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REMARKS BY DR. STANLEY A. CAIN, ASSISTANT SECRETARY OF THE INTERIOR FOR FISH AND WILDLIFE, AT A MEETING OF THE UNITED AUTOMOBILE WORKERS OF AMERICA INTERNATIONAL EXECUTIVE BOARD, TAMIMENT, PENNSYLVANIA, JUNE 7, 1965

Natural Resource Prospects and the Population Explosion

I consider it a privilege to speak to you this evening about matters I feel are so important to our future. I believe that the human situation popularly described as the population explosion gives us one of the supreme challenges of modern time. When, as you have suggested for this discourse, we set this complex problem in juxtaposition with our use of natural resources, we have an area for discussion that needs attention at all levels of society.

I wish to devote my first few minutes to natural resources to emphasize -- although many people know it -- that the United States is far from being self-sufficient in raw materials. We are a net importer by a significant amount and our overseas dependence increases every year. We cannot, then, safely take other than an international outlook. A second point about natural resources is that our concern for conservation is increasing and changing. Fortunately, most of our earlier fears of certain imminent shortages have not become reality. Our future for energy supplies and certain other materials, including food, is reasonably secure. But new areas of concern have appeared and they are forcing us to change our appraisal of the environment and our goals.

The reason for setting resources problems beside the modern demographic situation is that there is a deep schism in American and world thought about the consequences of rapid population growth. Many persons dealing in commodities appear to see only the business impact of a larger market. Others are impressed by

the problems of providing adequately, from natural resources, to meet the needs of people. These problems are especially formidable in developing countries.

Our concept of natural resources is changing. It once was sufficient, in a general treatment of natural resources, to have a unit on forests and others on fish and wildlife, soil and water, ferrous and other minerals, and one on fossil fuels. More recent general treatments have something to say, also, about air, nuclear energy and space (but not outer space), urban sprawl, recreation, and wilderness.

Within such broad categories it generally has been customary to think of individual resources as specific and separate entities, abstracted from nature. For example: the problem of certain firms was only to mine and market coal to make a profit while other firms, for the same reason, dealt only with iron or copper or petroleum. The farmer raised crops or livestock. The lumber or paper company reduced forests to products -- lumber, dimension stock, poles, pulp bolts, tanbark. The fisherman caught menhaden, tuna or shrimp. Rivers were developed when their channels were made navigable or when every dam site was utilized and the water of impoundments reduced flood hazard and regulated flow, irrigated fields, and generated electricity.

We lived for decades as our industrial economy was developing on a largely single-purpose basis. We extracted useful goods from nature's raw materials, each of us going after the one thing we knew how to handle best -- how to take from nature and market or process and concert to a good or service of higher value.

Up to a point this understanding of natural resources and this way of using them had worked quite well. The economy grew; people had jobs; fortunes were made; the future seemed limitless. The extent to which this approach was acceptable was due, I think, largely to the fact that much of our industrial history transpired on a large continent fantastically rich in natural resources and unoccupied by people who could compete with us. It was encouraged by principles that favored the idea of man's dominance over nature, the concept and hope of material progress, and a belief that success was, somehow, a consequence of moral virtue.

The demand for a change in attitude toward natural resources has become progressively more imperative during this century. As the frontier ceased to stretch limitlessly before an advancing population, lumber companies discovered that it was not possible to stay in business on a "cut-out-and-get-out" basis. Game hogs and market hunters found fewer and fewer waterfowl each year. There came a time when it was no longer easy for a farmer who had worn out his land to pick up and move westward to virgin soil.

Simultaneously, technical advances were adding their influences. Once-lush oil fields, which had become marginal under earlier development methods, could be restored to production by repressurization. Uses were found for previously unmarketable forest-tree species. New strains of familiar crops and farm animals were products of the developing science of genetics; engineering contributed to soil and water conservation; and chemistry aided the maintenance of soil fertility and the output of crops and protection of products.

The single purpose is yielding to multiple purpose. Byproducts were added, sometimes becoming more valuable than the original or basic product. The simple firm became a diversified firm or some kind of group of integrated or interlocking firms.

But such influences are not all that have been brought to bear on our utilization of natural resources. We are discovering that resources do not exist as distinct entities in nature.

There is now a much more general appreciation of the fact that natural resources are not separate entities in nature. Resources are associated with one another. For example: ore bodies are generally rocks that contain many compounds other than the particular mineral that causes one to refer to "iron ore" or "copper ore." Ores, as a consequent are complex natural resources and one such ore body under modern technology may yield several metals to commerce. The change that has come about is clear in the fact that the spoil banks of earlier mining are in many cases worth reworking, not only because of improved methods of extracting the original commercial metal, but because of the value of other ingredients formerly discarded.

When we turn our attention to living resources, it is readily apparent that a forest is a complex natural resource. Among the many species of trees in forests some may have greatest value for veneers or such specialty products, others for lumber or dimension stock. But the complexity of the forest as a natural resource does not stop with the trees. Forests have values for watershed protection, wildlife production, recreation and even minor products from shrubs and herbs. Lakes and streams provide another excellent example of the broadness of the resource spectrum. They are much more than water and, as we all know, their uses are numerous and varied.

Natural resources are not only associated in nature; they interact with one another in complex and constantly changing ways. For example: physical and chemical characteristics of soil affect vegetation and vegetation influences animal life. And the reverse: living things do as much to create the characteristics of different soils as do minerals.

Such ever-present and inescapable interactions in nature have gradually brought to us a realization that there is a unity of life and environment. An organism and its environment, a population and its environment, a community and its environment, are inseparable. Ecologists refer to this phenomenon as an ecosystem -- a shortened term for ecological system, which stresses inter-relations among living organisms and between them and the surrounding physical environment. The concept is a useful and productive one for it can be applied to the full range from the tiniest tidal pool and its associated life to the world as a whole.

This inter-relatedness of nature is one of the ingredients, once it is understood by man, that affects man's use of natural resources, and recognition of this is bringing about changes in private and public management of our resources.

Of course it still is possible to farm with disregard for water conservation and maintenance of soil fertility, but it is not possible to do so without destroying the soil as productive capital. It is possible to use water in a manufacturing process and return it to a stream grossly polluted, but it is not possible for several firms scattered along a stream to do so without incurring important costs to others and eventually to themselves. It is possible to carry on

mining with disregard for other values of the local ecosystems, but there comes a time when society steps in, in the national interest, with regulations concerning landscape restoration, pollution control and other social costs of private enterprise.

Something else is meant by the term resource complex. A watershed, for example, is a resource complex. It is a stream and all of the land surface that drains into it, together with its natural and managed vegetative cover. A watershed has boundary and is natural in the one sense of surface drainage. It may be very heterogeneous as to bedrock, soil, vegetative cover, wildlife and the uses to which man has put all these elements.

In a related, but different sense, a piece of property is usually a natural resource complex, and if it is a large property this is always true. This is, I believe, the real basis for the principle of multiple-use management as applied to the National Forests by the Forest Service or, in the private sector of the economy, by a number of progressive firms harvesting trees on a long-term, sustained-yield basis.

The management problem in such cases is a complicated one. Each natural resource taken alone is usually subject to several different uses, and a complex of individual resources is subject to several different management plans. A firm will analyze the economic consequences of alternative products and management systems in making its choice. It may also take into consideration the pertinent costs and benefits that are intangible and, often, not marketable. Such intangibles may include public relations benefits accruing from public access to a property for fishing, hunting, and other recreational activities. The soil and water conservation benefits from a well-managed forest are not retrievable by a firm but this makes their social value no less important. This complex problem is the same on public forests except that intangible values are more easily realized because there is no requirement for fair return on capital from marketable goods and services.

In both the private and public sector, however, multiple-use of a natural resource complex poses some difficult decisions. There is not only the weight that may be given to different resources and different uses of them, but some uses are incompatible. It is not possible to have a true wilderness with developments in it. It is not possible to dam a stream and impound its waters and still have those values that distinguish a free-flowing river from a quiet pond.

It is not possible to have quiet and space for fishing where there is a congregation of aquatic hot-rodders and water skiers. It is not possible to preserve a rare and endangered species of bird and have unrestricted hunting or, perhaps, even simple disturbance of nesting by the naturalist or the merely curious.

The problems of the natural resource complex become even more critical when we consider an urban situation with its suburbs and hinterland. The quality of air and water and land come to the front as men have planned well, or poorly, for their many uses for business, industry, and dwellings. The problems of the supply and distribution of goods and services, including utilities and transportation, are matched by the more-often-neglected aspects of a livable environment. Open space, recreational space, natural beauty, and the aesthetics of man's own constructions have as much to do with the quality of living as do the more easily quantified aspects of our affluence.

It is most gratifying to us in the Department of the Interior and to others dedicated to the many causes of conservation that the United Automobile Workers of America subscribes to this theme.

I can give no better example than to quote from President Walter P. Reuther's foreword to a special booklet prepared for the recent White House Conference on Natural Beauty:

"The 20th Century technological revolution has given us the tools of automation and economic abundance with which we can conquer man's ancient enemies--poverty, ignorance, and disease. We can free the human family from material poverty. We must also work to create a living environment of beauty which will liberate man from the spiritual poverty of ugliness and urban blight.

"We have mastered the scientific, technical and productive know-how to satisfy man's material needs. We must now make a comparable effort to master the human, social, and moral know-why essential to achieve man's higher purposes and relate him to nature as he searches for fulfillment.

"President Johnson's call to build the Great Society is a society where men are more concerned with the quality of their goals than with the quantity of their goods.

"The good life is more than money in the bank, food on the table, and a roof over the head. The good life is also a place for all children to play and breathing space to live in and grow strong in body, mind, and spirit."

The role of prophet is a thankless one, and perhaps rightly so. Conservationists do not have a good record of being correct about many happenings. Being one of them during recent years, I am reluctant to put on the hair shirt. Perhaps many forecasts made by the earlier conservationists turned out to be incorrect because people began to manage resources differently, partly because they took some heed of the warnings. Earlier in this century it was widely thought that the nation would run out of timber. For some decades it appeared that we would run out of petroleum within a dozen years or so. The rates at which we were allowing destructive soil erosion to continue seemed to foreshadow coming food shortages. The end of Great Lakes iron ore was in sight.

Technological advances in the beneficiation of low-grade ores have in the case of iron, for example, made the resulting product competitive with high-concentration direct-shipping ores. Early production of copper was based on the native mineral and at the turn of the century an ore had to average about five per cent pure copper to be economically minable. Today technology permits the profitable use of copper that occurs in complex chemical combinations and amounts to as little as a fraction of a per cent. Land is farmed so as to maintain its fertility and even enhance its richness. Forests are managed on a sustained-yield basis. Multiple-use dams benefit navigation, curb flood hazards, permit irrigation and electric power production as well as provide for fishing, boating and other kinds of recreation. In early dam building no thought was given to watersheds. As a result, some of the smaller reservoirs are already silted full. At least since the birth of the Tennessee Valley Authority-type program it has been known -- if not always followed in practice -- that the land as well as the water must be managed. Still more recent and in some ways more interesting and heartening is the fact that some streams may be left not fully developed in the earlier sense and some stretches will remain as wild rivers.

Finally, in this vein, more and more attention is being paid to a livable environment for man, including the amenities of life. Much of the earlier conservation effort went into the correction of past

mistakes, what Evelyn Hutchinson of Yale University called "repairing the biosphere." Now some thought and money are devoted also to avoiding mistakes that would deteriorate and degrade the environment.

Today we need not be distressed about the future supply of many natural resources that once concerned us in America. We will not have to depend so largely on the non-renewable fossil fuels for energy. Most minerals can be obtained at bearable costs. Organic products can be obtained in satisfactory supply if farms, pastures, forests, and fisheries are managed as well as we now know how. Present and probable technology will undoubtedly be adequate to solve such supply problems. Real costs need not rise prohibitively, if at all.

There are areas, however, for which the solution of our resource problems will be very difficult. It will be difficult to coordinate politically and equitably the necessary public and private efforts first to check the rate at which we are polluting air, water, and soil and then move on to clean up the damage already done. It will be extremely difficult to check the pollution of the environment by chemicals, including pesticides, and radioactive materials, and the contamination of all life, including man. It will not be easy to rebuild our cities to human scale -- to accommodate urbanization to man rather than man to the megalopolis. This is not just a problem of providing necessary restraints on real estate developers. There are still areas in the public sector where single-purpose objectives are carried on with equal disregard for concomitant consequences to the ecosystem and man's place within it.

The degree of American affluence is unique in human history. Measured in per capita income, citizens of the United States have about twice the spendable income of the relatively small cluster of the next most rich. Several dozen nations form a depressing cluster of the truly impoverished, with annual per capita incomes equivalent to little more than a hundred dollars.

The solution of our resources problems and the maintenance and enhancement of what we call our way of life is not a provincial matter. It is difficult for many of us to understand that others are poor, poor in extremis. Also, I believe, few of us realize the extent that the United States depends on other peoples' natural

resources and the rate at which our domestic production is shrinking in relation to our total consumption. For many natural resources we are the world's greatest producers and, in spite of that, we are a net importer of many of the same raw materials.

Another ingredient that is causing changed attitudes toward natural resources is the human population explosion. The expression is trite, but it is accurately expressive.

The demographic revolution has become generally apparent. Its significance, however, although appreciated by some persons in all nations, is not generally understood. Throughout the hundred-thousand-year history of man, he has experienced such demographic success that his species became truly cosmopolitan and spread even into many unlikely and uncongenial places -- Tierra del Fuego, the high Arctic, and the deserts. There were certainly many places where man flourished during extended periods of time. The fact remains, however, that from the beginning until the dawn of the Christian Era man achieved scarcely an estimated quarter of a billion members. What has happened since has often been told.

It took sixteen to seventeen centuries to double that number. The next doubling, making a total of one billion, took about two centuries. And the next doubling occurred in less than a century. The population explosion is a recent and essentially worldwide phenomenon.

The past few years, since the United Nations has been making estimates of human populations and the rate at which our numbers are growing, have seen constant upward revisions from a little over one per cent to an estimated two per cent per year as a global figure. In some nations the rate of growth is as low as one-half to one per cent, but in Latin America, as a whole, the rate is about three per cent and Costa Rica has recently been growing at a fantastic four per cent rate. Among the developed countries, the United States and Canada, for example, have high rates of about two per cent.

It is not necessary for our present purposes to look into this matter in detail any more than earlier in these remarks was it necessary to look at production and consumption details for natural resources. It is enough now to emphasize the meaning of such compound-interest rates. A population that continues to increase at

a rate of two per cent would double in about thirty-five years, and at four per cent Costa Rica will have, in a generation, twice as many people to feed and house and clothe and educate. In this case a generation is the short one of the tropics -- something less than twenty years.

In very general terms, the demographic revolution is a consequence of man's increasing control over the causes of death while the birth rate was unaffected or declined more slowly than the death rate. The conditions which are conducive to a falling death rate are those of increasing agricultural production, improved social organization, the harnessing of external energy to machines to enhance the productivity of man's labor, and more knowledge of the conditions for health and the causes and control of ill health. These phenomena are epitomized by the familiar expressions: nationalization, urbanization, agricultural and industrial revolutions, general education, the advances of medicine and public health, and internationalization as represented by the multilateral specialized agencies of the United Nations and the bilateral activities of the Point-Four type. The latter have accomplished programs of low per capita cost, such as the use of DDT in malaria control, that can be applied essentially to an entire national population, with drastic reductions of the death rate.

When we relate current demographic changes to natural resources we find that it is exceedingly difficult for many nations to maintain a favorable relationship between the needs of people and their ability to meet them.

The two post-war decades have seen the appearance of the new international principle of foreign aid whereby it has become national policy for developed nations to assist those seeking speedier economic development. In spite of this, recent history is not encouraging. Despite valiant effort, certain nations are no better off and some are worse off today than they were in the pre-war years.

In this regard, aggregated statistics are misleading. Much of the world increases in agricultural production, for example, are taking place in the nations that are already well fed, and nations with the highest rates of population growth are, in many cases, those whose economies are least able to support the population increases much less improve the general welfare.

The disparity grows: the rich get richer and the poor get poorer. There once was a song one line of which went, "The rich get richer and the poor get children."

We do not need to turn to any other country to know how misleading statistics aggregated on a national basis can be. One needs only to remember how many times newspaper stories report the failure of the vote for a milage increase to build an adequate school system, to provide for an adequate sewage treatment system, or for parks and open space. Nationally, every proposal for a National Park or Recreation Area has been violently fought by certain local vested interests. Belatedly, but with some hope, we are attacking the local and regional enclaves of poverty in the most affluent nation the world has ever known. We are trying to get at the causes of poverty -- in Appalachia, in the District of Columbia. It is not easy for us. How much more difficult is it for Brazil or for India.

In conclusion, I would merely stress the obvious. I once expressed it as "the race between production and reproduction." We must seek an acceptable balance between the utilities that we can wring from natural resources and the material satisfactions and amenities of life. There is no other basis for progress in this direction other than that of conservation management of natural resources and that of allocation of the goods and services from them to the general welfare.

The knowledge exists to handle most production problems and the scientific method is at hand to speed solutions for others. The difficulties that confront us are not scientific and technological. They have to do largely with social philosophy and the will to organize for the general welfare. The bottlenecks are moral, political and economic. We need a wider and deeper dialogue on social purposes. Only then can our policies be better formulated and our practices improved.

Unfortunately the evolution of social change tends to be slower than that of technologic change. It need not be so.

For many, the novelty of conquering outer space already has worn off. In scientific circles as well as in the popular mind, there is little doubt that man will reach the moon and extend even farther

his knowledge of the yet-unexplored. Thus, we now find man looking much more closely at his day-to-day environment on the earth where he dwells and where future generations will live, regardless of what we do in outer space. There is, I believe, a growing awareness among thoughtful people that greater attention must be given to stabilizing population and to restraining the demand of resources in order that a long-term favorable balance can be established and maintained. Our drawing closer to the people of all the earth and to their problems has brought us ever closer to an appreciation of the place of mankind in the world ecosystem. Whether the outcome for us and our descendents will be entirely favorable and measure up to our anticipations will depend on the serious attention and creative efforts that the full range of people, their leaders, and their organizations -- academic, social, political -- can bring to bear on such fateful matters.



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