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THE DUTY OF SCIENTIFIC MEN IN CONSERVATION[1]

THE conservation movement of a few years ago crystallized and brought to public attention a great principle, one so far reaching that its real significance and scope are even to-day not generally grasped. Regardless of how the term may be defined, the problem of conservation involves the whole question of the relation of our natural resources to the economic life and upbuilding of the country. We have to do not merely with the prevention of waste and economical use of our resources, but also with the problem of how these resources may render their highest service in building up local communities, maintaining our industries, and contributing to a strong civilization.

We can point to considerable progress in certain features of conservation during the past decade. Scientific men have conducted research of great value that already is resulting in new uses of various raw materials, in more economical methods of handling them, and in improved methods of perpetuating those resources which are renewable; engineers are giving more attention than formerly to the problem of preventing unnecessary losses in the exploitation of raw resources; the more far-sighted leaders of industry have an increasing appreciation of the relation of natural resources to the permanence of their own enterprises. And yet, the conservation principle is making slow headway, when viewed from the larger aspects of the economic needs of the country. The loss through unnecessary waste is still appalling, uneconomic methods in the use and development of various

[1] This paper was presented at a joint meeting on April 9, of three Committees on Conservation, representing the National Academy of Sciences, the National Research Council, and the American Association for the Advancement of Science.

of the resources continue, and the interests of industries and communities are already in many cases jeopardized by the depletion of local sources of raw material.

Among the obstacles to the more rapid application of the principles of conservation are ignorance and indifference on the part of those engaged in developing natural resources, unwillingness to change old methods, and selfishness of individuals who are willing to sacrifice even the interests of their own industry to immediate gains. But there are also obstacles of an economic and public character, that are retarding progress. These relate to the character of ownership and control of natural resources, to the existing organization of certain of the industries, to problems of transportation, and in some cases to questions of taxation and the relation of the public to industry.

Scientific research furnishes the foundation of conservation. Education will solve the problem of ignorance and indifference. The economic and political obstacles, however, can usually be overcome only through action by the public. Thus it is that those who are engaged in promoting the principles of conservation in their respective fields are urging legislation in the federal Congress and in state legislatures, seeking public aid for private owners of resources and for the industries, public cooperation in marketing and distribution, public action in road building and other transportation problems, and in some instances public control over the basic resources themselves, over their exploitation, or over the distribution of their products.

In studying the situation in the different fields of conservation, I have been increasingly impressed by the inadequacy of the available information about the different resources in their relation to the problems of our national development. This may be surprising in view of the extensive research in different branches of science, and the large amount of reliable data in regard to the quantity of the various resources, their basic qualities, their possible uses, and the general requirements of American industry. Yet this information has not been assembled and interpreted in a way to show the real meaning of our resources and their conservation to the permanent advancement of our industrial and social life.

Not long ago I asked a prominent leader of forestry in Massachusetts if anyone could inform me just what the forests in that state mean to its permanent economic life; the relation of the forests to wood-using industries, their importance in maintaining successful agriculture, their relation to transportation, to rural life, and to the labor problem of the state. The answer was that no such comprehensive study had ever been made. In that state as elsewhere, the discussion of forestry has centered chiefly about the problem of the production of board feet for the market. The economic aspects of forestry as a land problem have been subordinated or overlooked. Forestry concerns the use and development of nearly one third of the area of the entire country. We have the problem of whether this vast area shall be of service in building up and maintaining permanent rural communities, with all the resulting benefits to the state and to the nation. When our forest problem is studied in its relation to the concrete economic needs of the localities where the resources are located, it takes on a new aspect, it reveals a more alarming situation than if it concerned only the question of a supply of specified products, and it calls for different considerations in public policy.

Our economic studies of natural resources have thus been too restricted in their viewpoint, often overlooking aspects of great importance in formulating policies. This is especially true where the service of one natural resource is dependent upon the development and right handling of another. It is the general rule that a state or a locality is not built up on the basis of a single resource. Its economic prosperity depends upon many branches of industry using various resources some of which are obtained locally. A permanent industrial organization depends upon the right handling of all the various natural resources. The development of one may be dependent upon others; the destruction of one may re-

tard or entirely prevent further progress in the region. No better example of this principle can be found than agriculture and forestry. In many regions the forest is essential to permanent agriculture. Where the land is largely of high quality, agriculture can be carried on as an independent enterprise; where poor land predominates, successful agriculture depends upon the development of other natural resources in the region. It was the forest and the forest industries that made farming possible in many of our lean-land regions. When the forest was destroyed, and the lumber and auxiliary industries moved out, the farms were abandoned or continued under great difficulties. The forest is often regarded only as a temporary cover which is to be removed to make way for agriculture or other industrial use of the ground.

It is assumed that settlement will take place after the forest has been destroyed. Precisely this situation exists in the pine region of the South. The forests are being cleared away with great rapidity, with almost no effort to replacement. Every tree is cut that will make a log, including the young timber that has grown since the Civil War; and many thousands of acres of small trees 25 years or so of age, are turpentined under methods that will kill them within a few years. The owners then undertake to dispose of the lands for farming. The public is appealed to for cooperation in attracting settlers, and to establish colonies of farmers upon these devastated areas. If this land were of the character of that in the Mississippi and Ohio valleys, the effort would be more successful. But only a part of the land is fertile, and that is intermixed with light soils suited only to tree growth. The raising of live stock will help this situation to some extent, just as it was a great factor in the early settlement of Virginia, Kentucky, Tennessee, and other states. But in the long run it will be the forest, growing on the poor soils, that will supplement farming and stock raising and, by affording additional opportunities to the farmer and by supporting local forest industries, will make the settlement successful and permanent.

You have doubtless, most of you, visited the Landes district of southwestern France. This is an extensive sandy plain, presenting conditions similar in many respects to the coastal plain of our South. The original pine forests were destroyed, and the whole region remained for many years in a backward condition. Prior to the middle of the last century this whole area, through the initiative and cooperation of the government, was reforested. The direct result was that the tillable lands, often in small areas, were cultivated and a prosperous rural organization built up. The farmers were able to devote a part of their time to logging, to turpentining, and to work in the mills. All of the land is in use, furnishing several resources that altogether support an astonishingly large population.

I am in sympathy with the efforts to attract settlers to the South and other cut-over land districts. I am in sympathy with the plans for public cooperation in land classification. I am in sympathy with public encouragement of systematic establishment of farm colonies, even with public help as is successfully done in California. But first of all we must stop the wasteful destruction of the very resources that are necessary to make such settlement work successful. And that can be done only by a recognition of the interrelation of the problems of the various resources, and the working together of all of them to the common end of building up the country.

Many other illustrations could be given of two or more resources which are interdependent and whose problems of development and conservation cannot be considered separately without loss. Forestry and stock-raising, farming and mining, agriculture and mining, forestry and recreation, wild life conservation and grazing, water resources and forestry, water power, oil and coal, are a few examples. Oftentimes too there is a failure to consider the larger aspects of resource development in the planning and building of highways. Transportation is one of the largest factors in removing the economic obstacles to successful conservation. In the past great sums have been expended on unwisely planned roads.

Every public officer charged with selecting road routes, is subject to enormous pressure to build specific roads in aid of special industrial groups or individual interests. This was brought home to me when, during my service as head of the Forest Service, we inaugurated a large enterprise of public highways in the National Forests. In working out a policy of public highways the selection of projects and planning of the roads were based upon studies of all the various natural resources and of the local economic needs. Every road was to render its highest service in aid of resource development, in building up and maintaining permanent communities; and in this we did not overlook the encouragement of outdoor recreation through conserving the scenic values along the routes.

One of the most important problems before our country to-day is to preserve and build up a strong rural civilization. Every one at all familiar with our economic history appreciates the influence on our physical prosperity and upon the moulding of American character of the existence of a vast public domain containing a wealth of natural resources of great variety and readily available for use. It was through this surplus of resources that there was developed among our people the qualities of individuality, initiative, and self-reliance. Our national strength lies in having a great number of small land proprietors, of small entrepreneurs in all industries, an army of men dependent upon their own individual efforts rather than upon mass organization. It is for this reason that we are seriously concerned by the movement away from the country to the industrial centers, and by the increase of ratio of the industrial to the rural population. Our public domain is now but a fragment and is no longer available as a factor in assimilating the great number of aliens that are flocking to our shores. The resources that can readily be developed by the individual are approaching exhaustion; the surface cream of our natural wealth has been skimmed off.

We still possess vast resources, but their development involves new problems. The process of exploiting the more accessible resources built up a rural organization. In many cases this has broken down or its character has been changed. The building up of a sound rural civilization on a permanent basis depends first of all on how we work out the new problems of handling our natural resources.

I would not in any degree minimize the problem of conservation as it relates to the supply and distribution of raw materials for our various industries. The need of conservation from this aspect has been borne in upon our industries by the artificial shortage created by conditions growing out of the war. Less appreciated is the relation of conservation to the welfare of the localities where the natural resources occur, and it is for that reason that I have to-day laid stress upon that special feature.

The efforts in conservation to-day are scattered among a large number of institutions, organizations, and individuals. There is a lack of unified purpose and direction in the movement. Workers in separate fields fail to give adequate consideration to the bearing of the problems of other resources upon their own. Oftentimes there is an actual conflict of interests in the use and development of two or more resources that is not being adjusted and is leading to public injury. In the field of public policy many proposals are being made, each perhaps with a good purpose, which are not in harmony as to principle and often are in conflict, with resulting confusion to the public and frequent failure to secure the legislation requested.

To-day there is no central agency, governmental or otherwise, that is considering our natural resources as a whole in their relation to our economic, industrial, and social development. There is no leadership in conservation in its larger aspects, that defines objectives, assembles and interprets the basic data regarding our resources, works out the principles of harmonizing conflicting interests in resource development, that furnishes, in short, the economic background for conservation and the principles that must underlie the public action necessary to make our natural resources render their best service; and there

is no agency equipped to organize the educational work that should be introduced into our colleges and schools, aside from popular education in conservation.

It must be clear to every student of the natural resource problem that there is an undertaking in conservation of great magnitude awaiting leadership and organized effort. There is an opportunity and, in my opinion, a duty for the great national organizations of scientific men to join hands in assuming this leadership. They are in a position to bring into harmony the objectives, the policies, and the efforts of those working in the several branches of natural resources. Under their guidance and inspiration there could be assembled the available information regarding our natural resources, and the interpretation of the problems of conservation from the broad viewpoint of the relation of all resources to our national development. The scientific organizations would thus be able to contribute to the formulation of public policies, and to aid in bringing about their adoption. And finally, it would be possible for them through existing agencies to carry out an educational plan for the introduction of appropriate studies in conservation in our schools and colleges, and to forward a far-reaching campaign of popular education.

The appointment of conservation committees by the National Academy of Sciences, the National Research Council, and the Association for the Advancement of Science, and the meeting of these committees for the consideration of joint action, should prove to be the first step in a new leadership that will give power to the conservation movement, with the promise of very large achievement.

In my opinion a very great responsibility rests upon this conference. We have an opportunity to organize the intellectual forces of the country in a movement that will have a profound influence upon the future well-being of the country. Our action may determine the direction the movement may take, and whether it will be effective or lag behind for lack of leadership. A great public interest depends upon our foresight and vision, upon our ability to plan with wisdom.

HENRY S. GRAVES

PRESIDENT HARDING'S PRESENTATION ADDRESS TO MME. CURIE

Mme. Curie: It is with an especial satisfaction that I perform the pleasant duty which has been assigned to me to-day. On behalf of the American nation I greet and welcome you to our country, in which you will everywhere find the most cordial reception. We welcome you as an adopted daughter of France, our earliest supporter among the great nations. We greet you as a native born daughter of Poland—newest, as it is also among the oldest of the great nations, and always bound by ties of closest sympathy to our own Republic. In you we see the representative of Poland, restored and reinstated to its rightful place; of France, valiantly maintained in the high estate which has ever been its right.

As a nation whose womanhood has been exalted to fullest participation in citizenship, we are proud to honor in you a woman whose work has earned universal acclaim and attested woman's equality in every intellectual and spirtual activity.

We greet you as foremost among scientists in the age of science, as leader among women in the generation which sees woman come tardily into her own. We greet you as an exemplar of liberty's victories in the generation wherein liberty has won her crown of glory.

In doing honor to you we testify anew our pride in the ancient friendships which have bound us to both the country of your adoption and that of your nativity. We exalt anew our pride that we have stood with them in the struggle for civilization, and have touched elbows with them in the march of progress.

It has been your fortune, Mme. Curie, to accomplish an immortal work for humanity. We are not without understanding of the trials and sacrifices which have been the price of your achievement. We know something of the fervid purpose and deep devotion which in-