

there is no reason why all these processes mentioned should not flourish at the same time. The demand is so large that all the efforts in the different directions will certainly not meet it for some time. Considering the subject from the technical point of view the progress compared with Mond's result is obviously due to the introduction of high temperatures and high pressures: *i. e.*, new physical aids. But looking into the matter from the general standpoint we recognize that the thermodynamic equilibrium questions play the deciding part. Theoretical consideration never replaces experiments, but points out and circumscribes the field in which experiment will probably be fruitful.

There is still a large field to be covered by applied inorganic chemistry, and I trust that the combination of experimental skill in chemical work with physical thinking will lead technical chemists to great results.

CONSERVATION OF NATURAL RESOURCES IN RELATION TO BUSINESS¹

By JOHN J. MILLER

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That the utilization of our natural resources is of vital importance to the people and especially to the chemists of this country no one will question; that the continued prosperity of our chemical industries is dependent upon an early and proper settlement of this problem is admitted by many, but when the method of simultaneously conserving and using our resources without upsetting business is under consideration, agreement upon any proposition seems difficult. The reason for this state of affairs is, we believe, that the logical, scientific or natural plan of conservation and use has not received due attention. As chemists it is our belief that problems of this kind as well as those in natural science are never solved unless the theory of their solution is in harmony with natural law, and, therefore, we propose in this paper to study the subject from that standpoint, first to refer to the law involved and then to build upon it.

In our opinion, the law pertinent to our proposition is: there are naturally two distinct kinds of business, public and private; public business should be owned by the public, whereas private business should be owned by individuals. This is a very simple and almost axiomatic statement and yet it signifies but little unless we explain that by public business is meant enterprises which involve a franchise, a "right of way" or a natural monopoly. All other business is private. Railroads involve rights of way; telephones or telegraphs require franchises; water power control and timber, coal, ore and oil privileges are natural monopolies.

In the conduct of private business let us say as far as this discussion is concerned that competition should reign. It seems natural that this should be so and whatever is natural is best. As against the argument that competition is extremely wasteful, we venture the suggestion that competition has not, in our time, had a fair trial. As we shall show later, much of our industrial wastefulness is due to too much monopoly rather than to a lack of it.

To decide what policy should prevail in the execution of public business (the question in hand) let us proceed negatively, *i. e.*, by casting aside the less desirable propositions.

I. Is private ownership and operation of public business (especially utilization of natural resources) desirable? Experience up to the present time answers emphatically "No." The socialist movement and the existence of the Conservation League are evidences of dissatisfaction with the system now in vogue, which is none other than private ownership and operation. This method means exploitation of the masses by the few and criminal waste of our natural resources.

¹ This article is an application of the fundamental principles set forth by Henry George in his "Progress and Poverty" and "Our Land and Land Policy."

II. The failure of the existing policy relative to public business has led to government control of private ownership and according to Prof. Van Hise, of the University of Wisconsin, this plan (which he broadens by including private coöperation under government control) will eliminate our difficulties [THIS JOURNAL, 5 (1913), 946-7]. To test this proposition let us turn to the work of the Interstate Commerce Commission, which has for some time controlled the railroads and recently the express companies. In some particulars the people have been satisfied, but without fear of being successfully accused of pessimism we will state that there has been considerable trouble. Little differences of opinion as to wages have been amicably settled, but the question of freight rates is becoming serious. Thousands of men were turned out of the railroad repair shops this winter because the roads could not pay dividends and keep up repairs too. Such conditions are intolerable and inexcusable, but we doubt if a rise in freight rates is the remedy. Everyone knows that the railroads are overloaded with watered stock on which dividends are being paid and it would seem only fair that the governing commission should squeeze the water out of such stocks rather than allow repair shops to close and freight rates to rise. This Interstate Commerce Commission has done wonderful work, perhaps all that is possible under the power delegated to it, but in our opinion the dispensation of justice by commissions is bound to be slow, artificial and cumbersome.

Prof. Van Hise's coöperation feature of the "government control plan" has not been published in detail as far as we have been able to learn but his article in THIS JOURNAL, 5, 946-7, indicates that in the case of coal mining and selling he would divide the country into sections and furnish coal for any given section only from the mines in the same district. This would, he says, destroy the wasteful competition in the various sections. With the government controlling coal prices and freight rates, we may fairly conclude that this system will furnish the consumer his coal at moderate cost whereas he is now paying abnormally high prices, but he will have to use the coal from his section whether it is the kind best suited to his needs or not. If he really wants the coal from his section he would be buying it now and there would be no use of imposing the divisions upon the country. If he is not now obtaining the coal produced in his own section it is because it is more economical for him to use another kind and any restrictions of his buying field would involve a greater loss than at present. We venture the idea that the coöperation which travels hand in hand with unfettered competition is the kind to be sought and the type that will exist when privilege in business is destroyed. Coöperation which is not natural is not desirable.

III. Some may conclude at once that public ownership and operation is the best plan, but we beg to dispense with this idea briefly by saying that if there is a better plan of action, government operation should be avoided because of the danger of political control. It has the advantage, however, of being more in accord with natural law than any method yet discussed.

IV. A résumé of the article at this point will show that we would discard (1) private ownership and operation, (2) private ownership under government control and (3) government ownership and operation. One other combination of these two factors remains, namely, government ownership and private operation.

If this can be brought about, we are in exact accord with natural law, to wit: government ownership of all monopolies and private ownership of business where no monopoly is involved. For example, the common ownership of natural resources signifies the impossibility of private monopoly. In mining by private enterprise (and with private tools) of the natural resources (owned by the government) there is no natural monopoly and, therefore, the operating feature may well be

classed as a private business. This plan then is in harmony with natural law, but let us see if it has any other support.

The purpose of the National Conservation Association is to see that "the minerals should be so used as to prolong their utility. . . . Monopoly of the sources of national wealth should not be tolerated, etc." The methods to be used by this Association are: (1) "Protection of source waters of navigable streams through purchase or control; (2) separation for purposes of taxation of the timber from the land on which it grows; (3) incorporation in all future water power grants by State or Nation of adequate provision for prompt development on pain of forfeiture: payment of reasonable compensation periodically readjusted, limitation of the grant to 50 years and recognition of the rights of public authorities to regulate rates of service; (4) legislation whereby title to the surface of public lands and to the minerals therein shall be granted separately and retention by the government of title to all public lands still publicly owned which contain phosphate rock, coal, oil or natural gas and their development by private enterprise under terms that will prevent extortion or waste."

It is evident that our scheme is in agreement with the foregoing, but we should ask ourselves if it is practicable and what is the machinery of its operation. In practice our plan is carried into operation by:

(A) Granting titles to the land surface and the deposits separately. The mining of the deposits would not greatly interfere with the best use of the surface.

(B) Removing taxes from all products of the mines or of timber lands. This will lower the price to the individual consumer and to all industries in which nature's products are used. In the case of timber, which can be replaced, it will augment tree planting and culture. It seems foolish to complain of the destruction of forests and water sheds when we penalize the growing of trees and encourage their destruction by taxing all that remain standing. When we tax oil, which has been taken from the ground, whether crude or refined, we raise its price, discourage the manufacture and sale of oil-using machinery, and burden the industries dependent upon oil.

(C) Taxing ground values or deposit values at the rental rate and equalizing the taxes on used and unused deposits are the last requirements of the proposed system. On first thought this may not seem to be in entire agreement with our natural plan of government ownership and private operation, but we contend that it is in *effect* identical. The advantage in government ownership of natural resources lies in the preclusion of their monopoly by individuals and this will be attained by taxing used and unused deposits at the same rate. Owners who are now holding out of use these valuable deposits, would use them or sell them to some one who would. This plan is simplicity itself, it involves no coercion or disputes and requires no machinery for its fulfillment other than the machinery of taxation which is already in existence.

But what will be the effect of this system upon our resources and upon business? These are the points in which we are especially interested. Starting with the timber, it is easily comprehended that if timber lands and barren timber lands which are especially suited to timber and are of equal value, are taxed at the same rate it will not be profitable for the owner of the unused land to leave it idle. He will either grow timber upon it or will sell it to some one who will. Can you imagine a better stimulant for replenishing our forests, preventing erosion and loss of soil fertility, and furnishing a supply near at home for our saw and paper mills and other wood product industries? Surely we have no right to complain about the failure of the Almighty to furnish us with necessary wood when we as a people are doing all we can to destroy existing wood and to prevent the growth of more. A simple change in our tax laws will produce timber in exact accordance with the demand for it.

In the investigation of our water power possibilities, which are many indeed and apparently everlasting if we protect our forests, taxation of the monopoly value of these sites whether used or unused would throw them all into use. This would mean competition between the men or companies controlling these water power privileges and consequent minimum prices to the public for the products manufactured. Such conditions are ideal and naturally follow when special privilege is destroyed and freedom of opportunity established.

The effect upon the coal industry and coal resources, of this taxation of title privilege, would be about the reverse of the tendency under the present system of tenure and operation. Now, immense tracts of coal lands are held out of use; only a small fraction of our coal is being mined and that part is sold at exorbitant prices to pay dividends on stock, the value of which depends not upon the amount of product that is mined or sold but upon the monopoly value of the total coal deposits. There is practically no competition between coal companies and what little does exist is between companies which are all overloaded with watered dividend-paying stock. Therefore, the price of coal is high and the chemical industries suffer. Incumbent upon us also is the fact that the operator is hardly ever the owner and the former pays so much a ton royalty to the latter. The operator is interested, therefore, not in taking out all the useful coal but in getting the highest-priced product in the shortest possible time. Is it any wonder that the Bureau of Mines complains about the wastefulness of the present system? Now, this "ground-value-taxation method" of ownership and operation would make it useless for anyone to own coal property unless he was also the user. Moreover, since he would be taxed on his entire holdings, he would be tempted to remove all coal for which there would be a sale.

But lest some one too hastily conclude that all our coal deposits would be mined at once and the supply exhausted, we wish to call attention to the handwriting upon the wall, which reads: "If you will properly utilize your water power possibilities you will need coal only where it is especially adapted and is of greater advantage than water power." Again it is likely that before our coal has entirely disappeared we shall be manufacturing coal out of cellulose or using the sun as a source of power. At any rate we must not overlook the fact that the supply of coal will depend upon the demand. No one is going to mine coal unless the market price insures him a better profit than he can obtain in some other kind of business. As long as there is a demand it will be mined and in several hundred years the supply may be depleted but we should not worry either for ourselves or for our descendants because if we do not waste our coal in mining it and supply only what the public demands (ends which the proposed system will attain) we are within our moral rights, as stated so admirably by Thomas Jefferson when he said: "The world belongs in usufruct to the living."

The ore, oil and other problems are exactly parallel with that of coal. Perhaps no small part of our waste of valuable raw material is due to lack of technical knowledge, want of methods yet undiscovered and the inadequacy of national protective legislation, but economic maladjustments are largely responsible. As long as our resources are privately monopolized they will be sublet at the highest possible rates to operators who will attempt to work them (on a royalty basis) no matter how inadequate their equipment may be. These tenants naturally strive to recover the best, not the most, product in a certain time and at a given cost. Another unfavorable feature of the present monopoly and subletting system is the tendency to operate on too small a scale. What are the causes of this tendency? They must be either lack of capital (perhaps due to too high royalties, taxes on equipment and investment of much money in monopoly enterprises) or difficulty of access to more

raw material (because of private monopolization) or both. The proposed system of equalizing the tax on used or unused resources will make access to larger tracts much easier and the elimination of taxes on equipment and destruction of monopoly will augment available capital. The first step then toward conservation is that of industrial freedom.

Since this paper is little more than an outline, a summary is hardly needed. We desire in closing merely to emphasize the tremendous importance of developing our timber and water power possibilities in order to save our fuel, to ask acceptance of the proposed plan only in so far as it is in harmony with economic law, and to suggest that legislative action relative to the nation's resources should not be artificial, for says the great philosopher and slave, Epictetus, "except in conformity with nature there is no progress."

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SOCIOLOGICAL WORK OF THE NEW JERSEY ZINC COMPANY¹

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There has been no stage in the growth of the world that has not brought to mankind its problems. To those of us who are here tonight there is probably no more vital problem than the one of adjustment between the industrial and social worlds. This problem is fast becoming the keynote of prosperity or non-prosperity throughout the civilized nations.

The greatest men of every nation have been those who have offered the best solution to the problems of their day. For this reason it is a most hopeful sign that the men who lead in the control of the great industries of the world are now turning their minds to the solution of the difficulties presented by the two factors—man as a social, human being, and man as a part of the great industrial machine—two factors which were a short time ago so widely separated.

It is through the consideration of this new adjustment that we now find the terms "Sociological Work," "Safety Devices," "Experimental Department," and "Department of Sanitation and Accident Improvement." These terms were not to be found in the business vocabulary of a quarter of a century ago.

To Americans great changes have come in comparatively few years. The great inrush of immigrants, the overcrowding in the cities and the development of large industrial centers have produced conditions which make the need for inter-dependence and coöperation more necessary to the prosperity of this country than in any other nation. If we take the question of our industrial centers, we find much the same conditions existing among the laborers and their families, whether the center be in the city, town or country. Almost without exception we find the immigrant bearing the brunt of the hardest labor. His lack of training, his inexperience regarding conditions of living, his limitation of language and his usually enduring physique relegate him to the rank of the minimum wage earner. The immigrant laborer in our industries is handicapped not only by these limitations, but oftentimes is up against the race prejudice of a boss who underrates his value to labor. This boss has long been the only mediator between the foreigner and the corporation. From this have arisen many of the serious labor problems of the day, and at this point the task of adjustment begins, a task that can be accomplished only through welfare work. I shall not go further into the wider aspects of welfare work, but shall take up the development work that has been carried out by the New Jersey Zinc Company at their various plants.

The first work to be put on a definitely organized basis was begun at Palmerton, Pennsylvania. When the New Jersey Zinc Company built its first plant at Palmerton, about fifteen

years ago, there was only a small group of farms. The next seven or eight years saw the growth of the town to two thousand inhabitants, and in 1907 it had many attractive homes, a park, electric lights, a modern sewage system, bank, hospital, and several churches. These improvements were provided by the Zinc Company in view of the future, and anticipating the time when the town would become a borough. With so much that was outwardly attractive at this time (1907) there was practically nothing being done to meet the needs of the physical, mental and moral welfare of the people. The population of the town was made up of Pennsylvania Germans, Hungarians and Slavs, three elements having nothing in common with each other. The schools at that time were scattered and poorly housed. The churches were each doing a share of Sunday work, but in between times there was nothing being done for the general welfare of the people. There was nothing offered to bring together the various elements among the people and provide them with a common interest. The ever-present activities of the young people were not being utilized. There was nothing being done to stimulate mental activities along uplifting lines or to establish any civic or community spirit in this fast growing town made up almost entirely of strangers brought together from many different points. It was at this time, when, confronted by the barrenness of possibilities of life, that the company decided that corporation responsibility toward the human beings in their charge warranted the establishment and support of an institution that would offer fuller opportunities to the working men and their families. On the well proven ground that a well-trained, right-thinking, contented human being makes a well-trained and intelligent workman, plans were made for the development of Settlement House work.

Two small dwelling houses which were being built in July, 1907, were connected and furnished for use as a Neighborhood House. What was a Neighborhood House? What was the house to be used for? These questions aroused much speculation. Only two answers could be given to start with.

Palmerton was to have a Kindergarten—the first in Carbon County—and the teachers were to live in the house and to form a Home Center, to which all who were willing to come would be welcome at any time of the day or evening. Beyond that, time must indicate the lines of development. The school children indicated the next step and came in increasing numbers, until it was necessary to reckon upon their regular attendance, and thus afternoon classes were formed. Games and stories were so new and interesting that they filled all needs up to Christmas time. After the holiday festivities were over, the need for organized work presented itself and classes were formed in various kinds of handwork.

As the summer season drew near, a new and urgent need presented itself. A public playground, where children and adults could gather for play. The streets of the town were graded above the level of the vacant lots, so there was no suitable spot to be found where people could gather for recreation. It was evident that a public playground would be of good service and one was promptly and generously provided.

The steady growth of the town and the consequent increase of numbers in the attendance at the Neighborhood House, made it necessary, if the settlement work was to develop, to build a new house, and enlarge both equipment and space. This was done and the new house opened in May, 1911.

The kindergarten is used not only for kindergarten class, which has enrolled eighty children between 4 and 6 years of age, but is used in the afternoons for dancing and folk-dancing classes and club meetings; in the evenings for dancing classes, handwork classes and classes for foreigners' English. We have this winter a class of eighty adult foreigners—men and women. These foreigners are being taught practical English. First the necessary human intercourse; then the language which will help

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