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The Editor is always glad to receive for examination illustrated articles on subjects of timely interest. If the photographs are *sharp*, the articles *short*, and the facts *authentic*, the contributions will receive special attention. Accepted articles will be paid for at regular space rates.

A CALL FOR STRONGER PASSENGER CARS.

The Pullman Company recently made the very significant statement that, during the year ending September 1, 1903, not a single passenger was killed or injured on a Pullman car in the State of New York. They also announced that although in the past three years the company had carried in all parts of the United States a total of 32,639,341 passengers, only six persons were killed (in two disastrous wrecks) and only four persons were seriously injured.

Compare these figures with the official statistics of railroad accidents in any given year, say for the year 1902, when 345 passengers were killed and 6,683 were injured. Of the thirty-two and a half million passengers that were carried in the three years in Pullman cars, only one in every three and a quarter million was killed or injured; but of the 640,000,000 passengers carried during the year 1902 in ordinary cars, over 7,000 passengers, or about one in every 92,000, were killed or injured. In other words, of two passengers who board a train together, he who enters a Pullman car has thirty-six chances of reaching the end of his journey in safety against one chance of his fellow passenger who enters an ordinary day coach.

Those of us who read between the lines in the accounts of railroad disasters, that appear with such shocking frequency in the columns of the morning papers, will not be at all surprised at these figures. The story of the smash-up, if it be a collision, may vary in details; but the general features will have a marked similarity. Thus the mail clerks will be killed outright, and the occupants of the smoker and first day coach, which in all probability will telescope into each other, will divide up the list of casualties pretty evenly between killed and injured; unless, indeed, a broken steam pipe is accountable for the parboiling of the whole mass of unfortunates; while incidentally the account will mention that the Pullman cars, after expending their momentum in crushing up the lighter first-class coaches, smokers, baggage cars, etc., came to rest, without any serious injury, and more often than not without even leaving the rails. Should they leave the rails and roll down an embankment, the passengers are pretty sure to escape with the conventional "bad shaking up."

Now, what do these results teach us? Just this—that if we cannot make railway travel safe by installing the very best signal systems, and by the careful selection of enginemen and train hands, switchmen, and operators; if we must forever go on having railway smashes, we can at least save the limb and the life of the passenger by building cars on the lines of the Pullman and rendering them practically accident-proof.

The strength of the Pullman car lies in its very massive underframe, the heavy steel angles and plating that are worked into the vestibule ends, and the massive vertical vestibule frames, which prevent the platforms from riding one upon another and shearing their way through the structure of the adjoining car. There is no question that it would be possible greatly to increase the safety of ordinary passenger travel, by constructing all railroad cars on the vestibule principle and building into the platforms that steel framing, which is largely answerable for the immunity from destruction in bad railroad wrecks of the present Pullman car. The railroad companies will naturally raise the objection that to give to all cars the strength of Pullman construction would so greatly increase the weight of trains, that the engines would be unable to cope with the service. But it is a fact that the strength and indestructibility of the Pullman car could be imparted to the ordinary first-class coach without any serious increase in the weight of the latter. The Pullman car is loaded down with a lot of unnecessary weight both in its structure and in its embellishments, which could be got rid of in the proposed type of car. A considerable saving of weight might be made by building the underframe, the sides below the sills, the platforms, and the vestibules, entirely of steel. This, indeed, has been done by the Illinois Central Railroad, to which too great credit cannot be given for the advance that has been made in its new steel passenger cars.

The steel passenger car is not by any means a novelty. In fact, between thirty and forty years ago, one of this type was constructed in this country and formed the subject of illustration in the columns of the Scientific American, while in Europe not only are the underframes of all cars built of steel, but there is a large number of freight cars of various types of metal construction that have proved their durable qualities by nearly half a century of service. In a railway collision it is always the weakest element that gives way. When telescoping occurs, it is the oldest car that is sliced in half by the platform of the adjoining car. With trains built entirely of steel cars, or cars with steel underframes, the injuries of a collision would be confined very largely to bruises and some broken limbs, due to the passengers being hurled violently forward under their own momentum. But the horrible dismemberment, the wholesale crushing out of life, now due to the telescoping of cars, would be of very rare occurrence. Indeed, with steel cars it is questionable whether telescoping would extend, even in the most severe collisions, much beyond the first eight or ten feet in the car.

In view of the shameful slaughter that has lately been going on upon our railroads in a series of accidents that is nothing short of a national disgrace, it becomes the duty of legislation to stipulate that for all new passenger cars, a certain minimum standard strength and excellence of construction shall be specified. By the mandate of the government we have the automatic coupler and the train brake; the time has now come for the government to demand for every passenger on the railroad the same immunity from maiming and death as is shown by the Pullman Company, in their statement of only ten persons killed or wounded out of thirty-two and a half million passengers.

CAN THE THEATER FIRE BE PREVENTED?

The panic and horror of collision at sea, with the terrible roar of the engulfing water, is only exceeded by that most pitiful of calamities—the theater fire. The very idea of the house of mirth being turned into a holocaust must appeal most strongly to even the hardest heart. The painful accident at the Iroquois Theater, Chicago, on the afternoon of December 30, when over 600 people were killed and some hundreds injured, is so very recent in the minds of all that it is unnecessary to dwell on the harrowing incidents of that awful scene. Suffice it to say that the fire is the third worst on record, the Ring Theater in Vienna, where 875 lives were lost, being the worst. The Brooklyn Theater fire in 1876, when 297 persons lost their lives, was brought home closer to us than any other.

The question of theater fires has received exhaustive treatment abroad. Out of 516 theater fires of which we have record, 460 were burned in the hundred years 1777 to 1877. These figures would now be considerably increased. The average life of an American theater at this period was only eleven to thirteen years, but fireproof construction has certainly doubled the life of the structures. Strange to say, the danger is only doubled during the performances, owing to the great watchfulness displayed while the audience is in its seats. Mr. W. Paul Gerhard, C. E., writing in the Scientific American Supplement, says:

"The lives of people in theaters, whether spectators, actors, musicians, chorus singers, ballet girls or stage hands, are, therefore, endangered:

"1. By smoke, fire gases, heat, asphyxia, exhaustion.

"2. By fire burns.

"3. By jams, knocking over, falling down stairs, trampling, crush.

"4. By direct shock or fright.

"5. By accidents, such as the falling of the central chandelier.

"The long list of theaters destroyed by fires breaking out during a performance, and the numerous instances of fires breaking out during these hours, but which are put out before spreading, are proof sufficient that the dangers spoken of are constantly threatening the theater-going public."

The third cause is quite as likely to result in death as the second, and seems wholly unnecessary if proper means are provided for a quick and orderly exit. Mr. Gerhard further says:

"If only plenty of exits are provided, so that, under all circumstances, the whole audience, even when frightened and suddenly thrown into a state of high mental excitement, can leave the building inside of two or three minutes, the fire-resisting qualities of the building are of less consequence, as regards the safety of the persons in the theater. In fact, a theater inferior in point of construction, but having exits as above described, would be safer than one built thoroughly fireproof, but otherwise not well arranged and not provided with sufficient stairs and exits, and where, therefore, in case of a false or real alarm of fire, or a panic from any cause, the people would be necessarily in grave peril."

In nearly all cities the regulation of the building of theaters is under the building department, but the fire department should have a voice as well. After construction, the theater is under the jurisdiction of the fire and police departments, who jointly look out for the safety of the public, the police at the front of the house and the firemen behind the curtain. We might give endless rules for the construction of safe playhouses, but our hand is stayed when we consider that apparently every safeguard known to modern science had been lavished on this theater, which had been opened less than five weeks. It is credibly stated that large sums had been spent to render the house immune from the very enemy which destroyed it. Still, the fact remains that one of the worst tragedies of modern times, involving a greater loss than the Spanish-American war, occurred in a "fireproof" building in broad daylight. Whatever may be the verdict which fixes responsibility, one thing is certain—the fire curtain must be so stiffened that no draught can belly it out so that it can bind or leave its groove. It must be arranged so that it can be tripped from the stage or the auditorium by purely mechanical means, very strongly and reliably constructed. The mechanism should be designed so that in case of any breakdown the curtain at once falls to the danger position. Possibly a steel girder spanning the proscenium and working vertically in well-oiled metal channels would be sufficient to carry a reinforced curtain, whose edges are anchored to the channels at regular intervals by steel guides. The fireproof wall should be extended up to meet the girder at the stage. Possibly two curtains would minimize the danger. Wood should be excluded absolutely from the stage, except where required by the scenery, and then it should be fireproofed. It is imperative that fireproof paint be used, and that all gauzes and scenes (drop and borders) be impregnated with chemicals. Asbestos can be freely used in properties, and wire rope should be substituted for ordinary ropes wherever possible. Accumulations of scenery should be avoided, and dressing rooms and all workshops and paint shops should be located in adjacent buildings connected by one fire door. The most modern fire appliances, such as sprinklers, should be provided; and lastly the inspection should be eternal. Even then, would there be any guarantee of immunity from loss of life by panic or fire? No; there is not; but we could at least feel that every human resource had been exhausted.

A NEW STUDY OF BIRD LIFE.

The myriads of migratory birds on their way south at this season of the year will be the subject of special scientific study on the part of the various ornithological societies and the experts of the Department of Agriculture. To the average person only indifferently interested in bird life there may seem little in the migration of the summer birds to furnish data for scientific deductions; but the modern student of our native birds sees in these annual flights material for reflection and observation of the greatest importance. The constant relationship existing between our agricultural crops and the migratory birds is a fact that has only in recent years been fully comprehended, and each season new data for study are collected by the expert observers. The problem of weed destruction is, for instance, intimately wrapped up in the migratory habits of the millions of our summer birds. Many of our most noxious garden and field weeds produce in a single season as many as one hundred thousand seeds, and in three seasons a single one of these plants would give birth to ten billion weeds.

There is only one effective agency that keeps in check these prolific weeds. When the seeds of the weeds ripen in the late summer and fall the millions of migratory birds begin their journey southward, devouring the weed seeds at the most critical stage of their lives. A few of the birds eat a number of seeds throughout the whole summer, but the vast majority eat them in the early autumn and early spring, a few staying North with us to pick up the seeds which fall on the ground when covered with snow. They gorge themselves with the weed seeds until their stomachs are distended to three times their normal size. All of our common song and plumage birds are great seed destroyers, and the blackbirds, meadow larks, sparrows, goldfinches, doves, quails, siskins, grosbeaks, and grass birds will eat all the way from one hundred to one thousand seeds of weeds at a single meal. They begin their annual campaign against the weed seeds in the far North as early as late August, and they move southward as the season advances and the seeds ripen in the lower part of the New England and Middle