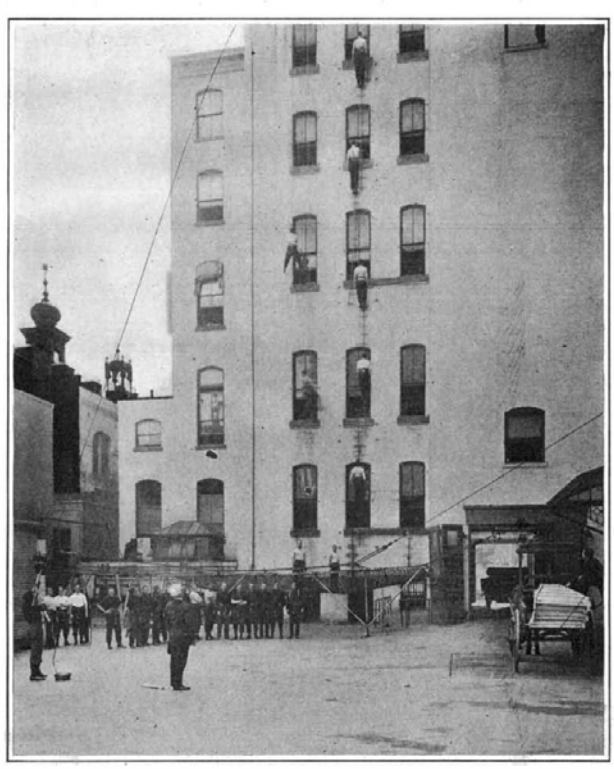
engines, that ther has been established a special class at the repair shops of the department for the training of such firem n. Here the men are taught the practical operation of motor apparatus so that competent chauffeurs will b forthcoming as the horse-drawn apparatus is displaced. This is taking plac as rapidly as possible, and by the end of the year th New York Fire Department will hav a number of distinct and separat types of motor-drawn machines in use.

The Offic rs' School affords a means of raising th general technical standard by having those who have evolved certain practical methods teach them to others, and give general information as to conditions and methods in diff rent parts of the city. Thus chiefs and company commanders in the high pressure districts hav learned to use this n w weapon most eff ctively and gradually are standardizing th different practices. These must b taught not only to thos serving in th protected territory but to others who may b called th r ither individually or with their companies in th vent of a large fire. In other words, certain chiefs and firemen have acquired special skill in dealing with certain conditions, and it is the intention that such methods should be taught to every officer.

For th company school entir companies are ordered to Fire Headquarters and are instructed and drill d in the effective us of th apparatus.

The entire Fir College is intensely practical in its spirit, and its object of raising the general standard of fire work in New York city doubtless will be attained. With th practical work thus brought up to an even higher degree of excell nce, it is likely that problems of construction and engineering eventually will be und rtaken and th technical and professional knowl dge of th firemen b correspondingly broadened, but to-day it is realized that efficiency alone is the keynot and this can be realized only through training and discipline.

Th lif n t. Fir m n b ing train d to jump into a n t h ld by th ir comrad s.



Drilling the probation rs. Th fir m n ar taught th us of scaling ladd rs and rop s for life-saving. Th lif gun and shot lin to haul up a rope is the last chanc for a fireman cut off by flam s or smoke.

NEW YORK'S FIRE COLLEGE

Wireless Detectors

By Ad lb rt J. Gog l

ELECTRIC wav detectors, th most delicate part of th wireless receiving set, are the subj ct of much argument as to th ir relative sensitiveness and relative m rits. Ther are a number of different types known, which may be arranged as follows in order of merit, according to most authorities:

(1) Electrolytic; (2) Peroxide of L ad; (3) Perikon (Chalco-pyrites and zincite); (4) Ferron (Iron pyrites); (5) Silicon; (6) Molybd nite (Molybdenum Disulphide); (7) Galena (Lead Sulphide); (8) Carborundum (Artificial Silicon Carbide).

Th Electrolytic Detector, perhaps th most widely known type, app ars in many forms, th most frequ ntly used of which is that in which the point of a very fine silver plated platinum wire, about 0.001 millimeter in diameter, called a Wollaston wire, is immers d in a nitric acid solution contained in a small graphit -carbon cup. It is necessary to us a batt ry and a non-inductive rheostat capabl of very fine adjustment, called a potentiom ter, in connection with this d tector. The batt ry polarizes the electrolytic c ll, that is, the fine platinum wir is covered with tiny bubbles of oxygen and th n the resistance rises so high that th current is nearly reduced to zero. If then an electric wav fall on the a rial connect d to the electrolytic detector, it suddenly reduc s the r sistanc of th c ll. A telephone rec iv r of great sensitiven ss being connected in series with the c ll and potentiometer, sound signals can be heard in the telephon . For gen ral and long distanc work, this detector cannot be exc lled except in localiti s where high pow r d interfer nc is very fr quent, which causes th platinum wir to b dissolv d v ry rapidly and a d t ctor working on diff rent principles must b substitut d. Substitut s will be mention d lat r. The L ad P roxide Detector consists essentially of a pellet of lead peroxide clamped between two surfaces, one of lead and on of platinum. A battery, potentiometer and telephone receiver are connected with the detector in the same manner as with the electrolytic detector. The lead peroxide detector works on a new principle; although no acids or liquids of any kind ar employed, its action is electrolytic. When lead peroxide, lead and platinum are brought in contact as described, it has long be n known that lead will be deposited on the platinum surface. When a battery is connected up properly with th detector, it opposes this action and causes the lead to be deposited upon the lead surface. Wh n an electric wav falls upon the wires conn ct d with the detector, a sound in the telephone is heard because of the chang of resistance brought about by th passing of a wave. The Perikon Detector contact is between crystals of chalco-pyrites and zincit ; in the Ferron Detector b tween a crystal of iron pyrit s and a metal point; in th Silicon Detector b tw en the element silicon and a wir ; in th Molybdenit D tector between a crystal of molybdenum disulphid and a metallic surface; in the Galena d tector b tw n a crystal of lead sulphide and a very fine wire; in th Carborundum D tector b tween a crystal of carborundum or silicon carbide and a m tallic surface.

Th Silicon Detector retains its adjustm nt v n wh n very near to a v ry high powered sending apparatus, and is th refore to b r comm nded wh r interfer nce is very severe. If a piec of 99/100 p r cent pur silicon can be procured, nothing bett r can b d sired.

The Carborundum Detector, v n though subj cted to somewhat sev re blows, often retains its adjustment for months at a tim , which causes it to be the favorit detector with the amateur. However, it requir s the us of a battery and potentiometer for its efficient use in long distanc work. The green crystals are mor sensitiv than th blu or purpl ones. Th side of the crystal connected to th ground should be covered with tin foil or soldered in a cup.

A New York firm has put on the market a promising new detector for which broad claims ar made. This d t ctor is of the vacuum bulb typ and very similar to the "Audion" of Dr. L e De Forest, which is not within th reach of the average experimentalist owing to its high cost. This detector consists of an electric light filam nt, a grid and a plat s aled in a highly exhausted bulb. A battery to light th filament and another battery and a rheostat capable of very fine adjustm nt ar nec ssary for th operation of this d tector. Wh n the curr nt to light th filament is turned on, the detector is ready for business, requiring no adjustments of crystals and points or Wollaston wire and acid. This detector can b us d to receive from all syst ms of transmission; singing spark, quench d spark, arc sets, telephone sets, in fact it will d t ct any wireless wave from whatev r source it is produc d. The makers of this detector claim it to be mor sensitiv than th lectrolytic, which will be a decided advanc in wir less receiving apparatus.

The wireless op rator should not content himself with on d tector, but should have several r ady for use and a switch with which to conn ct up the desir d one.

A d vice of som kind should be used to asc rtain whether or not the d t ctor of a wireless set is in a receptiv condition. Several d vic s of this class ar quit well known, but a short d scription will not b amiss. If a k y sounder and battery are conn ct d up near th detector, a sound is h ard in th d t ctor when th key is rais d, if th det ctor is in working order. This method requires the constant operation of th k y during th test or search for a s nsitive area. But th author has found that if an ordinary el ctric b ll with th gong removed, or a buzz r, is conn cted with a switch and battery, and two or three feet of copper wir b conn cted to the interpret r, th arrang m nt is much more conv nient and effici nt. The short l ngth of wir acts as an antenna, and owing to th sp ed of th vibrator, a continuous musical not is heard in th receiv r wh n th d tector is working prop rly.

A variable condens r of good capacity should be shunted around th d tector, enabling weak signals to b str ngthn d or cut out as desir d. Whil transmitting, th d tector should b short circuit d by a switch to pr v nt its being burned out, or the wire in the t l phone fus d.

Wh n not in us , th d tector should b protected from dust and moistur . The crystals of the th rmo- l ctric typ of det ctor should be touched with the hands as littl as possible, for the oil s cr t d from th skin causes a mark d d cr as in th sensitiveness.

STREET ACCIDENTS—NEW YORK CITY.*

By E. S. Clowes, *Statistician for the National Highways Protective Society.*

This paper deals with Street Accidents in New York. Last fall I took charge of the statistical work of the National Highways Protective Society and I have, in the interval, learned enough about street accidents to realize that the problem of their control is a very complicated one—not to be solved in any quack fashion, but only by the force of an aroused and intelligent public sentiment, expressing itself in definite and comprehensive regulations and laws, administered with common sense and impartially enforced.

The dangers of the streets of New York are becoming a national tradition. Clippings come to the society from nearly all over the country stating the numbers of killed and wounded here and expressing editorially more or less humorous comment regarding the agility of New Yorkers and the perils of life in the metropolis. Captain Bob Evans, "Fighting Bob" of Santiago fame, once is alleged to have said that he felt safer on the bridge of a battleship in action than he did when trying to cross Broadway or Fifth Avenue.

For three years past the National Highways Protective Society has been keeping a record of traffic accidents in New York. These have been classified with respect to the vehicle that inflicted them, whether the victim was less than seventeen years old, and whether or not the injury was fatal. The number of fatal accidents has been derived from the coroners' offices of the respective boroughs and are collected each month. I believe this to be more satisfactory than the Board of Health figures, as the Board of Health gets its figures of violent deaths from the coroners' offices, and while accurate with respect to the nature of the injury the Board of Health is not always particular as to the cause of it. How a variation in the figures occurs is easily seen by a little study of the way the coroners'

* Paper prepared for the Quarterly Meeting of the American Statistical Association, New York, April 17, 1913.

records are kept. When the office is first notified of a death all that is entered is the victim's name, the place where the body was found, the coroner assigned to the case, and the proximate cause of the injury, with almost invariably, if it is a traffic case the nature of the vehicle inflicting it. These cases are all entered a second time in a journal where such details as age, occupation, etc., are noted with a more complete description of the injury and occasionally the detailed findings of the coroner's jury. Quite frequently, however, in this journal the cause of the injury is not stated, the record merely reading "Fractured skull," "Crushed pelvis" "Rupture of the viscera," etc., without stating that the injury was due to having been run over. The Board of Health records I think have been largely taken from this journal rather than from the day book because the journal gives the victim's age, civil condition, and a more nearly complete account of the anatomical injury, but for the reasons above stated it is necessary in order to get an accurate list to go over both volumes of records. This the National Highways Protective Society has always done, and its figures at the close of the year agree closely with the coroners' reports.

We classify accidents under Automobiles, which includes all power propelled vehicles not running upon rails; Trolleys, which include all surface electric railways, running upon the highways or streets, and Wagons, which include all animal drawn vehicles. The following classes of accidents are excluded from our record: automobile or motorcycle accidents in which the victim was the driver of the vehicle and where the accident was due solely to his own recklessness, trolley accidents other than collisions in which the victim was an employee in the discharge of his duty, and wagon accidents when the victim was the driver and no one else was apparently to blame. Runaway accidents are counted. Collisions between vehicles are noted and classified by the two vehicles engaged, such as trolley and wagon, automobile and trolley, etc., and the death or injury is blamed upon the stronger class of vehicle in the encounter. In automobile and trolley collisions the blame is put upon the automobiles as it is the more easily controlled and has greater freedom of action. Colli-

sions, however, are responsible for very few deaths, for instance in the years 1910–11–12 out of 473 automobile fatalities, only thirteen were due to collisions. The remainder represented pedestrians run down.

Our figures for injury are derived from newspaper clippings and are undoubtedly much below the mark, although we get clippings from pretty nearly every newspaper printed in English in Greater New York, some of which, such as the *Home News* and the *Greater New York Star* are probably unfamiliar to most of the city's residents. I think we get 90 per cent. of the serious accidents, but many minor ones go unreported, and at times when the papers are full of important news, as they were after the loss of the "Titanic" or during the recent floods in the West, many accidents are unrecorded.

Since the first of December last, I have kept a name record of every accident, either reported in the papers or from the coroners' offices to which, in addition to the usual details, I have added such information as, driver drunk, victim deaf, mute, driver ran away, taxicab, ambulance, doctor's car, owner driving, driver exonerated, or whatever I thought might be of possible interest. Some of these in time will present features of interest.

So much for the way in which the records are kept. I think that for purposes of comparison and study it will best suit our purpose to consider only the fatal accidents. Even they could provide material for a longer article than I feel that I have at present time to prepare, but a briefer study will not be entirely sterile if not of conclusions, at least of interesting leads for further study.

The first thing to notice is that automobile fatalities are progressively increasing, while those due to trolleys and wagons are nearly stationary from year to year. Automobile deaths in 1910 were 112, in 1911, 142, and in 1912, 221; for the first three months of 1913, there were 51 against 39 last year. Trolley deaths in 1910 were 148, in 1911, 109, and in 1912, 135. Wagons showed 201, 172, and 176, respectively, for the three years. This shows the way automobile fatalities are increasing and is interesting also in that last year automobiles, for the first time, caused more deaths than any other class of

vehicles. The increase has been largest in the Borough of Manhattan, the most congested borough, least in Richmond, the least congested, the increase over the year 1911 being zero in the latter against about 62 per cent. in the former, and 56 per cent. for the whole city. Brooklyn shows about the average increase, but Queens shows 100 per cent. increase due probably to the fact that several of the speedways to Long Island lie through this borough.

In all classes of street accidents, children furnish much more than their share of numbers. According to the United States Census of 1910, 28.7 per cent. of the inhabitants of this city were under fifteen years of age. It would be a safe guess that the figure for those sixteen or less, which is the National Highways Protective Society's classification of children, would be close to 30 per cent. Proportionately to the population, then, children should furnish 30 per cent. of the traffic fatalities. On the contrary they have furnished during the last three years 42 per cent. of such fatalities. The vehicle that has been relatively most fatal to children is the wagon, as children were the victims in 49 per cent. of the fatal wagon accidents. Automobiles are just at the average, trolleys are relatively safest with 33 per cent. or little above the normal proportion. Perhaps these figures might be explained in the theory that in the tenement district where most of the children live, and where they spend nearly all day on the streets, wagons furnish the principal part of the traffic. Trolleys are relatively safer for children because even the child soon knows he is safe if he will only keep off the tracks, and the motorman is particularly careful if he sees a child running into danger, whereas he thinks the adult is able to look after himself.

We have seen, then, that the killings from automobiles now exceed those from either trolleys or wagons, and that they are rapidly increasing, while those due to the last two causes remain nearly stationary. We have also seen that children furnish an undue proportion to these fatal accidents, and that wagons are relatively the most fatal vehicle for them. With these and subsequent data let us see if we can get any clue toward a reasonable method for preventing these fatalities.

Along any street or highway the four factors that enter into accidents are: congestion of the highway, the speed of the vehicle, the carelessness of the driver, and the negligence of the victim. The latter is what one might call a "human constant" which for purposes of comparison can be disregarded. The carelessness of the driver is in part proportionate upon his fear of punishment, and there remains the other variables of congestion of the street and normal speed of the vehicle. The congestion of the street is due to two factors, the density of the population and the mileage of the streets per unit area. It might be reduced to one factor, the density per street mile, but that would overlook the diminishing effect upon traffic accidents of vacant spaces not traversed by streets where children may play in safety. The five boroughs of this city offer excellent grounds for comparison: Manhattan is densely populated, Brooklyn and Bronx are of the density of the average city, and Richmond entirely and Queens outside of Long Island City are suburban or even rural in their character.

I have, therefore, worked out a comparison for these five boroughs. I have taken for purposes of comparison the automobile figures for the last year as the rate of increase has been so great that the figures of two years ago would have little present application. Because of improvements in the trolley system of Brooklyn about two years ago, which caused that year a marked drop in the death rate, I have taken the trolley figures for 1911–12. For wagons I have taken all three years. Figuring on this basis the fatal accident rate per million per year shows that Manhattan has the highest rate for wagons and Queens the highest for both automobiles and trolley, although the rate for trolleys for Queens, Bronx and Manhattan are close together, being 30, 29, and 27 respectively. Manhattan stands second on the automobile list, the Brooklyn last and next to last in trolley accidents. In other words, the fatal wagon accident rate per million is highest in the most congested borough while for automobile and trolleys it, although high there, is exceeded by the next to the least congested borough, which happens to be one which in proportion to its population endures a very large automobile traffic, and this auto traffic as well as the trolley traffic, is largely along highways where high speed can be maintained.

There is another interesting basis of comparison. If we divide the street mileage in any borough by the number of fatal accidents, we get a figure representing the number of miles of road for every such accident. Reduced to a per annum basis, these show that for any given stretch of road Manhattan excells in all classes of accidents, followed by the other boroughs in proportion to the density of their population. In order to see how closely this proportion held I multiplied the figure representing the miles of street per accident by the population per acre for each borough, and although the latter varies as much as 200 and 38 for Manhattan and Brooklyn, and the accident rate varied from 3.6 to 20 I found that the six products derived by multiplying these two factors for these two boroughs for each class of traffic, only varied from 608 to 880 showing a pretty well defined relation between accidents and population density mileage of streets. In making these comparisons of course the trolley mileage was used for the trolley figures, not the general street mileage. For the other boroughs the relation did not hold so well owing to the fact that the street mileage there is small with relation to the area.

Summed up, all these figures seem to show in general that wagon accidents are a function of population density and that automobile accidents are a function of population density and the speed at which the vehicle is likely to be run. The protective effect of a low density of population is seen to be overcome by the presence of sketches of road over which many automobiles pass at very high speed. Two remedies are needed. First relieve congestion. We have already seen that nearly half the victims are children, particularly those killed by slow moving wagons. If sufficient playgrounds could be established to take the children off the streets it would save more than half of them, as fully that many are killed while at play. All trolley cars should be equipped with a powerful air or power brake. Nearly all are in Manhattan and Brooklyn, where notwithstanding congestion the rates are lower than in some of the outlying boroughs. Efficient fenders should be provided.

With respect to automobile fatalities which now exceed

those due to any other class of vehicles, the taking of children off the streets would help some, and speed regulations more, but there would be little need of the latter, if every driver realized that a fatal or serious accident would mean for him either the loss of his means of livlihood or the deprivation of the use of his property.

Finally, the figures for a few other large cities as compared with New York might be of interest.

In 1912 there were 532 fatal traffic accidents in New York.

In 1911 there were 410 fatal traffic accidents in London.

In 1911 there were 236 fatal traffic accidents in Paris.

In 1911 there were 129 fatal traffic accidents in Berlin.

This gives a fatality rate per million for these cities for these years as follows:

New York	106	Paris	81
London	56	Berlin	64

This confirms the general impression that Paris is the most dangerous and London the safest of the European cities, but New York exceeds even Paris and has very nearly double the rate of London where traffic regulations are strictly enforced.

MILES OF STREET PER ACCIDENT.

	Autos.	Trolley.	Wagon.
Manhattan	3.6	4.2	4.4
Brooklyn	20.	16.	18.
Bronx	25.	13.	33.
Queens	46.	20.	224.
Richmond	105.	62.	100.

POPULATION PER ACRE.

Manhattan	200.
Brooklyn	38.
Bronx	20.
Queens	4.8
Richmond	2.5

Population per Acre Times Miles of Street per Accident.

	Autos.	Trolley.	Wagon.
Manhattan	720	840	880
Brooklyn	760	608	684
Bronx	500	360	660
Queens	221	96	1075
Richmond	262	155	250

Fatal Accident Rate per Million per Year.

	Autos.	Trolley.	Wagon.
Manhattan	52.5	27	43
Brooklyn	30.	19	33
Bronx	36.	29	27
Queens	65.	30	14
Richmond	33.	11	33

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STREET TRAFFIC ACCIDENTS.*

By Frederick S. Crum.

The street accident problem as it is presented in various forms in our American cities looms so big that I can hope to touch upon only a few phases of it in the short time at my disposal. My remarks will be limited to that group of accidents which may perhaps be best described as traffic or vehicular accidents. Probably the majority of this class of accidents in cities occur in the streets. Many of the traffic accidents, however, particularly those classed as steam railway accidents, occur in railroad yards and on railway tracks within city limits. Some of the street car accidents, in cities like Boston, New York, Philadelphia, and Chicago occur in subways and some on elevated tracks. Vehicles for my purpose include everything on wheels or runners used to transport persons or goods on railway tracks within city limits or in city streets, excepting invalid chairs, baby carriages, and wheelbarrows. Usually also horses or other draft animals are considered a part of the vehicle to which they are attached, in discussions of vehicular accidents.† Kicks by horses and runaway accidents are generally included with street and traffic accidents. Obviously, however, some of the accidents by horse kicks occur in stables or elsewhere than on the streets.

What the actual conditions are in American cities as regards vehicular hazards it is difficult to determine from the information at present available. A fairly adequate notion, however, can be obtained from a careful study and analysis of the fragmentary data which may be derived from various sources.‡ To add to the difficulty, there seems to be a lack of uniformity

* Read at the quarterly meeting of the American Statistical Association, Yale Club, New York City, April 17, 1913.

† See Appendix K.

‡ See Appendices A, B, D, H, I, and J.

in reporting traffic accidents where they are reported at all by local or state authorities, and this must be expected so long as we almost everywhere find a division of responsibility and in many cases a duplication of reports through two or more separate offices. Here in New York City, for illustration, the coroners make certain returns, the Department of Health publishes other and different returns, the Public Service Commission compiles and publishes still different figures, and, finally, the National Highways Protective Society compiles statistics different from those found in any of the other three official tabulations.* Similar confusion exists in other cities and states and to such an extent that it is often quite difficult to reconcile one set of figures with another.

The Bureau of the Census in recent years has published some very interesting fatal traffic-accident statistics for the registration area, and although we know that these are not complete returns they are nevertheless useful as indicating the general trend of such accidents in an area which now embraces over 63 per cent. of the total population of the United States. According to the census reports there has been a slight decrease in fatal traffic accidents in the whole registration area during 1911 as compared with 1907, when measured against population. The rate was 271 per million of population in 1907 and 243 in 1911. The rates for steam railway accidents were 178 in 1907 and 143 in 1911; for street railway accidents the rates were 44 in 1907 and 35 in 1911. Automobile fatalities numbered 1,291 in the registration area in 1911 against only 294 in 1907, and the rates per million of population were 7 in 1907 and 24 in 1911. Fatal accidents due to wagons and horses and miscellaneous vehicles remained practically stationary during the five-year period, the rate being 42 in 1907 and 41 in 1911. In the registration cities there were 7,606 fatal traffic accidents, so classified, in 1911 as against 7,435 such accidents in 1907. Automobile accidents were the only class of fatal traffic accidents in the urban area which showed an increase during the five years, 1907–1912. The city fatality rate from automobiles was 9 per million of population in 1907 and 31 in 1911. The increase in the reported actual numbers was from

*See Appendix A, Tables I and V.

240 in 1907 to 985 in 1911.* Assuming that the same rapid increase in automobile fatalities has continued during 1912 and will continue during the present year, and assuming further that the automobile fatality rate returned by the Bureau of the Census for registration cities is practically the same as for all the urban area, I estimate that during 1913 there will be fully 2,000 automobile fatalities within the urban area of the United States. Many automobile fatalities, however, escape being reported as such in the census returns, and are reported under such ill-defined headings as fractures, traumatism, etc., so that it is very probable that the true number of automobile fatalities within the urban area of the United States during 1913 will exceed this estimate of 2,000. A similar estimate for the whole United States, based upon the rate for the whole registration area (1911) yields approximately 3,500 as the expected number of automobile fatalities during 1913.

Official reports for the whole United Kingdom showed 950 fatalities from motor car, motor omnibus, and motorcycle accidents during 1912.† The similar accurate official figure for the German Empire during 1912 was only 442.‡

To further illustrate the menace of the automobile in this country the following comparison for a few of the principal cities will be of interest:

FATALITIES FROM AUTOMOBILE ACCIDENTS.

City.	During		Increase	
	1907.	1912.	Actual.	Per Cent.
Baltimore	3	8	5	167
Buffalo	7	21	14	200
Chicago	27	104	77	285
New York City (Health Department Record)	42	188	146	348
Pittsburg	7 (1908)	28	21	300
Providence	2	11	9	450
St. Louis	4	21	17	425
San Francisco	13	22	9	70
Washington, D. C.	2	24	22	1100
Total for 9 cities	107	427	320	299

* See Appendix B for detail statistics of the registration area.

† See p. 12.

‡ See Appendix C, Table IV.

In these nine American cities there were only 15 fewer automobile fatalities recorded in 1912 than were returned for all Germany in the year ended September 30, 1912. The increase in this class of fatalities during an interval of five years was in actual numbers 320, or 299 per cent. The average increase in the automobile fatal accident rate in these nine cities on the basis of population was from a rate of 11.2 in 1907 to a rate of 40.3 per million population in 1912, or an actual rate increase of 29.1 per million of population. The rate in 1912 was 3.6 times that in 1907.*

From the census returns for 1909 for the registration cities it appears that about 30 per cent. of all the deaths from accidents, excluding injuries at birth, were traffic accidents. The aggregate number of reported traffic fatalities during 1909 in the registration cities was 6,605 and this number had increased to 7,606 by 1911. Of this total of traffic fatalities reported during 1911, 3,808, or 50.1 per cent. were steam railway accidents; 1,528, or 20.1 per cent. were street railway accidents 1,285, or 16.8 per cent. were accidents caused by wagons, horses and miscellaneous vehicles; and 985, or 13.0 per cent. were deaths caused by automobiles.†

Although during 1911 in our American urban area only 1 in every 8 of the traffic fatalities was caused by the automobile the ratio is increasing very rapidly. The motor car is fast replacing horse-drawn vehicles and as the relative numbers of the two classes of vehicles change we may expect a still larger increase in the automobile fatalities, and a further reduction in the fatalities from wagon accidents.

To still further emphasize the rapid increase in automobile fatalities in this country I may quote the following death loss statistics compiled from the mortality experience of 116 life insurance companies during the three years, 1910, 1911, and 1912:

* See Appendix D, Table I.
† See Appendix B, Table II.

MORTALITY FROM AUTOMOBILE ACCIDENTS, LIFE INSURANCE COMPANIES' EXPERIENCE.*

Year.	Deaths.	Amount of Claims.
1910	137	$449,638
1911	186	604,814
1912	232	1,041,819
Totals	555	$2,096,271

According to these statistics the deaths on account of automobile accidents in American life insurance companies' experience have nearly doubled in number in the last three years and the amount of claim losses has more than doubled.

Some idea of the increasing use of automobiles can be obtained from the following figures which are quoted from an address made in 1912 by Mr. Bertrand A. Page, vice-president of the Travelers Insurance Company: "Ten years ago, roughly estimated, there were less than 100,000 pleasure automobiles in the United States and Canada. To-day (1912) there are at least 900,000 in use. There were 180,000 automobiles sold in the United States in 1910, 190,000 in 1911 and it is estimated that approximately 210,000 new cars will be sold this year (1912)." Mr. Page also states that prior to 1907 the effect of automobile losses on the accident claim ratios of the Travelers Insurance Company was negligible, the losses paid for the five years, 1902 to 1906, inclusive, comprising only 2.9 per cent. of the total. Commencing with 1907, the ratio has steadily increased from 5.3 per cent. for that year to 21.8 per cent. in the year 1911, or in detail as follows:

CLAIM LOSS ON ACCOUNT OF AUTOMOBILE ACCIDENTS. TRAVELERS INSURANCE COMPANY.

Years.	Per Cent. of Total Claim Loss. All Causes.
1902–1906	2.9
1907	5.3
1908	6.5
1909	11.4
1910	14.1
1911	21.8

* Compiled by the Southern States Life Insurance Company, Atlanta, Ga., in 1913.

The automobile is so easily controlled that drivers are continually tempted to become careless and are apt to forget that their machines have weight as well as power and therefore develop great momentum even when going at a moderate rate of speed. The average-size automobile of to-day is heavier than were the cars on passenger trains in the early days of railroading, and the engines of modern high-power machines are more powerful than the first locomotives. Saturday last (April 12), Jules Goux, on an English track, drove a racing auto 106 miles and 387 yards in one hour, breaking all previous records. Only about two months ago an English driver established the first over-100-miles in an hour record, a feat which had been attempted for years without success, and yet last Saturday that first record of 103 miles in an hour was beaten by more than three miles. We are now speed mad and are getting more and more crazy. Think of driving machines as large, heavy and powerful as the up-to-date automobile over country roads at railway speed of 60, 70, 80 and more miles an hour, and yet that very thing is being done every day!

In 1830, when the Liverpool and Manchester railway was opened, eight trains of carriages with as many locomotives were sent over the road at a speed of fifteen miles an hour. A member of the House of Commons, Mr. Wm. Huskisson, one of the excursionists, was killed, and another prominent member of the party wrote to the editor of the Edinburgh Review saying among other things: "the folly of seven hundred people going fifteen miles an hour, in six carriages, exceeds belief." *

In 1854, in New Jersey, a work train, carrying a number of laborers, was backing down to a station when a cow suddenly jumped up from a hollow in which she was concealed, ran under the forward end of the first car, threw it off the track and down an embankment, six or eight feet high. Three other cars were dragged down the bank. The aggregate result was 12 persons killed, 10 seriously injured, and 12 slightly injured. †

These two illustrations will help us to appreciate the vast

* See "Notes on Railroad Accidents," by Charles Francis Adams, Jr., N. Y., 1879, p. 7.

† "Annual Reports of Railroad and Canal Companies of the State of New Jersey, 1854," p. 28.

progress that has been made in less than a hundred years in the speed and size of railway engines and trains, and they also emphasize the relative power, weight, and speed of the modern, trackless automobile as compared with the locomotives and railway cars in the early history of railroading.

The most accurate and complete statistics of automobile accidents are those for the German Empire. A census of automobiles was first taken in Germany on January 1, 1907, and a similar census has been taken annually as of January 1, from that date.

Detail statistics of automobile accidents have been compiled for Germany beginning with April 1, 1906. These returns are published in the quarterly reports of the Imperial Statistical Office and the year, for this statistical purpose, ends September 30. The statistics for six complete years are now available, or for the period 1907–1912, inclusive. The German census returns show an increase in the total number of automobiles and motorcycles from 41,727 on January 1, 1909 to 77,789, five years later, or on January 1, 1913. There has been an actual decrease in the motorcycles, or from 21,176 on January 1, 1909 to 20,448 on January 1, 1913, while the automobiles proper have increased in Germany from 20,551 in 1909 to 57,341 in 1913.* The census returns give many details, such as the horse-power of the automobile, the general purposes for which they are used, whether they are owned by German citizens, or by residents of other countries, whether they are freight or passenger machines, etc., and all these statistics are separately reported for the various larger political divisions of the Empire.

Nearly all of the accident statistics are also separately returned for the principal political divisions of the Empire. Among other facts disclosed in the accident returns are the number of persons injured, fatally and non-fatally; the amount of damage to other vehicles or goods, and to the machine causing the accident; the nature of the penalty, if any, imposed upon the person or persons to blame for the accident; and whether the blame attached to the driver, to a passenger in it, or to a person or persons outside it. The sex, age, and occupa-

* See Appendix C, Table I.

tion of the injured and killed are given in detail, also the place where the accident occurred—whether in cities of over 100,000 population (there being 38 such in Germany), in smaller cities, in villages, or on country roads. All of these classifications by age, sex, occupation, and place of accident are subdivided so as to indicate whether the injured or killed persons were drivers, other persons inside, or persons outside the automobiles. The non-fatal injuries are divided according to their nature and extent into 18 classes so that the number and character of the serious and slight non-fatal injuries can readily be determined. The day of the week and time of day of the accidents are reported and tabulated, also the horsepower of the machines involved. The general character of the accident is noted,—whether it was caused by collision with a street car, with another automobile, with a wagon or other vehicle, whether it was a case of hitting a pedestrian, etc. Also the cause of the accident so far as it can be determined is carefully noted and tabulated—whether it was due to excessive speed, to failure to sound a warning, to other inattention or carelessness of the chauffeur or driver, or the pedestrian; whether traceable to some defect in the street, to some defect in the machine, to explosion, to burning of the machine, etc. These and many other details are faithfully presented in these really wonderful German statistics.* Many very interesting and important facts are disclosed in these accident figures for Germany, a few of which I may here cite to illustrate the utility of such accurate and comprehensive returns. The number of persons non-fatally injured in automobile and motorcycle accidents in Germany has increased from 2,419 in 1907 to 5,542 in 1912, or 129.1 per cent. The number killed—and all those dying within a month subsequent to the accident are counted among the fatally injured—has increased from 145 in 1907 to 442 in 1912, or 204.8 per cent.

During the five years 1907–1911, 1,101 persons were killed in Germany, 802, or 73 per cent. being males, and 297, or 27 per cent. being females. The sex was reported of all but two of the 1,101 persons killed.† During the same five years 15,907 persons were non-fatally injured in motorcycle and

* See Appendix C.

† *Ibid*, Table IX.

automobile accidents in Germany and the sex was reported in all but 54 cases. Of the non-fatally injured, 72 per cent. were males and 28 per cent. females. Of the 1,101 persons killed in Germany during 1907–1911, the ages were reported in all but 3 cases, and 316 were under 16 and 163 were 61 years of age or over.* Of the total, therefore, 479, or 43.5 per cent. were either young or old persons.† Of the 15,907 persons non-fatally injured 3,001 were under 16 years of age, and 1,020 were 61 years of age or over, or about 26 per cent. of the total were young or old persons. Similar sex and age statistics are not available in the German returns for 1912.

Of the 1,101 persons killed during 1907 to 1911, 438 were killed in the large cities, 104 in the smaller cities, 161 in village streets and 389 on country roads.‡ In cities and villages together 703 persons, or 63.9 per cent. of the total, were killed as against the 398, or 36.1 per cent., on the country roads.

During the five years, 1907–1911, there were 85 drivers killed and 151 other persons in automobiles, while 865 of the 1,101 victims were outside the automobiles. These fatalities and non-fatal injuries were classified according to place of accident during 1907 to 1911 and although nearly 64 per cent. of all the fatal accidents during this period occurred in the cities and villages of Germany the percentages were entirely different for the drivers. Of that group only 15 of the total of 85 were killed in the cities and villages as against 70 on the country roads. Similar differences are to be noted for occupants of automobiles other than drivers, only 40 of whom were killed in cities and villages as against 111 killed on the country roads. These figures bring out clearly the fact that the automobile accident problem is very different in places where population is congested, as in cities, from that presented in places where the population is scattered, as in the country. In the first case the danger is principally to persons outside the automobiles, while on the country roads the hazard is about equally divided, according to the German experience—or 181 occupants were killed on the country roads as against 217

* See Appendix C., Table VIII.

† For similar data for New York City. See Appendix I.

‡ *Ibid*, Table XIV.

persons outside the machines.* This particular experience was not extended through 1912, or at least the corresponding statistics were not published in the last report.†

The German experience shows that about 17 per cent. of the freight-carrying automobiles meet with accidents, as against about 21 per cent. of the passenger type.‡ Over 27 per cent. of the passenger automobiles of from 16 to 40 horse-power meet with accidents in Germany every year. With freight-carrying machines of the same horse-power the percentage meeting with accidents has averaged over 17 during the six years, 1907 to 1912.

Enough has been said to indicate something of the detail of the German figures, the like of which is hardly imaginable for any state or city in this country. An automobile law comprehensive in character went into effect in Germany in 1910, and it was based upon full information of a statistical character that had then been accumulated for something over three years. Imagine, if you can, a state law in this country, or a city traffic ordinance based upon such full and illuminating statistics.§

The certainty of accountability, and the knowledge that punishment will be swift and sure for disregard of the law must act as a powerful deterrent and for the good of every user of the streets and roads of Germany. Otherwise, it would be difficult to explain why in all Germany during the six-year period, 1907–1912, there were only 1,543 persons killed by automobiles and motorcycles, while in the United States probably fully twice that number were killed in 1912, and in the Registration Area alone in 1911, 1,291 were killed by automobile accidents, according to the reports of the Census Office, which are admittedly incomplete in this particular.

Some excellent statistics of street railway accidents are available in the report presented by the German electric street railway companies to the International Hygiene Exhibit at Dresden in 1911. The accident problem had become so acute

* Appendix C, Table XIV.

† Vierteljahrshefte zur Statistik des Deutschen Reichs, Herausgegeben vom Kaiserlichen Statistischen Amte. Erstes Heft, 1913.

‡ Appendix C, Tables II and III.

§ The recently enacted Ordinance for New York City was based upon as good local information as was available. See Appendix H.

in Germany by 1909 that the street railway companies decided to coöperate in an extensive and thorough inquiry into the subject. As a result detail returns of accidents were secured from 158 companies, which together represented about 95 per cent. of the total mileage. The report as a whole is very interesting, but I can only mention a few of the more important facts which it disclosed.*

1. Statistics for the five years, 1905–1909, showed that 136 passengers had been killed on the electric railways making returns, only 7 of whom were under 13 years of age. The fatality rates based upon the number of passengers carried were fairly constant, fluctuating from 1.2 per 100,000,000 in 1909 to 2.1 in 1908.

2. The statistics of fatal injuries to persons other than passengers showed that children under 13 years of age formed the majority of the victims in every one of the five years for which the facts were collected. In the aggregate 732 persons other than passengers were killed, 409 of whom were persons under 13 years of age.† The report comments at some length upon the fact that parents are blameworthy for their negligence in permitting their young children to play in the streets. On the basis of car mileage the fatal accident rates of persons other than passengers remained fairly constant during the five years, and the same was true also of the severe and slight injury rates. According to the German figures, in about 95 per cent. of all the fatalities the fault lay with the victims, only about 5 per cent. being the result of carelessness on the part of the street railway employees.‡

The conclusions deduced from these German statistics may be briefly stated as follows:

First. The most potent and immediate remedy for present conditions will be found in the education of children and the public generally to exercise greater care when walking across streets, driving in other vehicles, or while boarding and alighting from cars.

* For some of the statistics compiled and re-arranged from this report see Appendix E. For a more full discussion of the report see a paper by the present writer published in The Spectator, New York, September 19 and October 31, 1912.

† See Appendix I, for statement of fatalities by age in New York City.

‡ See Appendix E, Table IV; also Appendix C, Table XII where it is shown that in automobile accidents a much larger proportion are due to causes beyond the control of the injured.

Second. The desirability of keeping children off streets used for electric street car traffic was particularly emphasized.

For the United Kingdom a statistical return is made to the House of Commons every year of all street accidents caused by vehicles and which were known to the police as having resulted in death or personal injury. This requirement was one of the good results of the investigation made by the Royal Commission on London Traffic, the work of which was concluded in 1905. These street accident returns for the United Kingdom date from May 1, 1908, and the first report was, therefore, for a period of only eight months. The statistics are classified as fatal and non-fatal and are further grouped according to the kind of vehicle, vehicles for this purpose being divided into six classes—horse-drawn omnibuses, other horse-drawn vehicles (excluding tramcars), horse-drawn tramcars, mechanically propelled tramcars, motor cars (including motor-cycles) and motor omnibuses. The tabulations are made in this detail by counties and by police districts.

A summary of these English statistics is presented in the following table for convenient reference:

STREET ACCIDENTS CAUSED BY VEHICLES IN THE UNITED KINGDOM, 1908–1912.

Kind of Vehicle.	Fatal Accidents.				
	1908.*	1909.	1910.	1911.	1912.
Horse-drawn omnibuses	11	16	15	10	7
Other horse-drawn vehicles (excluding tramcars)	418	622	639	670	672
Horse-drawn tramcars	...	5	1	4	...
Mechanically propelled tramcars	69	122	112	123	135
Motor cars and cycles	198	311	478	633	751
Motor omnibuses	50	75	82	117	199
Total	746	1,151	1,327	1,557	1,764

STREET ACCIDENTS CAUSED BY VEHICLES IN THE UNITED KINGDOM, 1908–1912.

Kind of Vehicle.	Non-Fatal Accidents.				
	1908*.	1909.	1910.	1911.	1912.
Horse-drawn omnibuses	283	383	262	208	145
Other horse-drawn vehicles (excluding tramcars)	8,627	13,241	13,289	13,165	13,130
Horse-drawn tramcars	101	111	71	54	19
Mechanically propelled tramcars	2,809	4,642	4,961	5,523	5,331
Motor cars and cycles	4,301	7,149	9,909	12,676	15,287
Motor omnibuses	1,106	1,346	1,258	2,027	2,921
Total	17,227	26,872	29,750	33,653	36,833

* Eight months only, and only for England and Wales.

These statistics are of interest as they indicate that whatever of increase there has been in fatal street-traffic accidents in the United Kingdom during the four years 1909–1912 has been due principally to motor cars and motor omnibuses, the fatalities from horse-drawn vehicles and from mechanically propelled tramcars having been practically the same for the three years. Combining the fatalities from motor cars, motorcycles, and motor omnibuses, we find that the numbers have increased in the United Kingdom from 386 in 1909 to 560 in 1910, to 750 in 1911, and to 950 in 1912. The actual increase in the fatalities resulting from motor cars and omnibuses in 1912 over the fatalities in 1909 was, therefore, 564, or 146.1 per cent.

The statistics of street traffic accidents in London* indicate that the conditions in that city have long been bad in this respect and vigorous efforts are being made to find some at least partial solution of the problem. Several traffic censuses have been taken to ascertain where congestion is greatest and the problem has now been studied by many experts and from various angles.† The conclusion thus far is that the remedies for present conditions must consist in the widening of streets so far as possible, in diverting traffic from congested to other ess used streets, and in additional regulations governing the movement of traffic. It has also been suggested that at certain large open spaces where several converging lines of traffic meet, there should be underground subways for pedestrians to enable them to cross with safety. Two such subways already exist in London, but little use is made of them as the approaches and exits are by flights of stairs. It is suggested that in the new ones, when possible, the approaches and exits be made wider and on gentle declines and inclines. Still another suggestion has been made, namely, that in certain streets all the traffic be compelled to move in one direction. This has been criticized as bound to lead to greater speed of the vehicles, with correspondingly greater hazard to pedestrians who may be obliged to cross such thoroughfares.

During 1912 there were 353 motor car, motor omnibus and motorcycle fatalities in Greater London. All the other street

* See Appendix G for recent English statement of London conditions.

† See Report of the London Traffic Branch of the Board of Trade, 1912. London, 1913.

vehicles together killed 185 persons. The total number of persons killed by vehicles in London streets in 1912 was 538 as against 303 in 1909, an increase of 77.6 per cent. The motor vehicle fatalities increased from 145 in 1909 to 353 in 1912, or 143.4 per cent.*

Reference has already been made to the fatalities in the registration area of the United States from street railway accidents. In nine representative large cities of the United States the average fatality rate from street railway accidents has decreased from 73.5 per million population in 1907 to 44.5 in 1912. The statistics in detail for these cities are presented in Appendix D, Table II.

The fatalities from subway and elevated railway accidents in New York City, according to the Health Department record, have fluctuated somewhat from year to year during the period 1907–1912, but it can not be said that there has been any increase or decrease during that period. The average fatality rate from subway accidents per million population for the six-year period was 3.3, and the similar average fatality rate from elevated railroad accidents was 2.8. The details are presented in Appendix D, Table III.

The fatalities from steam railroad accidents in nine large representative cities of the United States have fluctuated considerably during the six-year period 1907–1912, or from 768 in 1907 to 543 in 1908. The average fatality rate for the nine cities combined was 86.1 in 1907, and 56.1 in 1912. There seems, therefore, to have been a diminution in this class of accidents in the larger urban centers during recent years. This can readily be accounted for by the gradual abolition of grade crossings and the more careful guarding of railroad properties in other respects. The details of the steam railroad fatalities in the nine representative cities are presented in Appendix D, Table IV.

Fatalities from wagons, bicycles, and other animal-propelled vehicles seem, on the whole, to have decreased somewhat in recent years in the larger urban centers of the United States. In the nine cities for which returns have been compiled the

*See Appendix F for London statistics and Appendix G for traffic conditions; see Appendix C, Table VII, for Berlin statistics of personal injuries, fatal and non-fatal, caused by automobiles and motorcycles, 1908–1912.

average fatality rate from this class of accidents was 59 per million population in 1907 and 37.9 in 1912. The rates have fluctuated and there is some reason to believe that the variations are of an accidental character rather than indicative of any considerable improvement in traffic hazards from this class of vehicles. In 1909, for illustration, the average fatality rate for the nine cities was only 36.6 per million population, while in 1911 the rate was 48.5, and in 1912 it had again declined to 37.9. The details of these statistics are presented in Appendix D, Table V.

Practically the only effective method thus far extensively adopted in this country to prevent traffic accidents in our city streets is through traffic regulation by municipal ordinance. Such ordinances are revised, amended, and extended from time to time, as new local conditions arise which seem to require correction. These rules and regulations governing street traffic are usually framed by the aldermanic or other similar local governing bodies and their enforcement is placed in the hands of the police.

I have recently read the traffic regulations in force in various of our larger cities, about forty in number, and while in many matters of detail they are all quite similar, there are some admirable ideas incorporated in a few of them that have not yet been generally adopted.*

When a street car is taking on or discharging passengers, a frequent cause of injury is another vehicle going in the same direction as the car and overtaking it while its passengers are alighting or getting on. To obviate or lessen this danger a very few cities require that the other vehicles come to a stop, other cities require that they keep to the right of such street cars, distances varying from four to twenty feet.

Another frequent cause of injury is found in the almost universal habit of boys and girls to hitch on to wagons, automobiles, and other vehicles. This is prohibited in some cities, also jumping upon or riding on the rear of such vehicles, without the driver's consent.

Roller-skating in streets has been absolutely prohibited in Washington, D. C., and all drivers will declare that such play

* See Appendix K, for excerpts from street traffic ordinances of several large American cities.

in the streets is one of the greatest nuisances with which they have to contend. Coasting in the public streets is usually prohibited, except by special permission and in designated localities, at specified times. Many of the worst of our street accidents have been caused by sledding in improperly protected streets.

A few of our cities have advanced far enough to prohibit bicyclists from carrying children on handle bars. Other rules of importance from the viewpoint of accident prevention relate to the distance which must intervene between vehicles following each other, the manner in which turns at corners must be made, etc. Of course nearly all traffic ordinances contain speed regulations, but of all the regulations these most important ones are most continually and consistently violated, and will continue to be until the violators are visited with penalties more in keeping with this particular offense.

The available statistics of street accidents furnish positive proof that traffic ordinances as at present enforced are not a complete solution of the street accident problem in this country.* All the cities for which we have even fragmentary street accident statistics show fatal accident rates much higher than those of London, Berlin,† or Paris. Perhaps one of the principal causes for this situation may be found in the fact that sufficient publicity is not given to street accident statistics in this country, and such accident statistics are not recorded and compiled in so complete and accurate a manner as is highly desirable in order that the conditions may be known in a more exact and convincing way than through the numerous, but non-cumulative, reports of accidents made in the columns of the daily press, or through the often conflicting reports of State, County, and Municipal authorities.

* "A lack of regard for traffic rules and regulations and ignorance of the Grant ordinance (1908), which clearly and succinctly outlines them, under five short, brief heads, is given as the cause of so many automobile accidents in Atlanta of late, which have caused the loss of life, injury to person and damage to property. According to police reports on them, in very nearly every instance the traffic ordinance has been violated, and the rights of the road not respected."

(From pamphlet issued by the City of Atlanta, Ga., in 1913, to emphasize the need of following traffic rules.)

† For Berlin Statistics, see Appendix C, Table VII.

Conclusions.

1. First of all we require more complete, accurate, and specific information relative to street traffic accidents. The recent German and English inquiries furnish clues as to what kind of data can be secured. At present the statistics available in official sources in this country are incomplete and inadequate for any purpose other than to indicate that street traffic accidents are unnecessarily numerous, both actually and in proportion to population.

The statistics of steam railway and street railway accidents compiled by the Public Service Commission of the First District here in New York State give some interesting details.* Distinction is made of injuries to employees, injuries to passengers, and injuries to persons other than employees and passengers. These statistics, too, for street railways are reported separately for the various surface street car lines or systems, elevated roads, and subway lines. It is interesting to note that in 1910 on the two subway lines then in operation 27 passengers were killed, 30 employees and no others. These facts illustrate the great advantage to the public of rapid transit facilities in that they tend greatly to reduce the accident liability of pedestrians and other users of the city streets.

The accident statistics compiled by the Public Service Commission are given in some detail as they relate to employees, but in my opinion they would be much more valuable if the accidents were reported separately for additional specific employments, or in the same manner and in the same detail that the employees are reported. It is of practical utility to know that the fatal accident liability of subway trackmen was 9.14 per 1,000 employed during 1909 and 1910 as against a rate of 1.79 for surface street railway trackmen. Similar facts if available in detail for all the important specific employments would be of exceptional value as indicating precisely where the danger points are in the transportation industry.

2. Traffic ordinances require in many cases to be more

* The statistics of fatal and non-fatal injuries to employees are apparently not complete. For illustration, the reported injuries to employees in the Hudson tubes include only injuries to employees on the New York side, although the reported number of persons employed include all the employees of the operating company.

specific, to cover more contingencies than at present, and to be more strictly enforced.

3. Relief of congested streets should be carried out as completely and expeditiously as is practicable. City planning commissions and traffic experts are working along these lines in various cities. As a part of this program every effort possible should be made to provide recreation centers and playgrounds for the children, so as to keep them off the streets as much as practicable during their play periods.

The growth of street car traffic during the last twenty years is a fair indication of the increasing use made of city streets for traffic pruposes. Unfortunately, our older cities were laid out when it was impossible to forecast their future development and the result is narrow streets, often in the very sections of the cities where traffic is heaviest. Four principal factors enter into street congestion—bulk of traffic, size of vehicle units, speed of vehicle units, and width of streets. Surface street cars run faster to-day than twenty years ago, also they are larger, but in almost any given city there are many more cars in use per mile of track to-day than formerly. And so as we analyze street car conditions we find that in most of the older cities the street car lines are overburdened with traffic—they are congested, and the congestion is largely due to narrow streets, too few street car lines, and faulty methods of line connection. In Newark, New Jersey, for illustration, in 1912 there were 78,000,000 rides taken on street cars as against 18,000,000 in 1893 and 45,000,000 in 1903. In 1893 the average number of rides per person was 90 as against 210 in 1912. In Newark there is the great advantage of one wide main thoroughfare, but aside from that, Newark is a typical, older city which long ago outgrew the street traffic facilities and practically nothing has yet been done materially to reduce the congestion of traffic—aside from improved police regulations and traffic ordinances. In twenty years the population of Newark has increased 85 per cent., the street car habit has increased 233 per cent., and the street areas have increased practically not at all.*

4. Education of parents, children, drivers, and the public

*These statistics for Newark are from "The Newarker," February, 1913. This particular number contained an excellent summary of traffic conditions in Newark. "The Newarker" is published monthly by the Free Public Library, Newark, N. J.

generally in the dangers incident to street travel and in the simple precautions which should be taken to avoid them so far as that is humanly possible.

In this connection it is interesting to note that the State of New Jersey has recently enacted a law which provides for the introduction into all the schools of the State of a system of instruction in the rudimentary principles of self-protection, which will familiarize the pupils with the causes that lead not only to accidental injury but also to the impairment of health, and of the best means by which these can be avoided. Thirty minutes every two weeks is the time allotted to this new and highly important line of constructive education, and at least once during each school term a lecture on the principles of accident prevention will be delivered by an accredited expert from the American Museum of Safety.

In adopting this plan of teaching children how accidents may be avoided, the State of New Jersey is simply following the example of Germany, where, to quote from an exhaustive report on the subject issued by the Bureau of Statistics a year ago, "this educational propaganda starts in the readers placed in the hands of school children, thus inoculating ideas of caution and safety at the very foundation of the child's life." An interesting article on the need of an educational campaign for the education of school children appeared in the Supplement to the Scientific American of April 12, 1913.*

Many of the more progressive public service corporations are making determined efforts to instruct their employees in the best known methods of accident prevention. In some cases the safety experts of these corporations not only instruct the employees of the corporations, but they also visit schools at stated intervals, or other public assemblies, and give illustrative talks on the dangers of street traffic and how best to avoid them. Here, as in so many other phases of the larger problem of conservation, education will probably be found to be the most potent influence for the removal of the ignorance, carelessness, and recklessness which at present are responsible for such a large percentage of the fatal and non-fatal injuries resulting from street traffic.

* The Dangers of Street Traffic and Danger Signals. An Educational Campaign. By Frederick Hutton, M. E., Sc. D.

Appendix A.

Street Traffic Accidents in New York City.

TABLE I.

A COMPARISON OF STATISTICS OF *AUTOMOBILE* AND *ELECTRIC STREET CAR* FATALITIES IN GREATER NEW YORK. RETURNS OF HEALTH DEPARTMENT COMPARED WITH COMPILATIONS MADE BY THE NATIONAL HIGHWAYS PROTECTIVE SOCIETY, 1910–1912.

Year.	Health Department.		National Highways Protective Society.*	
	Automobiles.	Electric Street Cars.	Automobiles.	Electric Street Cars.
1910	111	156	112	148
1911	128	122	142	109
1912	188	111	221	134
Total	427	389	475	391

* As a partial explanation of these discrepancies, the statistician of the National Highways Protective Society states that in the fatalities due to trolleys, compiled by the Society, trespassers or others killed because of gross negligence, are not included. He further states that garage accidents and fatalities due to gross carelessness, in which the victim was in the car, are not included as automobile accidents. Just why persons killed under these circumstances should not be classified as deaths due to trolley accidents, or automobile accidents, as the case may be, it is difficult to understand. While these deaths might preferably be reported separately, they certainly ought to be included in the general totals.

TABLE II.

FATALITIES IN GREATER NEW YORK CAUSED BY AUTOMOBILES, STREET CARS, AND HORSE-DRAWN VEHICLES, 1910-1912.* (RATES PER 1,000,000 POPULATION.)

Years Ending December 31.	Population.	Automobiles.†		Electric Street Cars.		Horse-drawn Vehicles.		Total.	
		Number Killed.	Rate.	Number Killed.	Rate.	Number Killed.	Rate.	Number Killed.	Rate.
1910	4,766,883	112	23.5	148	29.0	211	43.9	471	98.8
1911	4,899,851	142	31.1	109	22.3	172	26.6	423	86.3
1912	5,032,819	221	44.3	134	35.1	177	35.2	532	105.7
1910–1912	14,699,553	475	32.3	391	26.6	560	38.1	1,426	97.0

* Compiled by the National Highways Protective Society, see New York Times of February 2, 1913.
† Includes motorcycle fatalities.

TABLE III.

FATALITIES FROM RAILWAY ACCIDENTS, NEW YORK CITY, 1908–1912.*

Kind of Traffic.	1908.	1909.	1910.	1911.	1912.	Total.
Surface Street Cars	248	161	174	143	149	875
Subway and Elevated Cars	89	61	80	70	59	359
Steam Railways	107	107	123	101	78	516
Total	444	329	377	314†	286	1,750

* Statistics compiled by the Public Service Commission, First District.

† To illustrate the apparent lack of knowledge of the ultimate utility of accident statistics, it requires to be stated that this total of 314 includes 13 deaths from natural causes and 16 suicides. Why these deaths should have been included is probably known only to the compiler. How far the other statistics are similarly vitiated, it is imposible for me to state.

TABLE IV.

FATALITIES IN SUBWAY AND TUBES, NEW YORK CITY, 1907–1912.*

Year.	Employees.	Passengers.	Other Persons.	Total.
1907	23	13	3	39
1908	24	24	5	53
1909	16	22	2	40
1910	30	27	..	57
1911	17	25	..	42
1912	10	19	4	33
Total	120	130	14	264

* Statistics compiled by the Public Service Commission, First District.

TABLE V.

CORONER'S RETURNS OF FATALITIES CAUSED BY VEHICLES IN NEW YORK CITY.

1907–1912

Borough of Manhattan.

Kind of Traffic.	1907.	1908.	1909.	1910.	1911.	1912.	Total 1907–1912.
Automobiles	37	36	46*	63†	92‡	146	420
St. R. R. Surface	137	131	68	62	78	72	558
St. R. R. Elevated	19	11	8	17	10	6	71
St. R. R. Subway	14	17	13	24	19	14	101
Railway	21	22	20	14	15	9	101
Wagons and Others	124	94	85	102	144	111	660
Total	362	311	240	282	358	358	1911

* Three fatalities caused by motorcycles; † 1 fatality caused by motorcycle; ‡ 2 fatalities caused by motorcycle.

Borough of the Bronx.

Automobiles	6	7	6	14	12	19	64
St. R R. Surface	22	9	6	14	16	18	85
St. R R. Elevated	6	4	1	4	6	2	23
St. R R. Subway	2	3	5	2	2	2	16
Railway	80	23	29	24	25	26	207
Wagons and Others	11	8	14	10	17	12	72
Total	127	54	61	68	78	79	467

Borough of Richmond.

Automobile	—	1	—	3	3	3*	10
St. R. R.	11	2	2	4	1	3	23
Railway	13	10	6	9	3	8	49
Wagons and Others	4	2	5	5	2	2	20
Total	28	15	13	21	9	16	102

* One fatality was caused by motorcycle.

Borough of Queens.*

				1910–1912.
Automobile	7	6	18	31
St. R. R.	8	8	11	27
Railway	48	40	25	113
Wagons and Others	5	3	8	16
Total	68	57	62	187

* Compiled returns for Queens borough are not available for 1907–1909 nor are such returns available for Brooklyn borough for 1907–1912.

Appendix B.

TABLE I.

FATALITIES FROM TRAFFIC ACCIDENTS, REGISTRATION AREA, U. S., 1907–1911. (RATES PER 1,000,000 POPULATION.)

Year Ending December 31.	Population.	Automobiles.		Street Cars.		Steam R. R.		Wagons, Horses, and Others.		Total.	
		Number Killed.	Rate.	Number Killed.	Rate.	Number Killed.	Rate.	Number Killed.	Rate.	Number Killed.	Rate.
1907...	45,500,625	294	6.5	1,880	41.3	7,676	168.7	1,810	39.8	11,660	256.3
1908...	47,605,626	393	8.3	1,696	35.6	6,080	127.7	1,924	40.4	10,093	212.0
1909...	49,710,627	632	12.7	1,723	34.7	6,659	134.0	2,152	43.3	11,166	224.6
1910...	51,815,630	980	18.9	1,949	37.6	7,877	152.0	1,940	37.4	12,746	246.0
1911...	53,920,631	1,291	23.9	1,883	34.9	7,696	142.7	2,237	41.5	13,107	243.1
Total	248,553,139	3,590	14.4	9,131	36.7	35,988	144.8	10,063	40.5	58,772	236.5

TABLE II.

FATALITIES FROM TRAFFIC ACCIDENTS IN REGISTRATION CITIES, U. S., 1907–1911. (RATES PER 1,000,000 POPULATION.)

Year Ending December 31.	Population.	Automobiles.		Street Cars.		Steam R. R.		Wagons, Horses, and Other.		Total.	
		Number Killed.	Rate.	Number Killed.	Rate.	Number Killed.	Rate.	Number Killed.	Rate.	Number Killed.	Rate.
1907...	27,771,540	240	8.6	1,647	59.3	4,404	158.6	1,144	41.2	7,435	267.7
1908...	28,670,744	322	11.2	1,425	49.7	3,269	114.0	1,079	37.6	6,095	212.6
1909...	29,569,948	500	16.9	1,401	47.4	3,489	118.0	1,215	41.1	6,605	223.4
1910...	30,469,152	721	23.7	1,562	51.3	4,173	137.0	1,122	36.8	7,578	248.7
1911...	31,368,356	985	31.4	1,528	48.7	3,808	121.4	1,285	41.0	7,606	242.5
Total	147,849,740	2,768	18.7	7,563	51.2	19,143	129.5	5,845	39.5	35,319	238.9

Appendix C.

Automobile and Automobile Accident Statistics of Germany.

TABLE I.

CENSUS RETURNS OF AUTOMOBILES AND MOTORCYCLES IN GERMANY.

Year Beginning January 1.	1907 to 1913.					
	Automobiles.			Motorcycles.		
	Passenger.	Freight.	Total.	Passenger.	Freight.	Total.
1907.....	10,115	957	11,072	15,700	254	15,954
1908.....	14,671	1,543	16,214	19,573	235	19,808
1909.....	18,547	2,004	20,551	20,928	248	21,176
1910.....	24,639	2,823	27,462	22,283	196	22,479
1911.....	31,696	4,082	35,778	20,535	121	20,656
1912.....	39,943	5,392	45,335	19,958	157	20,115
1913.....	49,760	7,581	57,341	20,325	123	20,448

TABLE II.

PERCENTAGE OF PASSENGER AUTOMOBILES AND MOTORCYCLES MEETING WITH ACCIDENTS IN GERMANY, CLASSIFIED BY HORSE-POWER. 1907–1912.

Year Ending September 30.	All Automobiles and Cycles.	Motorcycles.	Automobiles of			
			Up to 8 H. P.	Over 8 and up to 16 H. P.	Over 16 and up to 40 H. P.	Over 40 H. P.
1907.....	13.8	1.5	12.9	42.9	46.9	70.8
1908.....	12.4	1.2	12.2	36.9	34.7	49.4
1909.....	12.6	1.1	10.7	31.1	38.9	42.9
1910.....	12.4	1.0	10.2	27.6	24.2	13.5
1911.....	13.2	1.1	9.9	21.5	25.3	16.2
1912.....	13.5	1.0	9.5	16.5	26.2	18.0

PERCENTAGE OF FREIGHT-CARRYING AUTOMOBILES AND MOTORCYCLES MEETING WITH ACCIDENTS IN GERMANY, CLASSIFIED BY HORSE-POWER. 1907–1912.

Year Ending September 30.	All Automobiles and Cycles.	Motorcycles.	Automobiles of			
			Up to 8 H. P.	Over 8 and up to 16 H. P.	Over 16 and up to 40 H. P.	Over 40 H. P.
1907.....	17.5	31.1	12.1	20.3	18.0	12.5
1908.....	16.3	25.0	12.6	25.9	10.0	....
1909.....	14.7	35.2	9.5	20.8	14.4	6.9
1910.....	15.0	18.2	11.2	18.7	16.4	16.3
1911.....	17.9	2.5	14.6	18.7	20.8	15.8
1912.....	17.7	3.3	13.6	17.1	19.4	25.4

TABLE III.

PERCENTAGE OF ALL AUTOMOBILES AND MOTORCYCLES IN USE IN GERMANY WHICH WERE INVOLVED IN ACCIDENTS, 1907–1912, WITH DISTINCTION OF PASSENGER AND FREIGHT-CARRYING MACHINES AND HORSE-POWER. SIX YEAR SUMMARY.

Kind and Horse-Power.	Passenger Machines.			Freight-carrying Machines.		
	Total Number in Use.*	Number Involved in Accidents.	Per Cent. in Accidents.	Total Number in Use.*	Number Involved in Accidents.	Per Cent. in Accidents.
Motorcycles.....	123,693	1,443	1.2	1,080	234	21.6
All automobiles...	183,673	37,897	20.6	24,844	3,872	15.6
Automobiles with:						
Less than 8 H.P.	72,053	7,632	10.6	8,481	1,044	12.3
8–16 H.P.....	56,130	14,095	25.1	6,779	1,118	16.5
16–40 H.P.....	52,137	14,221	27.3	8,456	1,475	17.4
40 and over H.P.	3,353	606	18.1	1,128	209	18.5
H.P. not known	.....	1,343	....	.....	26	....

* According to annual census returns. The aggregate number here represents the number of machines exposed to the risk of accident approximately one year.

TABLE IV.

NUMBER OF PERSONS KILLED BY AUTOMOBILES AND MOTORCYCLES IN GERMANY, 1907–1912. CLASSIFIED AS DRIVERS, OTHER OCCUPANTS OF THE MACHINES, AND THIRD PERSONS.

Year Ending September 30.	Total Number Killed.	Drivers of Machines.		Other Occupants of Machines.		Persons Outside the Machines.	
		Number.	Per Cent. of Total.	Number.	Per Cent. of Total.	Number.	Per Cent. of Total.
1907.....	145	13	9.0	17	11.7	115	79.3
1908.....	141	12	8.5	22	15.6	107	75.9
1909.....	194	13	6.7	31	16.0	150	77.3
1910.....	278	23	8.3	32	11.5	223	80.2
1911.....	343	24	7.0	49	14.3	270	78.7
1912.....	442	34	7.7	61	13.8	347	78.5
Total.....	1,543	119	7.7	212	13.7	1,212	78.6

TABLE V.

NUMBER OF PERSONS NON-FATALLY INJURED BY AUTOMOBILES AND MOTORCYCLES IN GERMANY, 1907–1912. CLASSIFIED AS DRIVERS, OTHER OCCUPANTS OF THE MACHINES, AND THIRD PERSONS.

Year Ending September 30.	Total Number Non-Fatally Injured	Drivers of Machines.		Other Occupants of Machines.		Persons Outside the Machines.	
		Number.	Per Cent. of Total.	Number.	Per Cent. of Total.	Number.	Per Cent. of Total.
1907	2,419	199	8.2	367	15.2	1,853	76.6
1908	2,630	188	7.1	431	16.4	2,011	76.5
1909	2,945	225	7.7	487	16.5	2,233	75.8
1910	3,651	245	6.7	641	17.6	2,765	75.7
1911	4,262	311	7.3	702	16.5	3,249	76.2
1912	5,542	407	7.3	1,045	18.9	4,090	73.8
Total	21,449	1,575	7.3	3,673	17.1	16,201	75.5

TABLE VI.

NUMBER OF PERSONS FATALLY AND NON-FATALLY INJURED BY AUTOMOBILES AND MOTORCYCLES IN GERMANY, 1909–1912. CLASSIFIED BY KIND OF MACHINE.

Year Ending September 30.	Fatalities Caused by				Non-Fatal Injuries Caused by			
	Automobiles.	Motorcycles.	Kind of Machine Not Stated.	Total.	Automobiles.	Motorcycles.	Kind of Machine Not Stated.	Total.
1909	183	10	1	194	2,671	235	39	2,945
1910	268	8	2	278	3,437	185	29	3,651
1911	331	10	2	343	4,058	171	33	4,262
1912	425	13	4	442	5,354	161	27	5,542
Total	1,207	41	9	1,257	15,520	752	128	16,400
Per cent. distribution	96.0	3.3	0.7	100.0	94.6	4.6	0.8	100.0

TABLE VII.

NUMBER OF PERSONS KILLED AND NON-FATALLY INJURED IN BERLIN, GERMANY, 1908–1912. (RATES PER 1,000,000 POPULATION.

Year Ending September 30.	Population.	Killed.		Non-Fatally Injured.	
		Number.	Rate.	Number.	Rate.
1908	2,058,813	29	14.1	839	407.5
1909	2,065,035	36	17.4	843	408.2
1910	2,071,257	70	33.8	1,257	606.9
1911	2,077,479	67	32.3	1,090	524.7
1912	2,083,701	75	36.0	1,343	644.5
Total	10,356,285	277	26.7	5,372	518.7

TABLE VIII.

AGE OF PERSONS KILLED AND INJURED BY AUTOMOBILES AND MOTORCYCLES IN GERMANY, 1907–1911.*

Year Ending September 30.	Number Killed.							Number Injured.						
	Age.							Age.						
	Under 16.	16–25.	26–40.	41–60.	61 and over.	Age not specified.	Total.	Under 16.	16–25.	26–40.	41–60.	61 and over.	Age not specified.	Total.
1907	35	25	36	31	16	2	145	422	462	770	497	161	107	2,419
1908	34	15	37	30	24	1	141	463	486	794	620	203	64	2,630
1909	60	22	39	51	22	....	194	570	595	903	628	193	56	2,945
1910	88	26	69	51	44	....	278	694	747	1,103	824	216	67	3,651
1911	99	25	72	90	57	....	343	859	894	1,262	936	247	64	4,262
Total.....	316	113	253	253	163	3	1,101	3,008	3,184	4,832	3,505	1,020	358	15,907
Percentage distribution.	28.7	10.3	23.0	23.0	14.8	0.2	100.0	18.9	20.0	30.4	22.0	6.4	2.3	100.0

* Similar returns by age not available for 1912.

TABLE IX.

SEX OF PERSONS KILLED AND INJURED BY AUTOMOBILES AND MOTORCYCLES IN GERMANY, 1907–1911.

Year Ending September 30.	Number Killed.				Number Injured.			
	Males.	Females.	Sex Not Specified.	Total.	Males.	Females.	Sex Not Specified.	Total.
1907.....	108	35	2	145	1,894	498	27	2,419
1908.....	110	31	..	141	2,055	570	5	2,630
1909.....	138	56	..	194	2,270	667	8	2,945
1910.....	200	78	..	278	2,835	809	7	3,651
1911.....	246	97	..	343	3,357	898	7	4,262
Total.....	802	297	2	1,101	12,411	3,442	54	15,907
Percentage distribution ..	72.8	27.0	0.2	100.0	78.0	21.6	0.3	100.0

* Similar returns by sex not available for 1912.

TABLE X.

AGE AND *SEX* OF PERSONS *KILLED* BY AUTOMOBILES AND MOTORCYCLES IN GERMANY, 1907–1911.

Year Ending September 30.	Under 16.			16–25.			26–40.		
	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.
1907.....	20	13	35*	24	1	25	32	4	36
1908.....	23	11	34	14	1	15	35	2	37
1909.....	45	15	60	11	11	22	37	2	39
1910.....	60	28	88	21	5	26	54	15	69
1911.....	56	43	99	20	5	25	65	7	72
Total.....	204	110	316	90	23	113	223	30	253
Per cent. of each sex at specified ages	64.6	34.8	100.0*	79.6	20.4	100.0	88.1	11.9	100.0
Per cent. of total at specified ages	25.5	37.2	28.8	11.2	7.8	10.3	27.9	10.1	23.0

Year Ending September 30.	41–60.			61 and over.			Summary—All Ages.			
	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females	Unknown.	Total.
1907.....	18	13	31	13	3	16	108†	35	2	145†
1908.....	24	6	30	13	11	24	110	31‡	..	141‡
1909.....	37	14	51	8	14	22	138	56	..	194
1910.....	41	10	51	24	20	44	200	78	..	278
1911.....	64	26	90	41	16	57	246	97	..	343
Total ...	184	69	253	99	64	163	802†	297‡	2	1,101
Per cent. of each sex at specified ages .	72.7	27.3	100.0	60.7	39.3	100.0	72.8	27.0	0.2	100.0
Per cent. of total at specified ages.....	23.0	23.3	23.0	12.4	21.6	14.8	100.0	100.0	....	100.0

* In two cases sex not stated.
† In two cases age not stated.
‡ In one case age unknown.

TABLE XI.

NATURE AND *EXTENT* OF THE NON-FATAL PERSONAL INJURIES BY AUTOMOBILE AND MOTORCYCLE ACCIDENTS IN GERMANY, 1907–1912.

Injury.	Year Ending September 30.						Total.	
	1907.	1908.	1909.	1910.	1911.	1912.	Number.	Per cent. Distribution.
Skull fracture	32	27	45	40	60	94	298	1.4
Brain concussion	83	98	113	147	182	230	853	4.0
Other head and face	61	56	98	94	67	73	449	2.1
Loss of eye	....	1	....	1	1	2	5	0.0
Sight impairment	....	....	....	1	....	4	5	0.0
Loss of ear, cheek	3	1	2	....	4	4	14	0.1
Loss of hearing	....	....	....	2	5	1	8	0.0
Loss of teeth, cut lip, etc.	402	435	441	661	758	1,166	3,863	18.0
Fracture of ribs, back, collar bone, shoulder, hip	76	109	108	132	169	186	780	3.6
Fracture of arm, or leg	166	162	171	235	263	399	1,396	6.5
Loss or crushing of legs or arms, hands, fingers, feet, etc.	....	2	3	4	16	17	42	0.2
Fracture of hands, fingers, feet, toes	44	51	48	52	61	84	340	1.6
Sprains	1,424	1,534	1,756	1,990	2,396	2,929	12,029	56.1
Burns	6	1	7	2	1	11	28	0.1
Serious internal	36	58	39	101	101	124	459	2.1
Slight internal	70	79	97	145	129	104	624	2.9
Shock	16	15	17	44	49	114	255	1.2
Poisoning	....	1	....	....	....	....	1	0.0
Total	2,419	2,630	2,945	3,651	4,262	5,542	21,449	100.0

TABLE XII.

CLASSIFICATION OF CAUSES OF AUTOMOBILE AND MOTORCYCLE ACCIDENTS IN GERMANY, 1907–1912.

Accidents attributed to	Number.	Per cent. of Total.
Speeding, failure to signal	4,183	10.13
Careless driving	8,680	21.01
Not stopping to heed warnings	212	0.51
Failure of brakes or steering gear	555	1.34
Breakdown, puncture of tire, failure of ignition	363	0.88
Explosions, short circuits, hot axles	242	0.59
Wet, slippery, or icy pavements	2,011	4.87
Fault or carelessness of injured or third person	3,692	8.94
Fault of chauffeur and third person together	162	0.39
Cause unknown	21,206	51.34
Total	41,306	100.00

TABLE XIII.

CLASSIFICATION OF AUTOMOBILE AND MOTORCYCLE ACCIDENTS IN GERMANY, 1907–1912, ACCORDING TO MANNER OF OCCURRENCE.

Accidents attributed to	Number.	Per cent. of Total
Collisions of automobiles with:		
Pedestrians, playing children, etc.	9,681	23.44
Wheel riders	5,624	13.61
Trolley cars	5,942	14.38
Other automobiles	2,230	5.40
Railroad trains	87	0.21
Equestrians, vehicles, etc.	9,007	21.81
Free-running animals	1,142	2.76
Other obstructions	1,632	3.95
Closed railroad gates	87	0.21
Lamp-posts and trees	1,520	3.68
Other forms of accidents:		
Plunging, upsetting, etc., of automobile	713	1.73
Falls out of automobile	131	0.32
Burning of automobile	248	0.60
Runaway of horses caused by automobiles	2,444	5.92
Other causes	818	1.98
Total	41,306	100.00

TABLE XIV.

LOCATION OF STREETS OR ROADS WHERE FATAL PERSONAL INJURIES FROM AUTOMOBILE AND MOTORCYCLE ACCIDENTS OCCURRED IN GERMANY, 1907–1911.*

Classification of Persons Killed.	Total Number Killed.	Persons Killed on							
		Streets of Large Cities.		Streets of Small Cities.		Village Streets.		Country Roads.	
		Number.	Per cent. Total.	Number.	Per cent. Total.	Number.	Per cent. Total.	Number.	Per cent. Total.
Drivers	85	3	0.7	3	2.9	9	5.6	70	17.6
Other occupants	151	15	3.4	6	5.8	19	11.8	111	27.9
Third persons	865	420	95.9	95	91.3	133	82.6	217	54.5
Total	1,101	438	100.0	104	100.0	161	100.0	398	100.0
Percentage distribution by locality	100.0		39.8		9.5		14.6		36.1

* Similar data for non-fatal injuries are available in the German reports. The statistics for 1912 do not include these data.

Appendix D.

Traffic Fatalities in Nine American Cities, 1907–1912.

TABLE I.

AUTOMOBILE FATALITIES IN NINE AMERICAN CITIES.
NUMBER KILLED.

City.	1907.	1908.	1909.	1910.	1911.	1912.	Total.
Baltimore	3	3	8	6	6	8	34
Buffalo	7	5	5	20	14	21	72
Chicago	27	23	23	52	62	104	291
New York City	42	84	90	111	128	188	643
Pittsburg	*	7	7	12	15	28	69
Providence	2	7	5	9	13	11	47
St. Louis	4	3	6	3	13	21	50
San Francisco	13	15	8	9	17	22	84
Washington	2	...	5	8	10	24	49
Total	100	147	157	230	278	427	1,339

FATALITY RATES PER 1,000,000 POPULATION.

Baltimore	5.5	5.5	14.5	10.7	10.7	14.1	10.2
Buffalo	17.7	12.4	12.1	47.2	32.3	47.5	28.6
Chicago	13.2	11.0	10.8	23.8	27.8	45.6	22.4
New York City	9.6	18.7	19.4	23.3	26.1	37.4	22.8
Pittsburg	*	13.5	13.3	22.5	27.7	50.9	26.0
Providence	9.6	32.7	22.8	40.1	56.7	46.9	35.3
St. Louis	6.1	4.5	8.9	4.4	18.6	29.6	12.2
San Francisco	32.9	37.3	19.5	21.6	40.1	51.0	33.9
Washington	6.3	....	15.4	24.2	29.7	70.3	24.9
Average	11.2	15.2	15.9	22.7	26.8	40.3	22.5

* Statistics not available.

TABLE II.

STREET RAILWAY FATALITIES IN NINE AMERICAN CITIES.
NUMBER KILLED.

City.	1907.	1908.	1909.	1910.	1911.	1912.	Total.
Baltimore	18	16	17	26	18	19	114
Buffalo	16	13	12	30	20	22	113
Chicago	197	125	131	119	95	195	862
New York City*	280	248	182	156	122	111	1,099*
Pittsburg	†	37	32	35	34	26	164
Providence	18	13	16	8	12	8	75
St. Louis	54	48	39	53	57	45	296
San Francisco	57	89	59	70	36	26	337
Washington	16	20	16	15	17	19	103
Total	656	609	504	512	411	471	3,163

FATALITY RATES PER 1,000,000 POPULATION.

Baltimore	33.1	29.2	30.7	46.5	31.9	33.4	34.2
Buffalo	40.5	32.1	29.0	70.8	46.2	49.7	44.9
Chicago	96.6	59.9	61.3	54.5	42.5	85.4	66.5
New York City*	64.1	55.1	39.3	32.7	24.9	22.1	39.0*
Pittsburg	†	71.5	60.9	65.5	62.7	47.2	61.4
Providence	86.2	60.7	73.0	35.7	52.3	34.1	56.4
St. Louis	82.6	72.2	57.7	77.1	81.6	63.4	72.4
San Francisco	144.4	221.3	144.1	167.9	84.8	60.2	135.9
Washington	50.7	62.4	49.1	45.3	50.5	55.6	52.3
Average	73.5	63.0	50.9	50.5	39.7	44.5	53.1

* Exclusive of Elevated Railroad and Subway fatalities.
† Statistics not available.

TABLE III.

SUBWAY AND ELEVATED RAILWAY FATALITIES IN NEW YORK, 1907–1912. (HEALTH DEPARTMENT RECORD.)

Year.	Population.	Subway.		Elevated Railroad.	
		Number Killed.	Rate per Million Population.	Number Killed.	Rate per Million Population.
1907	4,367,978	10	2.3	15	3.4
1908	4,500,946	15	3.3	19	4.2
1909	4,633,914	17	3.7	4	0.1
1910	4,766,883	21	4.4	12	2.5
1911	4,899,851	15	3.1	16	3.3
1912	5,032,819	16	3.2	12	2.4
Total	28,202,391	94	3.3	78	2.8

TABLE IV.

STEAM RAILROAD FATALITIES. NUMBER KILLED.

City.	1907.	1908.	1909.	1910.	1911.	1912.	Total.
Baltimore	44	31	33	44	29	26	207
Buffalo	95	69	57	63	67	72	423
Chicago	316	192	219	247	198	231	1,403
New York City	178	102	82	106	78	56	602
Pittsburg	*	96	74	128	91	100	489
Providence	12	10	15	12	11	20	80
St. Louis	80	74	54	55	77	59	399
San Francisco	24	26	7	11	16	15	99
Washington	19	17	11	10	5	15	77
Total	768	617	552	676	572	594	3,779

FATALITY RATES PER 1,000,000 POPULATION.

Baltimore	80.9	56.5	59.6	78.8	51.5	45.7	62.1
Buffalo	240.2	170.4	137.6	148.7	154.7	162.7	168.3
Chicago	155.0	92.0	102.5	113.0	88.6	101.2	108.2
New York City	40.8	22.7	17.7	22.2	15.9	11.1	21.4
Pittsburg	*	185.5	140.8	239.7	167.9	181.7	183.2
Providence	57.4	46.7	68.4	53.5	47.9	85.3	60.1
St. Louis	122.4	113.3	79.9	80.1	110.3	83.2	97.6
San Francisco	60.8	64.7	17.1	26.4	37.7	34.7	39.9
Washington	60.3	53.0	33.8	30.2	14.9	43.9	39.1
Average	86.1	63.9	55.8	66.7	55.2	56.1	63.5

* Statistics not available.

TABLE V.

FATALITIES FROM WAGONS AND OTHER VEHICLES.

NUMBER KILLED.

City.	1907.	1908.	1909.	1910.	1911.	1912.	Total.
Baltimore	6	10	8	13	8	7	52
Buffalo	4	1	1	1	...	4	11
Chicago	92	49	65	70	73	113	462
New York City	371	206	213	265	362	210	1,627
Pittsburg	*	13	16	9	10	23	71
Providence	9	8	13	6	7	10	53
St. Louis	13	32	13	15	13	8	94
San Francisco	25	31	19	20	17	19	131
Washington	6	17	14	9	12	7	65
Total	526	367	362	408	502	401	2,566

FATALITY RATES PER 1,000,000 POPULATION.

Baltimore	11.0	18.2	14.5	23.3	14.2	12.3	15.6
Buffalo	10.1	2.5	2.4	2.4	....	9.0	4.4
Chicago	45.1	23.5	30.4	32.0	32.7	49.5	35.6
New York City	84.9	45.8	46.0	55.6	73.9	41.7	57.7
Pittsburg	*	25.1	30.4	16.9	18.5	41.8	26.6
Providence	43.1	37.4	59.3	26.8	30.5	42.6	39.8
St. Louis	19.9	48.1	19.2	21.8	18.6	11.3	22.9
San Francisco	63.3	77.1	46.4	48.0	40.1	44.0	52.9
Washington	19.0	53.0	43.0	27.2	35.7	20.5	33.0
Average	59.0	38.0	36.6	40.3	48.5	37.9	43.1

* Statistics not available.

TABLE VI.

SUMMARY OF THE STREET TRAFFIC FATALITIES IN NINE AMERICAN CITIES, 1907–1912.*

NUMBER KILLED.

Year.	Automobile.	Street Car.	Steam R. R.	Wagon and Others.	Total.
1907	100	656	768	526	2,050
1908	147	609	617	367	1,740
1909	157	504	552	362	1,575
1910	230	512	676	408	1,826
1911	278	411	572	502	1,763
1912	427	471	594	401	1,893
1907–12	1,339	3,163	3,779	2,566	10,847

FATALITY RATES PER 1,000,000 POPULATION.

Year.	Automobile.	Street Car.	Steam R. R.	Wagon and Others.	Total.
1907	11.2	73.5	86.1	59.0	229.9
1908	15.2	63.0	63.9	38.0	180.0
1909	15.9	50.9	55.8	36.6	159.2
1910	22.7	50.5	66.7	40.3	180.3
1911	26.8	39.7	55.2	48.5	170.2
1912	40.3	44.5	56.1	37.9	178.7
1907–12	22.5	53.1	63.5	43.1	182.1

* Exclusive of fatalities in subways and on elevated railroads in New York. For these see Appendix D, Table III.

TABLE VII.

POPULATIONS ON WHICH RATES ARE BASED.

Year.	Baltimore.	Buffalo.	Chicago.	New York.	Pittsburg.
1907	543,626	395,437	2,039,270	4,367,978	.....
1908	548,579	404,863	2,087,941	4,500,946	517,425
1909	553,532	414,289	2,136,612	4,633,914	525,665
1910	558,485	423,715	2,185,283	4,766,883	533,905
1911	563,437	433,140	2,233,953	4,899,851	542,145
1912	568,389	442,565	2,282,623	5,032,819	550,385
Total	3,336,048	2,514,009	12,965,682	28,202,391	2,669,525

Year.	Providence.	St. Louis.	San Francisco.	Washington.	Total for Nine Cities.
1907	208,911	653,491	394,673	315,363	9,661,157
1908	214,049	664,670	402,086	320,598	8,996,487
1909	219,187	675,849	409,499	325,833	9,894,380
1910	224,326	687,029	416,912	331,069	10,127,607
1911	229,464	698,208	424,325	336,304	10,360,827
1912	234,602	709,387	431,738	341,539	10,594,047
Total	1,330,539	4,088,634	2,479,233	1,970,706	59,556,767

Appendix E.

STATISTICS OF ELECTRIC STREET RAILWAY ACCIDENTS IN GERMANY.

TABLE I.

PASSENGERS (FAHRGAESTE)* INJURED ON GERMAN ELECTRIC STREET RAILWAYS, 1905–1909.

Years.	Number of Companies Reporting.	Number of Passengers Carried.	Number of Passengers Injured.							
			Slightly.		Severely.		Fatally.†		Total.	
			Children.‡	Adults.‡	Children.	Adults.	Children.	Adults.	Children	Adults.
1905....	123	1,430,298,593	82	2,450	10	266	2	16	94	2,732
1906....	130	1,580,733,246	77	2,631	7	335	2	24	86	2,990
1907....	140	1,750,266,590	61	2,661	2	354	1	29	64	3,044
1908....	150	1,846,750,324	72	2,615	8	371	2	36	82	3,022
1909....	158	1,949,621,269	76	2,513	11	372	..	24	87	2,909
1905–09.	...	8,557,670,022	368	12,870	38	1,698	7	129	413	14,697

INJURY RATES OF PASSENGERS PER 100,000,000 CARRIED—CHILDREN AND ADULTS.

Years.	Slightly Injured.		Severely Injured.		Fatally Injured.		Total Injured Non-Fatally and Fatally.	
	Number.	Rate.	Number.	Rate.	Number.	Rate.	Number.	Rate.
1905.....	2,532	177.0	276	19.3	18	1.3	2,826	197.6
1906.....	2,708	171.3	342	21.6	26	1.6	3,076	194.5
1907.....	2,722	155.5	356	20.3	30	1.7	3,108	177.5
1908.....	2,687	145.5	379	20.5	38	2.1	3,104	168.1
1909.....	2,589	132.8	383	19.6	24	1.2	2,996	153.6
1905–09.....	13,238	154.7	1,736	20.3	136	1.6	15,110	176.6

* By Fahrgaeste is meant all persons on cars, and persons about to board or actually boarding cars, also all persons alighting from cars.

† By fatal injuries are meant injuries which result in death within 24 hours after the accident. By severe or serious injuries are meant fractures, internal injuries, etc., which require that the victim be confined to his bed three weeks or longer.

‡ Children include persons under 13 years of age; adults include all persons 13 years of age or over.

TABLE II.

PERSONS ("PASSANTEN") OTHER THAN PASSENGERS INJURED ON GERMAN ELECTRIC STREET RAILWAYS, 1905–1909.

Years.	Number of Car Miles.	Number of Persons Injured—Not Passengers.							
		Slightly.		Severely.		Fatally.		Total.	
		Children.	Adults.	Children.	Adults.	Children.	Adults.	Children.	Adults.
1905	255,001,065	466	1,231	85	241	59	51	610	1,523
1906	275,403,562	546	1,421	77	271	76	58	699	1,750
1907	304,816,441	548	1,606	99	301	101	59	748	1,966
1908	324,389,796	622	1,438	118	337	89	82	829	1,857
1909	338,654,953	658	1,556	81	329	84	73	823	1,958
1905–09 .	1,498,265,817	2,840	7,252	460	1,479	409	323	3,709	9,054

INJURY RATES ON THE BASIS OF EVERY 10,000,000 CAR MILES.

Years.	Slightly Injured.		Severely Injured.		Fatally Injured.		Total Injured Non-Fatally and Fatally.	
	Children.	Adults.	Children.	Adults.	Children.	Adults.	Children.	Adults.
1905.....	18.3	48.3	3.3	9.5	2.3	2.0	23.9	59.8
1906.....	19.8	51.6	2.8	9.8	2.8	2.1	25.4	63.5
1907.....	18.0	52.7	3.2	9.9	3.3	1.9	24.5	64.5
1908.....	19.2	44.3	3.6	10.4	2.7	2.5	25.5	57.2
1909.....	19.4	45.9	2.4	9.7	2.5	2.2	24.3	57.8
1905–09.....	19.0	48.4	3.1	9.9	2.7	2.2	24.8	60.4

TABLE III.

AGES OF PERSONS INJURED IN ELECTRIC STREET CAR ACCIDENTS, GERMANY, 1905–1909.

ACTUAL NUMBERS.

PASSENGERS INJURED WHILE BOARDING OR ALIGHTING FROM ELECTRIC STREET CARS.				
Males.				
Ages.	Injured Slightly.	Injured Severely	Injured Fatally.	Total.
13–25.....	546	103	14	663
26–40.....	1,235	186	25	1,446
41–60.....	573	114	15	702
61 and over.	93	15	..	108
Total....	2,447	418	54	2,919
Females.				
13–25.....	427	58	7	492
26–40.....	599	99	11	709
41–60.....	297	70	12	379
61 and over	69	31	8	108
Total....	1,392	258	38	1,688

PERSONS OTHER THAN PASSENGERS INJURED BY ELECTRIC STREET CARS.				
Children.				
Ages.	Injured Slightly.	Injured Severely.	Injured Fatally.	Total.
Under 5 ...	632	133	198	963
5–7.....	532	112	86	730
8–12.....	407	79	37	523
Total....	1,571	324	321	2,216
Adults—Males and Females.				
13–25.....	466	99	28	593
26–40.....	664	175	40	879
41–60.....	474	145	59	678
61 and over	167	71	45	283
Total....	1,771	490	172	2,433

PERCENTAGE DISTRIBUTION.

PASSENGERS INJURED WHILE BOARDING OR ALIGHTING FROM ELECTRIC CARS.				
Males.				
Ages.	Injured Slightly.	Injured Severely.	Injured Fatally.	Total.
13–25.....	22.3	24.6	25.9	22.7
26–40.....	50.5	44.5	46.3	49.5
41–60.....	23.4	27.3	27.8	24.0
61 and over	3.8	3.6	....	3.8
Total....	100.0	100.0	100.0	100.0
Females.				
13–25.....	30.7	22.5	18.4	29.1
26–40.....	43.0	38.4	28.9	42.0
41–60.....	21.3	27.1	31.6	22.5
61 and over	5.0	12.0	21.1	6.4
Total....	100.0	100.0	100.0	100.0

PERSONS OTHER THAN PASSENGERS INJURED BY ELECTRIC STREET CARS.				
Children.				
Ages.	Injured Slightly.	Injured Severely.	Injured Fatally.	Total.
Under 5 ...	40.2	41.0	61.7	43.5
5–7.....	33.9	34.6	26.8	32.9
8–12.....	25.9	24.4	11.5	23.6
Total....	100.0	100.0	100.0	100.0
Adults—Males and Females.				
13–25.....	26.3	20.2	16.3	24.4
26–40.....	37.5	35.7	23.3	36.1
41–60.....	26.8	29.6	34.3	27.9
61 and over	9.4	14.5	26.1	11.6
Total....	100.0	100.0	100.0	100.0

TABLE IV.

CAUSES OF INJURIES TO PASSENGERS IN ELECTRIC STREET-CAR ACCIDENTS, GERMANY, 1905–1909.

Causes.	Number of Passengers Injured.								
	Children.			Male Adults.			Female Adults.		
	Slightly.	Severely.	Fatally.	Slightly.	Severely.	Fatally.	Slightly.	Severely.	Fatally.
Carelessly boarding or alighting from cars in motion	194	33	6	5,838	874	72	3,172	467	50
Carelessly leaning out of car windows	20	1		92	7		26	2	

	Children.			All Adults.		
	Slightly.	Severely.	Fatally.	Slightly.	Severely.	Fatally.
Causes beyond control of injured passengers:						
a—Street cars	102	1	1	3,312	301	6
b—Causes external to street cars	52	3	..	430	47	1

OTHER PERSONS, NOT PASSENGERS, INJURED BY ELECTRIC STREET CARS IN GERMANY, 1905–1909, ON ACCOUNT OF THEIR CARELESSLY GETTING ON TRACKS OR RUNNING OR DRIVING AGAINST STREET CARS.

	Slightly Injured.	Severely Injured.	Fatally Injured.
Children	2,736	452	406
Sober adults:			
Males	3,899	801	202
Females	1,030	250	51
Total	4,929	1,051	253
Intoxicated adults:			
Males	409	87	32
Females	13	2	3
Total	422	89	35
Total adults	5,351	1,140	288
Grand total, children and adults	8,087	1,592	694

CAUSES INDEPENDENT OF THE CONTROL OF THE INJURED—OTHER PERSONS.

	Slightly Injured.	Severely Injured.	Fatally Injured.
Street car causes:			
Children	64	4	1
Adults	1,809	310	31
Total	1,873	314	32
Causes attributable to third persons:			
Children	40	4	1
Adults	102	29	4
Total	142	33	5
Grand total	2,015	347	37

TABLE V.

SEASONAL OCCURRENCE OF PERSONAL INJURIES BY ELECTRIC STREET CARS, GERMANY, 1905–1909.

PASSENGERS.

Months.	Slight.		Severe.		Fatal.		Total.	
	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.
March–May	3,359	25.6	446	27.0	32	25.4	3,837	25.8
June–August	3,504	26.7	438	26.5	31	24.6	3,973	26.7
September–November	3,548	27.1	445	26.9	41	32.5	4,034	27.1
December–February	2,697	20.6	325	19.6	22	17.5	3,044	20.4
Total	13,108	100.0	1,654	100.0	126	100.0	14,888	100.0

PERSONS OTHER THAN PASSENGERS.

March–May	2,520	25.8	443	23.0	174	24.0	3,137	25.3
June–August	2,903	29.7	591	30.6	231	31.8	3,725	30.0
September–November	2,445	25.1	521	27.0	197	27.2	3,163	25.5
December–February	1,893	19.4	375	19.4	123	17.0	2,391	19.2
Total	9,761	100.0	1,930	100.0	725	100.0	12,416	100.0

TABLE VI.

TIME OF DAY AT WHICH PERSONS WERE INJURED ON GERMAN ELECTRIC STREET RAILWAYS, 1905–1909.

PASSENGERS.

Time of Day.	Slight.		Severe.		Fatal.		Total.	
	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.
Before 9 A. M.	1,135	10.2	136	9.7	18	15.6	1,289	10.2
9 to noon	1,723	15.5	153	10.9	17	14.8	1,893	14.9
Noon to 6 P. M.	3,939	35.3	506	36.0	34	29.6	4,479	35.4
6 P. M. and after	4,351	39.0	611	43.4	46	40.0	5,008	39.5
Total	11,148	100.0	1,406	100.0	115	100.0	12,669	100.0

PERSONS OTHER THAN PASSENGERS.

Before 9 A. M.	865	10.5	164	9.5	32	4.9	1,061	10.0
9 to noon	1,558	19.0	308	17.7	105	16.0	1,971	18.6
Noon to 6 P. M.	3,407	41.5	700	40.3	309	47.1	4,416	41.7
6 P. M. and after	2,380	29.0	564	32.5	210	32.0	3,154	29.6
Total	8,210	100.0	1,736	100.0	656	100.0	10,602	100.0

TABLE VII.

NATURE AND EXTENT OF INJURIES BY ELECTRIC STREET CARS, GERMANY, 1905–1909.

Nature and Extent of Injuries.	Slight.		Severe.		Fatal.		Total.	
	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.
Fracture of skull	.....	.....	272	7.9	303	36.2	575	2.2
Concussion of brain	304	1.4	497	14.3	95	11.3	896	3.4
Other injuries to head and face	1,439	6.6	274	7.9	29	3.5	1,742	6.6
Broken ribs, collar bone, shoulder blade, back	.....	.....	399	11.5	48	5.7	447	1.7
Broken arm, leg, thigh, shin	.....	.....	997	28.7	37	4.4	1,034	3.9
Loss of one or both arms or legs	.....	.....	165	4.8	96	11.5	261	1.0
Broken hand, fingers, toes	.....	.....	226	6.5	.....	.....	226	0.9
Bruises, sprains, muscle lacerations	7,924	36.1	426	12.3	54	6.4	8,404	32.0
Skin abrasions, cuts, broken teeth	11,224	51.1	.....	.....	.....	.....	11,224	42.8
Internal injuries	189	0.9	113	3.3	176	21.0	478	1.8
Nerve affections, collapse, etc.	860	3.9	98	2.8	.....	.....	958	3.7
Total	21,940	100.0	3,467	100.0	838	100.0	26,245	100.0

Appendix F.

STATISTICS OF TRAFFIC ACCIDENTS IN GREATER LONDON.* 1909–1912. (COMPILED FROM ANNUAL RETURNS OF DEATHS AND PERSONAL INJURIES KNOWN BY THE POLICE TO HAVE BEEN CAUSED BY VEHICLES IN STREETS, ROADS, OR PUBLIC PLACES.)

Kind of Vehicle.	Persons Fatally Injured.			
	1909.	1910.	1911.	1912.
Horse-drawn omnibuses	9	8	1	5
Other horse-drawn vehicles (exclusive of tramcars)	120	139	120	143
Horse-drawn tramcars	3	1	1	.....
Mechanically propelled tramcars	26	24	26	37
Motor cars and cycles	86	129	155	171
Motor omnibuses	59	66	107	182
Total	303	367	410	538

Kind of Vehicle.	Persons Non-fatally Injured.			
	1909.	1910.	1911.	1912.
Horse-drawn omnibuses	295	201	136	90
Other horse-drawn vehicles (exclusive of tramcars)	5,913	5,676	5,296	5,170
Horse-drawn tramcars	99	62	44	16
Mechanically propelled tramcars	2,092	2,231	2,330	2,231
Motor cars and cycles	3,402	4,489	5,501	6,316
Motor omnibuses	1,284	1,197	1,947	2,828
Total	13,085	13,856	15,254	16,651

* Metropolitan Police District and City of London.

Appendix G.

Discussion of Street Mortality in London. The Spectator, London, Eng., 1913.

"The select Committee of the House of Commons, under the presidency of Sir George Toulman, has been investigating the street accidents of the Metropolis, especially in connection with motors. It appears that the Chief Commissioner of Police has prepared a most elaborate analysis of actual returns of accidents for the period 1910–12. We gather thence that during that period the number of children killed was 136 per million of the population, as against 122 adults. That is a very striking fact. There was a higher rate of fatalities amongst persons between 15 and over 60 years of age, which might arise from the fact that they took more journeys into the busier danger zone than young children and old people, who were more or less confined to their own locality. It appears that a comparative return of street fatalities elsewhere than London showed that in relation to area there were fewer fatalities in the Metropolitan Police District than in Glasgow, Liverpool, Manchester, Berlin, Birmingham, Edinburgh, City of London, Brussels; and in relation to population fewer than in the City of London, Paris, New York, Chicago, the proportion in Chicago being nearly double. It further appears, as might be expected, that accidents were most numerous in areas of congested traffic. It is shown too that the total number of persons injured in 1901 was 9,197, and in 1911, 18,749. The difference of these totals is highly suggestive. Allowing for increased population and the increased number of journeys taken by everyone the accident rate of 9,197 in 1901 was equivalent to at least 17,410 in 1912. Cycle fatalities showed, as might be anticipated, a remarkable increase. During last year no less than 65 cyclists were actually killed. Unquestionably the ordinary cycle is not a safe vehicle for streets where motors run, as well as many other forms of mechanically propelled traffic. What is to be done it is very difficult to say. The facts and figures are here, and the commission has already told us very much that we knew before and of which not a little has

from time to time been already expressed in these columns. Of course, the main cause of the increasing risks of the streets to pedestrians as well as cyclists, arises from the *variety* of the traffic and the mixture of vehicles of so many kinds. Formerly we had virtually only fast and slow locomotion in the road, but now there are more than half a dozen descriptions of vehicles to consider, and then in streets and roads where trams run, the risk is enormously increased. The bare idea of taking up and setting down passengers in the middle of the road a generation ago would have been scouted as impossible. The railway train proper has a platform for alighting from and entering trains, but our light street railways have none of the safeguards so carefully thought out for the safety of railway passengers. Is it not strange that with so much public hygiene, so much vexatious sanitary legislation, and the like, that the safety of the tram passenger is practically left to the individual, and so, naturally, we have a heavy mortality thence, while the big trams blocking the perspective view of the road and street, considerably increase the risk for those who are not riding by tram."

Appendix H.

Report of Special Committee on Speed Regulations of New York City. The City Record, April 17, 1913.

The present city ordinance is antiquated, ineffective, inadequate, and unsatisfactory to the public in general and to those who have to do with the enforcement of the law. Some slight amendments have been made to the proposed ordinance heretofore reported, which in the main will make the proposed ordinance more acceptable to all concerned. The changes may be briefly summarized as follows:

The first proposed ordinance provided a strict 15 mile per hour limitation in the built-up portions of the city. This feature has been changed in accordance with the practice obtaining in practically all of the cities of the United States, making any speed in excess of 15 miles per hour *prima facie* evidence of reckless driving. The committee has seen fit, however, to add a strict limitation of 20 miles. The *prima*

facie rule makes possible an arrest at any time for exceeding 15 miles per hour, and there is a legal presumption of guilt on the part of defendant unless he can demonstrate to the satisfaction of the Court that there was no recklessness. The speed permitted on country roads and outlying sections of the city remains 25 miles per hour, the same as previously reported.

The committee has made no change in the severe penalties for reckless driving, which apply under all circumstances and conditions, regardless of the rate of speed whether it be 4 or 15 miles per hour. These penalties alone should discourage speeding, and taken together with the *prima facie* rule and the limitations prescribed should prove effective for all purposes.

Comparative Dangers of Vehicular Traffic.

Owing to the fact that there is now no accurate record of the number of automobiles and other classes of vehicular traffic it is impossible to make an accurate comparison. It was urged at the outset by the automobilists that the danger incidental to motor traffic was much less than that of other street traffic. The hospital records and the coroners' records submitted herewith for this year would seem to indicate that such is not the case. It is now claimed that the total mileage of the motor cars exceeds that of other vehicles and that this accounts for the heavy death toll and many injuries. It is to be noted, however, that much of the mileage is on country roads; that motor cars are used but little during the winter months and more particularly on Saturday afternoons, Sundays and holidays during the remainder of the year, while other vehicular traffic is nearly constant throughout the year. It is estimated that there are five times as many horse-drawn vehicles as automobiles. All things considered the committee is of the opinion that the automobile leads in accidents and fatalities.

Statistics of Accidents, Injuries, Death and Other Matters Pertaining to Vehicular Traffic in New York City.

Hospital Records.

Fourteen hospitals having ambulance service have submitted records for the months of March and April, 1912. The totals have been compiled and are given herewith.

Cases Cared for Resulting From—

(a) Automobile accidents..... 163
(b) Street-car accidents..... 129
(c) Horse-drawn vehicles..... 126

NATURE OF INJURIES.

Vehicle.	Fractured Skulls.	Broken Legs or Arms.	Serious Injuries, Internal or Otherwise.	Slight Injuries.	Very Serious Injuries from all Causes.	Total Slight Injuries from all Causes.	Deaths.	Permanently Injured.
Automobiles.....	19	32	21	91	72	91	10	4
Street cars.....	8	34	7	80	49	80	6	2
Horse-drawn vehicles...	4	41	7	74	52	74	3	2

Coroners' Records.

Deaths caused by automobiles for the months of January, February, March and April, 1912.

Manhattan..... 39
The Bronx..... 7
Brooklyn..... 5
Richmond..... 1
Queens..... 2
Total..... 54

Statistics of the National Highways Protective Society of accidents due to vehicular traffic in the City of New York for the first four months of 1912.

PEDESTRIANS, AS NEAR AS POSSIBLE TO ASCERTAIN.

	Killed.	Injured.
Automobiles.....	58	344
Trolleys.....	41	111
Wagons.....	34	49

COLLISIONS IN THE CITY OF NEW YORK FOR THE FIRST FOUR MONTHS IN THE YEAR 1912.

	Killed.	Injured.
Automobiles with automobiles		27
Automobiles with trolleys		47

Coroners' Records.

Comparison of the number of deaths caused by automobiles, street cars and horse-drawn vehicles for the year 1911 in various boroughs:

Borough.	Automobiles.	Street Cars.	Horse-drawn Vehicles.
Manhattan	90	72	139
Brooklyn	48	25	37
The Bronx	12	16	17
Richmond	3	1	2
Queens	6	8	3
Total	159	122	198

Statistics of the National Highways Protective Society of accidents due to vehicular traffic in the City of New York for the year 1911.

PEDESTRIANS, AS NEAR AS POSSIBLE TO ASCERTAIN.

	Killed.	Injured.
Automobiles	125	617
Trolleys	106	204
Wagons	161	102

COLLISIONS IN THE CITY OF NEW YORK FOR THE YEAR 1911.

	Killed.	Injured.
Automobiles with automobiles	1	82
Automobiles with trolleys		123

REPORT OF POLICE DEPARTMENT, NEW YORK, ON AUTOMOBILE ACCIDENT CASES FOR 1911.

There were 2,469 cases reported, in which 2,431 persons were injured, 40 killed, and 29 died later as result of injuries.

At or near corner	1,609
Weather conditions:	
Wet	133
Dry	667
Unknown	1,669
Chauffeurs licensed:	
Yes	2,033
No	55
Unknown,	381
Arrests	166
Dispositions of arrests:	
Imprisonment	1
Fines	36
Sentence suspended	9
Discharged	106
Pending	14
Chauffeurs arrested before:	
Yes	12
No	196
Unknown	2,261
Persons injured under 16 years of age	851

Remarks—One killed, no arrest made, by order of Magistrate. (This case happened in the 147th Precinct.)

Report of Police Department, showing summary of deaths, injuries and arrests in connection with street traffic during 1911.

Total deaths from automobile accidents	69	
Total deaths from street-car accidents	63	
Total deaths from other traffic accidents	138	
		270
Total injured by automobile accidents	2,431	
Total injured by street-car accidents	3,614	
Total injured by other traffic accidents	4,532	
		10,577

Number of arrests for speeding and reckless driving	3,171
Convictions	2,999
Discharged and acquitted	167
Pending	5
	3,171

See Report of Special Committee on Speed Regulations of New York City. The City Record, April 17, 1913.

Appendix I.

Children Killed in Street Accidents, New York City.

(The *New York Times*, Sunday, February 2, 1913.)

"Of the 1,426 people killed on the streets in the past three years, 592 were children 16 years of age or under, or 41 per cent. of the entire number. According to the United States Census of 1910, the proportion of children 14 years old or less in New York City was 28.7 per cent. On that basis the proportion of children 16 years old or less would be about 30 per cent. This means that street traffic in this city is 30 per cent. more dangerous to children than to other members of the community—or, in other words, that the chance of an adult being killed by vehicular traffic is only about three fourths that of a child.

"At the other end of the scale of life the danger also increases. During the month of December, out of 46 fatalities in the entire city, 7, or about 16 per cent., of the victims were people 60 years old or over. By the same census report the proportion of such people to the entire population is about 4.86 per cent., showing that old people furnished nearly four times their ratio of victims. Tabulated these figures are:

	Children.	Old People.
Per cent. of population	30.0	4.86
Per cent. of fatalities	41.0	16.0

"This means that over half the victims of traffic in this city are drawn from the immature, the unprotected, the weak, and the ailing—in short, from just those classes of society which civilization boasts that it most protects."

Appendix J.

Traffic Accidents in Massachusetts.

In only a few of the state and city reports on vital statistics in this country are there any classified data relating to traffic or vehicular fatalities. The Massachusetts Registration Reports give some details, with distinction of sex.

DEATHS FROM TRAFFIC ACCIDENTS IN MASSACHUSETTS, BY KIND OF VEHICLE, AND BY SEX AND AGE OF PERSONS KILLED. 1909-1911.

BY AUTOMOBILES.

Ages.	Males.		Females.		Total.	
	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.
Under 5	5	3.2	2	4.3	7	3.5
5-9	21	13.6	12	25.5	33	16.3
10-14	20	12.9	..	....	20	9.9
15-19	9	5.8	1	2.1	10	5.0
20-29	21	13.6	11	23.4	32	15.8
30-39	29	18.7	5	10.6	34	16.8
40-49	23	14.8	3	6.4	26	12.9
50-59	7	4.5	6	12.7	13	6.4
60-69	12	7.7	2	4.3	14	6.9
70-79	5	3.2	4	8.5	9	4.5
80 and over	2	1.3	1	2.1	3	1.5
Age N. S.	1	0.7	..	....	1	0.5
Total	155	100.0	47	100.0	202	100.0
Sex Distribution of Persons Killed		76.7		23.3		100.0

BY ELECTRIC RAILWAYS.

Ages.	Males.		Females.		Total.	
	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.
Under 5	10	5.8	7	19.4	17	8.1
5-9	11	6.3	8	22.2	19	9.0
10-14	11	6.3	2	5.5	13	6.2
15-19	7	4.0	..	....	7	3.3
20-29	27	15.5	5	13.9	32	15.2
30-39	32	18.4	6	16.7	38	18.1
40-49	30	17.2	2	5.5	32	15.2
50-59	16	9.2	3	8.3	19	9.0
60-69	20	11.5	1	2.8	21	10.0
70-79	4	2.3	1	2.8	5	2.4
80 and over	5	2.9	..	....	5	2.4
Age N. S.	1	0.6	1	2.8	2	1.0
Total	174	100.0	36	100.0	210	100.0
Sex Distribution of Persons Killed		82.9		17.1		100.0

BY STEAM RAILROADS.

Ages.	Males.		Females.		Total.	
	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.
Under 5	6	0.7	8	12.9	14	1.4
5–9	28	3.0	7	11.3	35	3.6
10–14	31	3.4	4	6.5	35	3.6
15–19	50	5.4	2	3.2	52	5.3
20–29	216	23.4	6	9.7	222	22.6
30–39	218	23.6	5	8.1	223	22.7
40–49	167	18.1	10	16.1	177	18.0
50–59	100	10.9	8	12.9	108	11.0
60–69	54	5.9	8	12.9	62	6.3
70–79	23	2.5	2	3.2	25	2.5
80 and over	8	0.9	2	3.2	10	1.0
Age N. S.	20	2.2	..	....	20	2.0
Total	921	100.0	62	100.0	983	100.0
Sex Distribution of Persons Killed		93.7		6.3		100.0

BY HORSES.

Ages.	Males.		Females.		Total.	
	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.
Under 5	1	4.3	2	66.7	3	11.5
5–9	2	8.7	..	....	2	7.6
10–14	..	....	..	....	..	....
15–19	1	4.3	..	....	1	3.9
20–29	4	17.4	..	....	4	15.4
30–39	4	17.4	..	....	4	15.4
40–49	4	17.4	1	33.3	5	19.2
50–59	5	21.7	..	....	5	19.2
60–69	1	4.3	..	....	1	3.9
70–79	1	4.3	..	....	1	3.9
80 and over	..	....	..	....	..	....
Age N. S.	..	....	..	....	..	....
Total	23	100.0	3	100.0	26	100.0
Sex Distribution of Persons Killed		88.5		11.5		100.0

BY OTHER VEHICLES.

Ages.	Males.		Females.		Total.	
	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.
Under 5	22	11.6	10	33.3	32	14.5
5–9	31	16.3	4	13.3	35	15.9
10–14	7	3.7	2	6.7	9	4.1
15–19	6	3.2	1	3.3	7	3.2
20–29	22	11.6	1	3.3	23	10.5
30–39	38	20.0	2	6.7	40	18.2
40–49	25	13.1	..	....	25	11.4
50–59	15	7.9	3	10.0	18	8.2
60–69	15	7.9	2	6.7	17	7.7
70–79	7	3.7	3	10.0	10	4.5
80 and over	..	....	2	6.7	2	0.9
Age N. S.	2	1.0	..	....	2	0.9
Total	190	100.0	30	100.0	220	100.0
Sex Distribution of Persons Killed		86.4		13.6		100.0

STREET RAILWAY FATALITIES, MASSACHUSETTS, 1908–1912.*

Year Ending June 30.	Passengers.	Employees.	Other Persons.	Total.
1908	28	13	80	121
1909	17	21	51	89
1910	9	12	59	80
1911	15	24	67	106
1912	27	21	74	122
Total	96	91	331	518

*Compiled from the annual reports of the Board of Railroad Commissioners.

STEAM RAILWAY FATALITIES, MASSACHUSETTS, 1908–1912.*

NUMBER KILLED.

Year Ending June 30.	Passengers.	Employees.	Travelers at Grade Crossings.	Trespassers.	Other Persons.	Total.
1908	11	92	27	146	15	291
1909	11	74	22	131	12	250
1910	9	89	29	164	12	303
1911	11	87	25	162	18	303
1912	15	91	24	132	17	279
Total	57	433	127	735	74	1,426

* Compiled from the annual reports of the Board of Railroad Commissioners.

Appendix K.

RULES AND REGULATIONS GOVERNING STREET TRAFFIC.

Nearly all of the larger cities of the United States have rules and regulations of one kind or another for the control of street traffic. A large proportion of these regulations have directly to do with the prevention of accidents, either to the vehicles, to the drivers or occupants of the same, or to the pedestrians on the streets and sidewalks. Certain of these rules are almost universal in application and among such may be mentioned the following: A vehicle meeting another shall pass to the right; a vehicle overtaking another shall pass to the left; a vehicle turning a corner is required to turn it in a particular way and so as not to interfere with traffic moving in an opposite direction; slow-moving vehicles are required to keep close to the right-hand side of the street, and fast-moving vehicles have the privilege of the more central portion of the street.

A "vehicle" is usually defined and the following extracts are typical:

Chicago. 1910.

The word "vehicle" includes equestrians, led horses and everything on wheels or runners, except street cars and baby carriages.

The word "horse" includes all domestic animals.

St. Paul. 1910.

That the term "vehicle," as used in this ordinance, shall include all vehicles propelled by human, animal or mechanical power, except fire apparatus, police patrols, hospital ambulances, United States mail wagons and vehicles which are run only upon rails or tracks.

These ordinances frequently make provision for a minimum age of drivers and this age in most cities is sixteen. In Syracuse, N. Y., however, no person is permitted to operate or drive a motor vehicle or other vehicle who is under eighteen years of age unless accompanied by a duly licensed chauffeur or the owner of the vehicle which is being operated. Some ordinances make it unlawful for any person to operate an automobile or motorcycle while in an intoxicated condition. In some ordinances, also, provision is made that the driver of any vehicle must have a sufficient view of the traffic following and at the sides of his vehicle, which must therefore be not so covered or constructed as to prevent such an outlook.

Most of the ordinances require that horses or other draft animals be securely fastened if left unattended in any street. Curiously enough, however, some cities make an exception to this rule. In Providence, R. I. for example, the ordinance reads, "No horse shall be left unattended for a longer period than ten minutes in any street unless he is securely fastened," etc. And in Boston, Mass., this provision reads, "No horse shall be left unattended for a longer period than five minutes," etc.

Several of the cities have found it necessary to make rules for the safety of drivers, passengers, and pedestrians, which on their face seem to infringe upon personal liberty. Experience, however, has taught these cities

that such rules have become absolutely necessary. To illustrate, the following rules are incorporated in the ordinances of several cities to prevent the carrying of passengers on the handle-bars of bicycles, a habit which has become quite common and which is exceptionally dangerous, not only to the riders but to pedestrians as well.

BALTIMORE. 1908.

Carrying children on Bicycles.—No bicyclist shall carry upon his bicycle any child under the age of 5 years.

Another practice which is common and yet exceedingly hazardous is that of stealing rides, hitching onto the rear of vehicles, etc. Many fatal accidents and a large number of very serious non-fatal injuries have resulted to children from this practice. Many of the cities now have quite stringent provisions prohibiting this and similar practices. Some typical instances are presented in the following excerpts from the ordinances of representative American cities:

BOSTON. 1908.

No one shall steal a ride upon any vehicle or street car, and no one shall ride upon the rear of any vehicle without the consent of the person in charge thereof.

CHICAGO. 1910.

No one shall ride upon the rear end of any vehicle without the consent of the driver, and when riding no part of his body shall protrude beyond the limits of the vehicle.

Another very dangerous practice in American cities is for children and adults to indulge in what is commonly called "coasting." This is a dangerous practice, particularly in congested sections of cities, and so many accidents have occurred that several of the cities now prohibit the practice. The following is a typical rule of this kind:

BALTIMORE. 1908.

Coasting Forbidden to Bicyclists.—No bicycle shall be allowed to proceed in any street of the city by inertia or momentum with the feet of the rider removed from the pedals.

Roller skating on streets is prohibited in a few cities of which the following is an example:

MEMPHIS. 1912.

No child or other person shall be allowed or permitted to use the streets of the city for the purpose of rolling thereon on roller skates; nor shall any child or other person be permitted or allowed to catch, hold on or attach himself or herself to any street car, automobile or other vehicle, whether such person is using roller skates or riding on a bicycle, with a view of being pulled along the streets.

It is a common practice also in American cities, and probably elsewhere also, for riders of bicycles to attempt trick riding in the city streets. This is specifically forbidden in Baltimore, the rule being as follows:

BALTIMORE. 1908.

Trick Riding Forbidden.—No rider of a bicycle shall remove both hands from the handle-bars, or practice any trick or fancy riding in any street.

Several of the cities incorporate in their street traffic ordinances, rules and regulations governing pedestrians as well as drivers. Some times these are in the form of warnings, and in other cases they are positive prohibitions. Typical instances of such regulations are the following:

CLEVELAND. 1912.

Pedestrians should never step from the sidewalk in crossing a street without looking in both directions to see what is approaching and shall cross at right angles with the street; and at street intersections they shall not cross diagonally, but shall go around the center of the line of traffic and cross only one street at a time.

DISTRICT OF COLUMBIA. 1912.

Pedestrians shall have the right of way over drivers of vehicles at street crossings only.

A pedestrian shall not walk in the roadway of a street except to cross at a street crossing, shall not stand in such roadway, and shall not cross the roadway diagonally.

A frequent source of serious personal injury is found in the interference of other vehicles with street cars while the latter are stopping to take on or discharge passengers. Several of the municipal ordinances, and particularly those adopted in recent years, make provision for the regulation of other vehicles in their relation to the street cars under the circumstances stated.

CHICAGO. 1910.

The driver of a vehicle overtaking a street car shall exercise the greatest care in passing not to interfere with or injure passengers who may board or alight from said cars.

NEW YORK CITY.

Report of Special Committee on Speed Regulations of New York City The City Record, April 17, 1913.

In overtaking or meeting a street passenger car which has been stopped for the purpose of receiving or discharging a passenger or passengers, no such vehicle aforesaid shall pass or approach within eight (8) feet of said street car so long as the same is so stopped and remains standing for the purpose aforesaid.

The committee has also slightly changed the provision as to protection of passengers who are getting on and off street cars. For the past few months the City of Chicago has conducted experiments along these lines and has finally secured a provision which the Mayor of that city believes

to have been material in the preventing of accidents and the saving of life. The provision reported by the committee requires that a space of at least eight feet shall be preserved at all times between a street passenger car, which has been stopped to receive or discharge passengers, and any vehicle. If the space of eight feet cannot be preserved the vehicle must be brought to a full stop.

ST. PAUL. 1910.

That when any street railway car stops at any street crossing or regular stopping place in the City of St. Paul to receive or discharge passengers it shall be unlawful for the driver or person in control of any vehicle as herein defined, traveling along the same street as said street railway car, to pass such car without bringing said vehicle to a stop at least ten feet distant from the rear of said railway car.

SCRANTON. 1912.

"No vehicle shall pass a railway car that is taking on or discharging passengers at any crossing."

In some cities vehicles are required to stop in such a manner as not to interfere with the passage of pedestrians at the crossings. In other words, they are required to stop so that no part of the horse or vehicle projects over the crossing, and some times the rule reads that no part of the horse or vehicle shall project within a certain number of feet of the crossing. An instance of such a regulation is presented herewith:

PHILADELPHIA. 1913.

Vehicles must stop in such a way as not to interfere with the passage of pedestrians at the crossings, always stopping so as that no part of the horse or vehicle projects within five feet of the crossing.

Another frequent source of street traffic accident has been the running down of the pedestrian, or collision with another vehicle due to one vehicle following close after another. Some cities have found it necessary to regulate this practice and an instance is presented herewith:

PROVIDENCE. 1910.

"No person having charge of a vehicle shall allow the same to come within ten feet of any vehicle in front of him when approaching and passing over a crossing where a pedestrian is about to pass."

A few of the cities, in recent years, have adopted the practice of requiring street cars to stop on the near side of streets rather than on the far side. The theory, so far as it concerns accidents, is that when street cars stop on the near side of the street to take on or discharge passengers the momentum of the cars when crossing the street will be less and the danger of accident at the most dangerous points will thus be reduced. This method of handling street cars is at present in force in Cincinnati, according to the following regulation:

CINCINNATI. 1912.

Street cars and interurban cars shall stop on the near side of intersecting streets, and not at the far side, for the purpose of taking on or discharging passengers, and shall not obstruct any interesecting streets, or the path to be used by pedestrians in crossing streets.

I may add that this method was attempted in Newark, New Jersey, in 1913, but so many objections were raised that the practice was discontinued after a few months' trial, not because of accidents but because the passengers objected to boarding and alighting from cars at such distances from the cross side-walks. The pay-as-you-enter cars made it necessary for passengers to enter such cars at least a car length from the cross walk.

Some cities regulate the kind of warning signal to be used by vehicles; an instance of such regulations is as follows:

MEMPHIS. 1912.

In the operation of automobiles, motorcycles and other self-propelled vehicles upon the streets of the city of Memphis, the only kind of warning signal that will be permitted to be used shall be a reed horn, hand operated, with a rubber bulb, such as will emit a single note, in low tone, except in cases of electric vehicles, in which a bell not larger than five inches in diameter may be used.

Speed regulations are, of course, among the most important and most numerous, but a few typical instances of such regulations are presented herewith:

NEWARK. 1912.

No person or persons shall drive or ride any vehicle upon or along any street at a greater speed than at the rate of twelve miles an hour excepting, however, when turning a corner of any street the rate of speed shall not be greater than six miles an hour.

LOS ANGELES. 1912.

It shall be unlawful for any person to ride or drive, or to cause or permit to be ridden or driven, any animal or vehicle at a rate of speed greater than six miles per hour over or past or across any street intersection within the business district.

PASSING PUBLIC SCHOOLS.

Report of Special Committee on Speed Regulations of New York City. The City Record, April 17, 1913.

Upon approaching a bridge, or in passing a public school on school days between the hours of eight (8) o'clock antemeridian and four (4) o'clock post-meridian, the person operating, driving or propelling any vehicle subject to the provisions of section one (1) of this article, shall not proceed, nor shall the owner of any such vehicle riding thereon or therein cause or permit the same to proceed at a rate of speed greater than ten (10) miles per hour.

In this connection it is interesting to note that the state law sometimes

overrules local regulations, and an illustration of such an instance is the following:

MINNESOTA STATE AUTOMOBILE LAW. 1912.

Local regulations prohibited; no city, town, village or other municipality shall make or pass any ordinance, rule or regulation limiting or restricting the speed of motor-vehicles, and no ordinance, rule or regulation heretofore or hereafter made by any city, town, village or other municipality in respect to or limiting the use or speed of motor-vehicles shall have any force, effect or validity.

PENALTIES.

The main trouble in this country seems to be the failure properly to enforce the ordinances and to impose sufficiently severe penalties for the violation of the street traffic rules and regulations. There is considerable variety in the penalties imposed, and in many instances the traffic regulations, particularly as regards speed, are almost a dead letter. A few illustrative instances of penalty provisions are presented in the following excerpts from city ordinances:

KANSAS CITY, MO. 1911.

Any person who shall violate any provision of this ordinance shall, upon a first conviction thereof, be punished by a fine of not less than one nor more than two hundred dollars; upon a second conviction, shall be fined not less than ten dollars nor more than two hundred dollars; and upon a third conviction thereof shall be fined not less than twenty-five nor more than two hundred dollars.

MILWAUKEE. 1911.

"Any person violating any of the provisions of this ordinance shall, upon conviction thereof, be punished as follows: For the first offense, by a fine of not less than ten nor more than fifty dollars; for a second offense, by imprisonment in the house of correction of Milwaukee county for not less than ten nor more than thirty days; for any subsequent offense by imprisonment in the house of correction of Milwaukee county for not less than three nor more than six months."

NEW YORK.

Report of Special Committee on Speed Regulations of New York City The City Record, April 17, 1913.

The penalties provided apply to any violation of the provisions of the ordinance and are:

For the first offense not less than $25 nor more than $100, or by imprisonment not to exceed 15 days or by both.

The penalty for the second offense within one year is doubled and the penalty for the third offense within one year is a fine of $100, or imprisonment for a term not to exceed 60 days, or both.

sional expert and that given by a raw intern or an inexperienced practitioner. There is no more excuse for giving scopolamin in a routine way, and without regard to the reaction of the patient, than there is for a routine dosage in ether anesthesia.

If the hospitals will furnish a proper environment for "twilight sleep," and the physicians of this country will make an attempt to ascertain what the real Freiburg method is, and then use the method with judgment before giving expression to a prejudice which is unscientific and unreasonable, the opinion of these physicians will command more respect from those seeking the truth.

It is well for us to remember that if the formally reported results with "Dämmerschlaf" as practiced by Krönig and Gauss are based on truth —and our experience seems to prove that this is so—no amount of vituperation or ill-concealed envy by our physicians will stop the just demand of women for "twilight sleep," and it is perhaps not out of place to suggest that a little more investigation and a little less vituperation will best serve the physician, the patient and the hospital.

SYSTEMATIC AMBULANCE SERVICE FOR METROPOLITAN HOSPITALS.

New York's Experience Demonstrates That Electrics, Gasoline Cars, and Horses Have Definite Use—Figures of Cost Differ Widely and Are Not Complete—Some Comparisons.

By NORMAN MAUL, New York.

SERVING more than 100,000 sufferers a year, the ambulances that bring emergency relief to the sick and injured of New York render a service that is not equaled elsewhere in this country. Even in continental Europe it is doubtful if the work is surpassed. New York's emergency ambulances treated 114,453 patients during 1913. The number will exceed 125,000 this year.

In rendering this service, 41 public and semi-private hospitals are subject to the call of the city, while more than 100 ambulances are held in instant readiness to respond to the call for help. Needless to say, the maintenance of this ambulance service has presented many problems for solution, and therefore a study of New York's methods should prove of interest to those concerned in ambulance work.

THE BOARD OF AMBULANCE SERVICE.

All ambulances designated for emergency calls operate under the supervision of the Board of Ambulance Service. This consists of the police commissioner, who is its president; the charities commissioner, who serves as secretary; the president of Bellevue and Allied Hospitals, and two members who are appointed by the mayor. The establishment of the board was authorized by the state Legislature in 1909, but its duties were not assumed until 1911. The effect of supervision on a service that heretofore had been run rather loosely and without a responsible head was at once apparent.

There was a decided improvement in equipment. Calls were responded to more promptly, and, as the powers of the board began to be felt, there was a marked falling off in the number of complaints regarding the service. Before the establishment of the board each hospital conducted its ambulance work as it saw fit. Any driver would do, and generally the cheapest was employed. Surgeons were answerable only to their medical board, and undergraduate interns were often sent out on the "bus." Cases were sometimes left in the station house that should have been brought to the hospital. There was no system under which hospitals were paid for their work, and no means of supervising the expense of operation or the efficiency of the ambulances. There were frequent disputes among the hospitals regarding district boundaries, and cases were often "stolen" by the ambulance drivers.

Quite a different condition exists now. There is a periodical inspection of ambulances, their equipment, and operating methods; each hospital renders a monthly report to the city of its ambulance calls as made from day to day; the history of every surgeon proposed for the service is secured, and no one may ride the bus who has not been approved; the bills for ambulance maintenance in such hospitals as are under contract with the board are verified; the district which each hospital shall cover is determined, and all complaints, regardless of their nature, are investigated.

In its supervision of surgeons, the board in the first two and a half years passed on the qualifications of upward of 300 men, 17 of whom failed to meet the required standard. During 1912 two surgeons were suspended and one dismissed from the service for dereliction of duty. It is within the power of the board to take the ambulance district from any hospital that fails to conform to its

requirements, but this power has never been exercised, for hospital superintendents have cooperated with the board in every way for the betterment of the service.

THE INFLUENCE OF THE AUTOMOBILE.

The ambulance service, in common with commercial and industrial progress, has felt the influence of the development of the motor car. New York's first autoambulance was placed in service about sixteen years ago. Today, of the 99 ambulances under the board's supervision, 58 are motor-driven. This development was slow at first, but has moved rapidly during the past two years.

Fig. 1. Army type of ambulance used by Bellevue Hospital in inaugurating an emergency service in New York in 1869.

In 1911 there were 22 motor ambulances, in 1912 there were but 26, while at the end of 1913 there were 51, with the prospect of more being added during the present year.

HORSES INDISPENSABLE.

Yet, while motor ambulances are increasing every year, the time should never come when the horse will be entirely discarded. This statement may seem strange when the economy and speed of a motor equipment are compared with the slower

Fig. 2. Harlem Hospital's electric—Bellevue and Allied Hospitals operate seven electrics, four gasoline cars, and two steamers, augmented by a stable of horses.

and more expensive horse ambulance, but during last winter's blizzard in New York the horse saved the service. High-powered cars were helpless in the drifts, but horses working in teams pulled through. Many "progressive" hospitals that had graduated from the antiquated horse had to transfer their calls to their less "advanced" neighbors, and for two days the horse ruled the situation. After the snow began to pack and the streets were fairly passable, the motors resumed operations, and the horses were given their well-earned rest. In fact, after the snow drifts had been removed and only the icy coating remained on the pavement, the going became so bad that it was positively dangerous to take out a horse.

ESTABLISHMENT OF EMERGENCY AMBULANCES.

New York emergency ambulance service dates back to 1869, when Dr. Edward B. Dalton inaugurated the work at Bellevue. Dr. Dalton had been in charge of the field hospital ambulance corps of the Army of the Potomac during the Civil War, and when he was requested to submit a plan of ambulance operation for New York he was guided largely by his battlefield experience. The methods installed then have remained practically unchanged during the forty-odd years since; in fact, they have served as a pattern that has been widely copied throughout the country. The ambu-

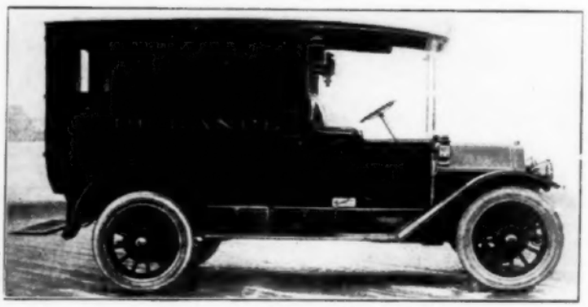

Fig. 3. Fast gasoline ambulance used by St. Joseph's Hospital for long runs through the Borough of Queens.

Fig. 4. Interior of St. Joseph's Hospital ambulance.

lance equipment at that time consisted of two vehicles, similar to those used in the army, but of lighter construction. The next year five more were added.

That there had been need for such service was at once evident, for in 1870 the ambulances responded to 1,401 calls. In 1891 Bellevue ambulances answered 4,392 calls, and the number increased every year despite the fact that eventually Bellevue had to share its operations with other institutions.

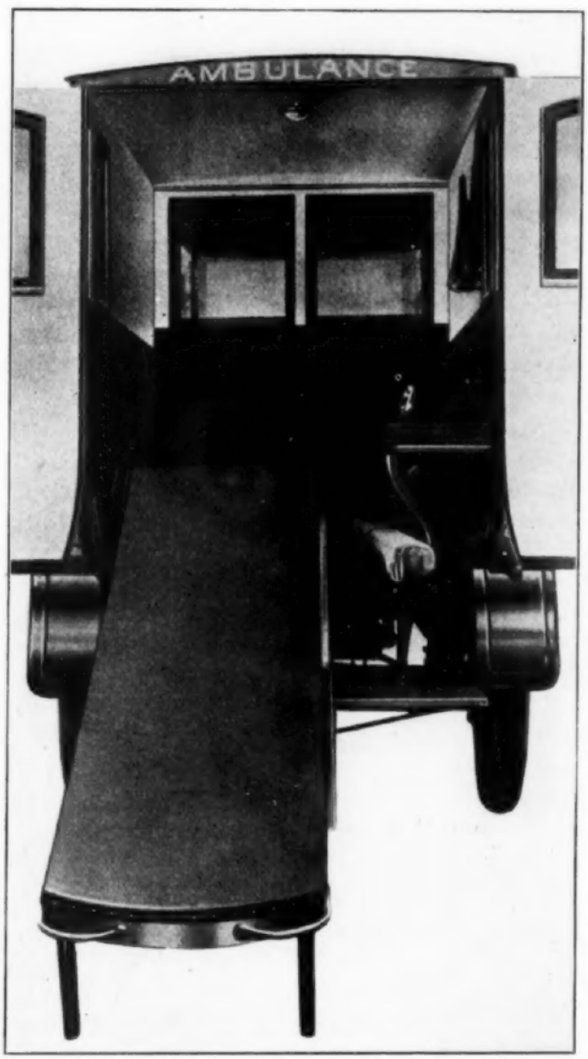

Fig. 5. Removable cot ready to receive the patient.

BELLEVUE'S EQUIPMENT.

Today the ambulance equipment at Bellevue consists of 14 horses, 1 steamer, 3 gasoline cars, and 4 electrics. In 1912 these responded to 11,700 calls. The electrics answer the emergency calls in the immediate neighborhood. Horses are held in reserve, while the steamer and gasoline cars make the longer runs in transfer work.

In the maintenance of its ambulance service, Bellevue has kept no records that permit a close analysis of operating costs. The first electric in use, however, taking first calls answered probably half the total calls that were received each day. From this it was estimated that at about half the total expense the electric did twice as much work as the horse ambulances. It was this estimated economy that led to the decision to electrify the emergency service, resulting in the installation of two additional electrics November, 1913, and a fourth car in March, 1914.

Bellevue is the parent hospital of three other institutions known collectively as Bellevue and Allied Hospitals, all controlled by one board of trustees. The other hospitals are Gouverneur, on the lower East Side; Harlem, up town, and Fordham, in the Bronx. Gouverneur and Harlem serve typical city districts—congested streets, good pavement, with short runs. The down-town institution uses two electrics and two horse vehicles. During 1912 these responded to 6,870 calls. Harlem, with one electric and three horses, answered 7,992 calls. Fordham Hospital faces different requirements; the territory served is large, practically all of the outlying sections of the Bronx Borough calling on this institution; roads are wide, with little traffic, offering opportunity for fast runs, and, as the trips are often five miles or more, the higher power and faster types of autoambulance were sent to that territory. One gasoline car and one steamer during 1912 responded to 3,768 calls.

IN QUEENS BOROUGH.

The same condition exists among the six hospitals in Queens Borough. Of the eleven ambulances in this district, eight are horse-drawn for nearby calls and three are gasoline cars for the long runs across the open sections of the still undeveloped borough. Single runs here are of a length that would incapacitate a horse for the rest of the day, and an electric would fare hardly any better. Fortunately there are not many accidents in this section, in 1912 the six hospitals responding to but 3,727 calls.

[To be continued.]

Dr. Frederic A. Washburn, administrator of the Massachusetts General Hospital, has been appointed superintendent of the Massachusetts Charitable Eye and Ear Infirmary of Boston, 225 beds, to take effect January 1, 1915. Dr. Washburn assumes his new duties in addition to his present position. The infirmary is located near the hospital. Dr. Farrar Cobb, for the past twenty years superintendent of the infirmary, resigns to give all his time to his surgical practice.

At the meeting of Pennsylvania State Graduate Nurses' Association held in Pittsburgh in November officers were elected as follows: President, Miss Susan B. Francis, of Philadelphia; first vice-president, Miss Roberta West, Philadelphia; second vice-president, Miss Katherine Dempster, Pittsburgh; secretary and treasurer, Miss Willimina Duncan, Pittsburgh; directors, Miss Ida F. Giles, of Philadelphia, and Miss Nellie MacAfee, of Pittsburgh. It was decided to hold the next convention in Philadelphia in November, 1915.

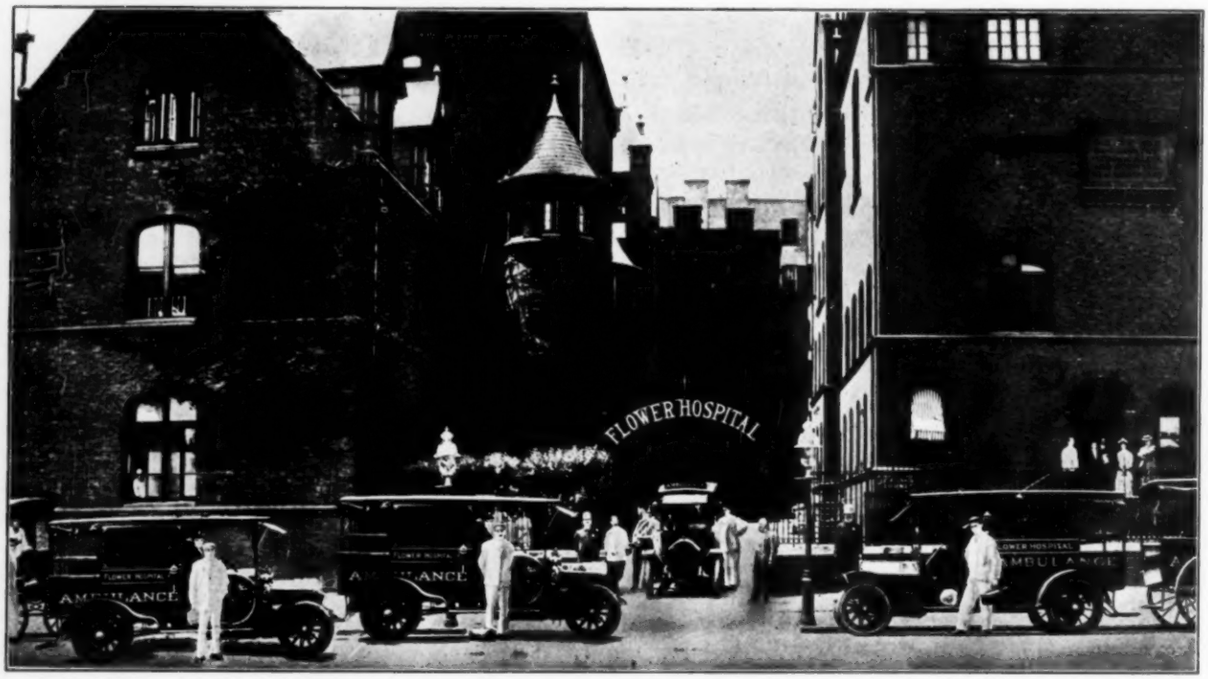

Fig. 6. Four gasoline and two horse ambulances used by Flower Hospital.

SYSTEMATIC AMBULANCE SERVICE FOR METROPOLITAN HOSPITALS.

New York's Experience Demonstrates That Electrics, Gasoline Cars, and Horses Have Definite Use—Figures of Cost Differ Widely and Are Not Complete—Some Comparisons.

By NORMAN MAUL, New York.

[Concluded from January number.]

NEW YORK Hospital was the second to begin the operation of an emergency service, the vehicles being installed in 1877. Today this hospital maintains seven autoambulances, and the space that was once occupied as a stable is now the living quarters of the corps of ambulance drivers. The New York fleet is all electric, the first machine having been installed in 1905. This is a one-ton vehicle, and, although it is not now on "first call," it has some interesting records. At the disastrous Triangle shirt factory fire it carried, on one trip, eight patients to the hospital, a distance of about half a mile, and on another occasion it made a fifty-mile trip to a hospital beyond the city limits. The trip was made on a stormy day, and in places the mud was hub deep. Only an hour's boost of the batteries was necessary to get the car home.

The House of Relief is the down-town branch of the New York Hospital. This institution uses one electric car and two horse ambulances. In 1912 New York Hospital responded to 6,971 calls and the House of Relief to 5,251. As in the case of Bellevue, no close record was kept of the operating costs of these ambulances. That there were, however, evident economies is shown in the report of Dr. Thomas Howell, the superintendent, in which he stated: "We find the electric vehicles much more satisfactory than the horse-drawn ones, especially in hot weather. During one hot day nearly ninety calls were answered between the two stations, and an electric ambulance responded to thirty calls in twenty-four hours." It was such experience as this that led the New York Hospital to keep adding to its fleet, the latest installation being two machines, which began work last fall.

POLYCLINIC'S COSTLY SERVICE.

In sharp contrast with the incomplete operating records of Bellevue and New York hospitals are those of the Polyclinic, which inaugurated its ambulance service in October, 1912. Polyclinic operates in an up-town district, extending from Forty-second street to Ninety-sixth street, and from Central Park west and Eighth avenue to the North River, making a territory of about three square miles. To cover this the hospital uses three high-power gasoline cars. One has a speed of fifty-five miles an hour, the other two are capable of forty-eight miles. The three cost $8,000 in May, 1912, and five months later they were placed on emergency call. During the first year of their operation they responded to 4,711 calls, and their operation cost $17,459.82. This sum includes a

matter of more than $1,000 for liability insurance, almost $2,900 for repairs, about $4,300 for salary and board for the three chauffeurs, and about $900 for gasoline, oil, and sundries. It does not include depreciation, which, based on their one year's experience, the hospital officials think should be something like 30 percent.

THE OLDEST AUTOAMBULANCE.

While not operating on emergency service, the ambulance of Mt. Sinai Hospital is interesting chiefly because of its age. It was presented to the hospital twelve years ago, costing the donor at that time $3,000. Used exclusively for the transfer of private patients, it averages about 300 calls a year. The annual cost of operation varies between $600 and $700 in years when no extensive repairs are made to between $1,600 and $1,800

Courtesy of the Edison Monthly.
Fig. 7. Dean of New York's motor ambulances—An electric that was installed by Mount Sinai Hospital in 1902.

when the ambulance is thoroughly overhauled and new batteries supplied.

THE NEED OF AUTOS.

The passing of the horse is quite pointedly shown in the following extract from the report of Dr. Willis G. Nealley, superintendent of Brooklyn Hospital:

"The ambulance service shows a decrease of 514 cases, there being only 2,505 in 1912 as compared with 3,019 in 1911. This decrease is to a great extent due to the installation of a motor ambulance service in one of the nearby hospitals, which has divided the ambulance service in this section of the city."

Brooklyn Hospital covers one of the busy sections of Brooklyn—the entire down-town shopping district, the approaches to two of the big East River bridges, and a large manufacturing district being in its territory. Until the present time, horses have been deemed quite sufficient, but the nearby auto, which took away 500 calls, was an unanswerable argument in favor of motors. Motors will be installed on the completion of the new building, which is now in course of construction. The operation of the two horse vehicles, which

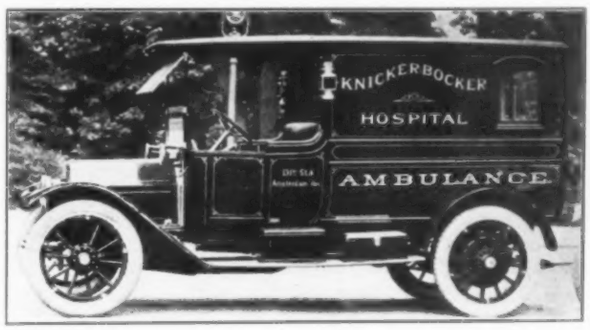

Fig. 8. One of the three gasoline ambulances used in the hilly territory of the Knickerbocker Hospital.

answered 2,505 calls in 1912, cost $2,612.02, while for 2,678 calls in 1913 the cost was $2,450.63.

GASOLINE AND ELECTRIC AT LINCOLN.

Lincoln Hospital, which ministers to a large territory in the Bronx, operates two gasoline cars and an electric. The service runs about 250 calls a month. There were 2,047 calls in 1912, and for the hospital year ending September 30, 1913, this had increased to a total of more than 2,800 calls.

Fig. 9. Interior of the Knickerbocker Hospital ambulance.

First calls are taken by the gasoline cars, while the electric, which has been in service a good many years, is held in reserve. During the mid-February blizzard, however, this equipment, in common with most of the autoambulances in the city, was tied up by the snow, and, until conditions had been somewhat restored to the normal, Dr. Gwyer, the superintendent, rigged up a bor-

rowed sleigh and thus kept his emergency service in operation.

HORSES IN THE BLIZZARD.

In Brooklyn during the storm the only ambulance in three adjoining districts was the horse vehicle of the Methodist-Episcopal Hospital. This took calls in its own territory, the Norwegian Hospital district, and that of Holy Family Hospital. The Methodist-Episcopal electric was laid up, and the horse vehicle was converted from a single-horse rig to a two-horse outfit, an extra horse being hired for the work.

Fig. 10. One of the fleet of seven electrics used by New York Hospital.

Under normal conditions the one electric handles three-quarters of all this hospital's calls, which total about 1,800 a year. The horse rig takes second calls, and is used at night, during the chauffeur's off duty. The electric was installed in November, 1911, and the only renewals at the present writing are the tires, which have been changed once, and about half the battery cells.

The expense of operating the electric and the horse rig during 1913 was only $1,556, a figure that is almost impossible of improvement in consideration of the service rendered. The auto gave all the speed that was needed, while the horse aided its faster companion in taking second calls and going on duty when snow tied up all types of motor vehicles.

GASOLINE AMBULANCES AT FLOWER HOSPITAL.

The big section of Manhattan between Forty-second and One-hundred-and-tenth streets and extending from Eighth avenue east to the East River, with the exception of a small territory in the northeast corner, is covered by Flower Hospital. This hospital operates a mixed service of gasoline and horse vehicles. There are four autos in active service, while two horse rigs are held in reserve. During 1912 there were 6,124 calls. This ambulance equipment, including the building, harness, tools, extra parts, etc., cost $23,000, while the annual cost of operation is about $8,000. This, according to Dr. Royal S. Copeland, is only an estimate, nor does it include interest on the investment or an allowance for depreciation.

THE KNICKERBOCKER EQUIPMENT.

The Knickerbocker Hospital, formerly the J. Hood Wright, serves the territory from Ninety-sixth street to One-hundred-and-forty-fifth street, between Eighth avenue and the Hudson River. Three high-power gasoline cars, installed in the summer of 1913, have displaced three horse ambulances and four animals. This hospital averages about 200 calls a month, which are equally divided among the three vehicles, as they rotate according to the off-duty days of their chauffeurs. In changing from horses to motors, two experienced auto drivers were hired, while one of the horse drivers qualified as a chauffeur and was retained. Geographically, the Knickerbocker district is one of the hardest in the city, for almost every north and south street is a heavy-graded hill.

RELIABLE DATA NOT AVAILABLE.

It is to be regretted that these various hospitals have not kept a closer record of the cost of operation of their emergency ambulances. Such data, together with a report of the work done and the operating conditions, would be invaluable in guiding hospitals that have not yet invested in motor equipment.

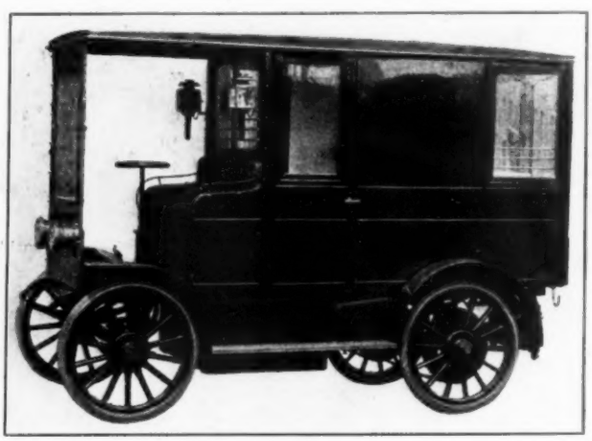

Fig. 11. Ambulance of Newton Hospital, Newton, Mass., in service two and a half years.

The few figures presented are interesting chiefly because they show the extremes of such operating cost. Polyclinic's $17,000 expense might not be equaled by another hospital anywhere. The $1,500 low mark attained by the Methodist-Episcopal Hospital is about as low an operating cost as any hospital could expect. Yet, with these two instances left out of consideration, there are certain

broad general facts that are plainly evident. The first is that the gasoline car and the electric car are not rivals in ambulance work. Each has a field in which it is better; as for the horse, he is indispensable.

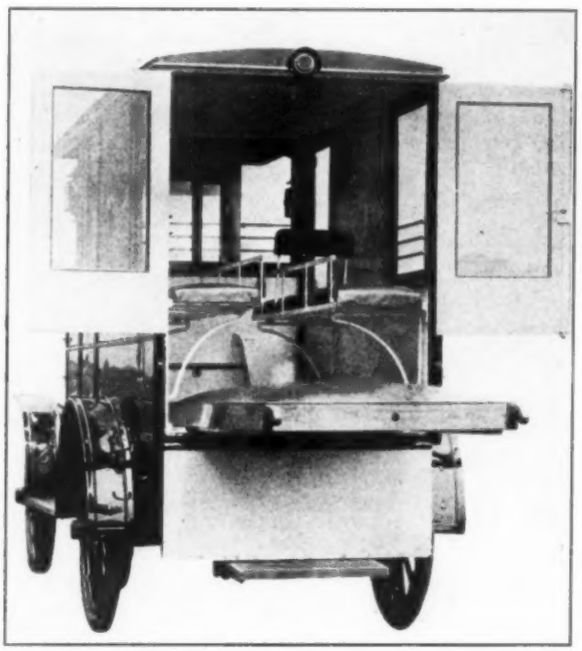

Fig. 12. Interior of ambulance of Newton Hospital, Newton, Mass.

The gasoline car is the fastest vehicle available. It is capable of long runs at a sustained speed of thirty to forty, even fifty, miles an hour. Of course such speed and endurance must be paid for. It is doubtful if the high cost of gasoline car operation justifies its use in the ordinary city district. For country hospitals and those operating in big

Fig. 13. White gasoline ambulance, Department of Health, New York City.

districts, where long runs and hilly roads are encountered, the gasoline car will render the most satisfactory service.

The electric car is not so fast, although with speeds varying from twelve to twenty-two miles an hour, it is quite sufficient for city operation. In a run of a mile, which is about the average in cities (New York at least), the difference between a fifteen-mile-an-hour and a fifty-mile-an-hour car is nil when traffic delays are considered. The electric is far cheaper to operate than the gas car, and, with the speed factor eliminated, it should be generally used for city work.

The horse, of course, is gradually being crowded out. In hot weather he works at a great disadvantage; on icy pavements in winter he is in constant danger of falling; the cost of feed is gradually becoming higher; yet, with the recollection of his service last February, who shall say that the horse has seen the end of his ambulance career?

DR. CRILE GOES TO EUROPEAN WAR.

Lakeside Hospital, Cleveland, Sends Famous Surgeon, with Corps of Assistants, to American Hospital, Paris.

A party of Cleveland (Ohio) physicians and nurses, headed by Dr. Geo. W. Crile, sailed December 30 to establish a surgical ward in the American Ambulance, in Paris. Dr. E. F. Kieger, Dr. Charles Stone, Dr. S. S. Ledbetter, Miss Agatha Hodgins, and Miss Iva Davidson were members of the party. The undertaking is being financed by the trustees of Lakeside Hospital. Dr. Crile is expected to remain in Paris several months, after which his place will be taken by Dr. William F. Lower, who is associated with him at Lakeside. The ward to be established will be known as the Lakeside ward.

KEEP FAMILIES TOGETHER.

Kansas Man Insists on State Paying Parents to Care for Children Rather Than Place Them in Institutions.

H. C. Bowman, a member of the Kansas State Board of Control, is in favor of the "mothers' pension" plan of providing for the welfare of dependent or neglected children as opposed to caring for them in state asylums. A recent report of the Kansas State Orphans' Home shows that it costs the state $4.65 a week for every child "fathered and mothered" at this institution. Mr. Bowman is of the opinion that it would be better to add to the resources of the natural parents of the children while they are getting on their feet and keep the family together, and he believes this could be done at an expense to the taxpayers that would be less than what it costs to operate the present system. Mr. Bowman has reached his conclusions with a full knowledge of the common objections to the pension plan.

The A. N. Brady Maternity Home, erected at Albany, New York, at a cost of $150,000, will soon be ready for occupancy. It is a five-story structure, thoroughly fireproof. The Albany *Evening Journal* is responsible for the statement that there is "not a stick of wood in the building." In the interior everything is of steel, finish.d circassian walnut. The floors are of cork preparation. On the entrance floor are the general office, the examination room, consulting rooms, resident physician's room, guests' rooms, nurses' dining room, and the general diet kitchen. On the second floor there is a ward with twelve beds, two wards with four beds each, two quiet rooms, diet kitchen, laboratory, etc. The third floor has ten private rooms, some with private baths. The fourth floor is the same as the third. On the fifth floor are the operating and sterilizing rooms. An electric elevator connects the floors. Glass enclosed verandas are built on three sides of the second, third and fourth floors. The home was made possible by a donation from the late Anthony N. Brady and his family.