of Japan, were on January 9 and 10 the guests of the Pennsylvania Railroad. The object of their visit was to inspect the Juniata shops and also those of the lines west of Pittsburgh. This they did in company with a party of railroad officials.

The many friends of Clement Hackney, formerly Superintendent of Machinery and Rolling Stock of the Union Pacific, will regret to learn of the news of his death, which occurred on January 6, at his home in Milwaukee, Wis., at the age of 54 years. He was born in Warrington, England, on May 16, 1846, and began his railroad career in 1860 as apprentice in the shops of the Prairie du Chien Railroad at Milwaukee, Wis. He was later with the Milwaukee Iron Company, first as Master of Transportation, then in charge of the Mechanical Department, and went to the Atchison, Topeka & Santa Fe in June, 1878, as Assistant Superintendent of Machinery, which position he held until December 1, 1885, when he became Superintendent of Machinery and Rolling Stock of the Union Pacific. He became General Manager of the Fox Pressed Steel Company in 1891, and after the absorption of that company by the Pressed Steel Car Company in 1899 was made District Manager of the latter company at Joliet, which position he held until August, 1, 1900.

Mr. T. R. Browne, Master Mechanic of the Pennsylvania Railroad at Juniata, has resigned to become Works Manager of the Westinghouse Air Brake Company at Wilmerding, Pa. Mr. Browne was appointed Master Mechanic of the Juniata shops at the age of 33, and for five years has had charge of the construction of the locomotives built by the road at that plant. Mr. Browne began as a machinist apprentice in Philadelphia, and after a varied experience, chiefly in civil engineering construction, and particularly in connection with hydraulic work, he entered the employ of the Pennsylvania ten years ago as draftsman at Altoona. He was soon made assistant to Mr. H. D. Gordon, Master Mechanic of the Juniata shops, during their construction, and succeeded Mr. Gordon in that position. His experience admirably fits him for his new position, and a better choice could hardly be made. He is of the sort of men the railroads need, and while his friends congratulate him and the Westinghouse people, it is not without regret that he will no longer devote his energies directly to motive power work, in which there is so much to be done just now.

At the January meeting of the North-West Railway Club, Mr. T. A. Foque, former Secretary of the club, was selected President, in place of Mr. E. A. Williams, resigned to go to the Canadian Pacific. Mr. T. W. Flannagan, Chief Clerk of the Mechanical Department of the "Soo Line," was elected Secretary to succeed Mr. Foque. The papers read at this meeting were "Electric Traction for Heavy Railway Service," by Mr. Edward P. Burch, Electric Railway Engineer, and "A Brief History of Composite Car Wheels," by Mr. Geo. H. Bryant, of Chicago. There was a good attendance.

If, as Mr. A. Lipschutz, of the Great Northern, says in a recent number of the "Railway Age," acetylene is sure to explode if heated to the dissociating temperature of 1,432 degs. F., it is a dangerous gas for railroad car lighting. It is understood that the Great Northern is using acetylene in a piping system and tanks which are soldered with soft solder or made of a metal which will melt at a temperature below that mentioned, so that the temperature of the gas will not rise above 400 degs. in case of fire. Instead of being reassured by this precaution, one is justified in being alarmed. This is placing a great deal of dependence upon those who mix the metals. It would seem to be better to use the present prevailing Pintsch system, or, if a brighter light is wanted, go to electricity at once.

PASSENGER COACH SANITATION.*

By J. N. Hurty, M.D., Indianapolis, Ind., Secretary State Board of Health.

Professor John Fiske, in a recent esssay, remarks: "Americans pride themselves on being extremely practical, yet we have not learned how to ventilate a Pullman car." In view of the havoc wrought by pulmonary tuberculosis, pneumonia and other diseases of the air passages, all largely due to lack of ventilation, this remark is calculated to lessen our conceit and cut our pride of invention to the quick.

The first step in passenger coach sanitation is sanitary construction. Angles, carvings, panels, bead work, channeling, all aid uncleanliness. These further the collection of dirt and make cleaning difficult and expensive. Transom ventilation in the deck fitfully and insufficiently changes the air, and is altogether a method which is contrary to physics. Such method does not and cannot ventilate a car properly, and sometimes, as when cold air falls upon the heads and necks of passengers through the transoms, is almost worse than no ventilation. Dr. Dudley, of the Pennsylvania Company, has devised a method of introducing pure air into coaches which probably meets all conditions so far as is practicable, but the removal of the air through transoms in the deck is wrong. Dr. Dudley describes his invention now in use on the Pennsylvania system as follows:

"We have experimented with and developed a system of ventilation which promises very good results, and is a great improvement over former methods. This system consists in taking air in at diagonally opposite corners of the car, through a hood, and by means of a down-take underneath the floor of the car, to the space bounded by the outside sill, the first intermediate sill, the floor and the false bottom. This space extends the whole length of the car. From this space the air passes up through the floor into the heater boxes, the apertures in the floor being 12 ins. long by 2 ins. wide, and being located between all seats on both sides of the car. In the heater boxes the air is warmed, and from these boxes under each seat the air passes out into the car, and finally to the outside through the ventilators in the deck of the car."

The boxing of the heating pipes, as here described, is attended with material disadvantages. First, needed space, when two persons are in on seat, is taken up; second, offensive and unremovable accumulations of dirt occur within the box. While this boxing presents advantages it does not seem essential and I would do away with it.

The Dudley, or Pennsylvania method, furnishes sufficient air from the outside and warms it immediately that it enters the car. My modification would be the abolition of the boxing over the pipes, and removal of the foul air from near the floor through ducts placed within the closets and the washrooms at both ends. These ducts would be made of galvanized iron, as wide as the closet, say 36 ins., and have a depth of 8 ins. and lead upward through the roof, terminating in a hood, the ends of which are covered with stout wire netting, and within which is a light and easily swinging, deflecting leaf or plate which readily responds to wind action. This leaf will tilt in accord with the direction of the movement of the car, and thus the air forced through the hood when the car is in motion will act the same as a steam injector and aid greatly in lifting the air column. The lower end of the ventilating shaft would be raised about 8 ins. from the floor to permit the entrance of the foul air at the floor level. In order to give the duct constant draft, a branch of the heating pipes should be placed therein. This would heat the interior, cause the air column to rise, and thus create an upward draft. In addition to this, and for reserve, a Pintsch gas jet could be supplied to the interior of each duct, and this, when lighted, would serve to heat the air column and cause it to rise. Four such ventilating ducts, two at each end of the car, would have a combined cross section area of 8 sq. ft., and if the air moved upward through them at the rate of 2 cu. ft per square foot per second—a slow rate—they will remove each minute 960 cu. ft., thus effecting a complete change of air throughout the whole car, about every six minutes, supplying each passenger—60 to the car—with about 15 cu. ft. per minute. Either standing still or moving a car equipped as described would be well ventilated.

*From a paper read before the International Association of Railway Surgeons. Reprinted by "The Railway Surgeon."

Cleanliness.

Window frames and sills should be rounding, the car sides perfectly smooth, the seat frames should be perfectly plain, the seat arms never upholstered, but on the contrary made of hard polished wood or enameled iron, and round, simple and plain. The seat supports next the aisle should be simple, round, enameled iron posts. Curved, fluted and elaborate supports should not be thought of, and it would be well to do away with foot-rests, for they are not really necessary, favor dirt accumulation, and are a hindrance to cleaning. The floors should be hardwood, well filled, and kept so.

Apparently, plush must be continued and frequent renovation be depended upon to keep it as sanitary as possible. In order to accomplish this, seat frames should be skeleton and so constructed as to admit of the easy removal of the plush upholstered bottoms and backs. At present, I know of no car seat from which the backs can be readily removed. Slats or blinds should never be used at the windows. Only smooth, impervious material on automatic rollers should be tolerated. The plain, uncarved interior need not be without ornament, for painted panels, stenciling and frescoing would take their place to relieve the eye.

The strip of carpet or matting now frequently seen in car aisles should never exist. It would be allowable to have a rubber strip, which is impervious and susceptible of thorough cleaning. Hardwood, polished floors with rugs, as we have in our modern homes, would not be practicable because it would be impossible to walk about the moving car owing to slipping. To obviate this, rubber tile flooring could be laid. This would be ornamental, free from slippery smoothness, impervious and in every way practicable and excellent. On it rugs could be spread, and the easy removal of the rugs for cleaning would greatly improve sanitation.

The only way to secure fit drinking water is to sterilize, distil or filter it. It could be dispensed from water tanks, as at present, and the drinking cup should be glass; tin or metal cups should be carefully avoided. The Pennsylvania road uses glass tumblers with rounded bottoms; these are, however, always fluted. I would recommend they be perfectly smooth. Of course, careful persons carry their own drinking cups. It would be practicable for railroads to furnish small paper cups in a penny slot machine, attached to the side of water reservoirs.

The present passenger coach water-closet is a nuisance, pure and simple. Before the car has gone fifty miles it is offensive. The closet must exist, but how may its nuisance character be abolished? Of course, no matter what its construction, the closet, unless properly cared for, will be offsensive, yet much remains to be done on account of better sanitary construction. It is imperative that floor and side walls of closets shall be of impervious material, and side walls perfectly plain and smooth. The porcelain hopper should be bell-shaped with the larger diameter at the bottom and the smaller diameter at the top. Such shaped hoppers would not likely become soiled and foul. Instead of receiving excreta upon the trucks, which is frequent in present construction, it should be received in removable drawers or boxes of iron, containing dry earth; and an arrangement provided whereby dry earth could be easily supplied in right quantity whenever the closet was used. If all arrangements are proper there would be no attending offense. At terminals the drawers could be removed, emptied, cleaned, and returned to place.

Cleaning and Disinfecting.

Being sanitarily constructed as described, a coach on arrival at a cleaning station should have the bottoms and backs of seats taken out and immediately placed in a steam sterilizer of sufficient capacity where they would be thoroughly sterilized and afterward dusted by means of the air blast. Or, ordinarily, they might be dusted first and then sterilized. If the seats and backs were kept in duplicate, clean sterilized seats could always be at hand. As soon as this first cleaning step has been taken, the floor of the car should be lightly sprinkled with water containing a very small amount of some efficient disinfectant (formaldehyde preferred) and then swept. Scrubbing with soap and water should then follow, the arms of the seats and all surfaces which need it should be washed and wiped and all dust taken up with damp cloths.

For car disinfection Mr. W. Garstang, Superintendent of Motive Power of the "Big Four," has invented a giant spray. This is a strong copper can with a capacity of one gallon, provided with an atomizing tube of proper size. It is attached to the air hose, and after filling with formaldehyde the workman enters the car and proceeds to the opposite end, dragging the hose after him. He now quickly backs out, spraying the chemical onto the floor, side walls, window sills, into corners, and onto bottoms and backs of seats. The air pressure is so strong and the atomizing tube so well adjusted, that the formaldehyde is driven forth more as a nebula than a spray. By means of this nebulizing the formaldehyde gas is set free and penetrates every part of the car, effecting complete disinfection. A car thus treated does not manifest animal odors upon standing closed in the hot sun.

Sleeping Cars.

In sleepers, the men's wash and smoking room, with its carpet, its plush upholstered seats and hangings, is a veritable filth hole at the end of a trip. Let the impervious rubber tile floor of the wash room be without even a rug. Let also the rubber tile floor cover the entire car, and, if desired, use rugs between seats. The heavy curtain which hangs at the wash room entrance is all too frequently pushed aside by polluted hands. Who can doubt what result would be obtained if a bacteriological examination of such a curtain was made? A plain hardwood, highly polished door should take the place of these curtains.

The compartment sleeper solves the problem of the abolition of the berth curtain, which, as a filth collector, has few equals and no superiors. Traveling in Colorado, I once saw a consumptive wipe out his mouth with the berth curtain, after a severe attack of coughing, followed with expectoration. What magnificent collectors and distributors of pneumonia, diphtheria and like infections car curtains must be! Repeated inquiries have failed to elicit information concerning the steaming of the blankets used on sleepers. I contend these blankets should be white, and then the story of cleanliness would be quite satisfactorily told. I have learned that these blankets are frequently aired. This is well, but it is not sufficient, especially as they are aired in railroad yards where conditions are surely not good. Anything less than steam sterilization after every using cannot be acceptable. It goes without saying that the mattresses should be frequently submitted to steam sterilization.

Dining Cars.

Many surprises are in store for those who have not made sanitary inspection of dining cars. In diners carpets should never be found. The rubber tile floor should be used and extreme plainness of interior exist. The food boxes, when of wood and unlined with impervious material, are an abomination; they cannot be kept sweet. Zinc lining is not acceptable for the zinc wears away, and between it and the wood accumulations which occur, bring forth odors to taint the food and possibly to furnish unwholesome products of decomposition. Wooden slat shelves in dining car food boxes are extremely unsanitary. I have taken such wooden shelves out which exhaled sickening odors and which could not be rendered free from smell after soaking in strong formaldehyde. Cleaning and scalding seemed not to lessen the bad odor of these wooden shelves. The discoveries of Vaughn in regard to the formation of poisons in foods warn us not to trifle with wood or other absorbent material in refrigerators. The dining car food box should be made of steel boiler plate and porcelain lined; the slatted shelves should be of metal porcelain covered. Such a food box could be easily cleaned with a jet of steam or by scalding with boiling water. I would emphasize this matter concerning food boxes, for my experience in inspecting them has been disgusting.

The United States Hotel, Saratoga, N. Y., will open June 15 for the benefit of those attending the Master Mechanics' and Master Car Builders' conventions. Those who selected this hotel last year will do so again and probably also a large number in addition, especially those who appreciate the dignified, quiet comfort which Messrs. Gage and Perry so well provide. Everything will be done for the comfort and convenience of their guests and entire relief from the crowd and the exasperating delays at the table with other uncomfortable convention experiences may be had by going to this hotel.