

land shall *not* have a fine chemical industry, and who are doing all in their power to let her sink back to her pre-war dependence upon Germany.

The many uses of fine chemicals in peace time, which justify so fully the claim of the industry to be regarded as a "key" industry, do not need to be laboured here. Research chemicals for our universities and teaching institutions, together with analytical reagents for the same purposes and for works' laboratories, have already been mentioned. The importance of the industry to medicine and national health is not confined to the supply of synthetic drugs, but rests also upon the fact that the expansion of an organic chemical industry is intimately associated with developments in biochemistry and in the most modern methods of treating and preventing disease.

It cannot be too frequently nor too cogently insisted upon that the nation which possesses fine chemical and dye industries possesses potential arsenals for waging war, so that the nation which does not possess them is ever at the mercy of nations which do.

The present critical position of the fine chemical industry is largely due to the lack of confidence which manufacturers have in the Government. To-day it is not too late to save the situation; soon it will be.

RAIL CONVEYANCE OF CHEMICAL COMMODITIES..

J. LUKES.

It was with satisfaction that I read the article which appeared in the *Journal* of November 15, written by Mr. L. Archbutt with the assistance of several of his railway colleagues, including one expert in rates, as those who may have compared this reply with my remarks which appeared in the issue of September 30 will have gathered that although the trader who consigns dangerous goods by rail may be wrong in his ideas, the railway companies have the power to decide as to which merchandise falls under this heading and to fix the sum which has to be paid for carriage, whether their views be right or wrong. Another inference I feel sure the reader will draw is that if the railway companies are so considerate and painstaking in the interests of the trader, if their conditions of carriage and the resultant charges are so manifestly reasonable, as suggested, they cannot possibly have any objection to the establishment of an impartial business tribunal as a court of appeal. The picture drawn so carefully by Mr. Archbutt does not represent the facts, at least as I view them, and the following remarks, whilst they may not carry conviction to all, will bring out more clearly the main point, namely, that the railway companies are the judges in their own cases, which is admittedly against the principle of British fair play.

Are the Rates on Chemicals Unreasonable?—Mr. Archbutt opens by stating that I charged the railway companies with having regarded *practically all* chemicals as dangerous goods, and then proceeds to show that non-dangerous goods are charged in accordance with the Statutory Orders, and takes credit for the fact that some rates for such non-dangerous goods have been reduced by the railway companies. It was stated distinctly by me that non-dangerous merchandise is scheduled in Part 1 of the Order Confirmation Acts 1891-1892, and that the consignor would have means of ascertaining the component parts of his rate.

Legal Conditions and Rates for Dangerous Goods.

—It was never suggested that the railway companies had refused to convey dangerous goods, and it is obvious that if they abused their rights, the power given them "in ancient history" to refuse to carry must have been withdrawn. Nevertheless, as the law stands to-day (Clause 105 of the Railway Clauses Act, 1845), the railway companies need not carry any merchandise which in their judgment *may* be of dangerous nature, and it is a sore point, as stated (not only to myself but to all the traders concerned) that the carriers are the sole judges of what goods may be dangerous. (It should be noted that it is not a question of the merchandise being dangerous in fact, but dangerous in the opinion of the railway company.)

The question is then raised as to whether any other arrangement would be just and reasonable, seeing that the railway companies are responsible for the safety of the public, etc. Referring to America, Mr. Archbutt says, "Accidents which were occurring led to the establishment of the Bureau of Explosives in 1907, and Col. Taylor came over here on purpose to study our British regulations."

The following quotation from the American Inter-State Commerce Commission Regulations for the Transportation of Explosives and Other Dangerous Articles by Freight and Express, Reg. 1706, 1918 edition, will show the status of the Bureau of Explosives (the italics are mine):—

"The Bureau for the safe transportation of explosives and other dangerous articles, hereinafter called Bureau of Explosives, organised by the railways under the auspices of the American Railway Association, is an efficient bureau in charge of an expert chief inspector. The Bureau will make inspections and conduct investigations *and will confer with manufacturers and shippers* with a view to determining what specifications and regulations will, *within reasonable limits*, afford the highest degree of safety in packing and preparing these dangerous articles for shipment and in transporting the same. *The Commission will seek to avail itself of the expert knowledge thus developed*, and, in formulating amendments to these regulations or specifications supplemental thereto, *while not bound thereby*, will give due weight to such expert opinions."

So the Bureau of Explosives organised by the American railways *must* confer with manufacturers and traders, and decisions rest not with the Bureau but with the impartial tribunal, the Inter-State Commerce Commission.

Reference is made to the American regulations being more severe than our own, and it is stated that "All glass carboys there have to be boxed and to withstand a swing test," but nothing is stated as to the limits of inflammability (over 80° F. is considered safe in America—over 150° F. *may* be thought safe in this country, but I refer to this point later). Mr. Archbutt has omitted to state that the American regulations provide that the thickness of the glass carboys should not be less than 2-32 inch (whilst our British railways specify about ¼ inch). Further, the American regulations do not provide a swing test when iron-cases outside containers are used for carboys; the regulations state that special arrangements are made.

Mr. Archbutt refers to the only three test cases heard before the Railway and Canal Commissioners, and adds that the Court decided that the railway companies did arrive at their decision in good faith and on good grounds. The reader will not overlook what the judges decided, *viz.*, "that the railway companies did arrive at their decision in good faith . . . etc.," that is the railway companies *decided*, and the Judges found that they acted in good faith.

The decisions in these cases may be summarised as follows:—

(1) *Reckitts v. North-Eastern Railway*.—The Court decided that liquid metal polish having a flash point of 80°–85° F. is “dangerous goods” within Part IV. of the Statutory Schedule.

The Hon. A. E. Gathorne Hardy—one of the Commissioners—said in his judgment:—“The article carried may be regarded as very near the border line as regards danger. The flash point is not high, great care is exercised by the manufacturers in manufacturing and securely closing the tin vessels in which it is enclosed.”

Sir James Woodhouse—the other Commissioner—said: “If the issue we had to determine were simply one of fact, whether liquid metal polish is dangerous for the purpose of railway transit, I should, for my own part, after a careful consideration of the evidence, regarding it purely from a business point of view, come to the conclusion that as an article of commerce very extensively used, it is not a dangerous article for the railway company to carry, because it involves nothing beyond what I consider is an ordinary commercial risk. . . . By that Act (1845, section 105) the railway company can refuse to carry goods of a dangerous nature, and what goods come within that description is left solely to their judgment to determine. . . . If I am right in this view, then it follows that though I think that as a fact the goods are not dangerous for the purposes of railway transit, yet it is open to the railway companies to take upon their responsibility a different view, and so long as the Court is satisfied that they have arrived at their judgment in good faith, it is conclusive.”

(2) *Traders' Traffic Conference v. Midland Railway and Others*.—The Traders contended that benzol, toluol and naphtha flashing under 73° F. were chargeable as Spirits of Tar under Class 2 of the Statutory Classification, and admitted that the goods were dangerous goods in opening their case.

(3) *Midland, Great Western, and Lancashire and Yorkshire Railway Companies v. Brotherton and Co., Ltd., and Wm. Butler and Co. (Bristol), Ltd.*—The railway companies applied for a declaration that a tar product flashing not below 100° F. was “dangerous goods” within Part IV. of the schedules.

In his judgment, Mr. Justice Lush, in addition to the quotations given, said: “The Legislature, from the earliest times in the history of railway legislation, quite clearly left it to the railway companies to decide what goods are dangerous, and enabled them to refuse to carry any goods which in their judgment were dangerous.”

It will, therefore, be seen that in one case—(*Reckitts v. North Eastern Railway*)—one Commissioner stated that metal polish flashing between 80° F. and 85° F. was on the borderland of danger, and another that metal polish so packed was not dangerous in fact; whereas in the case of the tar product flashing not below 100° F. no judgment was given as regards danger.

It seems, therefore, of little use to ask, “Is not the decision of His Majesty's judges sufficient?” when they have now decided that they are prohibited from judging whether any commodity is dangerous, in fact.

Mr. Archbutt points out that Mr. Justice Lush in his judgment said: “The railway companies and their advisers and witnesses place the limit of a safe flash point at 150° F.” This should be compared with the instructions given by the Bureau of Explosives in America to its inspectors:—“An inflammable liquid, as defined by the Bureau of Explosives, does not mean any liquid that can be burned. The meaning is restricted to liquids which at ordinary temperatures give off inflammable

vapours. These vapours are not only inflammable, but when mixed in proper proportions with air in an enclosed space will explode with great violence, if ignited by any means. This action is exactly similar to the explosions caused by the ignition of coal gas mixed with air in houses, cellars, sewers, etc., which frequently occur through the accidental escape of gas into enclosed spaces. Any liquid giving a flash point of 80° F. or less is classified as an inflammable liquid.

“The flash point is determined by gradually heating the liquid in question in a small open cup; after each five degrees rise in temperature a small flame is passed across the top of the cup about ¼ inch above the surface of the liquid. The lowest temperature at which a flash passes over surface of liquid is called the flash point. It will be readily seen that the lower the flash point of any liquid, the greater the risk in handling it.”

It may be added that in America liquids flashing above 80° F., open test, are carried and treated as non-dangerous goods by the railway companies.

I must leave it to your readers to decide whether tar products flashing not below 100° F. are really dangerous in transit any more than other materials are dangerous, such as paper, cotton and woollen goods, hay, straw, and thousands of other articles.

Rates on Dangerous Goods.—With regard to the rates chargeable, Mr. Archbutt states, “The Order Confirmation Acts, 1891–1892, enacts that the charges made for the conveyance must be reasonable;” but the Act reads: “such reasonable sum as the company may think fit in each case.” Again, we are told that the trader has a remedy if he considers the charges excessive; doubtless he has, if he is prepared to contest his position, in connexion with every rate for every commodity manufactured, through to the House of Lords.

I feel confident in leaving to the judgment of impartial persons the decision as to whether a decidedly interested party should be the judge in his own case to the extent indicated, when the result of such judgment entails the payment to him directly or indirectly of considerably increased carriage charges, knowing the great reluctance of the trader to appeal to the law courts in every case of dispute.

Further, I maintain that in regard to commodities removed from the white pages or statutory classification, to the yellow pages or dangerous goods classification, the charges have been raised directly or indirectly, the conditions having become more onerous. A rather striking case arose recently in connexion with trinitrotoluol, which for some years past was not treated as an explosive during conveyance, being charged at “Class 2 rates, collected and delivered, company's risk.” The Home Office decided that the merchandise was to be treated as an explosive during transit, and although the increased cost of conveyance did not add to the safety, the companies raised the class to Class 5, plus 50%, station to station, owner's risk:

	Class 2, collected and delivered.	Class 2, less cartage.
	s. d.	s. d.
Leeds to London ...	82 8	63 4 per ton.
Leeds to London, Class 5, plus 50% station to station = 200	9 per ton.

(The difference, £6 12s. 5d., per ton increase, would not encourage trade.)

Spirits of tar appear in the Statutory Classification under Class 2, company's risk; the judgment referred to, viz., *Traders' Traffic Conference v. Midland Railway and Others*, gave the companies the right to charge a higher rate at Class 3, owner's risk. Also in the Tar Products case mentioned, the judgment means that the railways charge as for

Heavy Naphtha, class 2, owner's risk, as against Mineral Tar Oil, Class 1, company's risk.

The chief objection, however, to the insertion of commodities in the dangerous portion of the classification is that the trader loses all statutory rights over the rates and conditions; the "reasonable sum" thought fit by the railway companies is not subject to disintegration, and no allowance from station rates is readily given to traders who have provided private sidings at their own expense, and relieved the companies of heavy capital expenditure, the cost of services, etc.

The explanation given to justify the application of station rates to private sidings is interesting:—a trader using the station provides a private siding, and as one-fifth of the tonnage is diverted to the siding, etc., the station is thus deprived of traffic to that extent, although equipped to deal with the whole business.

Evidence has recently been given in public by the Chief Goods Manager of an important northern railway company that, in round figures, there are in Great Britain 10,000 private sidings and 7000 railway stations, and that the stations could not deal with the whole traffic. The same Goods Manager indicated that his company welcomed the opening of private sidings on his line; and the advertisement to "build your works" adjacent to so-and-so railway line is familiar to all.

The majority of railway stations has been so congested that traffic has had to be refused, restricted and regulated by the companies, to the great inconvenience of the trading public, as everyone concerned in transportation knows only too well.

Is it reasonable that a trader who has provided a private siding (in fact a station of his own) at his expense should pay the charges for station accommodation and labour services as if he used the railway station? If so, such a trader has to pay twice, viz., for the provision and upkeep of his siding, the wages of his staff, and for the railway company's station and staff. The Private Siding Act of 1904 gives the trader a right to a siding, and the Order Confirmation Acts, 1891–1892 (which Mr. Archbutt quotes), provides that the railway companies cannot charge for station accommodation and station services upon private-siding traffic; yet they have made equivalent charges, and the expense of an appeal to the Railway Commission Court is necessary in most cases to get any abatement or siding allowance; and the manufacturer of so-called dangerous chemicals is in a most difficult position, as already explained, owing to Section 105 of the 1845 Act and to Part IV. of the Order Confirmation Acts.

How can traders in dangerous goods use railway stations? The companies raise what are admitted to be *penalty charges* if stock is detained (see my remarks under *Contract Conditions*); they do not store the commodities in their warehouses; and it is admitted that many stations could not provide standage accommodation even for the many tank and open wagons which the trader is forced to provide to conduct this particular class of business.

Contract Conditions.—Even Mr. Archbutt does not try to justify all the conditions to which traders have to submit. He omits any reference to the charge of 5s. per ton per hour for standage of tank wagons at stations (20-ton tank = £120 per day); also the fact that the carriers are exempted from responsibility for loss, damage, misconveyance, delay, or detention of the said goods, or a trader's truck or sheet, except in case of wilful misconduct on the part of the company's servants. It is, however, a fact that if a trader complies with the railway companies' packing specifications he is not at the present time responsible for third party damages in case of accident, etc. Why should the trader be responsible for train accidents or negli-

gence of railway companies' servants, over which he has no control whatever? The point as to the responsibility for accidents, etc., has received public attention on various occasions, and it is referred to in Mr. Russell Rea's Report, 1911, as follows:— "We think that if they carry such goods (dangerous or inflammable) they should not deprive the trader of an opportunity of sending them on terms under which the companies would be responsible for loss or damage occurring as a result of their own negligence, and not in consequence of the nature of the goods."

Premiums for Risk.—Rolling Stock.—It is noticeable that although Mr. Archbutt found my figures in regard to German rates too vague to be of any service for comparison (although he admits that the German chemical industry was prostituted as well as subsidised through the railways), he makes no reference to the rates, quoted by me, chargeable by the English companies. He does assert, however, under the heading *Rolling Stock*, that the rates on crude naphtha and fuel oil in tank wagons are lower than in steel barrels; but is this not in accordance with the principle of the Statutory Classification, which, although framed in 1891 when tank wagons were little used as compared with to-day, generally indicated a lower class for liquids in tank wagons than when conveyed in casks or drums?

Let us consider what this means; 20 tons of liquid is conveyed in a tank wagon, costing about £900, provided by the trader; this would entail the use of from 80 to 100 fifty-gallon drums, and the provision by the railway companies of from 6 to 7 trucks for the full drums and 4 to 5 for the returned empties. Surely it is only equitable to make some difference in the rate, as although no additional charge is made for the return of the empty tank wagon, a large amount of haulage is necessary for each empty railway truck; in fact, we were told quite recently in a railway manager's evidence before the Rates Advisory Committee that the statistics of the Ministry of Transport show that in the case of coal and goods, if a wagon goes 70 miles on the outward journey loaded, on the average it comes back 30 miles empty.

It is interesting to note in passing that for some reason crude naphtha, whether flashing below, at, or above 73° F. is chargeable at the same rate, although naphtha, not crude, flashing below 73° F. bears a higher charge than naphtha flashing at 73° F. and over. This is an illustration of the application of "such reasonable sum as the companies think fit," and my experience is that the classification of crude naphtha, viz., Class C, plus 10 per cent., is too high, and is actually prohibiting traffic from passing in many instances.

Dangerous or Non-dangerous?—Mr. Archbutt is entirely wrong in stating that I am disturbed because the English railway companies are guided by a body of chemists; what I do object to is that the railways can finally decide what is dangerous upon the advice of their chemists. It seems to be entirely overlooked that the manufacturers' chemists have a much closer, and, I submit, a better knowledge of the commodities they specialise upon. These chemists have, as a rule, the highest qualifications, they are familiar with transportation throughout large works, through cities, etc., and their knowledge of the commodity and its behaviour under all circumstances is sufficient to enable them to judge of its safety during rail transport. There is no doubt, however, that difficulties will arise, not only with so-called dangerous goods, but with all classes of merchandise, in the event of serious train accidents or of faulty stowage into trucks by railway servants.

It must not be overlooked that this phase of the question was fully considered by the Board of

Trade Conference on Railway Matters in 1909—“Committee A reported that the existing grievances arose from the unrestricted power of the railway companies to decide what came under this (dangerous) classification, and under what conditions they should be carried. The Conference, following the recommendations of the Committee, suggested the appointment of an Advisory Expert Committee to deal with the classification of dangerous goods other than explosives. The terms of the resolution adopted were as follows:—

“As regards dangerous goods, other than explosives (as to which no question was raised), it is recommended that an advisory expert committee be established, to which may be referred by the Board of Trade questions at issue between traders and the railway companies in connexion with the inclusion of articles in the list of dangerous goods; such a committee to be constituted of an expert nominated by the Home Office, an expert nominated by the Admiralty and Army Council, and an expert nominated by the Board of Trade and Board of Agriculture and Fisheries; the railway companies and the traders concerned each to state their case by means of experts, and the committee to recommend whether the article in question should be included in the list of dangerous goods, and, if so, what conditions of packing and labelling should be imposed.

“No such question should be referred to the Advisory Expert Committee before it has been dealt with by the railway companies parties to the Railway Clearing House, or until the Board of Trade gives a certificate that there has been unreasonable delay on the part of the railway companies.”

Mr. Archbutt complains that my reference to the recent case in the Railway Commission Court is quite misleading, and he quotes the words in the judgment of Mr. Justice Lush, “The companies and their advisers and witnesses place the limit of safe flash point at 150° F.” During the hearing of the case counsel for the railway companies pointed out that in 1891 three consignment notes existed, one of which was for products flashing over 150° F., and he added, “because the railway companies never recognised that 150° was in any way a limit of safety.” Further, giving evidence on behalf of the railway companies, Mr. J. H. B. Jenkins, the Great Eastern Company's chemist, replied to the railway companies' counsel that in the opinion of the companies, though the vapour is inflammable above 150° F., close test, he thought it necessary to treat it as dangerous goods. If the Judge intended that 150° F. should be taken as the dividing line and the railway companies accept this, they should insert this flashpoint as the limit of inflammability in their classification.

Assistance for Key Industry.—I am aware that the classification of intermediate products for use in colour manufacture has received considerable attention recently, with a view to fixing uniform rates and conditions, and although it is beside the point, I fail to understand why railway companies, assisted by the State, should not encourage key industries for the national benefit. The point of my argument was that extortionate charges are demanded; the trade—far from being encouraged—has to fight against prejudice and extreme views.

Revision of Railway Rates.—There are now reasons to suppose that an impartial tribunal will fix the classification of dangerous goods; yet it is not—and never has been—the traders' idea that the Railway Chemists and Dangerous Goods Committee should give less patient attention and consideration to these matters; it is essential that its members should continue to apply all their ingenuity and experience to the problems which arise. What the public asks is that the Committee shall

not have the power to *decide* finally the rate or charge, or as to what is dangerous or not dangerous.

It is conceded on all sides that the railway companies should have an opportunity of earning an adequate revenue, but is it not a more business-like proposition to charge against all traders in proportion to the cost to the railway for the accommodation provided and used, and the services rendered, plus a reasonable margin for profit, than to suggest that if light chemicals get some reduced charges, heavy chemicals or other merchandise must bear some increased burden?

Mr. Archbutt may take it, and I have the authority of the Association of British Chemical Manufacturers to say so, that the light and heavy chemical manufacturers and others are willing to pay their just proportion of railway charges measured by the railway accommodation provided and used, and the duties undertaken by the railways at the traders' request and for their convenience.

I have recently been reading with great interest the report made by the chairman (Mr. Joseph B. Eastman), of the Special War Committee at the Thirtieth Annual Convention of the National Association of Railway and Utilities Commissioners of the United States of America. He advocates the need for local public tribunals, and adds that “Men who for years have viewed railroad policy in the light of railroad interest do not overnight become satisfactory exponents of the public interest.”

IMPRESSIONS OF THE AMERICAN GLASS INDUSTRY, 1919-1920.

W. E. S. TURNER.

To the person who has some acquaintance with the conditions of the glass industry in this country there are several things which come home with great force when he comes into contact with the corresponding industry in the United States. He is, for example, impressed by the fact that nearly all efforts are directed to the mass production of articles for sale to the million, and whilst it is true that America has become nearly self-supporting in respect of articles of glassware, optical glass manufacture is still in its infancy, and glass of the higher quality for table decoration and general artistic purposes occupies a relatively smaller place in the American glass industry than in our own.

As already stated, glass manufacture in the States is, wherever possible, confined to such articles as can be produced in enormous quantities. Not only so, but each manufacturer tends to specialise in a limited number of types of one particular form of glassware. For example, a glass-bottle manufacturer will confine his attention as far as possible to just a very few types of bottles; one very large undertaking, having several factories under its control, manufactures only wide-mouth milk bottles, of which it produces an enormous number.

This specialisation and high production are made possible by the use of automatic devices at every stage; and by limiting the number of types of article, the design of the machinery becomes greatly simplified. Automatic belts and various other devices are in operation for the conveyance of articles of glassware from the machine to the annealing oven or lehr, whence they are again automatically transferred. Both the transfer from the machine to the conveyor and from the conveyor again to the annealing oven, are only possible where all the articles are of one size and type. Further, where the annealing oven carries one size