April 1, 1862.

JOHN HAWKSHAW, President,
in the Chair.

No. 1,067.—“ Railway Accidents—showing the bearing which existing legislation has upon them.”¹ By Captain DOUGLAS GALTON, R.E., F.R.S., Assoc. Inst. C.E.

THE subject of Railway accidents was laid before the Institution in the year 1852, in a Paper by Captain Huish,² (Assoc. Inst. C.E.). Railway communication and railway management have, however, been largely developed since that period; and a recent decision in a court of law has induced greater attention to the question of compensation paid for accidents. The time would, therefore, appear to have arrived, when it is desirable, that the subject should be again brought forward for discussion.

The length of railway communication open in the British Isles, at the end of 1860, was 10,433 miles, upon which 163,435,678 passengers were conveyed during the year. Of these 1 in 5,447,855 were killed, and 1 in 362,079 were injured, from causes beyond their own control. It would moreover appear, from the public returns, that during the seven years ending 31st December 1860, there were 116 passengers killed, and 2,832 passengers injured, from causes beyond their own control, making a total of 2,948 sufferers during the seven years.

The Author has obtained returns from a limited number of Railway Companies, showing the amounts paid as compensation during the last three, or four years, and applying the figures to obtain an average, in comparison to the number of passengers conveyed on the several railways, it may be assumed, that an average sum of from £100,000 to £120,000, has been paid annually by Railway Companies, as compensation for railway accidents. If this sum be divided between the number of passengers, and if the average number of miles travelled by each passenger be brought into the calculation, it may then be assumed that an insurance of one-twenty-fourth part of a farthing per passenger per mile would, on the average of all the lines, cover the cost of railway accidents. One Company, however, with a capital of about

¹ The discussion on this, in conjunction with the preceding Paper on the same subject, by Mr. Brunlees, was continued over portions of four evenings, but an abstract of the whole is given consecutively.

² *Vide Minutes of Proceedings, Inst. C.E., vol. xi., p. 434.*

£14,000,000, appears to have paid, on an average of four years, one-fourteenth of a farthing per passenger per mile; but on an average of fourteen years, the payments for compensation by that Company did not exceed one-twenty-fifth of a farthing per passenger per mile. Another Company appears to have paid, on an average of four years, as much as one-ninth of a farthing per passenger per mile.

In some special cases, the amounts paid by a Railway Company have been very large. For instance, in the case of the collision at Atherstone, on the London and North-Western Railway, in November 1860, the Company paid £17,964 as compensation for personal injuries and for cattle killed. The accident which occurred at Nuneaton, in May 1858, from a train having been thrown off the line, by a cow which had strayed on to it, cost the Company for compensation £5,375 and for law expenses £4,095, making a total of £9,470. For the collision at Hitchin, between a Great Northern and a Midland train, the Companies paid £13,440, and for the accident at King's Cross, in May 1860, from a train running at too great a speed into the station, and coming into contact with the buffer stop, owing to the guard having omitted to apply his break, the Company paid £10,122. On the South-Eastern Railway, the Company paid in compensation £7,489 for the accident which occurred at Chilham, in June 1858, from a train leaving the rails on account of the fracture of a crank axle; and for the collision which occurred at Lewisham, in 1857, the same Company actually had to pay the enormous sum of £27,067, in addition to the cost of injury to the rolling stock.

Besides the money paid as compensation to the passengers, almost every accident involves the injury to and often the death of railway servants; and the men injured have to be supported by the Company during illness, or their families have to be compensated, if they are killed. Large sums have also to be paid for injuries done by accidents to merchandise and cattle, and for the destruction of rolling stock. Railway accidents cause, therefore, a serious loss to the community at large.

Conveyance by railways would, however, appear to be safer than by any other mode. It has been found impossible to obtain reliable information as to the number of coach accidents in this country. But the returns of the 'Messageries Impériales' show, that in a series of years the number of passengers killed and injured, from causes beyond their own control, was 1 in 28,000; whilst from the latest comparative returns of railway accidents, the number of passengers killed and injured from causes beyond their own control, would appear to have been on British railways 1 in 334,000; on Belgian railways 1 in 1,600,000; on Prussian

railways 1 in 3,000,000; on French railways 1 in 4,000,000. The greater comparative safety of foreign over British railways can be clearly traced to differences in the conditions of the traffic and management, and in the habits of the people, which lead them to allow the convenience of the Railway Companies to be consulted in the running of the trains, before that of the travelling public; but it would extend the limits of this Paper too far to enter upon these considerations.

There is, however, little satisfaction in showing that railways are safer than other modes of conveyance, unless it can be shown, at the same time, that none of the accidents which occur could have been prevented by reasonable precautions. In endeavouring to elucidate this question, the first point which arises is the extent to which the amount of traffic on the several lines influences the accidents. An analysis of the returns on British railways shows, that there are lines whose total length amounts to one-sixth of the railway communication of the country, upon which no accidents occurred during ten years; and that the average number of passengers per annum travelling on those lines was under 3,000 per mile. Whilst upon the other lines, or those upon which accidents have occurred during the same period, the average number of passengers was over 14,000 per mile per annum. These general averages show, that lines of small traffic are comparatively safe. But, although the amount of traffic has a material influence on the safety of the different lines, many other causes enter into the question.

The following Table shows the ratio of traffic to the degree of safety upon certain specified railways on an average of seven years :—

Proportion of the Killed and Injured to the Number Conveyed.	NAME OF RAILWAY.	Average Number Conveyed per Mile.	Per Centage of Goods Traffic to Total Traffic.	Colli- sions.	Other Acci- dents.
1 in 180,365	Lancashire and Yorkshire . .	232,621	60	25	15
1 in 212,067	London and North-Western . .	93,764	53	31	23
1 in 252,158	Caledonian	126,694	62	7	6
1 in 257,051	Midland	94,799	64	23	14
1 in 285,237	Eastern Counties	78,456	47	15	5
1 in 289,979	South-Eastern	244,500	25	10	15
1 in 350,200	North-Eastern	66,660	62	21	16
1 in 433,583	London and South-Western . .	127,942	26	18	16
1 in 533,324	London, Brighton, and South Coast	283,577	19	6	6
1 in 601,679	Edinburgh and Glasgow . . .	84,533	49	2	2
1 in 676,235	Great Western	84,024	38	10	6
1 in 702,470	Bristol and Exeter	73,056	33	4	4
1 in 742,429	Great Southern and Western . .	20,183	33	..	2

From this Table it is clear, that traffic alone does not determine the number of accidents. In order, therefore, to arrive at a clear understanding of the question, it is necessary to analyze the causes of each accident in detail. This is a course which the Author followed for some years, whilst at the Board of Trade, and he has continued the analysis down to the end of 1860, for the purpose of this Paper. During the seven years ending on the 31st December 1860, there were 534 accidents to trains reported upon by the Inspecting Officers, in which 2,912 passengers were killed, or injured, from causes beyond their own control. These accidents may be generally classed as follows :—

	Number of Accidents Reported upon by the In- specting Officers of the Board of Trade.	Sufferers.
Engines, or Carriages leaving the Rails, or frac- tures of Machinery }	135	313
Collisions of all classes }	319	2,532
Other causes }	80	67
Total }	534	2,912

The causes which appear from the reports of the Inspecting Officers, to have contributed to occasion the accidents may be thus classified ;

1. Causes which could not be guarded against.
2. Causes which were within the control of the managing, or working staff, employed in conducting the traffic of the line.

The general results may be thus stated :

Number of Accidents re- ported upon by the Inspecting Officers of the Board of Trade, the Reports on which have been analysed.	Sufferers by Accidents.	Cases in which the Accident could not be guarded against.	Cases in which the Accidents were due to Causes within the control of the Management.		
			Cases attributable to the Works, or Rolling Stock.	Cases attributable to the System of Working.	Negligence of Inferior Servants.
534	2,912	82	388	247	207

In explanation of this Table it is to be observed, that in the case of many accidents there has been more than one contributing cause :—for instance, the negligence of a servant may have contributed towards the accident, but defects in the system of working, or in the condition of the road and trains, may also have contributed to cause the accident. In such a case each contri-

buteing cause appears in the Table. A further analysis shows, that the large majority of those accidents may be classed under two principal heads, and the following instructive Table shows the contributing causes of the accidents which fall under the two heads ;—

	Number of Accidents reported upon.	Number of Sufferers.	Cases in which the Accident could not be guarded against.	Cases in which the Accidents were due to Causes within the con- trol of the Management.		
				Cases at- tributable to the Works, or Rolling Stock.	Cases at- tributable to the System of Working.	Negligence of Inferior Servants.
Accidents from En- gines and Carriages leaving the Rails, or from fractures of Ma- chinery	135	313	59	98	15	17
Collisions of every description }	319	2,532	16	222	219	183

These figures show clearly, that a very large proportion of so-called accidents are due to preventible causes. In the case of accidents from fractures of axles and tyres, and from engines and carriages leaving the rails, it appears that somewhat under one half of the accidents were attributable to causes which could not have been guarded against. But out of a total number of 319 collisions reported upon by the officers of the Board of Trade, only 16 were attributed to purely accidental causes ; and of the 303 remaining cases there were only 183 into which the negligence of the inferior servants entered as a contributing cause. The remaining 120 collisions were entirely attributable to the manner in which the traffic was conducted, and ought therefore not to have occurred.

1. ACCIDENTS WHICH COULD NOT BE GUARDED AGAINST.—Of the 82 casualties classed as accidents which could not be guarded against, the greater number were cases of fractures of axles, tyres, rails, and other portions of the machinery of the trains, or of the road. In cases of fractures of tyres, or axles, where no flaw has been visible before the occurrence of fracture, and when every care has been taken to obtain good material and manufacture, the *prima facie* conclusion would be, that the accident could not have been prevented. The question must, however, arise, whether the form of axle, tyre, rail, or piece of machinery fractured, has been that best adapted to resist the strain to which it was subjected, or whether the material has been overtasked. Much has, no doubt, been accomplished by Railway Engineers in improving machinery ; but much more remains to be done to diminish the number of ac-

cidents, and to mitigate the severity of the results. The best and safest form of tyre for a railway wheel has not yet been definitely settled; the wheels and axles can scarcely be said to be mechanically satisfactory; and the form of break in general use is imperfect. These and many other points, which should have been long ago settled by continued scientific and experimental inquiry, are still undecided. Individual Railway Engineers must possess an enormous number of facts bearing upon every point of railway construction; but the facts collected by one experienced person are often not collated, or published, and are consequently not available for others to refer to. The result is, that time and money are frequently wasted by a Railway Engineer, in repeating experiments upon questions which may have been determined previously. In Germany and in Austria an Association of all the Railway Companies has been formed, for the purpose of collecting statistical and engineering information from the different railways, and for collating and rendering it available for the use of all the contributing Companies. Each Company is represented by one, or more of its officers; and committees of the members are appointed to investigate and experiment on suggested improvements in railway construction. The results are collected and communicated to each of the Companies. The Association circulates periodically a series of principles to be observed in railway construction, and these are adopted on new lines, and are gradually introduced, as opportunities occur, on the old railways.

2. NEGLIGENCE.—Of the 183 cases in which negligence of the servants contributed to cause the accidents, only 35 were attributable to negligence alone. In the other cases, the carelessness alone of the servant would not have occasioned the accident, had not some defect of system, or want of the requisite auxiliaries to safety, existed, which also contributed to cause the mishap. Simple negligence cannot be entirely prevented, as in instances like the following:—On the London and North-Western Railway a train was thrown off the rails, because the platelayers omitted to put in a rail which they had taken out. On the North-Eastern Railway an accident was caused by the platelayers leaving a rail across the line. In more than one case trains have been run at too great a speed into a terminal station, and have come in contact with the fixed buffers, solely because the guards omitted to put on the breaks. Such cases as these will always occur, for so long as human agency is resorted to, men will now and then become flurried, or will err in judgment, or be subject to forgetfulness. As an instance of this may be quoted the accident at Hitchin, in 1859, where the signalman at the junction between the Great Northern and the Midland Railways, first gave a signal to the Midland train to advance, and

when it had got into motion and could not be stopped, he changed it to a danger signal, and signalled forward the Great Northern train; the natural consequence was that a serious collision ensued.

In several of the cases in which negligence has been one of the contributing causes of accidents, the negligence has been attributable to the defective arrangements of the Company. For instance, in the case of an accident caused some years ago by an engine-driver running past a danger signal—the engine-driver and the fireman had been out on the engine for thirty-six consecutive hours. Pointsman and enginemen have, in some cases, been regularly kept on duty for seventeen, or eighteen hours out of the twenty-four; and sometimes the rule has been, that for one day in each week a pointsman shall remain on duty for twenty-four hours at a time. Negligence in cases of overwork is not chargeable as a fault against the individual servant, but against the Company. The following is another instance, in which faulty arrangements were mixed up with negligence:—A collision occurred between a goods train and a passenger train, under the following circumstances; the goods train, which was four hours late, was started from a station, against the regulations, ten minutes before the express train was due, because the express train was generally unpunctual. The goods train was shunted on to the opposite line, contrary to the regulations, to allow the express train to pass, at a station where there was no siding, because the signals were defective at the next station where there was a siding. A collision almost necessarily occurred between the goods train and a passenger train travelling on the main line of rails on to which the goods train had been shunted.

Many of the cases of accidents from trains passing on to a wrong line through facing points, in consequence of the latter having been erroneously set through carelessness, would not have occurred had an indicator been attached to the points, to show, at a distance, in which direction the points were set. Acts of negligence must be punished, and the law affords Railway Companies the means of punishing, by a "fine to the extent of £10, and imprisonment to the extent of two months, on summary conviction, before a magistrate, any servant who shall wilfully, maliciously, or negligently do, or omit to do, any act whereby the life, or limb, of any person passing along, or being upon the railway, or the works thereof, shall be, or might be injured, or endangered; and whereby the passage of any engine, carriage, or train shall be, or might be obstructed, or impeded." There are about 190,000 railway employés; and of these there are nearly 20,000, the careless act of any of whom might create a frightful accident. But these men are directly responsible for their acts, and are easily amenable to punishment. The comparatively small number of accidents which are traceable to negligence of the

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inferior servants alone, is a strong evidence of the efficacy of this direct responsibility. Dismissal is a punishment frequently resorted to ; and would be probably the severest punishment to which railway servants could be subjected, if employment on a railway possessed preponderating advantages over other employments, and if a railway servant dismissed from one line were not eligible for employment on another line. In order to attract good servants, and to retain them, the French Railway Companies have almost invariably organised for their lines a "caisse de secours," out of which payments are made in cases of accident, and from which some provision is made for the servants in their old age.

Inasmuch, however, as the human instruments, with which Railway Companies must work, are liable to failure, however excellent be the system of working, and however great be the care taken in selecting and managing them, it seems no doubt a hardship on Railway Companies, that a simple error of a good servant, when the man was not overworked, and when the arrangements and working were well regulated, should be visited on the Company in the way of compensation more severely than the fracture of an axle, or a tyre, or the failure of an inanimate piece of machinery. It is, however, practically impossible to entertain such questions. The Company must be held responsible for the acts of its agents ; but it may be worthy of consideration, whether the same responsibility should not invariably attach to the failure of machinery, as to accidents which have been classed as preventible.

3. CAUSES OF ACCIDENTS WITHIN THE CONTROL OF THE MANAGEMENT.—Out of the 534 accidents, the causes of which have been analysed, there were 388 cases in which the accident was wholly, or partially attributed to defects in the condition of the railway, or of the vehicles, or to the absence of the requisite auxiliaries to safety, such as signals, breaks, &c. ; and there were 247 cases in which a defective arrangement for working the traffic, or a laxity of system, contributed to cause the accident.

It would extend the limits of this Paper too much to quote the numerous cases which are described in the Reports of the Inspecting Officers, and it is beyond its scope to enter into the merits of special forms of road, of breaks, or of signals, or other mechanical contrivances. The Author will confine himself, therefore, to alluding, cursorily, to a few instances, which generally illustrate the argument. In one case, when a train ran off the line, in consequence of the defective condition of the road—the sleepers were decayed, the chairs were loose, the ballast had nearly all disappeared, and the drains were closed up ; yet trains were habitually travelling over the line at a speed of fully 40 miles per hour, until the attention of the Company was called to the state it was in, by the

occurrence of this accident. In many cases, when accidents have occurred in consequence of the absence of signals at a station, or at a siding, the deficiency has arisen from a change in the condition of the traffic. At the opening of the line, the signals placed at the stations were sufficient for the then wants of the traffic. But new sidings were added, and a largely increased traffic was developed. No thorough re-consideration of the arrangements necessary for safety took place until the accident occurred. In one case of an accident due to the failure of a self-acting signal, it appeared that the failure was occasioned by the signal not having been properly looked after for some time previously. In numerous instances it has appeared, that engine drivers have been habitually permitted to disregard caution, or danger signals, until an accident has occurred, and then the rules which they have been allowed for some time previously to neglect, have been quoted against them. Goods and cattle trains have been habitually permitted to be started a few minutes in advance of passenger trains, until an accident has occurred, when the rules, whose violation had been previously overlooked, have been brought forward as a justification of the Company. Heavy excursion trains have been 'timed' to start at short intervals apart, and have been directed to proceed rapidly; whilst the amount of break-power provided has been so small, as to be quite insufficient to stop the train within any reasonable distance. Trains have been 'timed' to run at a high speed over lines unfit for even a low speed, and the carriages have left the rails. In some cases the original construction of the line, as sanctioned by Parliament, has been in fault. The crossing of one railway by another, on a level, and junctions between railways, have been placed in positions in which they should not have been allowed.

In considering these questions, however, weight must be given to the fact, that the railway system has been, and is still, a vast experiment. At its commencement the road, the rolling stock, and the mode of working were all new; and the system is even now in process of development. What was considered perfect yesterday is looked upon as antiquated and unsafe to-day; and the improvements introduced at great expense to-day will probably in their turn be superseded to-morrow. When the railway of 1840 is compared with that of 1860, it is found that the whole machine has been renewed. But with every allowance for the 'newness' of the enterprise, it will be found, that the Reports of the Inspecting Officers are full of instances, in which properly exercised care and foresight would have prevented the accident. Good rules are easily made. It is not for the want of them that accidents have occurred, but for the want of a continued enforcement of those rules, and of a close examination into the details of the manner in which the traffic is

worked. Without constant watching, unsafe methods of conducting the traffic infallibly creep in, from thoughtlessness, or ignorance amongst the servants, in whose hands those details are left, and whose habits do not lead to those methodical arrangements which are essential to safety in working.

In France and in Germany, the people have a habit of methodical administration which the British do not possess; and it is probable, that one of the causes of the French and German railways being more free from accidents will be found in the rigidly methodical manner in which every detail of working is treated.

The system upon which railways are managed in this country is in some respects to blame for the 'shortcomings' to which preventable accidents are attributable. A railway is several hundreds of miles in length. It has cost several millions sterling, and it employs servants who may be reckoned by thousands. Its profits depend, as in any other business, on attracting custom by civility, thoughtfulness, and reasonable charges, and on carefully practised economy in working. This vast property is often managed by Directors who meet only occasionally; who give up only a portion of their time and thoughts to the concern; and who frequently absorb the time and fetter the responsibility of the managers appointed under them. On one railway, which extends over nearly 1,000 miles, there are thirty-two Directors, not one of whom is at present paid sufficient to entitle the Company to demand his whole time and thoughts. A private concern could not go on under such arrangements. Besides, those who are specially charged with the duty of looking after the safety of the traffic do not occupy, as a rule, such a position, or status, in the Company as the importance of their charge calls for; nor is there, generally, that gradation of responsibility which alone enables the Directors to hold their officers responsible for results.

Parliament has, upon more than one occasion, discussed the subject of railway accidents. Mr. Cardwell's Committee in 1853 examined very closely into the question. That Committee arrived at the conclusion, that any interference with the details of management was undesirable; but recommended that there should be placed upon those in whom the management of railways was vested a greater degree of responsibility than the law at present admitted, and proposed that each Railway Company should have an Engineer, a Locomotive Superintendent, and a Traffic Manager, who should each be responsible for the proper working of his department. A Bill to give effect to this proposal was introduced into Parliament; but obvious difficulties in the way of dealing with the question in this manner, caused it to be given up.

In 1857, Mr. Bentinck obtained a Committee on Railway Accidents. The Committee recommended, that a law should be passed

to compel all railways to be worked by the Electric Telegraph, and that punctuality should be enforced, by enabling passengers to obtain prompt and cheap redress, in the recovery of penalties in every case of want of punctuality in the departure and arrival of trains at every station. Parliament has not acted upon this Report. The enforcement of punctuality on Railway Companies would be a great benefit to the public, as well as to the Railway Companies themselves. But there would be practical difficulties in the way of equitably reducing the recommendations of Mr. Bentinck's Committee into a law; for circumstances occasionally arise, over which a Railway Company cannot have any control, but which prevent a train from being punctual; and in such cases it would be unjust to the Company to give the public more claims to compensation than they now possess. The other recommendation of Mr. Bentinck's Committee—that Railway Companies should be compelled to work their lines by means of the Electric Telegraph—would be an interference with the details of working, and would, therefore, introduce a new feature into Railway Law. At the present time, Railway Companies are free to construct and to work their lines in any manner they choose, provided only that the construction is such, at the opening, as in the opinion of an Inspecting Officer of the Board of Trade, will enable the then anticipated traffic to be worked without danger to the public. When the line has been opened for traffic, Government only possesses a power of making regulations at the junctions of the lines of two Companies, and in cases where the lines interfere with landowners' interests, as, for instance, at level crossings. But the control over the manner of working the line is left by Parliament entirely in the hands of the Railway Company. The Company in undertaking the duty of carriers becomes liable under the common law, and under Lord Campbell's Act, to compensate persons injured, or the relatives of persons killed, by the negligence either of themselves or their servants.

If an accident occurs attended with fatal consequences, a Coroner's jury inquires into it in England and Ireland; and if any accident occurs in Scotland, the Procurator-Fiscal inquires into it, and the Director, or officers of the Company would be held responsible, and be liable to criminal prosecution and punishment, in the event of culpable mismanagement being proved. If Parliament were to enact a particular mode of working, and if an accident were to occur under that mode of working, the responsibility of the manager would to that extent be diminished; and Parliament would probably be called upon to enact some farther detail of working to meet the newly-discovered danger. Several different systems of telegraphic working are in use, and Parliament is not a proper tribunal to decide which of these systems should be adopted.

Besides, a railway is so complicated an instrument, that whatever be the mode of working adopted, it would require modification under special circumstances. To meet objections of this nature against legislation by Parliament upon such details, it has been frequently urged, that a department of the Government should have power to regulate the mode of working to be adopted by Railway Companies.

The majority of accidents are due to combined causes ; and, as much to a lax enforcement of good regulations, or to a neglect in using appliances for safety which are in existence, as to the absence of regulations, or appliances for safety. When accidents occur from an absence of regulations, or a want of the necessary appliances for safety, it frequently appears that such absence is due to the circumstances of the traffic having been altered, and to elements of danger having been gradually developed, without anything having occurred to bring the altered circumstances to the notice of the manager. Government interference would not necessarily meet this case. It is, moreover, the tendency of Government Inspection to seek to multiply accessories to safety ; these accessories are more, or less valuable, according to the condition of the traffic on a line, and the manner in which it is worked. So long, therefore, as those who control the traffic are free to accept, or to reject the Government recommendations, it is very desirable that they should be made. But the more such appliances are multiplied, the greater are the chances of danger from their neglect, or their failure to act ; and the chances of danger are diminished, or increased, according to the class and character of the men who use them. The selection of the men must always rest with the manager ; and he should, therefore, remain responsible for the selection of the appliances for safety which he places in their hands.

It has been urged by Mr. George Robert Stephenson, (M. Inst. C.E.) that the Government should limit the speed of trains.¹ Had a rate of speed been prescribed by Government in the days of George Stephenson, probably the present rate would not exceed 20 miles per hour. The road and the machinery now in use render a speed of 40 miles per hour safer than the roads and machinery of those early days were with a rate of travelling of 15 miles per hour. But it would be as unwise to fetter speed now, as it was then ; for mechanical appliances are, at present, as much below perfection, as they were in that day below their present degree of improvement. The fact is, that the safety of the traffic does not depend so much upon the system, as upon the individuals

¹ *Vide* "High Speeds." A letter to the Right Hon. T. M. Gibson, M.P. By George Robert Stephenson. 8vo. London, 1861.

who administer that system. It would be better to have a faulty system, administered by good men, than a good system administered by careless men. These considerations lead to the conclusion, that freedom from railway accidents is not to be obtained by Government interference ; but that it is to be guaranteed only by an effective and responsible internal management, which would enforce the greatest care and punctuality in working the traffic, and maintain the strictest discipline amongst the servants employed. Such improvements must originate with the Railway Companies themselves ; and it is worthy of consideration whether some arrangement could not be advantageously made, for promoting safety and good management, analogous, in its nature, to the Association for the Prevention of Boiler Explosions, which has worked so successfully amongst manufacturers in the neighbourhood of Manchester.

That Association was formed a few years ago, chiefly by the exertions of Mr. William Fairbairn, F.R.S. (M. Inst. C.E.), in consequence of the numerous boiler explosions which occurred when steam engines began to be worked expansively. The Association is entirely voluntary. It provides for the periodical inspection of the boilers of those persons who join it. The Reports show, that it has fully answered the expectations of its promoters, by preventing accidents in numerous instances, and it has rendered unnecessary any attempt at Government interference. The Association has moreover collated for reference much valuable information on the subject of boiler explosions.

It has been shown, that by the existing law Railway Companies are responsible for the safe working of their lines ; and that if, in case of accident, culpable mismanagement can be fixed upon any of the superior officers, they would be liable to criminal prosecution. In practice, however, the complicated nature of railway management renders it, as a rule, impossible to fix such an amount of blame on any one of the superior officers as would justly render him liable to criminal punishment. Compensation, however, has to be paid by Railway Companies for accidents, the amount of which is sometimes enormous ; but its operation as a penalty is uncertain and frequently unjust. It is, of course, impossible to say what number of accidents it may have been instrumental in preventing ; but so long as the number of preventible accidents continues so large as it has been shown to be, compensation cannot be considered to have attained that complete success, as a means of prevention, which would be desirable. The law is, that if any person be injured, or killed, by the negligent act of the Railway Companies, or their servants, the person, if injured, or his representatives, if killed, are entitled to be compensated. The payment consequently depends upon the quality of the person who happened to be travelling in the train, or if killed,

upon the description and number of his relatives, and upon the pecuniary loss they have sustained from his death : and it does not follow the degree of faultiness in the Company's arrangements. Thus, in the case of a collision on one of the Northern lines, in which the Report of the Inspecting Officer seriously inculpated the management of the Company, the amount of compensation paid was under £60 ; whilst on the Great Northern Railway the fracture of a tyre made of the best iron, procured from one of the most eminent manufacturers in the country, and which, till fractured, presented no outward sign of defect, cost the Company £1,260 for compensation, besides the injury to the rolling stock. In the case of a fracture of a crank-axle, procured from one of the best makers, which had only been run for a short period, and which had been carefully examined a short time previously, the Company had to pay £2,250 as compensation for injuries.

Considerable hardship is also frequently entailed upon Railway Companies when the accident has been occasioned by a simple act of negligence of one of the inferior servants. In one instance, when a collision occurred between a train and the fixed buffers in a terminal station, in consequence of the guard of the train having omitted to put on the break, on descending an incline into the station, the Company had to pay nearly £9,000 for compensation, in addition to £1,300 for law expenses, besides the repair of the rolling stock. In the case of the accident at Hitchin, which has been already alluded to as having been occasioned solely by the mistake of the signalman, the amount of compensation paid was about £11,500, and a sum of £1,650 was paid for law expenses, besides nearly £300 for damage to the rolling stock.

The most serious evil from which Railway Companies suffer, lies in the exaggerated and unfounded claims made upon them. As, for instance, on the North Eastern Railway, when on one occasion a person claimed £500 and accepted £35 ; while on another a person claimed £300, and accepted £20. These are fortunate specimens ; such cases are rarely settled so easily, especially when recourse is had to a jury. In the following cases the Railway Companies have had cause to complain of the decisions of juries. In one fatal case it was proved, upon highly creditable medical testimony, that the deceased was a man of irregular habits, and that he was in such a diseased condition, that his life was not worth a week's purchase ; yet the jury awarded nearly £1,100 damages. In another case a plaintiff obtained nearly £300 damages for an alleged injury to his wife's eye, although it was shown that the defect in her eye had existed long previously. Juries are not infallible. They are liable to the human infirmity of being led by their feelings ; but it cannot be said, that they are a less fit tribunal for assessing damages in the case of railway

accidents, than in other cases in which damages have to be ascertained ; and probably, on the whole, a jury is a more satisfactory tribunal than a permanent judge. Railway Companies have, however, paid many claims, which they have considered fraudulent, to avoid the additional legal expenses, which recourse to a jury is almost certain to entail.

The present state of the law gives great facilities for fraudulent claims. A low class of legal and medical practitioners seek out claimants, and, relying on the sympathy of juries, make most excessive demands. The following quotation from the summing up of Mr. Justice Williams, on the 6th August, 1861, in the case of Clements versus the London and North-Western Railway Company, bears upon this question, and shows how largely legal expenses are increased thereby :—

“It is not to be tolerated, that the occurrence of a railway accident should render the Company a prey to false and exaggerated claims, as the means of putting unnecessary costs into the pockets of the professional advisers of the claimants. It is manifest, if such a state of things were allowed to prevail, not only would fraud and injustice be triumphant, but in the result the ultimate sufferers would be the public, because it is plain that the fares which the public have to pay upon railways must be high enough to allow of a remuneration to the shareholders; and it is quite manifest that among those expenses must be reckoned the damages and the costs recovered in these law-suits; and the fact, therefore, is, that these damages and costs fall upon the public, to a certain extent, by reason of the necessity they superinduce for the Companies keeping up their fares.”

“Gentlemen, the inquiry has lasted a very long time, and a vast expense has been incurred in the trial of it. On the one hand, the plaintiff has called a vast number of witnesses, and it is impossible not to see that it is a very pleasant sort of case for the plaintiff; because, whatever the expenses are, he must be reimbursed his costs in this action. It is manifest the Company must bring a strong body of witnesses. It is manifest the plaintiff, also, is under the necessity of making his case as strong as he can; and as to the Railway Company, it will be unfair to consider as confined to this single case their resistance to what they think an excessive claim.”

The offer of compensation by the Company is frequently taken as an admission of culpability, and it is used as a means of extorting a further amount. The following quotation from Mr. Baron Wilde's summing up in the case of Appleby versus the London and North-Western Railway Company, on 21st August, 1861, puts the evils of this grievance in very forcible language :—

“If a Railway Company, having been the cause of an accident, have behaved liberally, fairly, and properly to the person who has been the subject of the accident, I think that an accident ought not to be turned into a method of pecuniary gain, and that the Company, if they really have dealt fairly and liberally with the question, ought to be protected in what they have done; and it is really of importance that that should be so, because if, notwithstanding the attempts of a Company to settle the matter, notwithstanding their making a liberal and proper payment, plaintiffs will always, acting upon a supposition that the jury when

they come to discuss the case will take the defendant's sum as a *minimum* and will always give the plaintiff something more, it will lead to every one of these cases coming into court. It leads to law in every case. It renders settlement impossible, and leaves no other alternative to the Company except to dispute the matter, from first to last—to dispute the negligence and the whole matter, at a very great waste of money both to themselves and to the person who is injured; and that system, when it comes to be applied to plaintiffs in poor circumstances of life, if you reflect on it, would be a very great injury. It would be a very sad thing if Railway Companies should be discouraged from making a fair and liberal offer and from paying the money to the plaintiff, if he will have it, or from paying it into court; because, as I said before, it will put many a man who can ill afford it to the necessity of an action."

Under existing circumstances persons who have been in an accident, but were unhurt, may attribute to it injuries otherwise received, and persons can, after any lapse of time, say they were in a railway accident, and unless the statement can be disputed, may recover damages; and instances have occurred of claims being made by persons who were not in the accident at all.

In considering these grievances, it is necessary to recal to mind, how the law of compensation has arisen. It seems to have been one of the oldest principles of justice, that an injury done by one man to another should be expiated by the infliction of a similar injury on the offender—thus 'an eye for an eye, &c.' Among savage tribes, including, until within a not very remote period, clans, or tribes among the Highlanders and the Irish, the "rough justice of revenge" (as Bacon calls it) prevailed; and it still does among uncivilized nations. By degrees the severity of the law was mitigated, and the offender was permitted to purge his offence by making compensation to the injured person, or when he had been killed, to his nearest relatives. Thus in the Anglo-Saxon laws of Ina and Alfred, compensation for injuries to men was provided for by minute assessments; the object was most humane, and the relatives of a slain man were entitled to compensation for his being killed. In process of time the remedy of the relatives for that sort of compensation was lost, but it was not taken away by direct legislation. Lord Campbell's Act was the Parliamentary recognition of that principle, and it was consistent with legal principles. It removed a technical difficulty in the way of recovering compensation that ought to be made, rather than gave a new right to the compensation. It is an advantage that in thus giving compensation to the injured party, the money payment operates as a punishment, and thus tends to prevent the commission of future careless acts. Compensation for a railway accident may, therefore, be looked upon, partly as a penalty on a Railway Company for its corporate carelessness, and partly as a compensation to the sufferer for the injury he has received. It would be difficult to substitute criminal punishment instead of the pecuniary com-

pensation, because in most cases of railway accidents which have been occasioned by mismanagement, the contributing causes have been such as to render it impossible to fix such an amount of blame on any one director or officer as would justify a conviction in a court of law. If viewed as a penalty, it should be such as would tend to prevent a recurrence of the act for which punishment is awarded. It should, therefore, depend on the degree of blame which attaches to the management for the accident, and it should be equally certain and just in its operation. In its aspect as a remuneration, it should be easily recoverable by the sufferer. As at present levied, it does not properly fulfil these conditions.

In its operation on the Railway Company it depends upon the condition in life of the travellers; and has been shown not to be proportionate to the degree of blameableness of the Company. The liability to heavy compensation gives the manager a hold over the purse of the Company, which he would in some cases not otherwise possess; and this is a reason for retaining this penalty. But if it is to act systematically, or be a benefit to the public, it must act with justice to the Railway Companies. It is urged, by the latter, as a matter of injustice towards them, that whilst they are compelled, by Act of Parliament, to carry all persons who offer themselves, under similar circumstances, at equal fares, they have no power to protect themselves against the chances of heavy compensation to which the dissimilar circumstances of the travellers expose them. Thus, for instance, a labourer earning nine shillings a week, and a professional man earning £10,000 a year, both having families, may take similar tickets, say at one penny per mile, and if they are killed, the death of the first would cost the Company probably £20, whereas for the death of the second, they might have to pay £20,000. It would therefore seem to be equitable, so far as the Railway Companies are concerned, that the penalty should be limited in amount, and that the limit should vary with the class of carriage in which the persons conveyed were travelling.

In its aspect as a remedy to the sufferer, the present law gives rise to litigation; which frequently swallows up all the money paid by the Railway Company, and thus it is a heavy burden on the sufferer; and this litigation is urged as a grievance by the Railway Companies themselves. The litigation is to a great extent due to the fact, that the amount of compensation is unlimited. A liberal offer made by a Railway Company is frequently taken as a basis for litigation. The Railway Company consequently contends every point. The negligence has to be proved by a number of professional witnesses; their evidence has to be rebutted by an equal number on the other side: the amount of injury done has similarly to be proved on one side and dis-

proved on the other by professional men; the expenses have amounted in many instances to several thousands of pounds. The taxed costs which the sufferer, if successful in his suit, would receive, would not cover legal expenses of this nature. The inducement to litigation would be diminished, if the amount recoverable as compensation were limited; and the grievances of which the Railway Companies complain would be diminished, if the compensation were recoverable, confined within a maximum amount which should be fixed with reference to the class of carriage in which the passenger was travelling. As part of such an arrangement any person desirous of obtaining larger compensation in case of accident, might have the option of insuring their lives.

In the Merchant Shipping Act, Parliament has recognised the principle of limiting the compensation, and of providing for it in an exceptional manner. By that Act the liability of shipowners is limited to the value of the ship and freight for the voyage; a minimum value of £15 per ton being placed on the ship.

The other side of the question must not, however, be forgotten. A limited compensation means that in some cases the sufferer would not receive an equal amount to that which he would receive under the present law; whilst even now it does not always happen that the money payment really compensates the sufferer, for it is obvious that no person would willingly become crippled for life for a money compensation.

Although the whole amount of compensation, including the heavy fines occasionally paid, when spread over the whole number of travellers, amounts to a very small sum per passenger per mile, the liability to unlimited compensation is a strong inducement to the railway directors to cause the employes to work the line carefully. Whilst giving full credit, however, to the effect of compensation, it must be noticed, that the personal feelings, convenience, and interests of the managers influence them in the strongest manner to avoid accidents; and the fact that an accident was attributable to mismanagement would be quite as galling to the employes of the Company, if nothing had to be paid, as if it involved enormous compensation.

It has been shown that the present law does not insure that care in working which is necessary. The object of an alteration ought to be, to devise a system which would insure that such care would be taken as the public safety demands; and that the grievances, of which Railway Companies now complain, should at the same time be remedied. How far would the limitation of the amount payable as compensation tend to such a system? Assuming that the compensation was fixed at such a maximum amount as would fairly compensate the generality of passengers, according to the class of carriage in which they were travelling;

and assuming that it were made payable in the case of every accident which occurred, beyond the control of the passengers, without there being any obligation to prove negligence, there is reason to believe, that the fine would be rendered more certain in its operation, but that as a preventive, the effect of the alteration would not be appreciable. The personal interests of the managers, to prevent accidents, would however, remain; and such an alteration would tend to diminish the grievances of the Railway Companies; whilst it would also benefit the community at large, by diminishing litigation.

The true remedy against railway accidents lies with the Railway Companies themselves. Improved management would be greatly assisted by placing at the head of each railway a Director of adequate capacity, responsible to the Board for the management of the concern, who should be required to devote his whole thoughts to its interests, and be paid in proportion;—by giving the chief officers of the railway control of and making them responsible for the several departments, so that they might be held answerable for results;—and by providing a gradation of responsibility throughout all the employés. Improvements in the machinery and system of working would be promoted by the formation of an Association amongst Railway Companies, combining the objects of the Association before mentioned, between the German Railway Companies, and of the Association between manufacturers, near Manchester, for the prevention of boiler explosions. It is doubtful, however, whether such an arrangement would be of any practical utility in this country, unless it assumed the form of a combination among the Railway Companies for the purposes of mutual insurance against railway accidents, to which all the lines should contribute, and in which they should all be represented; and it should be managed by a Board of railway men chosen from the Associated Companies. If such an arrangement could be adopted, it would obviously become the right of the Association, as well as its duty in the interests of the insurers, — the individual Railway Companies,—to examine into the detailed working of the several lines, to inquire into the accidents which occurred, to point out defects and to compel a carelessly-managed railway to improve its management, under penalty of being excluded from the benefit of the insurance in case of accident. Such an arrangement would diminish the inducement which the liability to a money payment gives a Company to manage its line properly; but it may be a question whether this would not be fully compensated for, by the influence the Association would have over the management generally.

The Author has thus endeavoured to lay before the Members the general considerations which bear upon this very complicated

question. He fears that this has been done in a manner very inadequate to the importance of the subject; but he trusts that his Paper, by affording an opportunity for a full discussion of the question, will be a means of promoting the interests of Railway Companies and of the public.

[Professor AIRY