that therefore the only means of employing every man is to spread this work out over the whole body of workers. This is an assumption around which there can be much profitless discussion. The argument for the taxation of land values is that land monopoly restricts the opportunities of production and employment by restricting access to the source of raw materials. This restriction results in aggravated competition of workers for jobs and a low rate of wages, and on the other hand it results in high rents and speculative prices for land due to the artificial narrowing of the supply.

It is evident therefore that a decrease in the hours of labour, though most desirable in itself, does nothing to remove the fundamental difficulty. Even if it resulted in more persons being employed—which as we have seen would not be the case where it led to an increase of efficiency—it would not increase the aggregate amount paid in wages, though it might distribute that sum between a larger number of persons, each receiving a smaller sum. The monopolists who control the land would still be able to demand their pound of flesh.

The so-called "Capitalist System" will remain intact, if its basis remains untouched. It is only necessary to study the financial press in order to see what that basis is. It consists in the ownership of land, coal mines, iron ore deposits or other natural agents embraced in the economic concept of land. There is a steady tendency for those firms which do not possess such advantages to be absorbed by stronger ones which do. We thus witness the growth of what has been called the "vertical trust," where there is a string of industries reaching back, say, from the shipbuilding and engineering trades to those which produce the coal and iron or other raw materials. This tendency is concealed because the firms which thus unify into a trust still carry on business under the original style.

While sympathising therefore to the full with ideals actuating those who are striving for shorter hours of labour, we must continue to affirm that this of itself will not bring any permanent solution. The trouble will break out in a fresh phase and continue to break out until the ultimate solution is reached in the restoration to the community of the communal right to land; when the value of land is taken as revenue for the benefit of all and it is made impossible for any one to hold out of use the land and all its potentialities for the employment of labour in useful and profitable production.

F. C. R. D.

RIGHTS TO THE NATURAL SOURCES OF ENERGY.

By James Dundas White, LL.D.

The right to the land includes in the ordinary course the rights to the natural sources of energy that are appurtenant to it, such as water-power, wind-power and coal. The gradual development of these sources of energy has been the mainspring of industrial progress; and the principal reason why industrial progress has failed to benefit the masses of the people, as it could and ought to have done, is that the land, including not only the surface but also the minerals and these other adjuncts, have been treated as belonging to the landed interest instead of to the people. If the people are to possess what is justly theirs, they must enforce their right to the land and all that naturally pertains to it.

Water-Power

The first of the natural sources of energy to be utilised was water-power. The water-wheel, in its earliest stage, appears to have been a wheel fitted with buckets to scoop water from the stream and discharge it at a higher level for purposes of irrigation, and to have been actuated by hand or by treading. The next stage was to attach float-boards to the wheel, so that it might be actuated by the flow of the stream. To the practical Romans is attributed the third stage of constructing the wheel as a water-motor and using it to operate a mill by means of a shaft and gearing, as described by Vitruvius in *De Architectura* c. 10. This use of water-power suggested new possibilities for lightening the lot of labour, which found expression in a Greek poem generally attributed to Antipater of Thessalonica, about the close of the first century B.C. (*Greek Anthology*, Bk. IX., Declamatory Epigrams, 418); it has been rendered into English poetry by Mr. J. A. Pott, who has kindly permitted me to quote his verses here:—

The Water Mill

Ye shall toil no more, ye maids of the mill,
Nor rise with the early sun,
Though the cock should crow, ye may slumber still,
Heedless of work undone.

For the Naiads hasten at Deo's call
To lighten the tasks ye do,
And the nymphs of fountain and waterfall
Are turning the mill for you.

So the ponderous wheel goes round and round
As they dance in the water's flow,
And the hollow stones where the corn is ground
Turn to their touch below.

For the life of old has returned again,
'Tis the golden age of yore,
And the goddess' work shall be free from pain,
And ye shall be tired no more.*

* *Greek Love Songs and Epigrams*, by J. A. Pott, 2nd Series, pp. 55-6; London, 1913, Kegan Paul, Trench, Trübner & Co., Ltd. My attention was first directed to a prose translation quoted by Mr. Thomas Cameron in an article on *The Triumph of Labour* in "The Single Tax" of August, 1895; but an error in the name of the poet made it difficult to trace the passage. For the correct reference I am indebted to Mr. T. E. Page, one of the Editors of the Loeb Classical Library (Heinemann), in which a new edition of the Greek Anthology has recently been published, with translations by Mr. W. R. Paton, this particular epigram being in Vol. III., pp. 232-3. It was also quoted by Johann Beckmann, in the Chapter on Corn Mills in his *History of Inventions and Discoveries*

Labour's Hope Deferred

But these fair hopes were not realised. The advantages of the invention went to those who, by possessing the land, possessed the water-power, and the disinherited workers, whether bond-slaves or wage-slaves, remained in much the same position as before. Similarly, also, with subsequent improvements, such as the overshot wheel, the Poncelet wheel, and the various kinds of water turbine; the resulting advantages have gone ultimately to the owners of the water-power.

Water-Mill Monopoly

Mention may here be made of a peculiar extension of their claims. Johann Beckmann, in the chapter on "Corn Mills," in his *History of Inventions and Discoveries* (trans. William Johnston, London, 1814, Vol. I.), says:—

> "Another restraint to which men in power subjected the weak, in regard to mills, was that vassals were obliged to grind their corn at their lord's mill, for which they paid a certain value in kind. The oldest account of such ban-mills, *molendina bannaria*, occurs in the eleventh century,"

and he gives several instances of this practice, which he characterises as a monument of feudal tyranny. It does not appear to have found a footing in England. In Scotland, however, the feudal lords who had water-mills frequently brought it in by making a condition, in feuing or letting their lands, that the corn grown on these lands should be brought to their mills to be ground. This quasi-servitude of "thirlage" not only "thirled" or bound the produce of the land to that mill and forbade its being ground at any other mill, but in some instances even forbade its being ground in a hand-quern. Always unjust, this monopoly was often used oppressively, and it appears to have been the common practice to charge "multures"—or tolls for milling—at monopoly rates on corn grown on the thirled lands, and at competitive rates on corn grown elsewhere. In practically all cases thirlage has now been either extinguished by redemption or otherwise, or has been commuted under the Thirlage Act, 1799, into annual money payments which, being substituted for thirlage, continue to be payable irrespective of whether any corn is grown on the land and even though the thirlage mill has been demolished. The amounts of these annual payments vary with the price of grain, and it is interesting to note that, where they are still payable, the rise in the price of grain owing to the war has increased them for the time being.

Future Developments of Water-Power

On the more general question it may be observed that, owing both to mechanical improvements and to the developments of the electrical storage and the electrical transmission of energy, the use of water-power will probably be extended considerably in the near future, and that special attention has recently been given to possible developments of the water-power of the United Kingdom. If, however, the people as a whole are to have their fair share in the benefits of any such development, the first step must be to enforce their rights to the land, of which the water-power is part and parcel. It should also be borne in mind that the right to the land, besides including the right to use the water-power, includes the right to prevent other people from using it. The use of water-power is discouraged by our present system of rating and taxation, which exempts the owner of the water-power from liability so long as he allows it to run to waste, but if he makes use of it charges him not only on its value but also on the value of the machinery and plant for using it. Under a proper system the value of the water-power, if appreciable, would be a special factor of the land value, on which he would have to pay whether he used it or not, and any machinery or plant would be rate-free and tax-free. These conditions, besides promoting the development of water-power, would place the effective ownership of it on a proper basis.

The Beauties of Nature

There is no reason to apprehend that such a system would impair our scenery. If necessary, special exemptions could easily be made for any waterfalls that add to the attractiveness of a neighbourhood, and the enforcement of the public rights to the land would of itself do much to preserve these beauties of Nature. It should be remembered also that the expenditure on machinery and plant would not be payable unless the water-power were either considerable or in close proximity to where it was wanted, and that a water-wheel beside a mill or a farmhouse is an artistic as well as a useful feature.

Wind-Power

The next of the natural sources of energy to be utilised was the power of the wind. Where the windmill originated is uncertain; but it appears to have been introduced into Western Europe by the Crusaders. As the right to the land ordinarily includes the right to make use of the wind that blows over it, the right to wind-power, like the right to water-power, was from the first treated as belonging to the landlords, without regard to the rights of the people, and subject only to the claims of the Church. Some of the earlier records regarding windmills relate to claims for tithe, and the question whether the proceeds of windmills were titheable was settled by Pope Celestine III. in the twelfth century in favour of the Church.*

Monopolizing the Wind

The right to the wind-power was generally treated as attaching to the possession of the land, but there have been instances where the feudal lord claimed the wind-power as part of his "regality." His "regality" generally included the exclusive right to build bridges and water-mills on navigable streams, and Beckmann, who deals with the matter at some length in the chapter already mentioned, says that:

> "The avarice of land-holders, favoured by the meanness and injustice of governments, and by the weakness of the people, extended this regality not only over all streams, but also over the air and windmills."

He also gives the story of a fourteenth century dispute on the subject, as recorded in the Chronicles of the Augustinian Monastery at Windscheim in Holland:—

> "As our Monastery had not a mill to grind corn, they resolved to build one. When the Lord of Woerst heard this, he did everything in his power to prevent it, saying that the wind in Zealand belonged to him, and that no one ought to build a mill there without his consent. The matter, therefore, was referred to the Bishop of Utrecht, who, as soon as the affair was made

(trans. William Johnston, London, 1814; i., 236), where references will be found to the literary works in which it has been recorded and handed down. Mr. Pott has expressed the opinion that it should be attributed to Antipater of Sidon, who lived about 100 B.C.; he has also been so good as to give me references to the statement of Strabo (*Geography*, XII., iii., 30) that at Cabeira in Pontus were the palace of Mithridates (who died 63 B.C.) and the water-mill, to the passage in which Diodorus Siculus (*History*, I., 34) speaks of the water of the Nile being raised for purposes of irrigation by the Archimedes screw (which was probably fitted with floats so as to be rotated by the river), and to the lines in which Ausonius, writing in the fourth century A.D. (*Mosella*, 362-3) refers to the stream of the Moselle actuating millstones and saws.

* "De reditibus molendini ad ventum solvendae sunt decimae." *Decretal. Greg.*, lib. iii., tit. 30, c. 23.

known to him, replied in a violent passion that no one had power over the wind within his diocese but himself and the Church at Utrecht; and he immediately granted full power, by letters patent dated 1391, to the Convent at Windscheim, to build for themselves and their successors a good windmill in any place which they might find convenient." (*Chronicon Canonicorum Regularium Ordinis Augustini, Capituli Windesemensis: auctore Joh. Buschio, Antverpiae*, 1621, 8vo, p. 73.)

As another instance, in which the claim to the regality was not challenged, he quotes a record which states that:—

"The City of Haerlem obtained leave from Albert, Count Palatine of the Rhine, to build a windmill in the year 1394." (*Theod. Schrevelii Harlemum: Lugduni Batavorum*, 1647, 4to, p. 181.)

Equal Property of All

In his book on *The Windmill as a Prime Mover* (2nd ed., New York, 1894, ch. 3) Mr. A. R. Wolff quotes these narratives from Beckmann's work, and observes that they are—

"of special interest to the school of political economists who hold that any free forces of Nature, such as earth, water, land and the like, should, in their natural unimproved offering, be the equal property of all,"

to which it may be added that this school of political economists, including those associated with the land-values movement, are interested in enforcing the public rights to all such subjects, in whosesoever hands they may be.

Future of Wind-Power

As the original invention of the windmill worked out to the advantage of these who by possessing the land possessed the wind-power on it, so did all the subsequent inventions, such as the revolving cowl, the mechanism for automatically adjusting the cowl so as to keep the arms of the windmill facing the wind, and the light steel-framed windmills of modern design. For centuries the windmill has been utilised very largely for land drainage in Holland; before the days of steam it supplied motive power for drainage, for milling and for sawing in many parts of this country; and in its newer forms its use is extending throughout the world for purposes which do not require great power. The wind is, of course, intermittent, and the energy developed by the windmill is not very great; but the modern windmill is not an expensive appliance and can be set up anywhere; and, besides its other uses, improvements in the storage and transmission of electrical energy may lead to its extended adoption for generating electricity, as suggested by Lord Kelvin. Here, too, it may not be out of place to observe that the development of wind-power, like that of water-power, is hindered by the present system of rating and taxation, which penalises windmills as soon as they are set up and working. Owing to its character, wind-power is not restricted to particular channels like water-power; but the right to the wind is included in the right to the land, and the better use of it would be promoted if rates and taxes were based on the market value of the land and windmills were exempt from them. Windmills would then be used on a more extensive scale, and the wind-nymphs, like the water-nymphs of the Greek poem, would be engaged more widely in the service of mankind

Coal

Coal, though it had long been used as fuel, assumed a new importance with the invention of the steam-engine, which, deriving its energy principally from coal made possible not only the railway and the steamship, but also the spinning-jenny, the power-loom, and the multitude of modern machines that operate manufacture and transport on a gigantic scale. Yet even the enormous development and extended application of this natural source of energy have failed to lighten the lot of labour as they should have done. Denied their just rights to the land, the working people were driven in large numbers to seek a livelihood in these new industries; their competition with one another reduced wages to starvation level and swelled the profits of the manufacturers, while the owners of the lands where coal and iron were obtained reaped a rich harvest from mining rents and royalties, which under just conditions would have been public property. Failure to recognise the rights of the people to the gifts of Nature vitiated the effects of these inventions so far as the great majority of the population were concerned. The conditions of life in the new factories became appalling, and suggested doubts as to the social advantages of inventiveness.

John Stuart Mill on Inventions

John Stuart Mill said:—

"Hitherto it is questionable if all the mechanical inventions yet made have lightened the day's toil of any human being. They have enabled a greater population to live the same life of drudgery and imprisonment, and an increased number of manufacturers and others to make fortunes. They have increased the comforts of the middle classes. But they have not yet begun to effect those great changes in human destiny, which it is in their nature and in their futurity to accomplish." (*Principles of Political Economy*, IV., 6, ii.)

Economics of Invention

The results, however, were not attributable to the increase of population, for the population had not increased as rapidly as the wealth. The fundamental defect, as may be seen from Mill's own statement, was that the wealth was unfairly distributed, and it does not require much analysis to show that the unfair distribution of the wealth was principally due to the unfair distribution of the sources from which it was derived. If mechanical inventions for making better use of the gifts of Nature are "to effect those great changes in human destiny which it is in their nature and in their futurity to accomplish," the rights of the people to these natural bounties must first be effectively secured. Then, and not till then, will they be able to participate fairly in the services rendered—to extend the Greek metaphor—by the water-nymphs, the wind-nymphs, and the wood-nymphs of the primeval vegetation that was turned to coal.

Petroleum

Though obtained in certain countries from ancient times, petroleum has never been obtained here in payable quantities, and the prospects of so obtaining it are still doubtful. During the war, however, petroleum was needed in large quantities for cars, tanks, aeroplanes, submarines, and many other purposes; and the high price of it, combined with the difficulties of obtaining and transporting it from the usual sources of supply led to the introduction by the Government in August, 1917, of the Petroleum Production Bill, to provide for experimental borings in this country.

Proposal for Petroleum Royalties

In order to avoid the multiplication of borings which might follow a successful result, the Bill proposed to confer on the Crown the sole right of boring for and obtaining petroleum. In order to conciliate the landed interest, it proposed that there should not only be full compensation for any taking of, or damage to, the surface, but also that the Crown should pay royalties for the petroleum to the owners of the surface; which of course would have given statutory sanction to their claim to own the petroleum. This proposal for royalties was the more indefensible, not only because there was no petroleum-getting industry in operation and advantage was being taken of public

necessity in a great national crisis, but also because, unlike coal, petroleum is a mobile liquid and it is impossible to say from under what land it comes, as a single bore-hole may drain a county. There was no legal authority for the proposition that the petroleum under the surface belonged to the surface owners; indeed, from the standpoint of law, the case of underground petroleum seemed analogous to that of underground water. But the latter consideration did not count for much with the promoters of the Bill, and they proposed to get over the difficulty of ascertaining where the petroleum came from by getting experts to say what they thought were the probable limits of the petroliferous area and dividing the royalties among the landlords of it.

Petroleum Royalties Defeated

To this proposal for petroleum royalties a small group in the House of Commons, of which the present writer was one, offered uncompromising opposition at every stage, and succeeded in defeating the Financial Resolution, without which the Bill could not reach its next stage. This fortunate circumstance directed attention to the question; what had been said in debate was supplemented by letters and articles in the newspapers, notably by certain letters in The Times of August 29th and November 1st and 6th; and it soon became evident that public opinion was against these royalties. The Bill was not proceeded with further, and in the next year another Petroleum Production Bill was introduced and passed into law without opposition, as, though in other respects it resembled its predecessor, it contained no provision for royalties, leaving that question to be settled later on. One may hope that it may then be settled right, by a declaration that petroleum under the soil of the United Kingdom is the property of the Crown, as representing the people. Any natural deposits of gold and silver in this country have for centuries been treated as the property of the Crown; and the same principle ought to be applied to the natural deposits of other metals and of coal, as well as to those of petroleum.

Rights of Labour

Nature has been generous, but her storehouse is the land, and land monopoly has led to the monopolizing of the surface, and the minerals, and the natural sources of energy, all of which should be treated as common property if industrial advance is to benefit the community as a whole. "If every instrument could accomplish its own work," wrote Aristotle* in the fourth century B.C., "if the shuttle should weave and the plectrum touch the lyre without a hand to guide them, chief workmen would not want servants, nor masters slaves." The unwanted "maids of the mill" probably resented the competition of the water-nymphs. The unwanted hand-workers of a century ago tried to break the engines and machinery that were displacing them. Even now the introduction of more efficient machines and the working of them to their full capacity is regarded with some misgivings, which will not be without justification until the people as a whole, by participating fairly in the gifts of Nature, are enabled equally to enjoy the increasing advantages that are obtained from them by industrial progress

General Considerations

The contrast between what is and what ought to be in these respects may recall the lines that Southey put in the mouth of Joan of Arc (*Joan of Arc*, i., 168–172):—

> "Oh, what a blessed world were this!" she cried,
> "But that the great and honourable men
> Have seized the earth, and of the heritage
> Which God, the Sire of all, to all had given,
> Disinherited their brethren!"

* Politics, I., 4; trans. Jowett.

To restore this inheritance is the first and most important step towards economic justice. There is a story that when Thomas Paine was asked during his last illness if he had any message to leave, his reply was, "Tell the tailors to put a knot on their thread before they take the first stitch." If social reformers want their stitches to hold, they should knot their thread by enforcing the right of the people to the land.

HOUSE FAMINE AND LAND PRICES

(*The particulars given below of population; total area; and area and rates paid in respect of agricultural land, refer to the year* 1911-12, *and are taken from the White Paper* 119 *of* 1913.)

£605 per acre in Blaydon.—Speaking at a Conference on Housing at High Spen, Councillor J. Ward (Blaydon) said his Council had decided to build 500 houses. They were negotiating with the owners of the Townley estate to purchase land, but they had been asked 2s. 6d. per sq. yd. This is equivalent to £605 per acre. The Council proposed to erect not more than twelve houses to the acre. He condemned the action of landowners in asking high prices for land as the result of which heavy rents would have to be charged.

The area of Blaydon (pop. 31,139) is 9,392 acres. Of that area 5,719 acres are rated as agricultural land and pay on the average only 2s. 3d. per acre a year in rates. It is probably for some of that land that £605 per acre is charged.

Search for Land in Harrow and in Wealdstone.—The Daily News of February 19th reports that the Harrow Council have decided to obtain particulars of any vacant land in the district that might be suitable for a housing scheme. The same paper states that the Wealdstone Council received on February 18th a report from the surveyor of interviews he had had with owners of certain lands in the district suitable for houses for the working classes.

The area of Harrow (pop. 17,074) is 2,028 acres. Of that area 1,206 acres are rated as agricultural land, and pay on the average only 4s. per acre a year in rates. Perhaps the Councillors will elicit these facts among the particulars to be obtained.

The area of Wealdstone (pop. 11,923) is 1,061 acres. Of that area 570 acres are rated as agricultural land, and pay on the average only 3s. 11d. per acre a year in rates. Would the surveyor take note of that?

£200 per acre in Kiveton.—The Kiveton Park Rural Council wish to erect 200 or 250 cottages. They are negotiating with local landowners and have, as stated at a meeting of the Council on February 10th, decided to offer Mr. M. Athorpe's agent £200 per acre for a site. This is equivalent to £10 an acre annual value—and in a rural district.

Mr. Esslemont, of Stonehaven, said at the meeting of the Scottish Chamber of Agriculture in Edinburgh on January 30th:—"They also required land for housing. The public would not tolerate having to pay at the rate of £10 to £14 per acre for feuing purposes (that is, an annual rent) while land for purely agricultural purposes was obtained at £2 per acre." Mr. Esslemont should be a member of the Kiveton Park Rural Council.

£230 per acre in Wigan.—The Westminster Gazette of February 21st states that the Wigan Town Council has bought land at £230 per acre for a housing scheme. The comment is made that "this is equivalent to 5/8ths of a penny in ground rent." If by this is meant a weekly ground rent, a simple calculation, taking the land rental