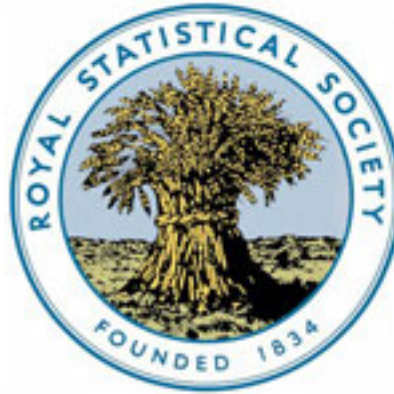


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ENGLISH RAILWAY STATISTICS. *By* W. M. ACWORTH, M.A.

[Read before the Royal Statistical Society, 16th December, 1902.
Major P. G. CRAIGIE, C.B., President, in the Chair.]

FIFTEEN years ago Sir Juland Danvers, who had borne a principal part in introducing into India the reforms for which he pleaded in England, read before this Society a paper on "Defects in English Railway Statistics." He concluded a powerful argument in favour of the compilation and publication in this country of statistics of ton and passenger mileage, such as are given in all other civilised countries, by urging that "power should be given to the Board of Trade to call upon the Railway Companies of this country to render such statistical returns as may be considered desirable in the public interests." Sir Juland's paper was read on 20th December, 1887. On the 10th of the following August the Railway and Canal Traffic Act, 1888, enacted by section 32 (1) that "the returns required of a railway company under section 9 of the Railway Regulation Act, 1871, shall include such statements as the Board of Trade may from time to time prescribe, and the forms referred to in that section"—which are much the same as the forms familiar to us in the half-yearly reports which were prescribed by statute in 1868, and have remained practically unaltered since then—"may from time to time be altered by the Board of Trade in such manner as they may think expedient for giving effect to this section." Unfortunately the Board of Trade have not hitherto, except in small details, used the powers so entrusted to them, and our English railway returns remain to this day in all their archaic simplicity, a monument to the wisdom of our ancestors and the ancestor worship of their descendants.

Not that the Board of Trade itself is unconscious of the imperfection of these returns. At least as long ago at 1884 Sir Henry Calcraft and Sir Robert Giffen (then Assistant Secretaries for the Railway and Statistical Departments respectively) regretted, as Sir Juland notices, that "it is impossible to show what is the receipt per ton per mile." Their successors have gone on lamenting the absence of this information ever since. But a government department can hardly be expected to act without public opinion behind it, and public opinion, till very recently, cared nothing for such abstractions as statistics. The shareholders were satisfied with their dividends. The traders pre-

ferred to endeavour to reduce rates by the simple methods of statutory compulsion, with results that certainly cannot be shown to have been successful by statistical methods. At length there seems a prospect of a change for the better. The man in the street is beginning to wonder whether the great goddess Rule-of-Thumb is a true divinity after all, whether it would really be dangerous to allow scientific methods to escape from the walls of Oxford and Cambridge and range at large among business people. Moreover, no one is satisfied with the present condition of railway affairs. Shareholders think—and, having regard to their recent dividends, may be excused for thinking—that the rates they are charging are too low. The traders think—and, having regard to what their rivals are paying in other countries, may be excused for thinking—that the rates they are paying are too high. And, finally, one go-ahead railway company, the North Eastern, has set to work to ascertain and publish, for the first time since English railways abandoned the keeping of ton-mile statistics for the special use of Dr. Lardner in the early fifties, what the rates actually are, and under what actual conditions of average length of haul and average weight of consignment these rates are charged.

We shall not, I think, be too sanguine if we expect that before long the more progressive companies will follow the lead of the North Eastern in this particular, and then, after an interval, Parliament and the Board of Trade will compel the laggards to fall into line. The defect to which Sir Juland Danvers called special attention is practically on the high road to be remedied. But no one who has ever compared the exhaustive statistics published in every leading country of the world, with the jejune tables of our own half-yearly reports and Board of Trade returns, will be content that reform should stop at this point. The time has, I venture to say, come when the Board of Trade should intimate to the railway companies its intention of revising completely the statutory forms of 1868 and 1871, and should, after consultation with the Railway Association or the Railway Clearing House, nominate a departmental committee to advise the Board as to the shape and scope of the new returns and reports to be adopted in their stead.¹

¹ The American Association of Railroad Accounting Officers is in constant communication with Professor Adams, the distinguished statistician to the Interstate Commerce Commission, and for some years maintained a special standing committee for this purpose; and year by year American railway reports are improving in fulness, in arrangement, and, which is almost more important, in uniformity. The instructions as to filling in the various tables in the returns issued by the Commission to the several companies form a bulky pamphlet, and set out in minute detail the category to which each item of income or expenditure, as to which doubt could possibly arise, is to be assigned. See also Mr. Chapman's note in the *Miscellaneous*.—ED.

One word at the outset. Such accounts must be annual, not half-yearly. The publication of final accounts half-yearly—for which Parliament, of course, is responsible, not the companies—not only causes the companies much unnecessary labour and expense, but makes statistical comparisons between consecutive periods more than twice as difficult and less than half as effective. The Board of Trade returns are now all, or nearly all, annual, and so should be the reports of the individual companies. The dividend for the first half of the financial year should be, as it is in ordinary trading companies, an interim dividend only, paid on the authority of the Board of Directors.

The Board of Trade publishes at present no less than eleven different series of reports and documents relating to railways. The list is as follows :—

Reports and Returns relating to Railways, prepared for Parliament by the Board of Trade.

| | Issued. | | Issued. |
|---|-------------|---|-------------------|
| (1.) Railway, &c., Bills. Report upon all Railway, &c., Bills and Provisional Orders of the Session | Annually | (8.) Light Railways Act, 1896. Report under Sect. 15 (5) of proceedings of the Board of Trade, and of the Light Railway Commissioners | Annually |
| (2.) Railway Accidents. General Report... .. | Annually | (9.) Railway and Canal Traffic Act, 1888. Report of proceedings under Section 31 (the so-called "conciliation" section) | From time to time |
| (3.) Railway Accidents. Returns of..... | Quarterly | (10.) Railway Companies Powers Act, 1864. Report on applications (if any) under..... | From time to time |
| (4.) Railway Servants' Hours of Labour. Report of Proceedings under Railway Regulation Act, 1893 | Annually | (11.) Railways Construction Facilities Act, 1864. Report on applications (if any) under | From time to time |
| (5.) Railways. (Capital, Traffic, &c.) Returns | Annually | | |
| (6.) Railway Share and Loan Capital, &c. General Report | Annually | | |
| (7.) Railways. (Continuous Brakes.) Returns.... | Half-yearly | | |

To this formidable list may be added the Annual Report of the Railway and Canal Commissioners, which deals mainly with matters also dealt with in documents issued by the Board of Trade. The collection of all these miscellaneous and independent publications into a single statistical volume—a course for which Parliamentary sanction would have to be obtained—would be in line with the practice adopted in other countries, and would not only be a great convenience, but would also afford an opportunity for re-casting or even abolishing certain returns, for instance that

relating to brakes, which are practically in a large measure obsolete.

But to come to the two important documents in the above list, Nos. 5 and 6. The full title of the first of these is "Railway "Returns for England and Wales, Scotland and Ireland" [I have never yet had the good fortune to come across the returns either for Man or the Channel Islands. Presumably they go to the Privy Council Office] "for the year , with Summary Tables "for United Kingdom from 1850 to ." No. 6 is entitled "General Report to the Board of Trade in regard to the Share "and Loan Capital, the Traffic in Passengers and Goods, and the "Working Expenditure and Net Profits from Railway Working "of the Railway Companies of the United Kingdom for the "year ." This is a report half letterpress and half tables, commenting on the facts set out in the Returns. It is signed jointly by the heads of the Railway and Statistical Departments of the Board, and addressed to the Secretary.

Before discussing the contents of and *lacunæ* in these two volumes, which evidently can only give such information as the returns of the individual companies on which they are based contain, a word will be in place on the general question as to what accounts and statistics railway companies ought to publish. Clearly of the publication *en bloc* of the vast mass of accounts and statistics kept by a railway company in the course of its ordinary business, there can be no question. A great railway company must record its current affairs in thousands of volumes. And in addition to its regular records, it is constantly conducting special inquiries in reference to particular portions of its undertaking. Considerations of mere bulk must decide in many cases. Then, further, the shareholders and the public have only to do with the system as a whole. Statistics of the traffic of individual stations, records of the comparative efficiency of co-ordinate district organisations, and so forth, clearly cannot go beyond the board room. Again, daily and weekly and monthly returns must be compiled into annual or at least semi-annual returns, before they are published. Finally, no company can be asked to publish information which might help its rivals to abstract its business.² It will hardly be denied that, provided the above-mentioned considerations are kept in view, the shareholders in any company are entitled to receive such accounts and statistics

² I cannot think, however, that there is as much in this point as is commonly supposed. If the fiercely competitive railways of America can publish, as they do, week by week returns of the tonnage which each of them carries from Chicago and St. Louis to the sea-board, it can hardly be that annual summaries would reveal here any important trade secrets.

as are necessary to enable them to understand clearly the physical and financial condition of their property. As for the rights of the public at large to such information, it is hardly worth while to argue the matter, because, in the first place, publication to the 20,000 or 30,000 shareholders of a great company, is practically publication to the world at large, and, secondly, because the point has been decided by the statutory obligation on the companies already referred to.

But statistics of a single undertaking for a single year tell us but little. For an adequate appreciation of the position of a company we need to compare it with itself in other years, and with its more or less similarly circumstanced neighbours in the same year. In other words, the form of accounts and statistics should be most carefully and deliberately settled, in order that, though additions and improvements may subsequently be introduced, no such radical changes may need to be made as would break their continuity over a series of years. And further, each company must fill up its schedules on the same basis. It is well known that this is far from having been the case in this country hitherto. The Board of Trade Report for the current year, for example, gives one instance affecting entries amounting to about 1,000,000*l.* per annum.

It is impossible, however, to ignore the fact that there is among many of the men who have the actual management of English railways—men certainly not the least progressive and enlightened of their profession—a strong prejudice against the publication of any figures beyond those which they already give, and to which they have presumably grown reconciled by time. “Why,” say they, “should we give any more information? It will only be “used against us; we shall make a rod for our own backs.” With respect, I cannot think their argument sound. Honest criticism will be better when based on facts instead of surmises. Malevolent misrepresentations can be better answered by statistical facts than by benevolent counter guesses. Let me give one instance. Critics both abroad and in this country have assumed for a generation past that English passenger fares were the highest in Europe, averaging about 1*d.* per mile. Actual figures for one line for one month have recently proved the average to be three-fifths of this amount. If this latter figure be typical, it would not be too much to say that, having regard to the service given, English passenger fares, instead of being the dearest, are about the cheapest in Europe. So with goods rates. Every trader is bred in the belief that English goods rates are extortionate. For my own part I make no doubt that the publication of precise figures as to average rate and length of haul would show that the rates charged in England for

English weights of consignment, carried English distances, under English conditions, are lower than would be charged for similar traffic carried similar distances under similar conditions in any other important country.

Even assuming for the sake of argument that it is in the interest of railway A to publish nothing, it is vitally in its interests that railway B and railway C should give full information as to their operations. A manager may know from his own figures that his own organisation is improving year by year in economy and efficiency. That it is improving as much as it can and as fast as it can, he can only know by observation of what his neighbours are doing. In the United States the volume of goods carried has increased in seven years 81·6 per cent. It has been handled with an increase of only 6·3 per cent. in the train mileage. No one who has lived in the atmosphere which surrounds American railway officials will, I think, doubt that precise statistical figures, enabling accurate comparison to be made between one company and another, have been the main cause in producing this marvellous result.

Judging, then, our English railway statistics by the criteria laid down above, let us see how far, on the one hand, the information they give is of practical value, and, on the other hand, how far other information is absent which might advantageously be present.

The half-yearly Reports and Accounts under the Act of 1868 are, as I have already indicated, different from the Annual Returns under the Act of 1871, but the differences between them are not very great, nor are they, as a rule, of much importance, and a discussion of these differences would be long and tedious, so I take the half-yearly Reports and Accounts as being most readily accessible and familiar to all of us. Tables 1 to 4 relate to capital, and are as follows :—

RAILWAY. HALF YEAR ENDING 18

[No. 1.] *Statement of Capital authorised and created by the Company.*

| Acts of Parliament, or Certificates of the Board of Trade. | Capital Authorised. | | | Capital Created or Sanctioned. | | | Balance. | | |
|--|-------------------------|--------|--------|-----------------------------------|--------|--------|-------------------------|--------|--------|
| | Stock and Shares. | Loans. | Total. | Stock and Shares. | Loans. | Total. | Stock and Shares. | Loans. | Total. |
| | £ | £ | £ | £ | £ | £ | £ | £ | £ |
| 1. <i>[Except where capital</i> | | | | | | | | | |
| 2. <i>powers are com-</i> | | | | | | | | | |
| 3. <i>prised in a Con-</i> | | | | | | | | | |
| 4. <i>solidation Act,</i> | | | | | | | | | |
| 5. <i>each Act or Certifi-</i> | | | | | | | | | |
| &c. <i>cate authorising</i> | | | | | | | | | |
| <i>capital to be stated</i> | | | | | | | | | |
| <i>here separately in</i> | | | | | | | | | |
| <i>order of date]</i> | | | | | | | | | |
| Total | | | | | | | | | |

[No. 2.] *Statement of Stock and Share Capital created, showing the
Proportion received.*

| Description. | Amount Created. | Amount Re- ceived. | Calls in Arrear. | Amount Un- called. | Amount Un- issued. |
|---|--------------------|--------------------------|------------------------|--------------------------|--------------------------|
| | £ | £ | £ | £ | £ |
| <i>[State each class of stock or shares in order of date of creation, showing the premium or discount, if any, at which it was issued, the preferential or fixed dividends, if any, to which it is entitled, and any other conditions attached to it]</i> | | | | | |
| Total | | | | | |

[No. 3.] *Capital Raised by Loans and Debenture Stock.*

| | Raised by Loans. | | | | | | | | | Raised by Issue of Debenture Stocks. | | | Total Raised by Loans and by Debenture Stocks. |
|--|------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------------------------------|--------------|-------------------------|--|
| | At per Cent. | At per Cent. | At per Cent. | At per Cent. | At per Cent. | At per Cent. | At per Cent. | At per Cent. | Total Loans. | At per Cent. | At per Cent. | Total Debenture Stocks. | |
| | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ s. d. |
| Existing at | | | | | | | | | | | | | |
| Ditto at | | | | | | | | | | | | | |
| Increase | | | | | | | | | | | | | |
| Decrease | | | | | | | | | | | | | |
| Total amount authorised to be raised by loans and debenture stocks in respect of capital created, as per Statement No. 1 | | | | | | | | | | | | | |
| Total amount raised by loans and by debenture stock as above | | | | | | | | | | | | | |
| Balance being available borrowing powers at 18 | | | | | | | | | | | | | |

Dr. [No. 4.] *Receipts and Expenditure on Capital Account.* *Cr.*

| | Amount Expended to | Amount Expended during Half Year. | Total. | | Amount Received to | Amount Received during Half Year. | Total. |
|--|--------------------|-----------------------------------|---------|--|--------------------|-----------------------------------|---------|
| | £ s. d. | £ s. d. | £ s. d. | | £ s. d. | £ s. d. | £ s. d. |
| To expenditure : | | | | By receipts : | | | |
| On lines open for traffic (No. 5) | | | | Shares and stock, per Account No. 2 | | | |
| On lines in course of construction (No. 5) | | | | Loans, per Account No. 3 | | | |
| Working stock (No. 5) | | | | Debenture stock, per Account No. 3 | | | |
| Subscriptions to other railways (No. 5) | | | | Sundries (in detail) | | | |
| Docks, steamboats, and other special items (No. 5) | | | | | | | |
| To balance | | | | | | | |

Table No. 1, it will seen, will run to very considerable length in the case of a company which comes to Parliament, as all the great companies do, every few years for fresh capital powers. Yet it gives the shareholders little useful information. It might interest them to know that Parliament in, say, 1902 sanctioned an expenditure of 500,000*l.* on new line A, 300,000*l.* on new line B, and 200,000*l.* on general improvements over their system. But to be told that a million was authorised by the South Northern (General Powers) Act, 1902, can help them little.

Table No. 2 tends rather to bewilder than to help the plain man. Reading the statutory instruction that premiums and discounts are to be shown, and looking at the first two columns, one would expect that the first of them would give the nominal capital of the undertaking, and the second the actual cash received in exchange for the shares. But the fact is quite otherwise. Where all the authorised capital is issued and paid up, "created" and "received" mean the same thing. The North Eastern, for example, shows its ordinary stock "North Eastern consols as, 'created' 29,536,615*l.* 10*s.*," "received" "29,536,615;" though elsewhere in the report capital is credited with "premiums received on stock and shares" amounting to over 5 million £. The Cambrian, on the other hand, was notoriously built "for paper," and the ordinary shares were practically a bonus to the people who built the line out of the proceeds of the sale of the debentures. Yet Form No. 2 of the Cambrian report shows the Company to have created stock to the amount of 2,664,757*l.*, and to have received the whole of this sum, less 159,281*l.* 10*s.*, which is set down as the "amount unissued." Were the Cambrian to issue this amount to morrow at its present market price of about 3*l.* per 100*l.* nominal value, the next half-yearly report would presumably show 159,281*l.* 10*s.* "as an amount received." Form 3 needs no special comment.

Form 4 is much more important. It is really a statement of "assets and liabilities." The "receipts" are not cash receipts but merely capital liabilities. The "expenditure" is not cash spent but merely the price at which the road and its equipment—to use the American phrase—stand in the Company's books; in other words, the cost in stock and debentures of so much of the "lines open for traffic," "rolling stock," and other subsidiary items as has been charged to capital and not paid for out of current income. Presumably when this form was drawn up in 1868, it was intended that the credit side should show under "amount received" not nominal value of stock issued, but actual cash received, *i.e.*, face value of stock plus premiums or minus discounts, as the case may have been. Another criticism is practical

rather than financial. "To expenditure on lines and works open for "traffic, 60,950,744*l.* 10*s.* 9*d.*;" this is the information given in one line to the North Eastern shareholders. One would readily barter the scrupulosity of that 10*s.* 9*d.* for a little more information as to what the lines and works are on which 61 millions sterling have been spent. What does the report give us? Just this much:—

| | Miles Constructed. | | Miles Maintained. |
|--------------------------------|-----------------------|--------------------------|----------------------|
| Owned by company | 1,627½ | Four or more lines | 50½ |
| Partly owned..... | 15½ | Three lines..... | 8½ |
| Leased, rented, or worked | 20 | Double line | 1,092 |
| | | Single „ | 512 |
| | 1,663 | | 1,663 |

Not much, surely, to tell us where 61 millions of money have gone. It is true that each half-year the details of capital expenditure are given for that half-year, but the half-year ended, they are swept up into the vast miscellaneous heap described above. In the first place where are the lines? The reports and returns of every other country give, as a matter of course, one or more maps, some of them admirable specimens of lithographic work, distinguishing the lines of different systems, or the parts of the same system, in a dozen different colours. An American report would put a little more flesh on to the skeleton exhibited above. Here is a specimen:—

Southern Pacific Company.

No. 1.—*Mileage of Railroads, Ferries, River and Ocean Lines.*

| Name of Company. | Main Track. | Second Track. | Sidings. |
|--|-------------|---------------|----------|
| Carson and Colorado Railway (narrow gauge)— | | | |
| Mound House, Nevada, to Keeler, Cal. | 293'62 | — | — |
| Junction to Candelaria, Nev. | 6'00 | — | — |
| | 299'62 | — | 22'25 |
| Central Pacific Railway— | | | |
| Oakland local lines, viz.— | | | |
| Oakland Pier to East Oakland | 4'84 | 4'834 | — |
| Alameda local lines, viz.— | | | |
| Oakland Pier to Melrose | 8'31 | 5'595 | — |
| Mastick Station to Alameda Wharf ... | 1'25 | — | — |
| East Oakland to Fernside | 1'98 | — | — |
| Oakland to Niles | 26'39 | 1'494 | — |
| San Jose, Cal., to near Ogden, Utah | 863'12 | — | — |
| Ogden, Union Station to Utah central } crossing | 0'11 | — | — |
| Roseville to Oregon State line..... | 296'58 | — | — |
| Lathrop to Goshen | 146'08 | — | — |
| San Francisco to Oakland (ferry 3'69 miles) | — | — | — |
| „ Sacramento (river line) | — | — | — |
| 125 miles) | — | — | — |
| Marysville steamboat line (river line) | — | — | — |
| 190 miles) | — | — | — |
| | 1,348'66 | 11'923 | — |

No. 1.—*Mileage of Railroads, Ferries, River and Ocean Lines—Contd.*

| Name of Company. | Main Track. | Second Track. | Sidings. |
|--|-------------|---------------|----------|
| <i>Leased—</i> | | | |
| From Union Pacific Railway, 5 miles, } west of Ogden | 5'00 | — | — |
| From Southern Pacific Railway of Cal.— Brighton to Sacramento | 5'64 | — | — |
| | 10'64 | — | — |
| | 1,359'30 | 11'923 | 393'69 |
| Direct Navigation Company (Texas)— Houston to Galveston (river line 75 miles) | — | — | — |
| Galveston, Harrisburg, and San Antonio Railway (Texas)— | | | |
| Houston to east bank Rio Grande, } El Paso | 834'57 | — | — |
| Spofford to Eagle Pass | 35'05 | — | — |
| Harwood to Gonzales | 12'30 | — | — |
| Smith's Junction to La Grange | 28'50 | — | — |
| Stella to Harrisburg | 7'74 | — | — |
| | 918'16 | — | 161'99 |

And so on for several pages. Then comes for the entire system the following:—

Recapitulation.

| | Main Track. | Second Track. | Sidings. | Ferries. | River and Ocean Lines. |
|----------------------------|-------------|---------------|----------|----------|------------------------|
| Proprietary companies— | | | | | |
| Lines owned..... | 7,812'851 | 93'410 | 1,760'94 | 10'69 | 3,565 |
| „ leased | 43'197 | 3'515 | — | — | — |
| Total | 7,856'048 | 96'925 | 1,760'94 | 10'69 | 3,565 |
| Non-proprietary lines.... | 350'697 | — | 23'47 | — | — |
| Total 30th June, 1900 | 8,206'745 | 96'925 | 1,784'41 | 10'69 | 3,565 |
| „ 1899 | 7,417'224 | 96'495 | 1,588'39 | 10'69 | 3,565 |
| Increase | 789'521 | 0'430 | 196'02 | — | — |

Let me here call attention to one small point. The American report shows mileage of sidings. English reports and returns ignore sidings altogether. Yet they are not without importance, both as showing where the capital of a company has gone, and still more in comparing one line with another. An instance will prove this. The Board of Trade returns five years ago, when I had occasion to look into the matter, showed the Lancashire and Yorkshire and the Midland Great Western of Ireland to be lines

And here are the corresponding figures from an American railway report—figures given, be it observed, not for the line as a whole, but for each division of the system separately:—

Pennsylvania Railroad Division.

Expenses in Detail.

| Accounts. | 1901. | Comparison with 1900. | |
|--|--------------|-----------------------|-----------|
| | | Increase. | Decrease. |
| | \$ | \$ | \$ |
| <i>Maintenance of Ways and Structures.</i> | | | |
| Engineering and superintendence ... | 181,924·88 | 12,837·68 | — |
| Roadway, repairs of | 712,297·58 | 189,483·87 | — |
| Ballast | 210,671·72 | — | 21,866·82 |
| Rail fastenings | 239,239·76 | — | 6,958·06 |
| Frogs and switches | 289,090·30 | 47,574·24 | — |
| Interlocking plants and signals, } repairs of | 292,263·91 | 46,167·68 | — |
| Roadway tools, repairs of | 81,904·81 | 16,603·10 | — |
| Track repairing | 1,621,289·28 | 95,302·70 | — |
| Rails | 641,367·83 | — | 54,028·63 |
| Cross-ties | 901,023·82 | — | 5,123·64 |
| Bridges and culverts, repairs of | 337,301·61 | — | 25,251·86 |
| Fences, road crossings, and signs, } repairs of | 53,053·27 | 968·18 | — |
| Overhead crossings | 53,692·93 | — | 55,580·86 |
| Stations, repairs of, and furniture for | 427,225·96 | 77,316·83 | — |
| Engine-houses and shops, repairs of | 413,750·71 | 34,027·41 | — |
| Fuel and water stations, repairs of.... | 230,567·19 | — | 6,443·59 |
| Dwelling, power, signal, tool, and } watch houses, repairs of | 126,858·43 | 32,513·71 | — |
| General office, repairs and furni- } ture for | 71,704·48 | — | 27,441·50 |
| Docks, dredging and cleaning | 21,025·09 | 8,306·91 | — |
| Wharves and landings, repairs of | 45,668·13 | — | 76,468·44 |
| Telegraph, repairs of | 119,332·68 | — | 15,978·35 |
| Stationery and printing | 16,617·42 | 3,859·49 | — |
| Insurance | 14,211·98 | 504·27 | — |
| Incidentals | 3,524·66 | 1,039·44 | — |
| Total | 7,105,608·43 | 271,363·76 | — |

Then after the expenditure in detail has been given, there is added a table showing the amount of new material put into the road during the year under the two main heads of rails and sleepers, as follows:—

Steel Rails and Ties used for Renewals.

| | Rails. | Cross-Ties. |
|--|---------|-------------|
| | Tons. | |
| Pennsylvania railroad division | 40,114 | 1,319,997 |
| United railroads of New Jersey division | 10,467 | 358,140 |
| Philadelphia and Erie railroad division..... | 8,305 | 290,004 |
| Buffalo and Allegheny Valley division | 7,879 | 319,615 |
| Philadelphia, Wilmington and Baltimore } Railroad Company | 7,595 | 407,139 |
| Northern Central Railway Company | 6,338 | 204,310 |
| West Jersey and Seashore Railroad Company | 1,005 | 189,047 |
| Cumberland Valley Railroad Company | 1,128 | 70,516 |
| Pennsylvania Company | 14,680 | 660,140 |
| Pittsburgh, Cincinnati, Chicago and St. } Louis Railway Company | 27,148 | 761,681 |
| Grand Rapids and Indiana Railway Company | 3,438 | 239,793 |
| Total | 128,097 | 4,820,382 |

It may be added that the American figures, full as they are in comparison with ours, are meagreness itself by the side of those given for the great Continental systems. The tables for these are much too voluminous to be reproduced here. Let me just give indications of what they contain in France or Germany. The French tables give (Tableau 2), for each department of the country separately, the length of line, both open and under construction, the name of the company operating it, and, if there is more than one line of the company in the department, a detailed enumeration of them all, with their respective lengths. A supplementary table (No. 2 *bis*) gives length of line, divided into first and second class railways and tramroads, partly or wholly open for traffic, per square myriametre and per 10,000 inhabitants in each department. Then Table 5 gives separately for each separate section of each railway system information of which the following is a sample :—

Western (of France).

| | Double Line. | | Single Line. | | | | | Grand Total. |
|-------------------------------------|-------------------------|---------------|--|---|---|---|-------------|--------------|
| | Sectional Length. | Total Length. | With Land, Formation, and Works for a Single Line. | With Land for Two Lines, Formation and Works for a Single Line. | With Land and Works for Two Lines, Formation for Single Line. | With Formation and Works for Two Lines. | Total. | |
| | Kilometres. | Kilometres. | Kilometres. | Kilometres. | Kilometres. | Kilometres. | Kilometres. | Kilometres. |
| 16. From Rennes to Brest | Rennes to Caulnes..... | 46·254 | 199·306 | | | | | |
| | Caulnes to Lamballe.... | 34·708 | | | | | | |
| | Lamballe to St. Brieuc | 20·297 | | | | | | |
| | St. Brieuc to Guingamp | 30·205 | | | | 49·873 | 49·873 | 249·179 |
| | Guingamp to Kerhuon | 60·399 | | | | | | |
| | Kerhuon to Brest | 7·443 | | | | | | |

Minute as this is, the German statistics, issued for the whole Empire by the Reichseisenbahnamt (Imperial Railway Office) are vastly more detailed. Tracing through the volume the information as to the physical condition and maintenance of a single piece of road, say the Wittenberge-Dömitz-Lüneburg section, we obtain the following information. It belongs to the Prussian Directorate of Altona; its length is 102·35 kilometres; it is worked as a first-class line; it is single line throughout; 43·740 kilometres (42·74 per cent. of the total length) are level; 58·610 kilometres (57·26 per cent. of total length) have gradients, but none of them worse than 1 in 200. Then, as for curves, 76·309 kilometres are straight (74·56 per cent.), 26·041 kilometres (25·44 per cent.) are on curves. The radii of the curves on 21·955 kilometres are not less than 1,000 metres; there are 3,754 metres on curves with radii between 500 and 1,000 metres, and 332 metres with radii between 300 and 500 metres. But outside station limits there is no curve of less radius than 700 metres.

These statistics, it is to be observed, apply to a sub-division of a sub-division of the Prussian State railways. The rest of the Imperial statistics as to physical condition and maintenance do not recognise sub-divisions. But for the Prussian State and other government railways as a whole, as well as for each of the still remaining private railway undertakings, a vast mass of further information is given. Table 5, for instance, shows that the Dortmund-Gronau-Enschedes Company's line is 96·89 kilometres long, of which 90·60 are outside and 6·29 inside station limits. Cross-over roads amount to 2·50 kilometres; there are 14 siding connections beyond station limits; there are in all 153 $\frac{1}{2}$ ¹⁴ highway level crossings, of which 62 have barriers closed by hand, 89 have barriers closed by mechanical means, 2 more are closed by a wire connection from a distance; the half crossing is kept locked. There are 15 road crossings over or under the line, 2 of them arched bridges, the rest girders. This same table goes on to give particulars of culverts, bridges, viaducts, and tunnels. The next table (No. 6) deals with the permanent way: how the rails are laid, whether they are steel or iron, their weight per metre, whether the sleepers are iron, wooden, or stone blocks—of which Bavaria still possesses 70 kilometres—the number of sleepers laid per kilometre, all are particularised. Table 7 gives a full statement of the telegraph, block, signal, and interlocking apparatus in use. Table 8 enumerates, under thirty-nine different

¹⁴ I cannot explain this "half;" but there are other instances in the return, so it is clearly not a misprint. Perhaps the portion of the line on which it occurs belongs to two companies jointly, and each is credited with one-half.

heads, the various buildings erected on the railway property, from station halls to coal tips and weighbridges. Table 9 deals with maintenance and renewals, and shows how many kilometres have been renewed, and precisely what materials have been used for the purpose, down to the number of yards of ballast. Table 10 gives the cost of maintenance under twenty-five different heads; not only gross cost, but cost per kilometre maintained, and cost per 1,000 kilometres of engine mileage over the road.

I have said enough to show that outside England expenditure on the road, whether out of capital or out of revenue, is both itemised and localised in a way quite unknown here. Now of course the railway manager will smile at the idea of any such particulars being given in this country. For my own part I am not competent to express an opinion which, if any, of them are superfluous. But this much is clear: a good deal of the information, in some not very dissimilar form, must exist at present in the railway offices; indeed, where it concerns the construction, as distinct from maintenance, of the lines, in the archives of the Board of Trade itself. Further, the present figures are obviously insufficient to enable shareholders to know what their property is, how it is being maintained, and where the money for this latter purpose is coming from.

I have dealt in such detail with capital and maintenance of road and buildings, that I may dismiss more briefly the capital and maintenance accounts of rolling stock. Broadly the same statement applies. The English figures are jejune in the extreme; Continental and American statistics are manifold more full. Capital Account, No. 4, of an English railway enters the cost of rolling stock in a single line. This is supplemented by No. 6, Return of Working Stock and Abstracts, B "Locomotive Power," and C "Repairs and Renewals of Carriages and Waggon." Let us put them all together, and see how far the information they give is sufficient. Here are the figures from the report of the Great North of Scotland for the last half-year:—

[No. 4.] *To Expenditure.*

| | | | |
|------------------------|---------|----|----|
| | £ | s. | d. |
| On working stock | 872,477 | 18 | 1 |

[No. 6.] *Return of Working Stock, as at 31st July, 1902.*

| | Engines. | | | Carriages. | | | | | | | | | Total. |
|---------------------------------|----------|-------|--------|------------|------------|------------|------------|-------------------------|-------------------|--------------|------------------|--------------|--------|
| | Tender. | Tank. | Total. | Saloon. | 1st Class. | 3rd Class. | Composite. | Passenger Luggage Vans. | Post-Office Vans. | Horse Boxes. | Carriage Trucks. | Fish Trucks. | |
| Stock at 31st January, 1902 | 97 | 18 | 115 | 2 | 74 | 287 | 60 | 71 | 2 | 20 | 13 | 200 | 729 |
| Stock at 31st July, 1902 | 97 | 18 | 115 | 2 | 74 | 287 | 60 | 72 | 2 | 20 | 13 | 200 | 730 |
| Increase during half-year | — | — | — | — | — | — | — | 1 | — | — | — | — | 1 |
| Decrease during half-year | — | — | — | — | — | — | — | — | — | — | — | — | — |

| | Waggons. | | | | | | | | | | Gross Total. |
|---------------------------------|-------------------|-----------------|------------------|-------------------|-------------------------|--------------------|---------------------|-----------------|------------|------------------|--------------|
| | Goods Brake Vans. | Brake Wag-gons. | Cattle Wag-gons. | Ballast Wag-gons. | Covered Goods Wag-gons. | Open Box Wag-gons. | Low-sided Wag-gons. | Furniture Vans. | Meat Vans. | Timber Wag-gons. | |
| Stock at 31st January, 1902 | 65 | 8 | 265 | 114 | 212 | 2,651 | 150 | 2 | 65 | 24 | 4,400 |
| Stock at 31st July, 1902 | 65 | 8 | 265 | 114 | 212 | 2,651 | 159 | 2 | 65 | 24 | 4,401 |
| Increase during half-year | — | — | — | — | — | — | — | — | — | — | 1 |
| Decrease during half-year | — | — | — | — | — | — | — | — | — | — | — |

Abstracts.

| Half-Year Ending 31st July, 1901. | | Half-Year Ending 31st July, 1902. | |
|--------------------------------------|--|-----------------------------------|-------------|
| £ s. d. | | £ s. d. | £ s. d. |
| 698 17 8 | <i>B. Locomotive Power.</i> { Salaries, office expenses, and superintendence | — | 688 1 3 |
| | Running expenses— | | |
| 9,023 3 8 | { Wages of engine drivers, firemen, &c. | 9,091 17 — | |
| 23,076 15 5 | Coke, coal, and firewood | 20,401 16 2 | |
| 750 12 6 | Water | 705 8 — | |
| 1,481 9 8 | Oil, tallow, and other stores.... | 1,227 5 10 | |
| 34,332 1 3 | | | 31,426 7 — |
| | Repairs and renewals— | | |
| 4,628 3 4 | { Wages for repairs of engines and tenders, &c. | 3,909 13 6 | |
| 3,541 19 3 | { Materials for repairs of en- gines and tenders, &c. | 3,178 19 2 | |
| 8,170 2 7 | | | 7,088 12 8 |
| 43,201 1 6 | <i>C. Repairs and Renewals of Carriages and Wagons.</i> | | 39,203 — 11 |
| | Carriages— | | |
| 203 10 1 | { Salaries, office expenses, and superintendence | 217 13 — | |
| 1,441 8 9 | Wages for repairs | 1,764 19 8 | |
| 1,513 1 9 | Materials for repairs | 1,751 5 6 | |
| 3,158 — 7 | | | 3,733 18 2 |
| | Wagons— | | |
| 188 12 2 | { Salaries, office expenses, and superintendence | 170 11 8 | |
| 1,335 18 2 | Wages for repairs | 1,383 5 11 | |
| 2,794 6 6 | Materials for repairs | 2,450 2 — | |
| 4,318 16 10 | | | 4,003 19 7 |
| 7,476 17 5 | | | 7,737 17 9 |

What, one naturally asks, are these engines? are they on the average ten years old or thirty? are they small shunting engines weighing 20 tons, and worth, when new, 1,200*l.*, or modern express engines, weighing 60 tons, and worth 3,000*l.*? Then, the carriages; are they 4-wheeled boxes, that cost 300*l.* a-piece forty years ago,

or modern 8 or 12-wheelers, worth, perhaps, 2,000*l.* a-piece? Repairs and renewals, what do they consist in? Patching up to keep worn out stock still moving on its last legs, or replacement of stock out of date, though still perhaps quite sound, by modern vehicles four times as costly? English railway practice reports, or at least has reported in the past, under the headings given above, financial extremes as widely divergent as these two imagined instances. A return on the German pattern showing the age and weight of every locomotive, and what percentage were in working condition on a given day, might have saved the shareholders of a company not long since from suddenly seeing the bulk of their normal dividend written off as contribution to a "rolling stock renewal suspense account."

I subjoin a portion of the information given under this head by an American company. With these tables before them, railway shareholders have only themselves to thank if their directors, over a series of years, allow their property to run down. The first table, it will be observed, shows that the company has increased its locomotive power about 12 per cent. during the year, its carriage capacity about 3 per cent., and yet that no change whatever has been made to capital on this account. The second table, with its large percentages of engines "in service needing repairs," is striking proof how the rush of traffic in America has overtaxed the resources even of the greatest and richest companies. Of course it is bad economy to work engines needing repairs. But where the alternative is not to carry the traffic at all, it is the lesser of two evils. Still the company did something to cope with its difficulties, as it put a new engine into service every three days throughout the whole twelvemonth.

Equipment Owned by the Pennsylvania Railroad Company, 31st December, 1901.

| | Available for Service, 31st December, 1900. | Acquired as Additions to Equipment during 1901. | Destroyed or Transferred to other Classes during 1901. | Built to Fill Vacancies or Transferred from other Classes during 1901. | Total Increase or Decrease. | Available for Service, 31st December, 1901. | Capacity. | | Valuation as Carried on General Ledger | |
|--|---|---|--|--|-----------------------------|---|------------------------------|------------|--|----------------------|
| | | | | | | | 1901. | 1900. | 31st December, 1901. | 31st December, 1900. |
| <i>Locomotives.</i> | | | | | | | | | \$ | \$ |
| Passenger | 470 | 39 | 24 | 24 | + 39 | 509 | Tractive Power. lbs. | 8,049,500 | 6,997,126 | 8,049,500 |
| Freight | 1,184 | 88 | 76 | 68 | + 80 | 1,264 | | 32,914,348 | 28,073,415 | 32,914,348 |
| Shifting | 235 | ... | 12 | 20 | - 8 | 243 | | 4,473,060 | 4,255,470 | 4,473,060 |
| Total | 1,889 | 127 | 112 | 112 | + 127 | 2,016 | 45,436,908 | 39,326,011 | 45,436,908 | 45,436,908 |
| <i>Passenger car equipment.</i> | | | | | | | Passengers. Seating capacity | 65,990 | 65,990 | 65,990 |
| Passenger | 1,072 | 21 | 58 | 58 | + 21 | 1,093 | 67,310 | 67,310 | 67,310 | 67,310 |
| " 2nd class | 76 | ... | 9 | ... | - 9 | 67 | 201 | 201 | 201 | 201 |
| Parlor | 6 | ... | ... | ... | ... | 6 | 654 | 654 | 654 | 654 |
| Dining | 14 | 6 | ... | ... | + 6 | 20 | 474 | 474 | 474 | 474 |
| Passenger baggage | 206 | 3 | 29 | 37 | + 11 | 217 | 8,422 | 7,742 | 8,422 | 7,742 |
| " mail | 12 | ... | ... | 1 | + 1 | 13 | 306 | 262 | 306 | 262 |
| Baggage mail | 56 | ... | 2 | 6 | + 4 | 60 | ... | ... | ... | ... |
| " | 103 | ... | 4 | 4 | ... | 103 | ... | ... | ... | ... |
| Express | 13 | ... | 2 | ... | - 2 | 11 | ... | ... | ... | ... |
| Baggage express | 151 | 17 | 9 | 2 | + 10 | 161 | ... | ... | ... | ... |
| Refrigerator express | 11 | 4 | ... | 1 | + 5 | 16 | ... | ... | ... | ... |
| Postal letter | 35 | 1 | 3 | 3 | + 1 | 36 | ... | ... | ... | ... |
| " paper | 11 | 1 | 2 | 2 | + 1 | 12 | ... | ... | ... | ... |
| " storage | 9 | ... | ... | 4 | + 4 | 13 | ... | ... | ... | ... |
| Dynamometer | 1 | ... | ... | ... | ... | 1 | ... | ... | ... | ... |
| Passenger (electric motor), B. and Mt. H. T. R. R. ... } | 3 | ... | ... | ... | ... | 3 | 150 | 150 | 150 | 150 |
| Total | 1,779 | 53 | 118 | 118 | + 53 | 1,832 | 77,043 | 74,819 | 77,043 | 74,819 |
| | | | | | | | | | 6,398,583.65 | 6,398,583.65 |

Equipment Owned by the Pennsylvania Railroad Company, 31st December, 1901—Contd.

| | Available for Service, 31st December, 1900. | Acquired as Additions to Equipment during 1901. | Destroyed or Transferred to other Classes during 1901. | Built to Fill Vacancies or Transferred from other Classes during 1901. | Total Increase or Decrease. | Available for Service, 31st December, 1901. | Capacity. | | Valuation as Carried on General Ledger. | |
|--|---|---|--|--|-----------------------------|---|--------------------------------|--------------------------------|---|----------------------|
| | | | | | | | 1901. | 1900. | 31st December, 1901. | 31st December, 1900. |
| <i>Freight car equipment.</i> | | | | | | | Tons. | Tons. | \$ | \$ |
| Box | 11,925 | ... | 742 | 548 | - 194 | 11,731 | 356,600 | 349,495 | ... | ... |
| Refrigerator | 752 | ... | 11 | 11 | ... | 752 | 18,525 | 18,450 | ... | ... |
| Stock | 1,929 | ... | 70 | 70 | ... | 1,929 | 48,305 | 47,935 | ... | ... |
| Gondolas | 32,607 | ... | 1,189 | 1,200 | + 11 | 32,618 | 914,645 | 882,855 | ... | ... |
| Four-wheel cabin | 890 | ... | 131 | 131 | + 16 | 906 | ... | ... | ... | ... |
| Box (Empire line) | 3,995 | ... | 146 | 341 | + 195 | 4,190 | 124,815 | 115,350 | ... | ... |
| Refrigerator (Empire line) | 60 | ... | ... | ... | ... | 60 | 1,500 | 1,500 | ... | ... |
| Rack (Empire line) | 1 | ... | 1 | ... | - 1 | ... | ... | 15 | ... | ... |
| Tank cars (Green line) | 625 | ... | 11 | ... | - 11 | 614 | 56,660 bbls. | 57,600 | ... | ... |
| Total | 52,784 | 16 | 2,301 | 2,301 | + 16 | 52,800 | tons 1,464,440 bbls. 56,660 | tons 1,415,600 bbls. 57,600 | 18,966,890'91 | 18,966,890'91 |
| <i>Maintenance of way equipment.</i> | | | | | | | | | | |
| Cabin | 55 | ... | 15 | ... | - 15 | 40 | ... | ... | ... | ... |
| Tool and block | 118 | ... | 21 | 10 | - 11 | 107 | ... | ... | ... | ... |
| Snow ploughs | 3 | ... | ... | ... | ... | 3 | ... | ... | ... | ... |
| " sweepers | 1 | ... | ... | ... | ... | 1 | ... | ... | ... | ... |
| Derrick | 76 | ... | 2 | ... | - 2 | 74 | ... | ... | ... | ... |
| Stone and wood trucks, and flat cars } | 1,123 | ... | 11 | 11 | ... | 1,123 | ... | ... | ... | ... |
| Test weight | ... | 1 | ... | 3 | + 4 | 4 | ... | ... | ... | ... |
| Hand cars | 786 | 23 | 46 | 45 | + 22 | 808 | ... | ... | ... | ... |
| " trucks | 1,069 | 19 | 22 | 22 | + 19 | 1,088 | ... | ... | ... | ... |
| Total | 3,231 | 43 | 117 | 91 | + 17 | 3,248 | ... | ... | 177,425'55 | 177,425'55 |

Equipment Owned by the Pennsylvania Railroad Company, 31st December, 1901—Contd.

| | Available for Service, 31st December, 1900. | Acquired as Additions to Equipment during 1901. | Destroyed or Transferred to other Classes during 1901. | Built to Fill Vacancies or Transferred from other Classes during 1901. | Total Increase or Decrease. | Available for Service, 31st December, 1901. | Capacity. | | Valuation as Carried on General Ledger. | |
|---|---|---|--|--|-----------------------------|---|-----------|-------|---|----------------------|
| | | | | | | | 1901. | 1900. | 31st December, 1901. | 31st December, 1900. |
| <i>Floating equipment.</i> | | | | | | | | | \$ | \$ |
| Steam ferry-boats | 14 | ... | 1 | 1 | ... | 14 | ... | ... | ... | ... |
| Tug boats | 32 | ... | 1 | 1 | ... | 32 | ... | ... | ... | ... |
| Steam lighters | 3 | ... | ... | ... | ... | 3 | ... | ... | ... | ... |
| Barges | 86 | 5 | ... | ... | + 5 | 91 | ... | ... | ... | ... |
| Flat scows | 30 | ... | ... | ... | ... | 30 | ... | ... | ... | ... |
| Dump " | 4 | ... | ... | ... | ... | 4 | ... | ... | ... | ... |
| Car floats | 66 | 2 | 2 | 2 | + 2 | 68 | ... | ... | ... | ... |
| Canal barges | 25 | ... | 3 | ... | - 3 | 22 | ... | ... | ... | ... |
| Dredgers | 3 | ... | ... | ... | ... | 3 | ... | ... | ... | ... |
| Total | 263 | 7 | 7 | 4 | + 4 | 267 | ... | ... | 2,236,353'25 | 2,236,353'25 |
| Grand total | ... | ... | ... | ... | ... | ... | ... | ... | 42,978,823'71 | 42,978,823'71 |
| Tools and machinery } in shops | ... | ... | ... | ... | ... | ... | ... | ... | 1,618,218'88 | 1,618,218'88 |
| Total valuation of } equipment as } per general } ledger | ... | ... | ... | ... | ... | ... | ... | ... | 44,597,042'59 | 44,597,042'59 |

Note.—This statement embraces only the equipment absolutely owned by the company, and therefore does *not* include 33,521 freight cars, with a capacity of 1,287,680 tons, leased under various car trusts and under the equipment trust gold loan.

Equipment Leased under Car Trusts, 31st December, 1901.

| | Date at which Cars will become Property of P.R.R. | Number. | Capacity. |
|---|---|---------|-----------|
| Pennsylvania rolling stock— | | | Tons. |
| Series "A" and "B" box | 1st April, 1902 | 3,161 | 95,430 |
| Series "C" and "D" box | 1st July, 1902 | 1,339 | 40,700 |
| " "C" and "D" hopper } gondola | 1st " " '02 | 2,000 | 60,550 |
| Series "C" and "D" long gondola | 1st " " '02 | 54 | 2,160 |
| " "C" and "D" steel " " | 1st " " '02 | 115 | 5,750 |
| Series "E," "F," and "G" steel } gondola | 1st October, 1908.... | 1,000 | 50,000 |
| Series "E," "F," and "G" box.... | 1st " " '08.... | 2,000 | 80,000 |
| " "E," "F," and "G" long } gondola | 1st " " '08.... | 1,946 | 77,840 |
| Series "H," "I," and "K" box.... | 1st April, 1909 | 2,000 | 80,000 |
| " "H," "I," and "K" } hopper gondola | 1st " " '09 | 1,910 | 76,400 |
| Pennsylvania car trust— | | | |
| Series "A," "B," and "C" steel } gondola | 1st November, 1909 | 500 | 25,000 |
| Series "A," "B," and "C" long } gondola | 1st " " '09 | 1,284 | 51,860 |
| Series "A," "B," and "C" box.... | 1st " " '09 | 430 | 17,200 |
| Series "F," "G," "H," "I," } and "K" box | 1st February, 1910 | 4,000 | 160,000 |
| Series "K" steel gondola | 1st February, 1910 | 500 | 25,000 |
| " "K" long " " | 1st " " '10 | 325 | 13,000 |
| Pennsylvania equipment trust— | | | |
| Series "A" box..... | 1st December, 1910 | 153 | 6,120 |
| " "B" " " | 1st " " '10 | 410 | 16,400 |
| " "B" long gondola..... | 1st June, 1911 | 1,000 | 40,000 |
| " "C" steel " " | 1st " " '11 | 505 | 25,250 |
| " "D" and "E" steel gondola | 1st " " '11 | 1,495 | 74,750 |
| " "E" flat..... | 1st " " '11 | 500 | 20,000 |
| " "E" and "F" box | 1st " " '11 | 437 | 17,480 |
| " "E" and "F" box | 1st " " '11 | | |
| * Series "F" and "G" box cars | 1st " " '11 | 695 | 34,750 |
| * Series "H" and "I" steel } gondolas | | 625 | 31,250 |
| | | 28,384 | 1,126,390 |

* Certificates covering these cars will not be issued until 1902, although cars are in service.

Comparison of the Condition of the Motive Power Equipment.

| Condition. | P. R. R. Division. | | U. R. R. of N. J. Division. | | P. and E. R. R. Division. | |
|---|----------------------|----------------------|-----------------------------|----------------------|---------------------------|----------------------|
| | 31st December, 1901. | 31st December, 1900. | 31st December, 1901. | 31st December, 1900. | 31st December, 1901. | 31st December, 1900. |
| | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. |
| In service in good working order | 81 $\frac{3}{10}$ | 79 | 79 $\frac{2}{10}$ | 78 $\frac{7}{10}$ | 78 $\frac{2}{10}$ | 78 $\frac{7}{10}$ |
| „ requiring repairs | 11 $\frac{7}{10}$ | 13 $\frac{4}{10}$ | 7 $\frac{4}{10}$ | 8 $\frac{1}{10}$ | 12 | 12 $\frac{1}{10}$ |
| In shop under repairs | 3 $\frac{8}{10}$ | 4 $\frac{9}{10}$ | 9 $\frac{8}{10}$ | 10 $\frac{5}{10}$ | 3 $\frac{6}{10}$ | 4 $\frac{3}{10}$ |
| „ awaiting repairs | 1 | 2 $\frac{2}{10}$ | — | — | 1 $\frac{3}{10}$ | 0 $\frac{5}{10}$ |
| Leased | 2 $\frac{2}{10}$ | 0 $\frac{5}{10}$ | 2 $\frac{1}{10}$ | 0 $\frac{3}{10}$ | 3 $\frac{1}{10}$ | — |
| Condemned | — | — | 0 $\frac{8}{10}$ | 2 $\frac{4}{10}$ | — | — |
| Loaned temporarily to P. R. R. Div. | — | — | — | — | 1 $\frac{8}{10}$ | 3 $\frac{9}{10}$ |
| „ U. R. R. of } N. J. Division | — | — | — | — | — | 0 $\frac{5}{10}$ |

| Condition. | B. and A. V. Division (P. R. R. Assigned Locomotives). | | Total. | | B. and A. V. Division.* | |
|---|---|----------------------|----------------------|----------------------|-------------------------|----------------------|
| | 31st December, 1901. | 31st December, 1900. | 31st December, 1901. | 31st December, 1900. | 31st December, 1901. | 31st December, 1900. |
| | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. |
| In service in good working order | 50 | — | 80 $\frac{3}{10}$ | 78 $\frac{2}{10}$ | 69 $\frac{4}{10}$ | 87 $\frac{4}{10}$ |
| „ requiring repairs | — | — | 10 $\frac{8}{10}$ | 12 $\frac{2}{10}$ | 10 $\frac{9}{10}$ | 3 $\frac{3}{10}$ |
| In shop under repairs..... | 8 $\frac{3}{10}$ | — | 5 | 6 | 8 $\frac{4}{10}$ | 7 $\frac{9}{10}$ |
| „ awaiting repairs | — | — | 0 $\frac{9}{10}$ | 1 $\frac{5}{10}$ | 5 $\frac{4}{10}$ | 1 $\frac{4}{10}$ |
| Leased | — | — | 2 $\frac{2}{10}$ | 0 $\frac{4}{10}$ | — | — |
| Condemned | — | — | 0 $\frac{1}{10}$ | 0 $\frac{5}{10}$ | 1 $\frac{7}{10}$ | — |
| Loaned temporarily to P. R. R. Div. | 41 $\frac{7}{10}$ | — | 0 $\frac{7}{10}$ | 0 $\frac{4}{10}$ | — | — |
| „ U. R. R. of } N. J. Division | — | — | — | 0 $\frac{1}{10}$ | 4 $\frac{2}{10}$ | — |

* Includes Pennsylvania Railroad assigned locomotives.

Mileage of Locomotives.

| | Passenger. | Freight. | Work. | Totals. |
|--|------------|------------|-----------|------------|
| Pennsylvania Railroad { 1901 | 10,621,445 | 30,218,606 | 2,588,331 | 43,428,382 |
| Division { 1900 | 10,104,981 | 30,008,424 | 2,179,814 | 42,293,219 |
| Increase | 516,464 | 210,182 | 408,517 | 1,135,163 |
| United Railroads of { 1901 | 6,799,999 | 6,788,972 | 601,266 | 14,190,237 |
| New Jersey Division { 1900 | 6,623,859 | 6,384,788 | 487,045 | 13,495,692 |
| Increase | 176,140 | 404,184 | 114,221 | 694,545 |
| Philadelphia and Erie { 1901 | 1,661,887 | 5,031,253 | 247,107 | 6,940,247 |
| Railroad Division { 1900 | 1,273,305 | 4,425,309 | 166,207 | 5,864,821 |
| Increase | 388,582 | 605,944 | 80,900 | 1,075,426 |
| Total { 1901 | 19,083,331 | 42,038,831 | 3,436,704 | 64,558,866 |
| { 1900 | 18,002,145 | 40,818,521 | 2,833,066 | 61,653,732 |
| Increase | 1,081,186 | 1,220,310 | 603,638 | 2,905,134 |
| Buffalo and Allegheny Valley Division— | | | | |
| 1901 | 2,577,716 | 4,551,410 | 305,885 | 7,435,011 |
| 1st August to 31st } December, 1900 | 869,168 | 1,835,144 | 73,678 | 2,777,990 |

Cost per 100 Miles Run of Locomotives for Repairs, Fuel, Stores, and Roundhousemen.

| | Repairs. | Fuel. | Stores. | Round-housemen. | Totals. |
|--|----------|-------|---------|-----------------|---------|
| | \$ | \$ | \$ | \$ | \$ |
| Pennsylvania Railroad { 1901 | 6·87 | 7·86 | 0·25 | 1·52 | 16·50 |
| Division { 1900 | 6·17 | 7·22 | 0·25 | 1·51 | 15·15 |
| Increase | 0·70 | 0·64 | — | 0·01 | 1·35 |
| United Railroads of { 1901 | 5·04 | 10·75 | 0·24 | 1·49 | 17·52 |
| New Jersey Division { 1900 | 4·98 | 10·29 | 0·24 | 1·50 | 17·01 |
| Increase | 0·06 | 0·46 | — | — | 0·51 |
| Decrease | — | — | — | 0·01 | — |
| Philadelphia and Erie { 1901 | 4·59 | 8·12 | 0·19 | 1·20 | 14·10 |
| Railroad Division { 1900 | 5·13 | 7·33 | 0·18 | 1·27 | 13·91 |
| Increase | — | 0·79 | 0·01 | — | 0·19 |
| Decrease | 0·54 | — | — | 0·07 | — |
| Total { 1901 | 6·22 | 8·53 | 0·24 | 1·48 | 16·47 |
| { 1900 | 5·81 | 7·91 | 0·24 | 1·48 | 15·44 |
| Increase | 0·41 | 0·62 | — | — | 1·03 |
| Buffalo and Allegheny Valley Division— | | | | | |
| 1901 | 5·34 | 7·37 | 0·30 | 1·29 | 14·30 |
| 1st August to 31st } December, 1900 | 4·75 | 7·04 | 0·33 | 1·23 | 13·35 |

Passenger Equipment Mileage.

All lines operated directly.

| | P. R. R. Division. | U. R. R. of N. J. Division. | P. and E. Division. | Total. | Comparison with 1900. | | B. and A. V. Division. | Total all Lines Operated Directly. |
|---|-----------------------|--------------------------------|------------------------|------------|-----------------------|-----------|---------------------------|--|
| | | | | | Increase. | Decrease. | | |
| Passenger, coach | 21,041,352 | 14,266,577 | 3,253,330 | 38,561,259 | 2,275,428 | — | 5,253,269 | 43,814,528 |
| " combined..... | 4,061,146 | 3,055,692 | 636,924 | 7,753,762 | 140,178 | — | 682,506 | 8,436,268 |
| " 2nd class | 697,353 | 234,944 | 17,822 | 950,119 | — | 6,685 | 362,485 | 1,312,604 |
| Dining | 521,566 | 546,683 | 80,580 | 1,148,829 | 137,974 | — | 70,606 | 1,219,435 |
| Parlor | 1,261 | 78,660 | 574 | 80,495 | 23,389 | — | — | 80,495 |
| Burlington and Mount Holly Traction Electric } | — | 73,022 | — | 73,022 | — | 16,865 | — | 73,022 |
| Street (W. J. and S. R. R.).... | — | 535 | — | 535 | 227 | — | — | 535 |
| Pullman | 10,083,129 | 6,361,983 | 948,489 | 17,393,601 | 1,139,568 | — | 1,197,982 | 18,591,583 |
| Postal | 3,545,119 | 1,209,830 | 29,450 | 4,784,399 | 443,860 | — | 29 | 4,784,428 |
| " storage..... | 725,826 | 174,020 | — | 899,846 | 188,003 | — | — | 899,846 |
| Baggage express. | 12,856,068 | 4,244,848 | 1,726,046 | 18,826,962 | 1,414,792 | — | 2,429,607 | 21,256,569 |
| Total | 53,532,820 | 30,246,794 | 6,693,215 | 90,472,829 | 5,689,869 | — | 9,996,484 | 100,469,313 |

Note.—Philadelphia and Erie Railroad Division figures for year 1900 include mileage made on low grade division from 1st August to 31st December inclusive.

So far we have been dealing with accounts which, however important, are after all only preliminary to the real business for which a railway company exists, namely, the transport of persons and things.⁵ And if our half-yearly reports have been found jejune so far, their information has been lavish compared to that furnished under the most important head of all. Here is practically everything that the shareholders are told :—

North Eastern Railway Company, June, 1902.

D. Traffic Expenses.

| | £ | s. | d. | £ |
|---|---------|----|----|---------|
| Salaries and wages..... | 634,049 | 7 | 5 | 623,942 |
| Dock expenses—shipping coal, dock master, &c..... | 54,618 | 8 | 9 | 58,727 |
| Fuel, lighting, water, and general stores | 77,510 | 10 | 10 | 75,412 |
| Clothing | 9,886 | 15 | 6 | 11,413 |
| Printing, stationery, and tickets | 22,376 | 17 | 6 | 21,413 |
| Horses, harness, vans, provender, &c. | 5,829 | 13 | 6 | 5,308 |
| Wagon covers, ropes, &c. | 13,700 | 7 | 4 | 9,602 |
| Joint station expenses | 15,138 | 1 | 3 | 12,895 |
| Miscellaneous „ | 4,346 | 19 | — | 4,129 |
| | 837,457 | 1 | 1 | 822,841 |

E. General Charges.

| | £ | s. | d. | £ |
|---|--------|----|----|--------|
| Directors | 4,250 | — | — | 4,250 |
| Auditors | 300 | — | — | 300 |
| Salaries—secretary, general manager, accountant, and clerks | 31,113 | 3 | 2 | 31,049 |
| Office, travelling, and incidental expenses | 5,301 | 7 | 1 | 6,483 |
| Advertising..... | 1,860 | — | 2 | 1,609 |
| Fire insurance | 3,750 | — | — | 3,750 |
| Electric telegraph expenses..... | 13,633 | 4 | 3 | 13,780 |
| Railway clearing house expenses..... | 11,531 | 6 | — | 11,522 |
| Contribution to superannuation funds | 8,506 | 16 | 10 | 8,164 |
| | 80,245 | 17 | 6 | 80,907 |

*F. Stationary Engines and Self-Acting Inclines, &c.**

| | £ | s. | d. | £ |
|------------------|--------|----|----|--------|
| Wages..... | 12,415 | 15 | 2 | 11,071 |
| Ropes | 548 | 6 | 8 | 64 |
| Materials | 4,920 | 18 | 9 | 2,421 |
| Horse hire | 1,358 | 4 | 1 | 1,108 |
| | 19,243 | 4 | 8 | 14,664 |

* This Abstract F is, I believe, peculiar to the North Eastern, which carries large quantities of coal down inclines, many of which must have been in existence before Tyneside had ever heard of George Stephenson and his audacious innovation.

⁵ There is one exception to this statement. Abstract B given above includes, it will be seen, “running expenses,” that is, the money spent on working the locomotives, wages of drivers and firemen, and coal burnt on the line. Clearly these items are in their wrong place mixed up with maintenance and repairs: they belong to what the Americans call “conducting transportation” (*exploitation, Betrieb*), and ought to be included under “traffic expenses.” The explanation of their anomalous position is to be found in the historical organisation of English railways.

Dr.[No. 9.] *Revenue Account.**Cr.*

| Expenditure. | | | | Receipts. | | | |
|--|--|--|--|---|--|--|--|
| 30th June, 1902. | | | | 30th June, 1902. | | | |
| £ s. d. | | | | £ s. d. | | | |
| 30th June, 1901. | | | | 30th June, 1901. | | | |
| £ | | | | £ | | | |
| To maintenance of way, works, } See and stations } Abstract A | | | | By passenger traffic— | | | |
| Locomotive power..... B | | | | Number of Passengers. | | | |
| Carriage and wagon repairs ... C | | | | 1902. | | | |
| Traffic expenses D | | | | 1901. | | | |
| General charges E | | | | 1st class ... | | | |
| Stationary engines, inclines, &c. F | | | | 2d, 3rd, &c. ... | | | |
| Law charges G | | | | Periodical } tickets ... } | | | |
| Parliamentary expenses H | | | | 44,788 | | | |
| Compensation (accidents and losses)— | | | | 42,895 | | | |
| Personal injury..... I | | | | Parcels, horses, carriages, and dogs ... | | | |
| Damage to and loss of } goods, &c. } 13,594 1 8 | | | | Mails ... | | | |
| Rates and taxes..... J | | | | Merchandise traffic ... | | | |
| Government duty K | | | | Less collection and delivery... .. | | | |
| Balance—carried to net revenue account } No. 10 | | | | Live stock traffic ... | | | |
| | | | | Mineral traffic ... | | | |
| | | | | Miscellaneous receipts, viz.— | | | |
| | | | | Rents and receipts on real property ... | | | |
| | | | | Transfer fees ... | | | |
| | | | | Dock revenue ... | | | |
| | | | | Mileage and demurrage of waggons, &c. ... | | | |
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[No. 15.] *Statement of Train Mileage.*

| | Half-Year ending 30th June, 1902. | Half-Year ending 30th June, 1901. |
|-------------------------------|--------------------------------------|--------------------------------------|
| Passenger trains | 7,172,666 | 7,155,845 |
| Goods and mineral trains..... | 7,468,914 | 8,094,496 |
| Total | 14,641,580 | 15,250,341 |

The omissions in the Revenue Account—or rather the fact that traffic, and then only passenger traffic, is merely regarded as an incident of revenue to be casually hinted at in a side note—are surely most curious. The shareholder may assume that his railway carried some goods traffic, as it earned a million and a half sterling by carrying it. But what that traffic was, and what quantity was carried, he has no notion, except so far as the mention of “mineral trains” in the “Train Mileage Statement” may lead him to suspect that a certain quantity of coal was one of the items. Even where certain particulars are given, they are carefully calculated to conceal facts. “Periodical tickets, 44,748,” include an unknown number of workmen’s weekly tickets at 1s. or thereabouts, and also an unknown number of first class tickets available for twelve months over large sections of the system, and costing perhaps 30l. or 40l. As for Abstracts D and E, it really hardly seems worth while splitting up E into nine items, when one single item in D, which is not regarded as needing subdivision, is eight times as large as the whole nine put together. Moreover the items in D are mainly not General Expenses at all. Travelling, insurance, advertising, and superannuation should be split up among the different departments. “Railway Clearing House” is wholly “telegraph,” chiefly a traffic charge.

Here are the corresponding abstracts from an American report—once more, be it observed, not for the entire system of the company, but for a single division. It will be observed that, while general expenses have shrunk to eight entries, traffic expenses have expanded from 9 to 47 :—

Pennsylvania Railroad Company.
United Railroads of New Jersey Division.
 Expenses in Detail—*Contd.*

| Accounts. | 1901. | Comparison with 1900. | |
|---|--------------|-----------------------|-----------|
| | | Increase. | Decrease. |
| | \$ | \$ | \$ |
| <i>Conducting Transportation.</i> | | | |
| Superintendence | 62,813·39 | 824·18 | — |
| Clerks, attendants, and office } expenses | 176,828·63 | 12,076·38 | — |
| Enginememen and firemen | 916,207·07 | 51,197·36 | — |
| Roundhousemen | 211,023·12 | 8,552·40 | — |
| Locomotives, fuel for | 1,461,086·41 | 122,846·82 | — |
| Fuel stations, expenses of | 65,634·59 | — | 1,679·74 |
| Locomotives, water supply for.... | 85,782·34 | 9,805·60 | — |
| " stores for | 32,769·26 | 1,589·90 | — |
| " other supplies for | 23,639·38 | 1,543·20 | — |
| Conductors, baggagemen, and } brakemen | 767,557·27 | 47,954·60 | — |
| Cars, heating and lighting | 63,458·16 | 16,184·46 | — |
| " cleaning | 95,162·43 | 15,946·47 | — |
| " lubricating | 26,863·37 | 3,212·82 | — |
| Other train supplies and expenses | 65,206·84 | — | 295·94 |
| Yardmen | 839,799·68 | 47,171·22 | — |
| Switch-tenders and signalmen.... | 110,736·60 | 3,645·12 | — |
| Watchmen | 244,656·08 | 1,358·21 | — |
| Telegraph expenses | 323,129·58 | 14,469·48 | — |
| Station agents and clerks | 932,198·94 | 26,539·70 | — |
| " labor | 1,735,828·92 | 56,593·18 | — |
| Stations, heating and lighting.... | 139,703·69 | 18,880·09 | — |
| Signals and interlocking plants, } expenses of operation and } supplies | 55,782·80 | 4,876·68 | — |
| Stations, other supplies and } expenses of | 132,639·35 | 14,083·80 | — |
| Switching charges, balance | 1,795·25 | 144·75 | — |
| Car mileage, balance | 173,852·29 | 14,613·76 | — |
| Loss and damage | 55,286·89 | 1,604·98 | — |
| Injuries to persons | 16,898·40 | 2,391·31 | — |
| Wrecks, clearing | 24,479·30 | 3,438·59 | — |
| Barges, car-floats, and canal- } boats, charters | 166,765·06 | 51,538·91 | — |
| Barges, car-floats, and canal- } boats, incidentals | 39,633·82 | — | 828·15 |
| Barges, car-floats, and canal- } boats, superintendence and } manning | 154,818·57 | — | 9,083·45 |
| Elevation and 'longshore labor | 196,730·07 | 2,159·45 | — |
| Steamboats and tug-boats, } charts | 54,846·80 | — | 322·08 |
| Steamboats and tug-boats, fuel } for | 364,022·84 | 45,998·27 | — |
| Steamboats and tug-boats, } incidentals | 75,989·12 | 872·68 | — |
| Steamboats and tug-boats, } superintendence and man- } ning | 465,995·20 | 7,604·25 | — |
| Advertising | 109,395·07 | 8,684·43 | — |

*United Railroads on New Jersey Division—Contd.**Expenses in Detail—Contd.*

| Accounts. | 1901. | Comparison with 1900. | |
|---|---------------|-----------------------|-----------|
| | | Increase. | Decrease. |
| | \$ | \$ | \$ |
| Foreign agencies | 116,505·70 | — | 424·80 |
| Stock yards and elevators | 30,973·74 | 12,817·64 | — |
| Rents for tracks, yards, and terminals } | 85,678·57 | 14,317·91 | — |
| Rents of buildings and other property } | 364,250·86 | 216·35 | — |
| Stationery and printing | 151,546·74 | 380·01 | — |
| Motormen and conductors | 3,538·47 | — | 525·93 |
| Power-houses, expenses of operation } | 5,568·49 | — | 1,113·78 |
| Yard and street lighting | 8,779·41 | — | 442·99 |
| Insurance | 91,681·89 | 580·25 | — |
| Incidentals | 29,735·66 | — | 8,364·02 |
| Total | 11,357,276·11 | 623,634·33 | — |
| <i>General Expenses.</i> | | | |
| Clerks | 206,304·41 | 13,948·00 | — |
| Heat and light | 123·70 | — | 9·75 |
| Office expenses and supplies | 5,292·13 | — | 177·86 |
| Relief department, expenses of | 31,923·51 | 14,435·88 | — |
| Law expenses | 26,929·61 | 4,309·72 | — |
| Stationery and printing, general office } | 30,920·35 | 5,580·48 | — |
| Advertising | 206·79 | 125·26 | — |
| Incidentals | 3,884·43 | 3,414·19 | — |
| Total | 305,584·93 | 41,625·92 | — |

This return, it will be observed, divides salaries and wages under about a dozen heads, and separates train staff from station staff, goods yards staff and signal staff, all of whom are lumped together with us. The French returns classify the staff in twenty-four categories; giving for each company the number in each category, but do not show the wages paid to them. Our Board of Trade does at irregular intervals publish a census of railway employees in different classes, but has never, I think, endeavoured to correlate the numbers with the wages paid, which latter figures are annually dealt with in its Report.

The Returns under the Act of 1871, it should be mentioned, do give one or two figures that the half-yearly reports omit, of which the important ones are the tonnage carried of goods and minerals,

each separately.⁶ But even so, they give no figures showing what the company really does, and what it charges for it. All we know is the company obtains, say, 5s. for each ton of merchandise it carries. But a ton of what, carried how far? A ton of bricks carried 10 miles, or a ton of furniture carried a hundred? We can only guess. The question "how far" would of course be answered by the production of ton-mile statistics, as to which I will only add one word to what I have said already. For the Board of Trade to require these to be produced would not be to sin against the canon I have proposed, viz., that statistics should not be specially produced for publication, but should be published after being produced for practical purposes, because ton-mile statistics—not annual, but weekly, or at least monthly—are found to be of great practical use in all other countries. The question, what is the composition of the traffic carried, is answered in very convenient form by the following table, which has been elaborated by the Statistician of the Interstate Commerce Commission, with the help of the American Association of Railroad Accounting Officers, and which now appears in all American railway reports. I cannot believe that there would be any difficulty in producing a similar table here:—

⁶ They also give a figure which perhaps would be just as well omitted, "Percentage proportion of expenditure to total receipts," which the Americans more briefly call "working ratio," and the French "*coefficient d'exploitation*." I say it might be better omitted, because the working ratio is often used as though it were a scale by which efficiency and economy of operation might be judged. This it can only be when all the other factors are constant, which they never are. Take an extreme instance. Imagine a railway with an average receipt of 1d. per ton-mile worked at 50 per cent. The following year Parliament, in its wisdom, cuts down the statutory maxima, and the average receipts fall to $\frac{2}{3}$ d. per ton-mile in consequence. The working ratio will now be 75 per cent., and its increase will be quoted by the quidnuncs who air their opinions in the press or at the half-yearly meetings, as a proof of the ineptitude of the management of the company.

*Classification of Freight Traffic.**
All lines operated directly.

| | P. R. R. Division. | U. R. R. of N. J. Division, D. and R. Canal. | P. and E. R. R. Division. | Total. | Comparison with 1900. Increase or Decrease. | B. and A. V. Division. | Aggregate Lines East of Pittsburgh and Erie Operated Directly. |
|------------------------------------|-----------------------|--|------------------------------|-----------|---|---------------------------|---|
| | Tons. | Tons. | Tons. | Tons. | Tons. | Tons. | Tons. |
| <i>Products of Agriculture.</i> | | | | | | | |
| Grain | 1,576,812 | 448,788 | 400,145 | 2,425,745 | — 298,132 | 140,623 | 2,566,368 |
| Flour | 537,223 | 257,970 | 270,849 | 1,066,042 | + 18,023 | 97,483 | 1,163,525 |
| Other mill products | 350,588 | 131,737 | 121,189 | 603,514 | + 7,003 | 69,146 | 672,660 |
| Hay | 179,048 | 101,959 | 57,483 | 338,490 | — 39,356 | 35,573 | 374,063 |
| Tobacco | 58,124 | 30,773 | 11,070 | 99,967 | — 16,989 | 2,242 | 102,209 |
| Cotton | 53,417 | 64,689 | 6,388 | 124,494 | — 15,900 | 888 | 125,382 |
| Fruits and vegetables | 375,232 | 349,314 | 152,165 | 876,711 | — 69,501 | 149,868 | 1,026,579 |
| Other articles | 168,727 | 111,752 | 148,984 | 429,463 | — 30,261 | 41,986 | 471,449 |
| <i>Products of Animals.</i> | | | | | | | |
| Live stock | 444,548 | 168,804 | 44,448 | 657,800 | — 54,597 | 19,419 | 677,219 |
| Dressed meats | 141,765 | 78,811 | 15,602 | 236,178 | — 59,551 | 7,394 | 243,572 |
| Other packing-house products | 147,949 | 56,583 | 21,632 | 226,164 | — 86,618 | 8,996 | 235,160 |
| Poultry, game, and fish | 65,097 | 52,031 | 16,806 | 133,934 | — 13,277 | 2,636 | 136,570 |
| Wool | 16,680 | 14,732 | 1,581 | 32,993 | — 13,562 | 998 | 33,991 |
| Hides and leather | 100,980 | 103,082 | 85,181 | 289,243 | + 16,029 | 51,382 | 340,625 |
| Other articles | 261,920 | 286,769 | 73,689 | 622,378 | — 93,304 | 63,597 | 685,975 |

Note.—As the lines embraced by the Buffalo and Allegheny Valley Division were operated by the Pennsylvania Railroad Company for five months only in 1900, no comparisons with that year can be shown for this division or for any totals in which its operations are included.

* It will be observed that these figures are tons only, not ton-miles. The Interstate Commerce Commission lately proposed to call on the companies to give the ton-milage of each item. The companies protested vehemently, and as it seems to me with entire justice, that the cost would be enormous and quite incommensurate with the advantages to be gained. The excellent Indian statistics give both tons carried and gross receipts for their principal articles of traffic, but not ton-miles. The New South Wales returns, on the other hand, do give ton-miles, but only enumerate about half-a-dozen principal articles.

Classification of Freight Traffic—Contd.
All lines operated directly.

| | P. R. R. Division. | U. R. R. of N. J. Division, D. and R. Canal. | P. and E. R. R. Division. | Total. | Comparison with 1900. Increase or Decrease. | B. and A. V. Division. | Aggregate Lines East of Pittsburgh and Erie Operated Directly. |
|-------------------------------------|-----------------------|--|------------------------------|-------------|---|---------------------------|---|
| | Tons. | Tons. | Tons. | Tons. | Tons. | Tons. | Tons. |
| <i>Products of Mines.</i> | | | | | | | |
| Anthracite coal | 5,567,436 | 4,458,617 | 5,667,824 | 15,683,877 | + 1,729,026 | 565,699 | 16,249,576 |
| Bituminous " | 21,450,987 | 6,814,019 | 5,747,201 | 34,012,207 | - 1,926,455 | 3,422,490 | 37,434,697 |
| Coke | 9,988,055 | 186,938 | 677,188 | 10,847,181 | + 1,508,557 | 594,448 | 11,441,629 |
| Ores | 2,872,523 | 403,856 | 954,758 | 4,231,137 | + 589,739 | 628,676 | 4,859,813 |
| Stone, sand, and like articles..... | 5,235,627 | 984,112 | 468,602 | 6,688,341 | + 1,173,160 | 698,466 | 7,886,807 |
| Other articles | 280,887 | 126,094 | 82,117 | 489,098 | - 181,187 | 135,043 | 624,141 |
| <i>Products of Forests.</i> | | | | | | | |
| Lumber | 2,095,070 | 995,908 | 1,423,349 | 4,514,322 | + 747,595 | 975,397 | 5,489,719 |
| Other articles | 284,792 | 108,828 | 488,282 | 876,852 | - 217,547 | 398,506 | 1,275,358 |
| <i>Manufactures.</i> | | | | | | | |
| Petroleum and other oils | 440,211 | 274,460 | 246,590 | 961,261 | + 22,768 | 561,922 | 1,523,183 |
| Sugar | 253,831 | 109,028 | 82,617 | 445,476 | - 17,326 | 21,462 | 466,938 |
| Naval stores | 19,316 | 7,534 | 5,077 | 31,927 | + 324 | 3,895 | 35,822 |
| Iron—pig and bloom | 1,670,747 | 320,629 | 288,770 | 2,275,146 | - 291,645 | 451,386 | 2,726,532 |
| " and steel rails | 742,544 | 140,718 | 74,611 | 957,873 | - 86,777 | 50,366 | 1,008,239 |
| Castings and machinery | 1,847,298 | 738,699 | 410,553 | 2,996,550 | + 490,870 | 282,019 | 3,278,569 |
| Bar and sheet metal | 3,084,361 | 668,198 | 299,850 | 4,052,409 | + 759,714 | 961,567 | 5,013,976 |
| Cement, brick, and lime..... | 2,002,248 | 530,031 | 310,826 | 2,843,105 | + 555,184 | 417,918 | 3,261,023 |
| Agricultural implements | 35,154 | 11,637 | 10,661 | 57,452 | + 2,555 | 8,456 | 60,908 |
| Wagons, carriages, tools, &c. | 44,244 | 26,757 | 16,445 | 87,446 | - 25,728 | 32,807 | 120,253 |
| Wines, liquors, and beers | 147,124 | 88,790 | 43,619 | 279,533 | + 20,060 | 28,233 | 307,766 |
| Household goods and furniture .. | 70,022 | 31,091 | 18,395 | 119,508 | + 814 | 13,368 | 132,876 |
| Other articles | 2,794,364 | 2,046,166 | 1,084,303 | 5,924,833 | + 381,264 | 573,952 | 6,498,785 |
| Merchandise | 307,274 | 292,337 | 51,919 | 651,530 | - 55,006 | 99,019 | 750,549 |
| Miscellaneous | 1,508,475 | 720,279 | 260,342 | 2,489,096 | + 1,047,685 | 407,788 | 2,896,884 |
| Total | 67,215,700 | 22,342,515 | 20,121,061 | 109,679,276 | + 5,488,987 | 12,020,064 | 121,699,340 |

If, in addition to a table similar to that last printed, we were furnished with statistics of tons and ton-miles of merchandise and minerals, with the number of passengers in the different classes, with their mileage, and the revenue from each category worked out at so much per mile, the shareholders would probably have about as much information as they require to show them the work their company does and the money it receives for doing it. But there is another point. It is highly desirable, if possible, to localise the traffic. The Great Eastern, for example, carries, not counting season ticket holders, 120 million passengers per annum. How many of these are beyond a ten-mile radius round Liverpool Street? It is practically impossible from any figures published at present to obtain even an approximate idea of the traffic and the revenue either of a suburban line, of a main trunk line, or of an agricultural branch. In France it is quite otherwise. The system of their Eastern Railway, for instance, is divided into 86 different sections. No. 1 is the main line from Paris to the German Frontier at Avricourt; No. 62 is a branch, three miles long, from St. Maurice to Bussang, and so on. For each of these 62 sections separate statistics show the tons and passengers carried, the ton and passenger mileage, the revenue from passengers and goods respectively, the working expenses, and the net receipts.⁷

Turning from traffic and the receipts therefrom to working and working expenses, it needs no discussion to show that even with the help of the additional information furnished long after date by the annual returns, shareholders have no material on which to base an intelligent criticism of the operation of their railway. We are informed that in the half-year the company ran so many million train miles, spending thereon so much, and earning therefrom so much. The company earned, therefore, say, 5s. per train-mile, and spent, say, 2s. 9d. And that is practically all. Comparing one half-year with another—assuming other things to be equal, which, of course, they never are—we can, of course, say that, if train-mile receipts are stationary while expenses increase, the management is extravagant; if receipts diminish while expenses remain fixed, the management is non-economical. But if train-mile receipts increase 5 per cent., while working expenses go up 10 per cent., what are we to say? It may be the result of extravagance, or it may be that wise and far-seeing management is

⁷ I must confess to wondering what it costs to produce these very interesting figures, and whether anything except the financial partnership between the French companies and their Government would justify that expense. It is, however, to be remembered that—in theory at least—the traffic, not of each section of the railway, but in each parish, has to be ascertained in this country for rating purposes.

encouraging the development of low-class traffic, which, while it leaves a profit, yet pays a profit at less than the average rate, but at the same time tends to establish on a solid foundation important industries in the district. Which explanation is right we can only guess from our own already formed conception of the character of the management. But there is no reason why we should not have facts on which to base our judgment. If we knew what the average load of a train—how many trucks or carriages—was, we should know by comparison with other comparable railways whether train-mileage was economically used. If we knew the number of engine-miles, we should know whether engine power was wasted. If we knew the percentage of empty to loaded trucks, we should know whether back loading was looked after as closely as possible. If we knew what the load of the average truck was, we should know whether space was being wasted, not only in the trucks, but in sheds, yards, and sidings all down the line. If we knew the miles run by each engine, carriage, and wagon, we should be able to tell how far full service was got out of these very costly appliances, and how far the constant demands for new rolling stock were justified. For the same reason a return in the form following would not be without value :—

| Number of hours per annum the locomotives are | | |
|---|--|--|
| A. In steam | <div> <div>(a.) In motion.</div> <div>(b.) Standing still owing to delays.</div> <div>(c.) Waiting for its train.</div> </div> | <div> <div>B. In the shed not under steam.</div> <div>C. In the repair shops.</div> </div> |

But I need not continue to enumerate possible statistics of operation and traffic : they take many forms in different countries : it is for experts to say which are most valuable under English conditions. Here, as a specimen of those in practical use elsewhere, are the freight traffic statistics published—they are only extracts from the very much fuller statistics prepared for the use of the officers of the road—by the Pennsylvania Company, which within the last few years has recast the form of its annual report with great care :—

On it I will make only one criticism. All the statements in the table, except those to which I have put an asterisk, are based on actual facts. The statements I have marked rest on estimates which each separate statistician would make differently. No one can say positively what it costs to carry a ton of freight on a line doing also a passenger business. It is obvious that the whole of the maintenance of way and the whole of the general expenses, and a considerable portion of the expenses for locomotive power and conducting transportation, are incurred neither for freight nor passengers separately, but for the traffic of the line as a whole. It is of course possible to allocate expenses between the two branches of traffic in any ratio one pleases—on the assumption that a passenger-mile costs the same or some fixed percentage of a ton-mile; on the assumption that a freight train-mile costs the same or some fixed proportion of a passenger train-mile; or on any other assumption you please. And if the assumption be maintained unaltered year after year, it may give valuable guidance to the management of the company. But I submit that it is unscientific to publish to outside persons as statistical facts figures which, to the extent of at least 50 per cent., rest upon wholly unverifiable assumption.⁸

We have now gone through the main outlines of an English report. I ought, however, perhaps to have noted one feature peculiar to this country, the certificates of the responsible officers that the whole of the plant of the company has been maintained in proper order, and the certificate of the auditors that revenue has been debited with all expenses properly falling upon it. It is probably due in no small degree to these excellent requirements that English management has been so creditably free from the gross scandals that in former years discredited the United States, where companies suddenly turned from large dividend payers to bankrupts. Whatever view we may take on the question how far railway companies ought to meet capital expenditure out of revenue, at least our companies have not deliberately paid dividends out of capital. I may perhaps also just notice that the following additional subjects are in some countries included in the railway statistics, viz., punctuality of passenger trains, privately owned sidings connected with the railway lines, friendly society, insurance, and superannuation funds; and that the statistics are very frequently given in diagrammatic as well as tabular form.

One word in conclusion. No one is probably half as conscious

⁸ These figures used to be habitual in American railway reports. Most companies have of recent years, with the full approval of the Interstate Commerce Commission, ceased to publish them; but the Pennsylvania and, I believe, the New York Central and some other Eastern companies still give them.

as the writer of the imperfections of this paper, which naturally should have fallen to the lot of some one with an inside familiarity with railway management and finance, to which I can make no claim. But no one however experienced and accomplished could single-handed construct a proper framework for a railway report. Such a framework must be the work of a committee of experts meeting frequently, and thrashing out the question after drafts and redrafts innumerable. What I have put forward is only a group of suggestions for consideration when the question of redrafting our reports is taken up seriously; and that it will have to be taken up ere long I firmly believe. Whatever the outside public may think, I question whether any Fellow of the Royal Statistical Society will care to deny that a reform of English railway statistics is already overdue.

DISCUSSION *on* MR. ACWORTH'S PAPER.

THE PRESIDENT, in inviting discussion, said the subject to which Mr. Acworth, in his most useful and timely paper, had drawn attention, was one that was of immediate interest to railway shareholders and those concerned in the administration of the vast industry which the internal transport trade of this country now represented. Despite the fulness of some of the railway returns of other countries, the question was enlisting interest and support abroad. It was discussed last year at the meeting of the International Statistical Institute, to which he was a delegate. At the instance of the Russian and French delegates, a committee had been appointed to go thoroughly into the whole of this question, from the point of view of securing more uniform and comparable statistics of railway working and finance. It was obvious that considerable reform in the direction suggested by Mr. Acworth would be needful in this country, before the necessary data would be elicited for the purposes of international comparison.

Mr. G. S. GIBB would have preferred to defer his own remarks until someone had addressed the meeting who was less in sympathy than he himself was with the views of the author. He thought that the author had probably acted wisely in refraining from elaborating a new system of accounts, because at the present stage of the discussion they were not concerned in settling what were to be the heads and items of the proposed new form of

accounts, but rather in discussing the desirability of having any revision at all. His own belief was that it would be found that there would not be so much objection to it as was generally anticipated. On the general question of revision he could not dissent from the main view of the paper, that the time had come when some revision of the form of railway accounts was necessary. There were several points of view from which revision should be regarded. First of all the point of view of the responsible management, the directors and managers of the railway companies; secondly, the point of view of the shareholders and proprietors; and thirdly, the point of view of intending buyers, which would to some extent be combined with that of shareholders, because it was obviously the interest of proprietors to publish such accounts as would give intending buyers sufficient information. Then there was the point of view of the customers of the railway, the passengers and the traders, and there was finally the point of view of the general public, which some people might perhaps think inadmissible. It must be conceded that the present accounts were inadequate, and did not enable anyone to form a sound judgment on the management, economy of working, or stability of the affairs of a company. The great defect of the present accounts was in the classification. Though no doubt a fairly good classification at the time it was adopted, it was now out of harmony with railway business. Re-classification and greater uniformity in debiting the various items of expenditure to various headings of accounts was necessary. On their face the accounts of the different companies looked as much alike as two peas, but when the items included under each heading were considered, it would be found that there was a considerable diversity of practice. He entirely agreed with Mr. Acworth as regarded the mistake of classifying the expenses of locomotive running with costs of manufacture or repair of rolling stock. He would, however, avoid detailed criticism, and keep to the general question of the desirability of some change. He could not conceive that any shareholder would object to receive fuller and better information than was given in the English accounts. Whether he would read it or not would be another question. He had no doubt it would really be found that the main objection in the minds of those who did object to improve the accounts was the fear of the possible abuse of the information to be given. There was no doubt legitimate ground for suspicion on the part of railway companies. Railway companies had for some years had a bad time of it. They were, perhaps, the one big industry of the country whose powers of charging what they thought necessary to earn a fair profit in conducting their business had, notwithstanding Parliamentary charters, been deliberately and forcibly cut down by Parliament. Experience of that sort of revision had naturally made railway companies hesitate about giving fuller data of their business affairs until they saw more accurately what was to be done with it. Personally he was not afraid. He believed that it would have been to the advantage of the railways if, when the revision of rates took place

in 1888-92, fuller information had been at the disposal of Parliament, shareholders, customers, and the public. He did not believe that railway companies had anything to fear from the production of all the figures necessary for satisfactory accounts, arranged and classified in a proper manner. What they had to fear was the injury that might be done to their interests by ignorance. He had no doubt that, from two points of view, fuller information, accessible to the public, would be advantageous. It would be an advantage to railway managers if there were better data available for sensible criticism. Fuller knowledge would also be of advantage in removing the suspicions and improving the habits of traders. He could not doubt that the absence of good accounts had deprived railway managers of the advantage derivable from outside criticism. All professions required the breeze of outside criticism. Again, it would be of advantage in showing Parliament and the traders where railway companies were making their reasonable profits, and where they were suffering losses. Obviously the revision of railway accounts could only be taken in hand by experts. But railway experts were a very busy, and he would say a very much overworked, set of people, and had not much time to take up new subjects. He was not as a rule in favour of Government interference, but having regard to the existing powers of the Board of Trade, and the general considerations affecting this question of railway accounts, he was rather inclined to think that the Board of Trade might take some action and, in co-operation of course with railway officers, form a committee which would report on the matter, as was done when the present form of account was settled. Personally he did not see the least reason why that should not be done again, and, though he could not speak for the railway interest, he would individually co-operate most heartily with any such movement.

Sir HENRY BURDETT, K.C.B., said he thought the paper was most opportune, and if there were any doubt on the subject, he thought it would be settled by the fact that the Parliamentary return showed that, in the ten years from 1890 to 1900, 279 million £ of new capital had been added to our English railway system, whilst the increase in the roads only amounted to 1,800 miles. Anyone who had studied railway finance must realise that unless some radical changes and modifications of system were adopted, there must be a very serious fall in the values of English railway securities as an investment. Speaking from considerable experience, he said that there could be no doubt that the best American system of statistics and charges as it existed to-day might be studied with advantage by English directors and managers. He was perfectly aware that the methods adopted in handling the American and Canadian traffic, though showing a large reduction in working expenses, could not be pursued at the present time in England, but he certainly thought that the time had arrived when there should be a broad and distinct line drawn in their published accounts by every English board of directors between betterment and maintenance. It was all very well to have a high dividend on a

railway stock for a certain number of years, but we had come to a time in the history of English railways when in many of these companies a radical change in the present system of apportioning profits, combined with the most careful consideration of the several items before any distribution took place, was called for in the interests of the shareholders, the public, and the efficient maintenance of our railway system. If the payment of large dividends were to continue to be the main object of the directors, there must be a serious falling off in the values of the stock of the majority of English railways. The public was beginning to realise that this continuous increase of capital, much of it for purposes the cost of which ought to a large degree to be met out of the net profits, was a suicidal system. The speaker proceeded to deprecate the addition of information to the reports on the mere suggestion of individual shareholders. This was apt to cause waste of shareholders' money in the publication of pages of figures as in the United States, which led nowhere. He agreed with the last speaker that it was possible that, under proper reservations, fuller and better information could be given in railway reports, but before any change could with advantage be made, the whole question should be considered by a committee of experts, to be called together by the Board of Trade, and representing all the interests affected. It must be remembered that when the present form in which railways issue their accounts was adopted, in 1868, things were very different from what they were that day. Thirty-four years made an enormous difference. In his judgment, if there had been a reconsideration of the form of railway accounts ten or fifteen years ago, it would have been infinitely better for everybody connected with our railways. He did not believe if such a revision had taken place, because of the improvement which would have resulted in the quality and form of railway statistics and accounts published, there would have been anything like the large capital expenditure to which he had referred, nor would the net profits have been distributed by several railways as they had been. With the aid of such statistics railway boards would have been strengthened by representations from their shareholders and expert critics. On the whole, the classes who held the best English railway stocks preferred less dividends and assured securities to larger dividends when attended with all the risks appertaining to the system which had brought several of our railways to what he might call the present *impasse* they had reached in this country. It was satisfactory to know that a few English railways of the highest rank had shown by the system they had pursued for many years, to the honour and credit of their directors and managers, that they supported the methods he had tried to suggest.

Mr. W. R. LAWSON observed that they had heard this very important question stated from three different points of view. Mr. Acworth had given them the reformer's point of view; Mr. Gibb had given them the conservative point of view; and the last speaker had given them the Stock Exchange point of view. Mr. Gibb had very rightly asked from what standpoint this

subject should be discussed? He, the speaker, considered that fuller information was wanted from every standpoint; above all, from the standpoint of the railways themselves, simply as a matter of railway operation. The question was answered long ago by an American railway man—President Hill, of the Great Northern. Someone on going through his figures with him, asked him how, with all his other work, he had found time to master these figures. President Hill's reply was, "Well, if I had not mastered these figures they would have mastered me." That was the originating cause of the statistical movement on the American railways to which Mr. Acworth had referred. Ten or eleven years ago he had the good fortune to travel for a week or two with Mr. Hill, from whom he learned that his statistical methods had been practically forced on him. Without them he would have been unable to exercise proper supervision over his staff. He took out his returns, and went over the figures division after division, pointing out their different results. In respect to one division he said, "We have a first class young Irishman there, and, in spite of heavy gradients, he moves his freight cheaper and quicker than any of the others." That young Irishman was now Vice-President of one of the principal systems of America, and at least a dozen of the young men whom Mr. Hill trained on the Great Northern were in high positions on other railways. Mr. Hill was so much impressed with the results of statistical training, that he established for his own line a school of railway statistics. He had always at his elbow a "phenomenal statistician" to give him every information he wanted about any station on the road. They took young men from Yale and Harvard, and passed them through the accountant's office. In England they could not get to-day either the young men or the means of training them. It was not a question of publishing all the statistics, but of having them for use; what accounts they should publish was a very secondary matter indeed. Most of those now published were of no earthly use to any shareholder, and half of the railway returns published by the Board of Trade were simply a waste of printing. All these forms for instance showing "capital created" "capital authorised" and "capital issued" might be out of date before they left the directors' hands. He was astonished that in this discussion no railway man had taken credit for one of our few strong points, namely, the capitalisation of our railways, which was infinitely superior to the American. It was logical, intelligible, and simple, and shareholders could rely upon it. When the Americans were re-organising so many of their roads some years ago, they adopted the English form of capitalization—bonds, preference stocks, and common stocks. Though now they were getting away from that as far as they possibly could, six years ago they did pay us the compliment of recognising our superiority in that respect. But the main point was the operating statistics. Everybody interested wanted greater economy in working our railroads, and surely the first steps towards reduction of cost was the ascertaining of what the cost really was. He therefore thoroughly agreed with Mr. Acworth in his desire for reform.

Mr. J. RUSSELL SOWRAY believed that the majority of shareholders did not care much about any figures in the reports except those showing the dividend, and that though a good deal more information in the reports was desirable, he could not go the length of desiring the issue of such bulky reports and accounts relating to English railways as appeared to be published by some other countries. The author was perhaps a little hard on the accounts of railway companies as they existed at present. Dealing with Tables 1, 2, and 3, of the capital account, Mr. Acworth appeared to contend that they should give information as to the amount of capital received in cash. But those three accounts did not profess to be cash accounts. They represented what capital had been created and what capital had been raised which was entitled to rank for dividend. No. 4 was a cash account of receipts and payments, and it would be found that it *was* an actual account of receipts and payments. A company sometimes issued stocks at a premium and sometimes at a discount, and in such an account, in order to make it balance, they would find there was a statement of the premiums received or the discounts allowed. Again, he would reply to the author's criticisms of the tables which he said showed locomotive power mixed up with repairs and renewals of carriages and wagons. Those tables were taken from the detailed accounts, and the accounts gave an entirely separate statement of what was expended for locomotive power from what was expended in repairs and renewals of carriages and wagons, and that distinguishing mark also appeared in the official returns published by the Board of Trade. He thought they were all agreed that the accounts at present published did not give everything that was necessary in order that the public or the shareholders might judge of the financial position of railway companies. Still it was well that they should have the credit for what they did give. In the statements published by the Board of Trade they gave what were called the net traffic receipts, which the public might naturally believe were the net receipts available for dividend. As far as he had been able to judge, that was not the case. The companies accounts had first of all a revenue account in which they gave all the traffic receipts and the working expenses, and the balance of this account was the net traffic receipts: then they had what was called a net revenue account, in which they brought forward the balance from the revenue account and inserted a good many items which were necessarily additions to or deductions from the net traffic receipts before a dividend could be declared.

Mr. GEORGE PAISH said that the information contained in the existing railway reports was not only inadequate, but actually misleading, though, of course, not intentionally so, and that consequently the accounts were of little practical value either to the officers who managed the roads, to the shareholders who owned them, or to the traders and the public who brought them traffic. As evidence of his charge of inaccuracy he remarked that the gross earnings from passengers were supposed to be earnings from passengers carried by the railway; but some of the companies

included passenger receipts from steamships in their railway passenger earnings. Again, the merchandise receipts, less cartage, were supposed to be receipts of the railway in respect of which train mileage had been incurred, but in some instances the freight receipts included large earnings from steamships, from canals, and from cartage. Thus the earnings either per passenger or per freight train mile would give an utterly wrong impression of the actual earnings per train mile. But even were it possible to ascertain accurately the earnings per train mile, the result would be of little value as a test of good management, as the earnings per train mile were largely governed by the length of haul and the class of traffic conveyed. If the haul were short, the terminal charges would have a greater effect upon the earnings per train mile than if the haul were longer. Again, if the class of traffic hauled paid rates relatively high, the earnings per train mile would necessarily be high too, although there may have been little effort to fill the trains or to work with economy. On the other side of the account, it was impossible to determine if due economy had been practised in the renewals and repairs of locomotives, of carriages, and of wagons. The statement of repairs and renewals contained no particulars of how much had been spent upon repairs and how much upon renewals. Thus one company might be repairing and renewing its rolling stock as thoroughly as another, but at a much lower cost. By so doing, however, it laid itself open to the charge of parsimony, because it did not waste as much as its neighbour. The question of railway statistics was, however, wider than a mere matter of accounts, it concerned the welfare of the country. The cost of transport entered largely into the cost of manufacture. In spite of the very great growth of railway traffic in the last thirty years, freight was until recently handled no more economically than it was thirty years previously. Indeed, it was handled with less economy. As an instance of possible economies, he stated that the cost of constructing a 15-ton or a 20-ton coal wagon was very much less in proportion than the cost of constructing a 10-ton wagon; in fact, his authority placed the saving in capital from the use of 20-ton wagons at 33 per cent. If they calculated the saving that would be effected by the substitution of 20-ton wagons for those in existence, they would find that it would amount to many millions. And similar economies in capital would accrue from the use of more powerful locomotives. Bearing in mind, therefore, that defective railway statistics have involved the country in enormous waste of both capital and revenue, that comprehensive information would probably lead to vast economies, and that the demand for more information was pressed for, not merely by economists and statisticians, but by shareholders, by traders, and by the press, it was evident that the moment was opportune for introducing a new system of accounts and statistics.

Mr. N. L. COHEN, after referring to the full and close thought reflected in the paper, observed that they all recognised that it was the custom of the Continental railroad companies, many of

which had received assistance from national funds, or from the national credit, and of the American railroads, which also in many instances had received much State assistance in the way of land grants, to publish very much fuller information as to the capital, haulage, and income of their roads, than was usual here. The author of the paper not only believed that the compilation and publication of such figures would be useful to the companies as trading concerns—that is to say, in the interests of their shareholders—but went on to urge that the collection and publication of the suggested particulars should be made compulsory. Surely not one of those present could imagine that the General Managers, or the Directors in consultation with them, could fail to have cognisance of the ton-mileage, and of the passenger-mileage, and of local statistics bearing upon the expenditure and revenue, and upon the various constituent factors in regard to the working of the railroad? Was it conceivable that without arrangements for the record and for study of excerpts from those particulars, the working policy of the railroad, the charges and fares, could be satisfactorily and completely adjusted or supervised? But the case for the fuller publication of such statistics rested on a different footing from the case for asking whether, and to what extent, such information was collected in the archives of the railroad, and really used by the Managers and the Directors. He suggested that the plea for fuller publication was due to insufficient knowledge of the extent to which it was customary for the Board of Directors to assist the General Managers in the supervision and sustained and detailed study of the broad lines of policy of administration. He thought the public had a high regard for the energy and great ability of the railway Managers, but there was a doubt as to how far they are assisted in the study of essential factors in the economical and efficient management of a railroad by the Boards of Directors, or by special Sub-Committees of the Boards appointed from time to time to study particular issues. It was really remarkable how many Railway Directors had also pledged a very large portion of their time to public affairs, or to Constituencies as Members of the House of Commons. He would have deprecated the view that great practical beneficial results would accrue from the publication of the suggested statistics, but for the speech of Sir Henry Burdett. He thought it was unfortunate that such suggestions were not susceptible of definite contradiction or confirmation. With regard to the alleged insufficient allowance for depreciation of rolling stock, he (the speaker) believed that, at all events in the cases of two railways whose figures he had studied, there was a great deal of exaggeration. Generally, he believed, it would be found that though the method of procedure might seem perhaps a little unbusinesslike and somewhat haphazard in regard to any particular half-year, yet in regard to a group of half-years there was nothing to justify the apprehension that there had been a payment of dividends at the cost of betterment, at least in respect of inadequate provision for depreciation of rolling stock. He felt with Sir Henry Burdett that it would be more satisfactory

if the expenditure were allocated on regular principles to each half-year. Turning to another point, he remarked on the insufficient inferences drawn by shareholders from the statistics already published, and the general "slackness" of shareholders. Take for instance the figures in regard to Law and Parliamentary expenses. Year by year they saw very onerous charges imposed upon railway companies repeatedly and successively by the Houses of Lords and Commons, in obtaining parliamentary sanction for the expenditure of fresh money, sometimes only on their own stock and on their own lines, or on other matters concerning no outside rights. Again, they saw the large sums which went in compensation for damaged goods. He had never heard of any meeting of shareholders pressing on their directors, nor had he ever heard of the directors of their own initiative urging, that there should be a reasonable limit of time for such claims after the delivery of the goods. From these and other indications he was led to feeling at least great doubt that they would obtain very helpful criticism from the general body of shareholders however much the published statistics might be extended. He felt that they should rather look to an improvement in the economic management of railways by the more intimate association of directors or of sub-committees of directors with the general managers in studying the constituent factors of the income and expenditure and new features that might be suggested. The text of the reports might certainly be made fuller. That would involve no fresh expense or delays for collection of statistics; no one could deny that the text of the English reports were very bald and somewhat crude. When railway directors had taken the responsibility of inviting their shareholders to incur large expenditure on new branches and extensions or developments, it seemed reasonable that shortly after those branches had been opened, or the developments had been realised, there should be some exposition as to whether the policy of the expenditure had been justified, or, if not, what was the position in regard to it.

After remarks from Mr. R. PRICE-WILLIAMS,

The Right Hon. Lord ALLERTON, rising in response to repeated calls, said he would have preferred to have said nothing. He thought the question of accounts was more a question for experts than for directors, but he might be allowed to say what his own view as a director was. Of course, he was speaking only in his personal capacity. The reader of the paper and those who had discussed it had spoken of America as leading the way in the affording of all this information in their reports. But he believed that the Indian railways had been the real pioneers. As a shareholder in one or two Indian railways, he got with the accounts information which appeared to him as full and as complete as anything which was provided by the American railway companies. A similar remark might be made of the reports of the railways of South America. He would like to say that he did not agree with Mr. Gibb as to the

desirability of inviting the co-operation of the Board of Trade. He would remind them that the form of accounts now used by the different companies was prescribed by the Board of Trade, but it was still hardly possible to compare the results of one company with another. Although all the companies filled up a return professedly on the same lines, everybody "inside" knew that there was in detail as between almost every company some slight variation. Speaking from the directors' point of view, he must admit that he sympathised with the view of having the accounts kept in a different form, but it might at least be taken that in their present form the accounts were accurate, reliable, and honest. It would, he thought, be of the greatest service to general managers to have the accounts tabulated in a different form, so as to enable them to ascertain more promptly if there was any leakage going on. If there was such a leakage, it was no use waiting for the half-yearly accounts. The general manager and the head of each department ought to have his accounts in such a form that if there was a leak taking place anywhere during one week, it should at all events be discovered before the end of the next week. Such a system might possibly lead to increased dividends. He quite agreed with the gentleman who said that the dividend figure was that for which the shareholder looked most anxiously in the accounts. He doubted whether the statistical information disclosed by a new system of accounts would be really of much advantage to the shareholders or to the public. Past experience had shown that every information which had been supplied by the railway companies had been constantly used, to the extent it could be used, against the railway companies and in attacking them. Therefore, there must be a limit even to the generosity of the directors in giving information which might be used against themselves. With all respect to the Board of Trade, he doubted if that department could assist them much. But all railways did not publish everything they were doing, and it was just possible that the movement which Mr. Acworth so zealously advocated had progressed further than he thought, and that within the railway offices of the country a very large amount of information was now in process of being obtained. In fact, they had it from Mr. Gibb that the North Eastern Railway Company had all the information with regard to ton-miles and the like. He had not himself seen it, but he had no doubt they would see it in due course. Too much importance might be attached to the ton-mile. It was not the ton-mile which of itself was necessarily of value, but what was of value was that the accounts should be kept in a form to enable that item to be ascertained, and to give all the details of the fluctuations of the traffic. In that sense he sympathised with the view that it was desirable to have a different form of tabulating the accounts, but, above all, what they wanted was to avoid having figures that—to use the expression of the railway world—had to "be got out." They wanted the accounts to keep themselves. If they could get them put into columns so that they would add up themselves, and so constitute the half-yearly returns, they would have made some progress in furnishing

the officers with information which was really necessary to improve—if improvement were possible—the management and administration of English railways.

Mr. BAINES observed that where, as in the present instance, the question was one of the application of statistical methods to material in actual daily use, it was the object of the Society to throw light upon the current system, and if defects appeared therein, to promote, so far as lay in its power, their correction. The case in point was a highly technical one, and must be left, to a great extent, to experts, many of whom were present. He had not heard any serious opposition to the general substance of Mr. Acworth's contention, so far as its statistical aspect was concerned, though criticism had strayed into the field of management and finance; and Mr. Gibb, an authority of weight among them, had confirmed Mr. Acworth's arguments. Lord Allerton, indeed, while refraining from following the latter to the full length of his case, admitted that revision of the present system was advisable. The Indian system, which had been mentioned with approval, related, it is true, to a simpler state of railway transactions, but in the main seemed to him applicable, so far as it went, to the work of the lines in this country. It was not beyond hope, therefore, that this discussion might turn out not merely platonic, but would bear fruit in the improvement of the matter to which it related, whether on the initiative of the Board of Trade, through whom the Parliamentary obstacles would have to be removed, or through the Railway authorities themselves. In either case, the Society would willingly aid, so far as its scope allowed, in the attainment of the desired object. Meanwhile, the vote of thanks to the reader, which he had the pleasure of moving, would no doubt receive the unanimous support of all present.

Mr. W. M. ACWORTH, in reply, said he hoped this paper would not, as in the case of Sir Juland Danvers's paper, have to wait fourteen years before any result followed. Lord Allerton had referred to ton-mile statistics, and he hoped Lord Allerton did not think that ton-miles were the only statistics wanted, or anything like it. Lord Allerton had also referred to the importance of having statistics constantly up-to-date. It seemed to him that the statistics the public ought to have were those which the general manager had already used, and that was, as far as he knew, what happened where the work was best done. Mr. Lawson reminded him of an interesting morning he spent with Mr. J. J. Hill in his office in New York, when they looked over together the returns and ton-mile figures of the Great Northern Railway, about 1,500 miles off at the nearest point. It was about the 10th of the month, but Mr. Hill had the ton-mile figures for the previous month, and was quite prepared to come down on the divisional superintendent whose ton-mile cost—of course an estimated cost—had gone up a fraction of a mill. As Mr. Lawson said, that was how the line had gone ahead, and set the example, of which other lines had made very good use. Even the management of the Pennsylvania

Railroad had been able to learn something at St. Paul. The real foundation and the substance of the management of the Great Northern of America was statistics. He quite agreed with Mr. Gibb and Lord Allerton in their objection to State interference, but in this case the question was settled for them. These returns existed by Act of Parliament. The form of the railway half-yearly reports was fixed by Act of Parliament. They did not want to put railway companies to the expense of two sets of figures—one because Parliament ordered it, and the other because they were of some practical use. But that was what it would be, unless they could get Parliament and the Board of Trade to acknowledge that they did not know so much about these matters thirty years ago as they did now. Lord Allerton had asked why he did not refer to India, which led the way in the matter of ton-miles? One reason why he had not done so was the difficulty in making comparisons, owing to their unfamiliar currency and weights and measures, and another reason was that the traffic was never competitive, and, as Mr. Baines had pointed out, the organisation there was altogether simpler. He thought the better comparison was with America. With regard to Argentina, their reports were particularly interesting, because, being all English railways, they had started on the basis of our English reports, and elaborated them in all directions, thus showing how inadequate the English reports as unelaborated were. But they were still on English lines, and he thought those lines were unfortunately drawn, as, for example, in mixing up locomotive repairs with locomotive running. He did not think anyone would deny that that was wrong in principle. Mr. Price-Williams must have misunderstood him. He did not say, and could not have said, that the North Eastern was going to show its cost per ton-mile. It could, of course, as the Great Northern of America did, work out an estimate of that cost, and if it made its estimate year after year on the same basis, it would be worth something for comparison with itself, but to say that the North Eastern was going to bring out the actual statistical figures showing the cost of carrying a passenger or a ton of coals to Tyne Dock, was to state that that was possible which was impossible in the nature of things. Mr. Cohen could not imagine that a railway manager did not know the receipts of his own company per ton-mile or per passenger-mile. But, unfortunately, it was true, and some railway managers did not believe that such figures could be any use at all, and did not want them. Sir Henry Burdett had said that English railway companies had in ten years added 270 millions to their capital, whilst they had only added some 2,000 miles to their lines. That seemed to point to an expenditure of about 125,000*l* a mile, and a good many critics would no doubt say that was a shameless rate of expenditure. But that was exactly where the Board of Trade statistics led the public astray. According to the Board of Trade statistics it was true there were only some 2,000 miles odd of new lines built, but the Lancashire and Yorkshire had added 238 miles of new “track” in the last five years, while the Board of Trade returns only credited them with 30 miles of new line. As everybody

knew, the South Western, the Midland, and many others had quadrupled what was previously a double line, but again that did not appear, though the cost of the new pair of lines was probably much higher than that of the original two lines. Here was another instance where railway companies were unjustly criticised, because the statistics necessary to justify their actions were not properly kept and published.

A hearty vote of thanks to the author for the paper was then put to the meeting, and unanimously accorded.