ART. VI.—1. *Report of the Commissioners Appointed to Inquire into the Several Matters Relating to Coal in the United Kingdom.* Presented to both Houses of Parliament by Command of Her Majesty. London: Printed by George Edward Eyre and William Spottiswoode, Printers to the Queen's Most Excellent Majesty, for Her Majesty's Stationery Office. 1871. [Three Volumes, folio, together with Numerous Maps, Sections, &c.]

2. *Report from the Select Committee on Coal; together with the Proceedings of the Committee, Minutes of Evidence, and Appendix.* Ordered, by the House of Commons, to be Printed, 18th July, 1873.

3. *Coals, Cinders, &c.* An Account of the Quantities of Coals, Cinders, and Patent Fuel, Shipped Coastways, from the Ports of England, Scotland, and Ireland severally; of the Quantities Exported from the same Ports to Foreign Countries and British Settlements Abroad; of the Quantities Brought Coastways into the Port of London; and of the Quantities Received Coastways at the Various Ports of the United Kingdom in the year 1872. Ordered, by the House of Commons, to be Printed, 28th April, 1873.

4. *Coal Experiments (Indian Troop Ships).* Copy of the Reports Received at the Admiralty from the Commanding Officers of the Indian Troop Ships Relative to the Coal Trials Conducted during the Last Session. Ordered, by the House of Commons, to be Printed, 5th August, 1873.

5. *Mines. Reports of the Inspectors of Mines, to Her Majesty's Secretary of State, for the Year* 1872. Presented to both Houses of Parliament by Command of Her Majesty. London: Printed by George Edward Eyre and William Spottiswoode, Printers to the Queen's Most Excellent Majesty, for Her Majesty's Stationery Office. 1873.

6. *High Price of Coal. Suggestions for Neutralising its Evils.* By Sir ROWLAND HILL, K.C.B., D.C.L., F.R.S., &c., &c. Read before the Statistical Society, December, 1873. London: 1873.

7. *Mr. C. W. Eddy on the Natural Distribution of Coal Throughout the British Empire.* Read at the Royal Colonial Institute, 28th May, 1873. London: 1873.
8. *Papers Relating to Her Majesty's Colonial Possessions.* Part II. 1873. (2nd Division.) Presented to both Houses of Parliament by Command of Her Majesty, 1873. London: Printed by W. Clowes and Sons, Stamford Street and Charing Cross, for Her Majesty's Stationery Office. 1873.
9. *The Coal Question; an Enquiry Concerning the Progress of the Nation, and the Probable Exhaustion of our Coal Mines.* By W. Stanley Jevons, M.A. Second Edition. London: Macmillan and Co. 1866.
10. *On the Smokeless Fire-place, Chimney-Valves, and other Means, Old and New, of obtaining Healthful Warmth and Ventilation.* By Neil Arnott. London: Longman, Brown, Green, and Longmans, Paternoster Row. 1855.
11. *Richardson's Popular Treatise on the Warming and Ventilation of Buildings.* London: 1856.
12. *Daily and Weekly Newspapers.*

It is now nearly ten years since Mr. Stanley Jevons published that important treatise on the coal question which is still a leading book upon the subject it is devoted to, and close upon the heels of which followed the elaborate inquiry of the Royal Commission, known as the Duke of Argyll's Commission. If our readers have no very special remembrance of the publication of Mr. Jevons' book and the appointment of the Duke of Argyll's Commission, it will yet be fresh in the memory of most of them how an anxiety, almost amounting to a panic, ran through the country at that time: our coalfields, it was said, were being drained so rapidly that we must face the dire possibility of being left dependent on foreign countries for that most important product, which we had been so lavishly using for centuries.

During the last two winters, recollections of this *quasi*-panic must have presented themselves very generally throughout the kingdom. The practical inconveniences associable with the state of things pointed to ten years ago became so important that another Parliamentary inquiry was deemed necessary; and the extreme scarcity and dearness of coal prevalent for the last two years forms

the subject of one of the most important blue-books of last session. If it is not absolutely the most important, it is not because the subject of any other was more momentous than the matter referred to Mr. Ayrton's Committee, but because the results arrived at were exceptionally barren as compared with the magnitude of the theme.

The Royal Commission appointed in 1866, to ascertain as far as possible the amount of the precious mineral then existing in the coalfields of Great Britain, and the quantity of it at that time consumed at home and transmitted abroad, presented a very extensive Report on the subject in July 1871; and the Select Committee of last Session have felt themselves excused from investigating any of the matters embraced in that Report, a fact which materially aids us in understanding the comparative barrenness of the Committee's own report. They refer, however, to some of the conclusions arrived at by the Commission, as explanatory of that condition of the coal supply which the Committee were appointed to investigate; and, indeed, this no one must fail to do, if he desires to understand the coal question in all its bearings, the inquiry having been admirably carried on, and the results set forth in an exceedingly able manner.

The Royal Commission satisfied themselves, by the most careful examination of the coalfields of Great Britain and the production of the mines at work in them, that there was an abundant supply of coal, not only for the present, but also for many years of the future; but the possibility of this supply failing at some remote period was made the subject of a good deal of speculation, very interesting in itself, and based upon estimates of the probable growth of our population, and the probable increase of consumption both in this country and abroad. Mr. Ayrton's Committee, on the other hand, somewhat sneeringly dismiss this phase of the subject, because, as they say, "they deem it equally unnecessary and futile to embark in any such speculative conjectures, for they are of opinion that no adequate materials exist for giving any judgment on the subject, and that they consider they will best satisfy the object of their appointment by confining their Report to a period immediately associated with the present condition of the coal supply." For our own part we should be glad if all Select Committees and Royal Commissions, entrusted with the investigation of such important questions as the

present, would indulge a little more freely in "speculative conjectures" of this vitally interesting character, as related to the future of the commonwealth, and follow the lead of the Duke of Argyll's Commission in passing beyond the limits of that hard, dry, political selfishness, which characterises most Parliamentary Reports, simply through the current practice of ignoring the claims of posterity, and indeed of all other claimants sufficiently distant to be ignored with present impunity.

Those who have followed the literature of coal at all carefully of late years will remember that the Report of the Royal Commission contained, among its masses of valuable matter, a tabular statement showing the progressive increase of the population, and of the supply and consumption of coal, as well as the computed rate of consumption per head of the population of Great Britain; and that tabular statement the Select Committee have introduced into their Report, correcting it from the most recent returns, and bringing it down to 1872. The table in question has been regarded as an important basis for all speculations as to the consumption of coal; but, as if to prove the fallibility of all statistics, however carefully gathered, we are now told that this table can only be accepted as an approximate statement of the quantity raised and consumed in each year, and that it does not afford a correct view of the capacities of the collieries at work. From this fallacy of the table, however, we learn one important lesson: the Royal Commission estimated that the amount of coal raised from a given area is less by 10 to 40 per cent. than the coal measured in the strata, owing to defects in the systems of working; so that we have a great question to urge on men of applied science, and keep urging on them, namely, how to save this enormous waste.

Another series of the "speculative conjectures" of this admirably conducted Commission* was that relating to the

* As the mode of proceeding adopted by this Royal Commission was, in our opinion, a good model for all such Commissions to follow in matters of world-wide importance, it will be interesting to state by way of foot-note what that mode was,—especially as the report has long been out of print, and become comparatively inaccessible. At their first meeting, the Commission decided that it was expedient to divide their enquiry and appoint committees; but that every member of the Commission might serve on any committee beside that to which he was specially assigned. Five committees were then chosen: A. On Possible Depths of Working; B. On Waste in Combustion; C. On Waste in Working; D. On the Probability of Finding Coal under Permian,

limits of depth at which it is possible to work the coalfields. It is by no means safe to calculate the coal supply of the future at the precise measure of the unworked portions of the strata, as computed by our geologists, even making deduction for waste in working. This deduction we certainly ought to make, if we mean to use the result of whatsoever calculation as a basis for our national conduct in this matter of coal; but it is also necessary, in that case, to make further deduction on account of the impossibility, as things stand at present, of working our coalfields below a certain depth. It is found that, after that certain depth, the heat of the coal itself cannot be sufficiently mitigated by ventilation to admit of human operations being carried

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New Red Sandstone, and the superincumbent strata; E. On Mineral Statistics. To these committees were transferred the powers, vested in the Commission, of calling witnesses and "inquiring by all lawful ways and means." In order to investigate the probable quantities of coal in the known coalfields of the United Kingdom, the quantity in each field, worked and unworked, was inquired into by separate members of the Commission; and for this purpose, the kingdom was divided into thirteen districts. Thus the whole inquiry was separated into eighteen divisions. Later on it was found expedient to subdivide the geological inquiries assigned to Committee D. and hand over some branches of it to gentlemen not in the Commission; and thus twenty-three separate inquiries, in all, were carried on simultaneously. When the plan of separate coal-districts was adopted, it was found that paid assistance would be required to carry on inquiries of great magnitude and difficulty; and by the 12th of March, 1867, the Treasury had managed to sanction the expenditure, on estimates prepared by the Commissioners. The members then proceeded, each on his own plan, to investigate the quantities of coal in the several districts, and reported separately, from time to time, as their work was completed. In December 1868, a sixth committee was named, to select maps, and obtain Treasury sanction for their publication. This sanction was asked and obtained in 1871, when the Report was published. Finally in March 1870, the drafting of the Report was assigned to a seventh committee: the Report was founded on the twenty-three sub-reports made to the Commission by the other committees. The laying out of the extensive Report of this Commission is as excellent as the method of carrying on the inquiry. Vol. I. contains the general Report and twenty-two sub-reports, arranged in the most lucid and consequent manner, and illustrated with diagrams, &c., where necessary. Vol. II. contains the account of the general business of the Commission, with the Minutes of Evidence and Proceedings of Committees A, B, C, and D: it is illustrated with excellent maps, and has a first-rate index to itself. Vol. III. consists of the Report of Committee E, with a mass of statistics as to the production, consumption, and export of coal, and also its own index. Added to the three volumes, is a portfolio of geological maps and sections of the highest merit, and produced at a cost such as it will probably be hard to move the Treasury to sanction again. Indeed, this Commission and its Report are a fine memorial of the almost extinct spirit of righteous and magnificent expenditure of money and intellect on the investigation of a great national subject. The new-fangled spirit of cheese-paring is now carried into matters of the highest importance; and the best we can hope for the credit of the nation is that this spirit is only temporary and local, and not the result of a new national temper.

on. The question what this depth is, was entrusted by the Duke of Argyll's Commission to one of the separate Committees ("Committee A"), formed for the purpose of securing a thorough and exhaustive inquiry on every branch of the subject. It appears that a higher temperature can be borne where the air is dry than where it is humid; so that the possible depth of working differs in various mines; but the general bearing of the medical evidence taken by Committee A, is to the effect that labour is not practicable in moist air of a temperature equal to that of the blood, namely 98 degrees, except for very short intervals. The conclusions of Committee A on this point are summed up in the following paragraph:—

"The evidence having shown that the question of maximum temperature under which work could be carried on in a coal mine hinges in a great measure on the hygrometric condition of the air, the Committee proceeded to inquire what was the state of the air in regard to moisture in coal mines? The observations which they collected on this point, show that the air at the working faces of the coal was always humid, and often saturated with moisture. In general, however, the deepest collieries appear to be the dryest, although there does not appear to be any ratio between depth and dryness. The depth at which the temperature of the earth would amount to blood heat, or ninety-eight degrees, is about three thousand feet. Under the long-wall system of working, a difference of about seven degrees appears to exist between the temperature of the air and that of the strata at the working faces; and this difference represents a further depth of four hundred and twenty feet; so that the depth at which the temperature of the air would, under present conditions, become equal to the heat of the blood, would be about three thousand four hundred and twenty feet. Beyond this point the considerations affecting increase of depth and temperature become so speculative, that the committee felt it necessary to leave the question in uncertainty; but looking to possible expedients which the future may elicit for reducing the temperature, they considered it might fairly be assumed that a depth of at least four thousand feet might be reached."

What the available stock of coal for the future really is, then, is a matter of the utmost uncertainty; but this very uncertainty gives us at once another important question for our men of applied science to work upon,—how to mitigate the heat of the mines, and how, further, to neutralise its effects by reducing the moisture. Outside

this task remain two vaster problems, still not too vast for modern science to grapple with. The first is how to supersede human labour in these underground pest-holes altogether; the second is how to tame and bring into our service that heat of the earth's crust which stops our mining operations. For heat we want the coals; and heat stops us in seeking them.

In regard to the primary object for which the Select Committee was appointed, namely, to ascertain the causes which have lead to the apparent scarcity of coal, the Report is pretty clear. The Committee inquired how far this scarcity has arisen from a diminution or stagnation of supply or from an unusual increase of demand for consumption, either temporary or permanent in its character; and it appears that several experienced colliery proprietors and managers, selected by important bodies of their class as representative witnesses, and examined before the Committee, concurred generally in opinion that there had been much disturbance in the minds of the workmen in and about the mines, as to the number of hours per day or week during which they should work, and that the general tendency has been to reduce the hours of labour. The Mines Regulation Act, passed the Session before last, is also alleged to have tended to the same result; and, consequently the mines have not yielded as much coal as they might otherwise have produced. As far as the Committee were enabled to ascertain, in figures, the exact effect of these circumstances on the production of coal per man employed, that effect is shown in the following table extending over nine years:

Year.	Number of men employed.	Number of tons raised per man.
1864	307,542	309
1865	315,451	313
1866	320,663	314
1867	333,116	316
1868	346,820	302
1869	345,446	316
1870	350,894	321
1871	370,881	317
1872	413,334	299

There are circumstances which render these figures inadequate for the purposes of an exact comparison; but the Committee is of opinion that "the diminution in the yield per man employed in getting coal in the mine since 1871, is not much less than that shown in the Table."

That this natural reluctance of the men to work longer than they are obliged has been the main immediate cause of the distressingly high price consumers have had to pay these two winters, there is little room or need for disputing: the Committee having satisfied themselves beyond a doubt that the existing collieries are fully capable of keeping up the present supply of coal, and that, with an adequate provision of labour the supply could be very largely increased. There is good ground for hoping that, when the employment of the men shall have adjusted itself to the requirements of the Mines Regulation Act, and to their desire to better their own condition, the aggregate result of the labour of the mining population will be as great as it was formerly; and to this adjustment we must probably look with most trust for the eventual and permanent restoration of the price of coals to some fairly reasonable standard.

But behind this unsettled state of the men, has been a much more powerful agent at work to raise the price of coals, the long continued industrial prosperity of the country, so much of which is carried on through enormous drains on the resources of our coalfields, and in particular, the great extension of the iron trade. Between 1867 and 1872, chiefly (it is computed) owing to greatly increased exports of iron to North America and Germany, the quantity of coal used in our iron manufactures rose from twenty-eight millions (in round numbers) to thirty-eight millions of tons. And this drain on the supply, taking place in an enormously wealthy country, led to the payment of almost any price for the article so much in demand; so that when, at last, the men began to work less, the decreased production, though not in itself of capital importance, sufficed to bring about the greatest distress among those who could not pay the enormous price which the well-to-do were able, if not willing, to pay, rather than be at any inconvenience whatever.

An economic paragraph in the Report of the Select Committee, on the aspect of this question, is well worthy

of quotation, on account of its truth and lucidity: it is as follows:—

"In the ordinary course of trade, the fluctuation in the price of coal might have been limited to the particular quality used specially in the manufacture of iron. The demand, however, was apparently so urgent, that it soon extended itself to other qualities and exercised an influence over their price. The prosperous state of several branches of industry produced a competition for coal which obliged all classes to pay the high price demanded, rather than suffer the loss consequent upon a diminution of business, or the discomfort arising from want of coal for domestic use. The production and export of iron, and the production and consumption of coal, shown in the Tables above quoted, might not be deemed sufficient to account for the great rise in the prices of those commodities, but the exact effect of any disturbance of the relations of demand and supply on prices is beyond the limit of arithmetical calculation. Price depends not merely on the quantity of the commodity, but on the motives which influence both the buyer and the seller in determining how much the one is content to receive, and how much the other is willing and able to pay, under the belief that the quantity brought to market is or may be insufficient to meet the demand. In the case of coal much of the demand is of such an urgent nature that the buyer would pay a very large price rather than be deprived of the supply he requires. Nor does the ratio of increase of price necessarily bear any definite proportion to the ratio of diminution of supply. A comparatively small deficiency may produce a very large increase of price if the eagerness of each buyer to secure his own supply, and to guard against deficiency in his own case, is coupled with the ability to pay for it whatever is demanded by the seller. This appears to have been the result of the comparatively small derangement in the production and consumption of coal enhancing its price in so great a degree."

At one time during the present "coal famine," a belief was pretty widely diffused, and it is still held in many quarters, that colliery-owners were combining to restrict the supply of coals, in order to create a scarcity in the market, and thus send up the price. The Select Committee are anxious to dispel this belief, and give it as their opinion that the owners have taken measures to meet the extra demand: indeed, they point to the well-known fact that, to this end, small coal, formerly "of no account," has now been brought to market, and used instead of other qualities of coal. It is, however, admitted by this most optimistic Committee that efforts have been made amongst the workmen to induce them to take active measures to prevent

the owners from increasing the output. This policy on the part of the men is both short-sighted and immoral: it would neither secure them any permanent advantage, nor will it fail to lose for them that general sympathy which they are quite likely to secure with the nation at large if they use their power fairly, without abusing it. The fluctuation of their wages, which some of them deem dependent on the price of coal, in reality is a normal cause of the rise and fall of that price, and not properly an effect of it: they must look to the state of the labour market for the immediate regulation of their wages; and if they grasp too hard and fast they may find themselves at some unexpected crisis superseded by an influx of labour. We are glad to think that the men generally have more good sense than to believe otherwise than thus.

The Committee dismiss with much *nonchalance* the idea that any combination of owners or of workmen can "by artificial means succeed in permanently affecting the ordinary results of the relations of demand and supply in adjusting the quantity of coal produced to the demand, or can permanently affect the price resulting from the state of the market;" and on this ground they deprecate any interference on the part of Parliament with the "course of industry and trade in coal," beyond what aims at "the prevention of injury to the health and morals of children and young persons, and the prevention of accidents from wilful neglect of recognized precautions." They particularly deprecate the imposition of any duty on coal exported to foreign parts, pointing out, without entering upon the "question at large," certain objections which they deem special to an export duty on coal, "beyond those of the general policy of the country." These special objections we must quote at length, before we go into the "question at large," in the light of some other authorities than the Committee. The two paragraphs dismissing this branch of the subject are as follows:—

"The coal exported to foreign parts is not for the exclusive use of foreign countries. A considerable quantity is used by English shipowners for their homeward and other voyages, while foreign steamships load coal at English ports for their own consumption. It would be as injurious to the English shipowner, and to the merchant whose goods he carries, and to the workman who made them, to deny them the free use of English coal, as it would be impracticable to levy a differential duty on coal consumed in

foreign ships trading with England. Even when the coal is consumed in the interior of foreign countries, it is not unfrequently used on their railways to bring to their ports commodities to be imported into this country, whether raw or manufactured, to be exchanged for the exports from England, and all these operations would be prejudiced to the extent to which English coal abroad would either be enhanced in price or diminished in supply.

"Nor would any duty which could have been placed on coal have had a material effect in mitigating the demand for coal, and the consequent rise in prices at the present time, as it appears that the excess of demand for export was not for coal, but for iron, and every ton of pig-iron exported was, in effect, an export of two or three tons of coal, and of rolled iron of about six tons of coal. The manufacture of iron in a more advanced stage, and of many other commodities, requires a large consumption of coal; the increased export of those articles would also be in effect an increased export of coal, and if the result of an export duty on the coal itself deprived foreign countries of the means of manufacturing commodities in which coal is used, it would only have the effect of increasing the export of those commodities, and consequently of the consumption in England of the coal required for their production, unless there resulted a general diminution of industry and trade, and a cheapening of coal by depriving the people both of their power to use it in manufacture and to purchase it for domestic use."

As a serious argument this is altogether inconclusive; because it merely shifts the question of protecting coal, by means of duty, from one branch of commerce to another. The obstacles in the way of an export duty on coal are certainly very great, if not insuperable, as the Committee hold them to be; but it must be obvious to any thoughtful mind that the objections special to such a duty, advanced by the Committee, do not apply to an export duty on iron, and that the abstract question of an export duty thus remains to be settled,—only with iron as the subject instead of coal. That we do not, for our own part, advocate any such export duty, whether on coal or on iron, will be seen by those who follow us to the close of the present article. It is very doubtful, and grows yearly more and more darkly doubtful, whether this huge commercial prosperity of ours, got mainly by the hideous underground existence of one vast concourse of human beings, and the fever-heat sweltering above ground of another vast concourse, is not the greatest misfortune that can befall a nation, entailing, as it does, that dire influx of bullion into

the country that constantly lowers the value of money, and makes the well-to-do poor, and the poor destitute. But it would be premature to advocate, as a means of preventing the exhaustion of our coalfields, a measure which would certainly reduce that commerce deemed by most Englishmen a supreme glory to us, and which could not easily be advocated except on principles smacking of communism.

One of the dogmas which may be held to underlie what Mr. Ayrton's Committee call the "general policy of the country" is the dogma of free trade, towards a wholesale application of which we have long been drifting. Now, that the application of this free trade dogma in its entirety to the coal question requires re-examination, is proved by the fact that a man of the intellectual and scientific calibre of Mr. Alfred R. Wallace addressed a letter to the Editor of the *Daily News*, during the autumn of last year, urging upon public attention certain limitations to the use of the doctrine in question, and protesting against the unrestricted draft, for purposes of exchange, upon commodities which, being natural products, are practically limited in quantity, and cannot be reproduced. Mr. Wallace argued his case, fairly and ingeniously, by two illustrations. The first was that of a hypothetic water-supply: supposing the springs or wells of a given country to be limited in number but enough for the general wants of the population, to whom they have been freely available on payment of a nominal sum to the owners of the land wherein they are situated; and supposing these latter, for commercial reasons, sell the springs or wells to manufacturers, who exhaust the water with the exception of what will meet the needs of their own workpeople, and thus make the rest of the country uninhabitable; the landowners would, in such case, according to Mr. Wallace, not exceed their rights as regulated by the current view of free trade. And he says the same of the landowners in his second supposititious case,—that of a country with a very fertile but not very deep surface-soil, supporting a dense population on its vegetable products, but which surface-soil the landowners choose to sell to foreign horticulturists, to their own profit, and to the impoverishment of the land, thus made unfit for the continued support of a large and healthy population.

Mr. Wallace contends that the proper subjects for free

trade are such products, animal or vegetable, and such manufactured goods, as can be obtained to an almost unlimited extent in a comparatively short time: the unrestricted exchange of such things, he says, is altogether beneficial to mankind, does not impoverish either party, but leads to improvement in the methods of cultivation and production, and adds to the "sustaining power of the earth." Such articles as coal, on the other hand, being absolutely necessary, limited in quantity, and not capable of being reproduced in any period that the length of human life allows us, ought to be regarded as a property held in trust for posterity. Unnecessary waste of such property is obviously a crime; and Mr. Wallace does not go too far when he says:—

"I maintain that it is a wrong to our own population, and a still greater wrong to the next generation, to permit the unlimited export of those mineral products which are absolute necessaries of life, but which, once destroyed, we can never reproduce. To do so is to sell and alienate for ever a portion of our land itself, and should no more be permitted to private individuals than the selling of the land-surface to a foreign state."

Certainly not: but what renders this argument for an export duty answerable is this,—that a Government which shrinks from any great measure not easy to reconcile with the "general policy of the country" would not dream of interfering with the "free course of trade and industry," if some monstrous landowner took it into his head to dispose of the surface-soil of, say, two or three counties in the most fertile part of England. Hence Mr. Wallace's *reductio ad absurdum* falls through, as such; and we must frankly admit that a Government of third and fourth rate politicians is somewhat wise in its generation in keeping clear of innovations as vital and radical as this would be; for there is hardly a branch of industry which might not, conceivably, be interfered with on the ground of moral responsibilities, if once the principle and practice of interference be admitted.

If moral responsibility to an unborn generation were admitted as the one criterion of state action, the millennium would be upon us before we could look round; and the necessary administrative intelligence would quickly follow in the wake of so great a spiritual revolution; but desirable as that state of things may be, it is almost too

sanguine to expect it just at present. Certainly, we repeat, it is as Mr. Wallace says,—we have "no right" to do as we are doing; and, logically, we are bound to say, "then let us turn over a new leaf." But that is quite another matter. There are some few thousands of actions done every day by us, individually and collectively, which we have no right to do, and many of them are criminal derelictions of our duty to humanity present and to come; but, however much we may feel this sad depravity, we are unable to agree among ourselves which particular points in our conduct we shall hand over for correction to those brilliant gentlemen who amuse themselves and the world at large by playing at government in the crumbling pile of modern building that stands aping the grandeur of the neighbouring abbey, just as the inmates—well, we need not follow up the figure. The question, we say, of giving our conscience in charge, even in commercial matters, to even competent and creditable statesmen, is really a serious question; and if we let the gentlemen referred to above play with that conscience, now so nearly emancipated, in one department, we may be asked to do the same in others. And yet the measure proposed by Mr. Wallace is "only a little one." He would begin with a very small export duty on coal, so as to avoid any sudden results in the labour market, and he would gradually increase it, so as to check the exhaustion of our coals, and stimulate the production of other people's—check our commerce in certain goods, and increase other people's. We are certain the present generation will not hear of it; but cannot exhaustion be checked by any other less objectionable measure? We think it can; but we do not think it will.

The policy advocated by Sir Rowland Hill, in a paper read before the Statistical Society in December last, was perhaps the boldest and most radical treatment of the question as yet advanced. The paper purports to consist of "suggestions for neutralizing" the evils attendant on the high price of coal; and it is of a very sketchy, though pithy character. These suggestions, had they come from any other quarter, would probably not have secured a hearing, but would have been laughed down at once; but the eminence of Sir Rowland Hill as a statistician and practical economist have secured him, generally, a patient hearing in this matter; and, indeed, when we consider that his penny postage scheme, received with the utmost viru-

lence and contumely at first, has in the last thirty years revolutionized the whole postal system throughout the world, we are bound to admit that whatever scheme he may put forward, seriously and categorically, relating to national economy, deserves a patient discussion.

Sir Rowland's proposal is, in brief, a general tax upon coal, whereby we are to place a check on the waste of that article of consumption, abolish nearly all other imperial taxation, and liquidate the National Debt. That this is not the wild idea of a moment, is shown by the careful manner in which the suggestions have been worked into shape; and yet we are satisfied that, at all events for the present, the measure in its entirety would be as inexpedient and unjust, as it would infallibly be pronounced by a vast majority of the nation at large. This is the Nemesis that pursues the modern scientific spirit, so far as it deals with statistics and averages: an average is constantly opposed to the facts of the individual cases of a vast majority; and no average of material facts can possibly be based upon those much more important psychical facts that give national life its impulse and direction, and are not yet to be found in any dictionary of political economy.

Still, statistics are a power; and we must proceed to look carefully at Sir Rowland Hill's scheme in detail. Statistics are certainly one of his *fortes;* by them he proved long ago that a penny postage would bring in nearly as much revenue as a sevenpenny postage; and by them he now proves that, by imposing a tax of about 5s. a ton on coal, we may defer the exhaustion of our coalfields, get rid of all imperial taxation except the duties on tobacco, spirits, wine, and malt liquor, and extinguish the National Debt in about fifty years. This is certainly a bold and comprehensive scheme; and one which, if it could be carried out, would throw into the shade Sir Rowland Hill's past achievements. But can it be carried out? That is precisely the question. Sir Rowland Hill himself does not put it forward as a matured scheme, but rather as a suggestion for others to elaborate and work upon. He distinctly states that he has sought to avoid all expression as to the practicability or expediency of the course indicated; but he says, "having conceived of such a course, as affording great promise of advantage, I have deemed it my duty to put forth my thoughts in the hope that they may in some degree aid in the solution of a question at

once very difficult and very important." We will briefly give the figures and arguments on which the suggestion is based, and then note the practical difficulties which have occurred to us.

Sir Rowland's position is this. The preservation of our unused stock of coal is now universally admitted to be of vital importance. The increase in our consumption is proceeding at so rapid a rate that, if continued, a few centuries will probably exhaust our supplies. This consumption is largely augmented by the enormous amount of waste that goes on; an amount which has been estimated at one-half the consumption! The best check on waste is a high price; but a high price on coal entails great pressure on the whole community, and much privation on the poorer classes. If, therefore, a high price be artificially maintained on coal, this must be counter-balanced by alleviation in some other direction. The question is, What shape shall that alleviation take? "Remission of taxation," Sir Rowland replies.

To show in a striking way the actual amount of pressure caused by the immense increase in the cost of coal, he compares it with the total imperial taxation of the country. Mr. Lowe, in his speech at Sheffield last year, estimated the latter at £60,150,000.

"Now, taking the consumption of 1872, according to the estimate of Mr. Ayrton's Committee, at 120,000,000 tons, and assuming the average increase of price to be about 10s. per ton [in London it was 14s.], or in the gross £60,000,000, it appears that the increased pressure caused by such augmentation is about equal to that which would be produced by doubling our taxation."

In other words, a tax of 10s. a ton on coal, assuming that the annual consumption remained at 120,000,000 tons, would supersede the necessity for all other imperial taxation. Not that Sir Rowland Hill advocates this; but having arrived at the fact that, for every shilling a ton levied on coal, taxation might be reduced to the extent of £6,000,000, he points out that one shilling would give us "a free breakfast-table," the estimated produce of the duty on tea, coffee, chicory, and sugar, for 1873, being in round numbers £5,300,000. A second shilling would sweep away the income tax; and an additional 2s. 4d. would supersede all other taxes, save those on tobacco, spirits, wine, and malt liquor—taxes which most people

agree to be unobjectionable, if not actually desirable. Finally, the imposition of another shilling, making in all 5s. 4d., would allow of the reduction of the National Debt by £6,000,000 a year, which, Sir Rowland Hill calculates, with the interest released from time to time, would completely extinguish the debt in about fifty years. Now, it is important to observe that Sir Rowland does not contemplate the imposition of his coal-tax at the present moment. He does not wish to make coal dearer than it has been this last winter; but he considers, for the reason given, that it is desirable to place a check on the consumption by preventing the price from falling much below what it then was. He anticipates that, sooner or later, a fall will come (indeed, already a reduction of several shillings a ton has taken place); and then, at whatever point might be considered suitable, the fall should be arrested by the introduction of the tax, which would be imposed gradually, becoming heavier as the price of coal declined.

It is clear, therefore, that, whatever other objections may be urged against the scheme, it is not open to the charge that its realization would make things dearer than they are now. Of course the practical effect of such a scheme would be to transfer the great bulk of taxation from the public generally to the large consumers of coal, such as gas, railway and steam packet companies, iron-masters and other manufacturers, in whose businesses the cost of coal bears a very large proportion to other expenses. It would, therefore, be strongly opposed by them. But, in the first place, it seems to us that these classes, which would most feel the burden of such a tax, are well able to bear it; and, in the second place, it is by no means unlikely that the inducement to economy, held out by the permanently high price of coal, would be so strong as to stimulate them to reduce their consumption by the use of improved furnaces, steam engines, &c.; until, possibly, they would pay no more with coals at a high price than they did when coal was cheap and they consumed it wastefully.

Supposing this desirable economical result to come about, it will be asked, "What effect would it have on Sir Rowland Hill's calculations?" No positive answer can be given; but we should think the utmost it is likely to do is to check the increase yearly taking place in consumption. An actual reduction in the amount now consumed can

hardly be expected, at any rate to an extent that would much affect Sir Rowland's figures. The rapid strides with which consumption advances may be seen from the fact that, since 1858, it has doubled, while in the course of this century it has increased tenfold.

As regards the Railway Companies, we find that, by a curious coincidence, the passenger duty, which would be remitted, exactly balances the increased cost at 5s. a ton that they would have to pay for coal. Although no such remission would equalize matters for the gas companies and steam packet companies, still they would be in no worse position than at present; and the individual shareholders would derive the general benefit of the remission of the other taxes.

The benefit which might arise to the public generally through the adoption of this scheme is manifestly great. Coal would not be further increased in price; manufactured articles need, therefore, be no dearer than they are now; and taxation would be very much less. Each family, in lieu of income tax, house tax, land tax, sugar duty, tea duty, &c., would only pay, say, 5s. on each ton of coal. Assuming that they used twenty tons in the year (and many families in the middle class do not use half that amount), this would leave their annual taxation at only £5.

We now come, however, to another consideration, namely, how such a tax would affect the poorer classes; and we may here say that we fear a tax on coal to the amount of 5s. would be impracticable, for this reason: the high price of coal falls most heavily on the very poor, to whom coal is a primary necessity of life, more important almost than meat and drink. And, as they pay no direct taxes, the only part of the scheme which would touch them, would be the abolition of the duty on tea, coffee, and sugar. From inquiries we have been at the pains to make among some twenty poor families in Marylebone, we are satisfied that, as regards the poor, the proposed tax could not be higher than 2s. 6d., assuming that the principle of a "counterbalancing alleviation" be maintained. The average weekly consumption of a poor family may be taken at 1½ cwt. of coals, 2 lb. of sugar, and 4 oz. of tea; so that, adopting these figures, the increased cost of coal for the poor would be, with a tax of 2s. 6d., 2¼d. a week, while the reduction on tea and sugar would be 2½d. This aspect of the case must, we think, have been overlooked by Sir Rowland:

probably he either over-estimated the boon which the remission of the tea and sugar duties would afford to the untaxed portion of the community, or did not fully realize the importance to them of every penny more or less that they are called upon to pay for fuel. Moreover, one of the chief arguments in favour of the retention of a high price on coal, the inducement to economy, would hardly apply to the poor, who have not the capital, and are too strongly prejudiced in favour of the old grates, even if they had, to provide themselves with better constructed grates, which would burn less fuel. Of course this is very lamentable; but we must take human nature as we find it. We cannot alter it by Act of Parliament. It is a melancholy fact that one possible tenant after another has been lost to some improved dwelling-houses lately constructed for the poor in a certain district of London, solely on the ground that the improved grates with which the rooms are provided, and which consume little more than half the amount consumed by the old-fashioned grates, were in their opinion ugly!

We are thus brought to the conclusion that it would be neither politic nor wise to attempt to impose a duty on coal of more than 2s. 6d. a ton; which might be apportioned thus: 1s. for the remission of the tea, coffee, chicory, and sugar duties, 6d. for the remission of one-half the income tax, and 1s. for the reduction of the National Debt; and we must keep in mind that even to this amount of tax there would be very strong opposition.

One of the most interesting branches of the coal question is that treated by Mr. C. W. Eddy, Honorary Secretary of the Royal Colonial Institute, in a paper which he read to the members of that institute last May. This paper, on the Natural Distribution of Coal, brought together an array of facts, not only of great importance in themselves when looked at conjointly, but also most significant as to certain matters of national policy much larger than the mere question of putting a duty on coal, export or other. Our readers are probably aware that the federation of our vast colonial possessions, to form with the mother-country one huge Empire, is a scheme specially dear to the Royal Colonial Institute. This being so, Mr. Eddy is naturally a person likely to lay particular stress on any natural phenomena tending to facilitate the carrying out of such a scheme, or seeming to point to its propriety. Now, had he stated briefly that Nature evidently intended us and our

Colonies for one Empire, looking at the way she had distributed the carboniferous system throughout the world, we should have been very much disposed to say he spoke from an exclusively Colonial Institute point of view. As it is, however, he follows the question out in so perfectly straightforward a manner, giving the best possible authorities for every statement, that we have no alternative but to accept the general remark he enforces, namely that, in the most important matter of coal resources, we and our Colonies appear to be a ready-made Empire.

In as few words as possible, we will follow Mr. Eddy across the world, and look through his eyes at the way the coalfields of the earth are laid out; for after all this is perhaps of greater moment to the thoughtful than the mere questions how our own particular coalfields are getting on, how soon we are likely to exhaust them, and how far we can wisely and fairly check the exhaustion by imposing duties and interfering with the course of free trade.

Starting from England in search of coal, the nearest considerable supply we come to is on the closest point of North America, the island promontory of Cape Breton, belonging to us, and teeming with "bituminous coal of excellent quality." This is found again a little further west, at Picton; and the carboniferous system extends over the greatest part of New Brunswick, "the beds of coal thinning out towards the northern edge," whilst the south-eastern extremity "puts out into the Atlantic." These coalfields, with those of Nova Scotia, are of incalculable importance.

Proceeding westward across British territory, we find a great breadth of coal area along the whole eastern flank of the Rocky Mountains, of enormous importance in maintaining the unity of the British provinces of North America, by means of the intended Pacific Railway, which, commencing on the Atlantic, in one coalfield, will cross another as it approaches the Rocky Mountains, and terminate in a third on the shores of British Columbia, immediately opposite Vancouver's Island, where again we have excellent coal. It is also found in Queen Charlotte's Island, and again in Trinidad.

We next go to Australia, where we note first the significant fact that Australian coal is able to compete with English and American in the market of San Franciso, indicating that it is of a high quality, which much of the "Newcastle" coal of New South Wales undoubtedly is. Mr. Eddy says

of this, that "the area over which it is found in New South Wales and Queensland, and the depth of the strata, show it to be practically inexhaustible." In South Australia, Mr. Eddy does not expect coal will be found; but it has been found in Victoria, though not in a very accessible situation. In Tasmania, again, there are vast coalfields; and in New Zealand the stores are incalculable; some of the coalfields there contain only a low quality of coal, but in others, of vast extent, the quality is excellent.

Coming back from the Antipodes to our starting point, and thence accompanying Mr. Eddy to the East, we are asked by him to notice that here again there is a general absence of true coal fit for marine purposes, and conveniently situated near the sea-coast, from all but British territory. On the route to India, up the Mediterranean and the Red Sea, and along the coast of Arabia, we come to no native coal. The depots are generally on English territory, as Malta, Gibraltar, Aden, and filled with English coal; and when we come to India, Australian coal "meets ours in the market." In India the carboniferous system lies almost entirely between the 20th and 26th degrees of latitude, "comprising a belt of about 400 miles in width," almost all of which is British territory. Going still eastwards, we come to no important coal until we reach our own island of Labuan, which, indeed, we took purely for the sake of its coal.

One great group of colonies still remains to be noticed, which is not rich in coal, but yet, in common with its sister colonies, possesses some of this "truly British mineral"—we mean the Cape Colonies. "Indications of coal," says Mr. Eddy, "have been met with in the mountain basin of Tulbagh, a district equidistant from Table Bay, Saldanha, and St. Helena Bay, only forty to fifty miles from each; so that, should it prove valuable, it is most happily placed; but as yet there has been but little temptation to explore it, because the excellent coal of which we are so lavish is taken to Cape Town, as the outward cargo of ships seeking colonial produce, at a less expense than the inland carriage would cost in the absence of railways."

At Natal also there seem to be indications of coal near the capital and port; but none worth working has been discovered in this locality. "In the far north-east corner of the colony, however," to quote Mr. Eddy again, "on the Tugela, about 120 miles distant from the port, a good coal-

field has been discovered, and the district has been given the name of Newcastle. In consequence of this remoteness, and of the want of roads or navigable rivers, it is, of course, alike useless to the capital and the port, to the lines of steamers which unite it with us and with the rest of the world, and to the coffee and sugar plantations on the fertile belt of coast line; but, happily, there is a near prospect of the formation of a railway to bridge the distance. . . . The position of this coalfield could not have been happier if nature had purposely intended it to be the means of linking together in material intercourse the various detached provinces of the coast line and the interior, as they will undoubtedly some day be linked in one great British Confederation."

Now here is the great point on which we should be glad enough to feel one quarter of Mr. Eddy's confidence. We have no doubt that England's best hopes of preserving her position as a first-rate power in the world (or should we not, perhaps, rather say "regaining" that position) lie in the Federation panacea of the Colonial Institute; and the questions whether or not she will "federate," and if so how soon, affect the home coal question so vitally, that we should be almost tempted to say, "if she federates in ten, twenty, or even thirty years, then let the coal question alone to take care of itself, except so far as regards enforcing, by an organized public opinion, some degree of economy in working and using so precious a product." Mr. Eddy says, "the means of achieving this great end [Federation] are obvious;" and he asks somewhat petulantly whether the British nation will "tolerate politicians who would thwart the designs of Providence?" We do not think the British nation would, if it felt as clear as Mr. Eddy does as to what those designs might be; but we would remind Mr. Eddy that this is just where there are differences of opinion; and further that, while the means of "achieving this great end are obvious," some twenty thousand objections to it are equally obvious to an equal number of persons.

We must not forget that it is no great while since the relinquishment of Canada, as a possession more troublesome than profitable, was advocated in a very high quarter, under the applause of a very numerous body of people; and it may be that what the poet-laureate might call—

"The faithless coldness of *the times*,"

will yet fling away all that loyalty that is known to exist in the hearts of at least three-quarters of the Canadian population. If England be rash enough to proceed further in loosening the bonds of loyalty and affection that bind Canada to us, leaving her first to herself, and ultimately to the United States, it is not Canada only that will go, but Nova Scotia, New Brunswick, in fact, the whole of the Dominion. What then, we would ask, is to become of these grand possessions in coal that Mr. Eddy makes so much of? For the mischief would not end there. No important group of Colonies would fail to lose confidence in us, and drop a great part of its loyalty and care for the *prestige* of being English; and the beginning of the end of our Colonial Empire would have set in.

Thus if we begin to drop our Colonies, we must not discuss any great question affecting the distant future without regarding them all as foreign countries or foreign dependencies. And if we do not very soon seriously take up the question of a Federal Empire, we must entertain, however unwillingly, the alternative of dropping these irrecoverable possessions one by one. Now if we are merely to look at the interests of the present and the immediate future, say the interests of our growing generation, then we need not make so much fuss as we have all been making about the coals. The coals will last *their* time, well enough. But what we have to face, looking into the dim uncertain vista of futurity, is the possibility of an England with a great National Debt, no more native coal to carry on her iron and other manufactures with, and no colonial resources to fall back upon. The possibility, we say, and no more, for we profess no greater insight or farther-reaching vision than the rest of the thinking world. In that possible situation, our grand-children, or whatever generation be in question, would be precisely in the same condition as the denizens of the most unproductive country on the face of the earth are now, except that those denizens have not had the opportunity of running hugely into debt. Instead of providing the world with coal and the produce of coal, they will be dependent on foreign powers for that great essential of civilized life, and will not be in a position to secure favourable treaties.

Looking, on the other hand, at the alternative possibility of a British Empire stretching from one end of the earth to the other, we see no reason to dread, as a calamity

of capital importance, that exhaustion of our insular coal-mines which must come sooner or later. It would be no matter of insuperable difficulty for the several members of one Empire, even as vast as this would be, to arrange the most favourable transfers and exchanges of produce of all kinds. As we have provided our Colonies with coal and its results, so in turn would our Colonies provide us with the like; and as they become more thickly populated, they must, in the natural course of things, whether as separate states or as members of an empire, develope those incalculable natural resources at some of which we have been looking through Mr. Eddy's eyes. We cannot, by fettering the freedom of trade, and throwing every possible obstacle in the way of coal and iron leaving the country, bring about that development of colonial coal-mining which must eventually come of itself, but we might do ourselves enormous commercial mischief. That development of coal-mining in British North America, in India, in Australia and New Zealand, and in Natal, will not come till, as the result of a dense population, better wages can be earned by burrowing in the bowels of the earth than by working in the daylight and fresh air; and we cannot populate the wildernesses by means of a coal or iron tax.

It is too late in the day to inaugurate an era of State mines; and we have but little prospect of the coal resources of the Colonies being developed by other than private enterprise, which must be more or less under the action of the inexorable law of supply and demand. Even in the little Labuan settlement, which we established purely as a coal station for our Eastern traffic, and where we can readily imagine state mines,—even there the working of splendid coalfields has been left to private enterprise; and the companies who have undertaken the business have failed to bring about any satisfactory results, simply through looking too exclusively for immediate returns of profit. Governor Pope Hennessy, in a report to be found among the papers relating to colonial possessions, mentioned at the head of the present article, gives a most interesting and intelligent account of the coal-mining operations in Labuan; and teaches us the lesson that it is not easy to force on operations of this kind. The failure to do much with the Labuan coal-mines seems to have arisen from the persistent attempts to work the surface coal, to the exclusion of the deeper portions of the strata;

and we should expect any forced coal-mining in the Colonies to be carried on in like manner and attended with like results. Governor Pope Hennessy expresses very sanguine hopes that the company now at work in Labuan will bring about valuable results; but if the matter rights itself so tardily and with such difficulty there, in the very gangway of the world's sea-traffic, what would not the difficulties be in remoter and larger coalfields? Besides, Governor Pope Hennessy is conspicuously, in this report of his, of a very sanguine and hopeful temperament; and we must wait and see the great results lying behind us in the past, before we venture to base any "speculative conjectures" on them.

If the conclusions we have come to are of a somewhat negative character, it is because, in the shifting and uncertain state of the present phase of our national life, there is no fixed and absolute point of view from which to treat the question of coal-legislation, except the point of view of statistics, which we have seen to be delusive and unsatisfactory. We cannot espouse Mr. Wallace's theory of an export duty, whether on coal or on iron, because we feel that it would involve a great check to our commerce, and cannot see that the nation is in a frame of mind to profit by any curtailment of commercial prosperity, or even to receive it stoically. We cannot wholly advocate the proposed coaltax of Sir Rowland Hill, even to the extent to which we have admitted it to be reasonable, because the benefits of it are not clearly enough proved to recommend themselves to the people at large, and because the fiscal statistics on which such a measure must be based are in as fluent and unsettled a condition as they can well be. And yet we should be sorry to admit that we give in our adherence to the cynical absence of recommendations which characterises the Report of Mr. Ayrton's Committee.

Certainly we cannot see our way to recommending any piece of legislation special to coal, unless it be the small measure of a shilling duty for the reduction of the National Debt, which Sir Rowland Hill, in common with several other persons, has long been bent upon urging, and unless we might add to this some small inoffensive measure for securing better economy in working, by means of improved apparatus. Beyond these two matters, we should like to see our numerous brethren of the press urging upon the attention of the public at large the desirableness of using

for domestic purposes some form of the economical stoves whose merits are fully expounded in the books of Dr. Arnot and other scientific gentlemen.

But as regards legislation affecting the coal question indirectly, and none the less vitally for its indirectness, we are prepared to advocate a measure that will scarcely be thought negative or too small for the occasion. If we are content to become a nation of peddlers and potterers, let us clamour for more Select Committees to inquire into this, that, and the other small question, affecting the happiness of wild fowl, the closing of public-houses, and the like. But if we wish to regain and keep that leadership in the affairs of the world which our coalfields have helped us so largely in, let us look seriously at the grave question, Who is to keep the best coalfields of the whole earth, at present in our hands? And with a view to the settlement of that important point let us offer the heartiest thanks to the first influential Member of Parliament who will move a humble address to the Queen's Most Excellent Majesty for a Royal Commission to inquire into the reasons for and against the creation of a Federal British Empire co-extensive with our wide dominions.