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A SYMPOSIUM ON STRIP-MINE RECLAMATION

held at

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The Ohio Agricultural Experiment Station

and the

Natural Resources Institute of

The Ohio State University

in cooperation with

Federal Research Experiment Station

for Forestry and Forest Products,

Reinbek near Hamburg, Germany

INTRODUCTION

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Strip mining for coal, or the removal of coal by surface excavation, has been practiced in Ohio for many years. This has resulted, except where careful management has been employed, in large areas of unsightly landscapes and ground that is essentially useless. In addition, acid waters draining from unmanaged areas have killed fish and wildlife and rendered unpotable water supplies downstream.

There is international concern for restoring to productive use the land disturbed by strip mining of coal. Nearly 30 per cent of coal used in the United States is now removed by this process. Strip mining has grown rapidly in recent years—from 9.2 per cent of total U. S. production in 1940 to nearly 30 per cent in 1961. In Ohio more than 70 per cent of coal production is by strip mining or augering in strip-mined areas. The development of large electrical and diesel operated shovels, giant drag lines, conveyor trucks, carry-all scrapers, and new explosive techniques have helped to make this possible. Ivan A. Given, Editor of *Coal Age Magazine*, has noted the recent appearance in United States mines of shovels with a capacity of 115 yd³, walking drag lines with an 85-yd³ capacity, and trucks

with a hauling capacity of 100 tons or the equivalent of 2 and $\frac{1}{2}$ ordinary railroad freight cars (Soil Conservation Society of America, 1962). Plans are now on the drawing boards for machines which will move up to 200 yd³ of overburden.

Strip mining has a substantial man power advantage over underground mining with the output per-man-shift twice as large as in underground mines (Bureau of Mines, 1960).

Nationally it is estimated that more than 800,000 acres of land have been excavated by coal strip mining. Approximately 20,000 acres are excavated yearly at current mining rates. Given's estimate is that the rate of use will rise to 30,000 acres annually by 1970. Compared to the total land area of the United States, this is a very small fraction. The acreage, for comparison, is approximately equivalent to that yearly devoted to the development of shopping centers in suburban areas. Strip mining, however, is largely concentrated in a few states, and to limited areas within those states.

Strip mining of coal has been practiced in Ohio since 1914. At the time Ohio's present stripmine law was adopted, 45,000 acres of land had been affected. Since 1948, more than 120,000 additional acres have been affected. Approximately 10,000 acres of land, largely in eastern and southeastern Ohio, are affected by these operations yearly. The affected area includes the area actually excavated, that on which excavated material is deposited, and that lying above coal which is buried too deep for economic removal by present methods.

The problems associated with these operations have only recently attracted significant interest in the research, informational programs, and institutional mechanisms necessary to achieve restoration. The problems include restoration to use of the often toxic-disturbed area, adverse effects on surface and ground water resources resulting from interruption of the natural hydrologic situation, and acid formation resulting from exposed sulfur-bearing materials and its subsequent drainage into streams and ground waters. The economic impact of land use changes on the local economy and the aesthetic impact of large barren areas on local residents, tourists, and the nation at large are other important problems.

The earliest reported research on re-vegetation of strip-mine areas in Ohio was initiated by the Central States Forest Experiment Station in 1937 (Riley, 1960). Research on this problem has since been initiated by the Ohio Agricultural Experiment Station. Additional Research has been undertaken by the Central States Forest Experiment Station and some research has been undertaken at Kent State University, Ohio University, and The Ohio State University. Meanwhile, research on the problem has been undertaken elsewhere in the United States and in some foreign countries.

The appointment of Wilhelm Knabe, of the Federal Research Station for Forestry and Forest Products in Reinbek, Germany, as a post-doctoral fellow in the Ohio Agricultural Experiment Station in the summer of 1962 appeared to be an appropriate time to conduct a symposium on the present state of knowledge concerning strip-mine reclamation. The Symposium was held on August 13, 14, 1962, at the Ohio Agricultural Experiment Station with approximately 150 persons in attendance, and representing all of the principal strip-mining states, interested agencies and organizations, the strip-mining industry, and interested scientists.

Papers presented at the Symposium and a stenographic record of the discussion of Dr. Knabe's papers and invitational papers by Irving Dickman, Ohio Division of Reclamation; H. Granville Smith and Associates of The U. S. Soil Conservation Service; and James Hyslop, Vice President of the Consolidation Coal Company are included in these proceedings.

We wish to express our appreciation to the Committee which helped to plan the Symposium and the organizations they represent for their assistance. We especially wish to express our appreciation to Edward Johnson of the Central States Forest Experiment Station for assistance in the technical editing of the

papers and also to Dr. Paul Struthers of the Ohio Agricultural Experiment Station for his careful editing of Dr. Knabe's replies to questions.

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