The United Nations Scientific Conference for the Conservation and Utilization of Resources

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WHEN MORE THAN 600 scientists, economists, private businessmen, and government officials from 50-odd countries of the world met at Lake Success from August 17 to September 6 for the United Nations Scientific Conference for the Conservation and Utilization of Resources, it was thought that anything could happen. What did happen was not startling. There were almost no sharp clashes that created ready-made newspaper headlines, for those who took part were not concerned in this meeting with political ideologies. The organization of the conference must be considered a great tribute to the work of the Economic and Social Council of the United Nations, and to its Secretariat.

In opening the conference, Trygve Lie, United Nations Secretary-General, stated:

> Modern science has developed a wide range of new techniques for wresting more wealth from the earth's resources. Their effective application is basic to achieving a world of abundance—a world where the specters of hunger and wastelands will be things of the past.
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> In particular, the underdeveloped areas of the world can reap the benefits of learning new methods to use their untapped resources and to build up their economies. The conference represents one of the first and most important steps in the program of technical assistance to underdeveloped countries, which the United Nations is undertaking.

What these world authorities talked about had to do with the material things necessary for the survival of man and his attainment of higher levels of living. What was said about the availability of resources was generally reassuring. There are a few materials which are now considered essential but which are believed to be insufficient to meet the world population's increasing demands. The possibility of new discoveries, the availability of substitutes of more plentiful materials, and the possibilities of conservation in use tended to alleviate the worries of those who were inclined to view the situation in great alarm.

The basis for this general optimism was founded upon the ingenuity, resourcefulness, and knowledge with which modern man is developing techniques for the conservation and use of the resources of the world. Reports of the tremendous advances that are being made in the techniques of production, processing, use, and conservation of resources of the world, as documented in the hundreds of scientific papers presented, proved that necessity was creating invention.

Colin Clark of Australia pointed out the race between the increasing world population and the world's food supply:

> While man has proved himself capable of the most appalling misuse of natural resources under certain circumstances, he has also shown himself capable of scientific improvement of agricultural technique capable of raising the product per man-year at the rate of 1½ percent per annum. Even in some of the crowded areas of Europe and Asia great increases in agricultural production have been achieved. The world's population is increasing at the rate of 1 percent per annum and our problem is clearly soluble if we go about it the right way.

A. I. Levorsen of the United States, summarized the outlook for petroleum reserves:

> Petroleum occurs in sedimentary rocks. The volume of sedimentary rocks found both on the land and under the shallow waters of the continental shelf areas bordering the continents may reasonably be expected to contain an amount of petroleum per unit volume comparable to what has been found in the sediments of the explored regions. The present estimates of the amount of the undiscovered reserve are on the order of 500 times the current annual world consumption. Such estimates merely reflect the state of technical development and geological understanding at the time of the estimate. As ideas have developed, estimates have increased and may be expected to continue to increase in the future.
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> These reserves must be discovered, to be of any use. Their discovery is determined by a combination of technological, economic, and political factors.

It was brought out time and time again that research, both fundamental and applied, must be increased if the demands of the world's increasing population are to be met. It was emphasized that research must include discovery, development, production, and use of resources if supplies of needed materials are to provide a basis for the attainment of higher levels of living. It appeared that the earth's resources and the ingenuity of man can provide an almost unlimited potential for improved living standards for the world's population.

But not all of the discussions painted such a rosy picture. Not all of the skill of the minerals scientist, whether he be geologist, mining engineer, or metallurgist, is being put to use in solving the problems of supplying metals and fuels essential to the attainment of higher levels of living. Only a small proportion of the energy available in the rivers of the world is being harnessed to supply power—power which is necessary if man is to produce the requirements for a more satisfactory life.

Tremendous strides are being made in the techniques of surveying forest reserves, in protecting forests from fire, and in the production and utilization of forest products. At the same time, forest resources continue to be destroyed in large scale through fires, insect ravages, and destructive harvesting methods. Decent housing for much of the world's population can be provided only if forest resources are carefully husbanded and utilized. Good forestry management can also supply paper essential to exchange of information among peoples of the world.

Papers dealing with soil resources brought out the disparity between the methods that have been developed for the production and conservation of soil fertility and the methods that are being used by the many millions of people who are trying to earn a living through cultivating the soil. Not only would these advanced techniques conserve the soil's fertility; they would even increase its productive capacity. If properly applied, this improved use of the soil, coupled with advancements in crop production and animal husbandry, could provide the necessary food and fibers to raise living standards for the world's increasing population.

It was also made clear that man need not look to the land alone for his requirements, for in the large part of the world's surface covered by the sea lie great potentialities for the production of food and other necessities. Yet today large populations are sorely undernourished while great unused quantities of fish are near by. In other parts of the world, marine resources are being destroyed by overexploitation.

The experts were in general agreement that, under most circumstances, it would be necessary to apply a combination of techniques involving a number of associated resources if such resources were to be conserved and used for the benefit of mankind. This principle seems to be true whether it is applied to a river valley or to the economy of a whole country or region. An example brought this out. Scarcity of fuel in one area had resulted in denuding the productive land of trees and shrubs that had protected it from desert encroachment. Hence, in this instance, the saving of productive soil became a question of finding an alternative fuel supply.

Thoroughgoing surveys and analyses are needed as a basis for planning resource developments. Without adequate surveys, a single resource may be developed for only one purpose, when further study may indicate that a number of purposes could be served by a single development. For example, in the rush of industrializing underdeveloped countries, a river may be dammed for power purposes without study of irrigation and flood control possibilities. In other instances, the conservation of soil fertility may be handicapped because of the lack of phosphates. Surveys may reveal that phosphate production must await development of transportation and power. Combined resource development was considered to be of particular importance in the underdeveloped countries.

Even though it was already agreed that this comprehensive approach is essential, the conference participants were unable to agree how a combined resource technique could best be applied in an underdeveloped country where technicians, skilled labor, and capital are limited. Roberto Vergara of Chile threw light upon the subject:

> A people must be considered the very first resource in any undertaking into industrialization. The structure of business and of government, the financial and political situation, and willingness or ability to carry forth programmes of development are the foundations of plans and statistics.

The importance of metal production and consumption to the attainment of high levels of living was examined. Howard A. Meyerhoff of the United States pointed out that:

> The rapid increase in the volume of metal production since 1914 has tempted experts to correlate metallic output and living standards. Upon analysis it is found that the correlation factor is low if based on production, and only moderately higher if based on consumption. Living standards depend upon productivity, which is a function of integrated regional economies. The natural or geographic regions that comprise the earth's economic units are unrelated to political boundaries, and integration is seriously impaired by artificial restrictions imposed by nationalistic interests. The expanding geography of metal supply demonstrates the international, rather than national, character of the world's economy; and if the production, processing, and utilization of metals are to make their proper contribution to improvements in living standards, there must be regulated but unrestricted exploration, exploitation, and movement of all essential raw materials and of the manufactured goods that foster higher productivity and create exchange.

It was found by comparison that there was wide variation between the levels of living attained by workers engaged in similar aspects of metal production in different regions of the world. Of the countries whose economies are based almost wholly on agriculture, not all can be characterized by a low standard of living. A high standard of living is dependent upon productivity rather than the presence of particular resources or combinations of resources in a political subdivision of the world.

The caloric content of a population's diet was thought to be a more realistic measure of the level of living than the per capita consumption of metals. Consequently, it appeared that present trends in some countries to develop a "well-rounded" economy by insisting upon developing mineral industries without adequate mineral resources were unsound. Proponents of industrial production have failed sometimes to understand that it is high productivity and not necessarily diversification of industries that creates the basis for high levels of living.

United States Secretary of the Interior J. A. Krug called attention to the fact that:

> . . . the peoples of the world want help in turning their best dreams into reality. There is demand everywhere for a fair chance to share in the opportunities which the world's scientists have opened up. People in the remotest hills and deserts have glimpsed the possibility of shifting some of their century-old, backbreaking labor over to machines and they are formulating the goals of a higher standard of living, of better education for their children, of a life that contains some leisure, pleasure, and promise.
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> None of us should underrate the force of this great popular longing. It is one of the major facts of this century. It crosses national boundaries. It pervades groups in all communities. It is dynamic. It pushes organizations and governments into action.

The techniques discussed, if applied to the problems of populations of underdeveloped countries, would greatly increase the level of economic activities which would support higher levels of living. However, the obstacles to the application of a particular technique in these circumstances were considered to be very great indeed. For example, a very high percent of the total population in many underdeveloped countries is engaged in what is known as "subsistence agriculture." This population is made up of families which produce their own food, clothing, and shelter but which either have no surplus for sale or have a surplus for which no markets are available because of lack of transportation or other reasons. In many cases such families are not producing enough food for themselves. With commercial fertilizers they could produce more food but even if they were able to produce more than they needed it could not be sold until marketing facilities were developed. Consequently, these families would have no money to pay for the increased fertilizer.

The scientists struggled with the problem of breaking into this vicious circle and were unable to find any solution that could be readily applied. But they did throw a great deal of light upon the nature of the problem. In most cases the amount of arable land per family is too small to yield surpluses to pay for fertilizer and other requirements for increased productivity and higher levels of living. Poor health, caused by malnutrition, improper sanitation, and other dangerous hygienic conditions, results in lack of energy—another segment of a vicious circle.

Experts at the conference who have worked in widely dispersed areas of the world firmly believe that the application of scientific techniques to primitive conditions can benefit not only the populations concerned but the whole world economy. However, they also agree that scientific techniques must be adapted to meet the physical conditions in a particular locality and must be presented to the populations concerned in such a way that the techniques will not only be understood but will be accepted. It was repeatedly said that a beginning must be made where the people are.

A representative from Israel, in commenting upon the prevalence of illiteracy throughout populations of the world, suggested that the beginning of the application of scientific techniques had to be made in teaching the populations to read and write. The transmission of new ideas is almost impossible, or at least greatly impeded, if the recipients of valuable information are unable to read or write. In making this statement, this conference participant was saying the same thing that others had said in different words —that the hope for the conservation and wise use of the world's resources is dependent upon the rapidity with which educational opportunities are extended throughout the world.

To some attending the conference it seemed surprising that scientists who would come to the conference to discuss purely technical subjects dealing with physical resources were interested in the discussions that dealt largely with the education of illiterate people. But as the discussions proceeded it became clear that ignorance was resulting in permanent loss of world resources, was retarding the demands for industrial products, and was preventing the development of a skilled labor force, which is essential to industrial production. It was clear that the rivers can be harnessed to produce power for industry. But unless there is available a skilled labor force to combine the power thus produced with the raw materials of the area, the production of the power is not economical. Further, if needed products are produced but cannot be marketed because the population lacks buying power their production is unprofitable.

In addition to defining some of the common denominators of economic development many corollary benefits were derived from the conference. The world's leaders in resource development became better acquainted. Frank and open discussion was possible. Time was not wasted in quibbling over words but was put to use in weighing ideas. The proceedings of the conference, to be published in a number of languages, will become a lasting source of technical information and practical ideas for applying scientific techniques toward world-wide resource conservation and use.

Although this conference was called long before President Truman's inaugural address, in which he proposed "a bold new program" for the development of the world's resources, especially in underdeveloped countries, it came at a particularly advantageous time —when the nations of the world are considering how to carry out such a program.

Age Determinations by Radiocarbon Content: Checks with Samples of Known Age

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FURTHER TESTS of the radiocarbon method of age determination (*1–3, 6, 8, 10*) for archaeological and geological samples have been completed. All the samples used were wood dated quite accurately by accepted methods. The measurement technique consisted in the combustion of about 1 ounce of wood, the collection of the carbon dioxide, its reduction to elementary carbon with hot magnesium metal, and the measurement of 8 grams of this carbon spread uniformly over the 400-square-centimeter surface of the sample cylinder in a screen wall counter (*7, 9*). The background count was reduced during the latter part of the work to 7.5 counts per minute (cpm), which is some 2 percent of the unshielded background, by the use of 4 inches of iron inside 2 inches of lead shielding, plus 11 anticoincidence counters 2 inches in diameter and 18 inches long, placed symmetrically around the working screen wall counter inside the shielding. The screen wall counter had a sensitive portion 8 inches in length, so the long anticoincidence shielding counters afforded considerable protection on the ends. No end counters were used. The data obtained are presented in Table 1 and Fig. 1.

The youngest sample used was furnished by Terah L. Smiley, of the University of Arizona Laboratory of Tree-Ring Research. It was a sample of Douglas fir excavated by Morris in the Red Rock Valley in 1931, the exact location being Room 6 of the Broken Flute Cave. The inner ring date is 530 A.D. and the cutting date is 623 A.D.

The next sample was furnished by John Wilson, of the Oriental Institute at the University of Chicago, and was a piece of wood from a mummiform coffin

TABLE 1

AGE DETERMINATIONS ON SAMPLES OF KNOWN AGE

Sample	Specific activity (cpm/g of carbon)		Age (years)	
	Found	Expected	Found	Expected
Tree Ring	11.10 ± 0.31 11.52 ± 0.35 11.34 ± 0.25 10.15 ± 0.44 11.08 ± 0.31 Average: 10.99 ± 0.15	10.65	1100 ± 150	1372 ± 50 (577 ± 50 A.D.)
Ptolemy	9.5 ± 0.45	9.67	2300 ± 450	2149 ± 150 (200 ± 150 B.C.)
Tayinat	8.97 ± 0.31 9.03 ± 0.30 9.53 ± 0.32 Average: 9.18 ± 0.18	9.10	2600 ± 150	2624 ± 50 (675 ± 50 B.C.)
Redwood	8.81 ± 0.26 8.56 ± 0.22 Average: 8.68 ± 0.17	8.78	3005 ± 165	2928 ± 52 (979 ± 52 B.C.)
Sesostris	7.73 ± 0.36 8.21 ± 0.50 Average: 7.97 ± 0.30	7.90	3700 ± 400	3792 ± 50 (1843 ± 50 B.C.)
Zoser: Sneferu		7.15	4750 ± 250	
Zoser	7.88 ± 0.74 7.36 ± 0.53			4650 ± 75 (2700 ± 75 B.C.)
Sneferu	6.95 ± 0.40 7.42 ± 0.38 6.26 ± 0.41 Average: 7.04 ± 0.20			4575 ± 75 (2625 ± 75 B.C.) Average: 4600 ± 75 (2650 ± 75 B.C.)