

Conservation Research

Oklahoma's Primary Problem

By JOHN W. MORRIS

The pages of history are blotted with man's waste and harsh treatment of the earth's natural resources. Human development has been brilliant and remarkable in many respects, but along the trail man has traveled can be found the stumps and smouldering embers of gutted forests, the poisons of polluted streams, the eroded gullies and barren fields of once green lands, and the bleached skeletons of wild life.

The natural resources of the land that now forms the State of Oklahoma must have seemed unlimited to those pioneers who first penetrated each virgin area of the State. In the eastern part of Oklahoma they found dense timber, rich valley soils, and pure water. In central and western Oklahoma they discovered prairies of abundant grass land, productive ranges, and again fresh water. Over all of the State, wild life of various sizes and kinds flourished. Because these first men were few, their harvest of natural crops was less than mother nature's ability to replace. Though their use of resources was often extravagant, their numbers were still small and nature's reproductive powers were efficient and sufficient.

Following the path of the pioneers came the exploiters and increasing numbers of settlers. The logger's axe cut wide paths through the eastern forest and the farmer's plow transformed the prairie and range land of the central and western parts of the State into cultivated fields. Cities and towns, with their factories and sewage disposal problems, rose upon the banks of the streams. Their waste products poisoned the clear waters. Fires, often deliberately set, swept through timber and brush. Soil no longer held in place by plant roots began to move—transported by running water and wind. Frequent harvesting of crops sucked life-supporting minerals from the earth. Increasing numbers of domestic animals depleted nature's range and grasses. As the woods and waters and ranges were changed, the homes and food of fish and wild life were altered.

At the same time that man was destroying much of the surface resources, he was also hard at work gaining access to the natural resources under the surface. Large oil fields, zinc mines, rock quarries, and numerous smaller mineral activities were in the process of development. Competition in production, poor extraction methods, and careless ignorance wasted much of the mineral values. Much of the land surface on which these minerals were produced and transported was ruined and can no longer be considered as part of the arable land areas of the State.

The destruction of the natural resources of Oklahoma progressed more rapidly than was expected. Many great changes occurred during a single generation. Man's trail of destruction had wound through and over the State before the intelligence of the common citizen became alerted.

Of all the problems facing the State of Oklahoma today, none is therefore more important than the problem of the conservation of its natural resources. Since the settlement of Indian Territory and the opening of Oklahoma Territory, the State has been built upon its natural resources of soil, water, minerals, forests, and grass lands. For the most part these resources have been used unwisely. Although none has been completely destroyed, all have been depleted to the extent that a large part of the economic foundation of the State is shaky. Over eighty per cent of the tax structure of the State is based on the production of its natural resources.

The problems confronting Oklahoma in the conservation and wise use of its natural resources cannot be settled overnight or around a conference table alone. Much research into all phases of these problems must be done and this research must be done by people who understand the problems from a technical point of view. When the facts have been gathered, they can be used by lawmakers to come to just and equitable solutions. The people of Oklahoma must have the problem of conservation put before them in such a way that

they will understand the philosophy and the issues involved, from the point of view not only of the individual, but also society as a whole.

During the past few years the need for water conservation has been brought to the attention of the citizens more forcefully than has any other problem. Many towns and cities have been forced to ration water. The use of water by some irrigation districts has been challenged by cities. Since most people have always thought of water as existing in unlimited amounts, this problem has caused more direct attention in the press and on the radio than any other resource-use problem. Although only a few of the people recognized it as such at that time, the soil problem during the Dust Bowl Era was actually one of water conservation.

The demand for information concerning the waters of Oklahoma, particularly information relating to the supply of surface water which must take care of a growing population and increasing industrial uses, is urgent. With the increase in urban population, the rise in standards of living, and the greater use of water for many purposes, the necessity for data on the supply of both surface and ground water has become immediately pressing, and will increase as time passes and as the limits of possible use are approached. In many parts of Oklahoma the limits of water development form a basis for economic values. As long as there is ample water for all uses, no one cares how little or how much there is in the sources of supply. When, however, as in the summer just passed, there is a shortage and a limit is put on development and on the growth of industry, then public interest becomes acute. But then it may be too late.

The available water in any region is not constant and can not be determined by a single measurement, or even by a series of measurements extending over a single season. The source of all usable water on or near the surface of the earth

is the precipitation from the clouds. Such precipitation is erratic, varying widely from year to year. Furthermore, there is no fixed relationship between rainfall and runoff since the amount of runoff depends upon porosity, dryness of soil, type of rainfall, and various other factors. The records of rainfall alone will not serve as a measure of available water supply. The flow of streams must be measured, sources of ground water must be studied, and records must be extended over periods of years in order that questions related to minimum and maximum discharges of streams, quantity, economic limits of storage, and quality of water for all uses may be determined.

The information thus gathered is vitally necessary in investigating locations for new industry, enlarging existing industry, solving waste and pollution problems, providing city and town water supplies, and investigating locations for steam and water-power plants. Some progress in gathering this information has been made by the Water Resources Division of the Oklahoma Planning and Resources Board and by the Ground Water Branch of the United States Geological Survey. Both agencies are headed by capable men, but both are handicapped by small staffs and insufficient funds to carry on the vast amount of research needed.

The relationship between productive soil and water is readily apparent to anyone who travels in the irrigated areas of the State. To separate the problem of soil conservation from the problem of water conservation is almost impossible. Man is so dependent on the land that if the soil of the world failed to produce for one year, most of the people living on the earth would die of starvation. Good land, which means good soil that can be used by man, is all the more important since there is so little of it. About two and one-half acres of land are required to produce the food one man in Oklahoma needs for one year. Another acre is needed to grow the timber used for his home, for his newspaper, furniture, and numerous other necessities.

Life is supported mainly by a thin layer of top soil which covers the land to an average depth of about six inches. From this soil layer comes the world's annual production of food and fiber products. From 500 to 1,000 years are required by nature to produce a single inch of top soil.

The soil of Oklahoma has been and is the principal producer of the state's economic wealth. Agriculture provides work for more people and produces a living for more families than does any other industry in the state. In spite of the importance of its agriculture, the State of Oklahoma has

the dubious honor of having destroyed a larger per cent of its soil in a shorter time than has any other state in the Union. Almost one-fifth of the plowable soil of the State has been damaged beyond repair. Another fifty per cent of the plowable soil is in such a condition that only constant use of conservation practices will keep it in production. So great was the soil depletion of Oklahoma during the Dust Bowl period that the term "Oklahoma" became almost synonymous with everything which indicated poor agricultural practices. With the realization that conservation methods must be used, the more progressive farmers of Oklahoma must be given credit for the readiness with which they accepted technical assistance and advice. Oklahoma was the second state to organize soil conservation districts and the first state in which these districts became active. Today, over ninety per cent of the State is in organized soil conservation districts.

Much research has been done upon the soils of Oklahoma. Much more remains to be done. Many counties in Oklahoma have not had a complete soil survey. Some counties still have no soil testing facilities. Many new crops are being tried in various sections of the State. Many more need to be introduced for experimental purposes. Some of these crops are being used because of their drought-resisting qualities, while others are being checked for the amount of water they would use if irrigation should be developed.

As with the problems in water conservation, more extensive research needs to be done in agriculture. Studies need to be made concerning the effect of certain crops on soil characteristics and soil structure. The amount of water runoff, rate of intake, soil losses, and organic matter gains or losses need to be checked. More research is needed on the use of grass in a long time rotation plan. Additional information must be obtained on the influence of land treatment and retardation structures upon the rate and amount of runoff on watersheds.

A study showing the effect of conservation farming practices on the economic stability of the individual farmer, the community, and the State would help to formulate future plans. Federal agencies, especially the Soil Conservation Service, have made much progress in solving certain problems about Oklahoma soils. The College of Agriculture at Oklahoma A. and M. College has done much to aid farm conservation work in Oklahoma. The Lloyd Noble Laboratory, a privately endowed foundation, has contributed greatly to soil conservation work in southern Oklahoma. Yet much remains to be done.

The problems of mineral conservation in Oklahoma are as great as those of soil and water. Although it is known that Oklahoma has vast quantities of many minerals, specific information about the quality of many of these minerals is lacking. The waste and loss from oil production can be seen in all oil-producing areas of the State. Definite steps in the preservation of petroleum were among the first conservation measures carried out in Oklahoma. Most Oklahomans have thought of mineral wealth only in terms of petroleum production. Too many still think of the State as being first in the production of this mineral, when actually it has dropped to fourth place and may soon drop still lower. Much of the conservation work carried on in petroleum production has been financed by the oil companies. True, it is to their advantage for their fields to produce more and longer, but it is also just as important to the people of Oklahoma that these fields produce as long as possible. Remember the importance of sub-surface resources in the tax structure of the State.

A quarter of a century ago Oklahoma led the states in the United States in the production of zinc. For a few years almost half of the world's zinc supply was mined in Ottawa County. Today these mines function primarily because they are subsidized by the Federal Government. As the income from these two principal min-



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John Wesley Morris, '30bs Education, Ph. D., George Peabody College for Teachers, '41, after teaching in the public schools of Oklahoma and at South-eastern State College, came to the University in 1948 as Associate Professor. From 1942 to '46 he had served in the Navy, one of his important assignments being Geographer on the staff of Vice Admiral Sherman with the Third and Fifth Fleets. He was recalled to duty as Lieutenant Commander, 1950-51. His interest in problems of conservation is deep and of long standing.

erals continues to decrease, the State must begin to develop its other mineral resources. To do this a complete inventory of all the minerals of the State must be made. It is known that Oklahoma has large quantities of limestone, gypsum, bentonite, tripoli, glass sand, volcanic ash, and numerous other minerals. To have a complete inventory of all the minerals of the State, however, is not enough. All vary greatly in quality. Limestone in one part of Oklahoma may be very different from limestone in another area. Various types of chemical analyses must be run to determine the exact content so that specific uses can be ascertained. Numerous surveys must be made and areas mapped in detail so that the quality as well as the quantity of minerals available in any particular place is known.

Much of the knowledge of Oklahoma minerals has been developed by the Oklahoma Geological Survey. This organization has made great strides with the well-trained personnel available. However, it is too limited in staff, funds, and facilities to carry on the vast amount of research needed. The information which this organization could supply would do much to aid the industrial development of Oklahoma.

Most of the people in the eastern part of the United States fail to realize that almost one-fourth of Oklahoma is covered with dense timber growth. Many Oklahomans are utterly amazed when they learn that forestry is one of the important industries of the State. There are more different species of trees growing in Oklahoma than grow on all the continent of Europe. When the Choctaws and Cherokees moved to Indian Territory, they found their lands covered with dense stands of oaks, hickory, and pines. At about the turn of the century large lumbering companies moved into the area. The trees of eastern Oklahoma were cut without any attempt at proper utilization or conservation. Some few years ago the State Forestry Division of the Oklahoma Planning and Resources Board was organized. Since then, great progress has been made in solving forest problems.

The State Forestry Division has worked successfully with the lumber companies in reforestation and selective cutting. The Division has developed a nursery, will supply trees to farmers who will use them for conservation purposes, and has reforested many acres of land from which the trees should have never been cut. In spite of the excellent work of this group, many problems remain unsolved. Intensive research into uses for blackjack and post oak should be made. Improvements in species for the

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American Literary Problems of the Early Nineteenth Century

By JOHN PAUL PRITCHARD

Amid the greatly increased interest in America's past which now actuates students of American history and literature, not the least important source of information is the files of old periodicals. Since its beginning, the United States has been prolific of magazines of various sorts. Though the life-expectancy of most of them has been merely a few months or years, each represents an interesting segment of personal opinion supported by whatever weight the publication in which it appeared could carry. Among these periodicals, those dealing with topics of varied public interest enjoyed the better health. Those dealing with literary matters alone seldom outlasted the year in which they were born, and their demise often left an aching void in their editors' purses. The review which treated of varied subjects in fact contributed more to the literary development of the country than the literary magazine could hope to accomplish, for men who picked up a quarterly or monthly to read some discussion in their particular field of interest were often attracted to a literary article which appeared in the same number. And of those attracted, some were infused with a literary interest which they otherwise might never have felt; thus the literary public was extended.

Not all of the reviews were written by Americans, and some few magazines, like the Philadelphia *Analectic* and the early numbers of *Harper's*, were composed chiefly of excerpts from British periodicals or of articles by foreign authors. Although these magazines are of interest as indications of what their editors believed would interest the American reading public, they are of slight value in showing how American reviewers tried to meet the literary problems of the day. This paper will consider the literary topics offered by those periodicals which printed original contributions by American writers. Even of this group, it can only sample a few, for the number of these periodicals was legion.

The subjects to be considered are, first, the problem of an American language; the protection of American literature; what were and should be the characteristics of the new literature; the propriety of writing and reading fiction; and the problems posed by "female authors."

The animosity between the United States and Great Britain, which was glowing when the century began, was fanned into flame by the War of 1812 and became almost a conflagration in the years following. Though its fierceness died down from time to time, its coals were ready to flare throughout the half-century. English reviewers denied to Americans the freedom of the language as sternly as their navy had refused to allow the freedom of the seas. To this hostility, Walter Channing, an early contributor to the *North American Review*, retorted by trying to discredit English as a medium for American expression. If we were to be a nation and produce a genuine national literature, we must have our own language. By using English, we could at best produce a variety of English literature.

In the Babel of the Revolution, which gave us a different moral and political existence, it is for our literature most heartily to be lamented, that we had not found a confusion of tongues. We might to this day have wanted a grammar, and a dictionary; but our descendants would have made for themselves a literature.

Since he saw no way to remedy the situation, he despaired of our ever producing a national literature.

English writers countered by charging that we used a language which was at least not English. Other writers in America produced long lists of so-called American words and attempted with considerable success to prove that each had actually a sound British history behind it. This kind of defense of our vocabulary was carried on during most of the century; as late as the 1880's it formed a staple of James

reaction could be carried out, but under the stress of the times, Russia has demonstrated that the necessary research program can be successful.

Without the stress of war or dire economic necessity, these remarkable advances in technology would certainly have been very slowly attained. Neither government nor industry would have felt it possible to justify the enormous expenditures of time and money, especially in view of the great risks involved, during periods of peace.

We may summarize these observations briefly. The conditions most favorable to the advancement of science, as defined in this paper, are those which allow for a free interchange of information and a free expression of ideas. The individual must also be free to spend his time in pursuit of fundamental truth, and this will require a maximum degree of security from actual want, and security from restriction externally imposed.

Technology on the other hand, makes most rapid strides when under pressure to accomplish a given task. In times of peace and security, the cost of rapid technological progress often appears too great, and what changes are made must therefore come about more slowly. Without the pressure of the First World War the chemical industry in the United States would probably have been delayed in its development for ten or twenty years. Without the present

cold war, the development of the technology of atomic power might conceivably have been delayed in Russia for a long time.

What can be expected for the future in these fields? So far as can be envisaged the future will follow the same pattern as the past. The advance of science will be slow, and the new ideas will come from men who have the time to speculate, and the chance to discuss their thoughts freely with fellow scientists. And technology will progress by spurts as in the past, forging ahead under stress, and relaxing in times of peace and prosperity.

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sub-humid areas need to be studied. Experiments in the production of quick-growing pulp wood should be considered. Waste products of the sawmills, such as sawdust, bark, and wood not suitable for lumber, could be analyzed for use in various products. These and many more problems must be solved before it can be said that Oklahoma forests are properly utilized.

For Oklahoma to continue to go forward, much research must be done in the conservation of these very important natural resources—water, soil, minerals, and forests. The conservation of all four is interrelated and the problems of all four must be solved in the relationship to each

other. The conservation of water cannot be accomplished without the conservation of soils and forests. The conservation of soils is of little value unless the water is available for crops. The production of minerals is related directly to the production of the other three because the processing of the minerals, to a large extent, depends upon the water available. Thus, the future of the State of Oklahoma depends upon the conservation of not one but all of these important resources. The solution of these problems lies in intensive research. On the basis of this research a long range, co-ordinated program for the conservation of natural resources must be developed.

Area Program Initiated

In response to the pressing demand from government and private business for personnel better trained to meet the problems which arise out of the relations of the United States with other countries, the College of Arts and Sciences has established Area Study Programs, on the undergraduate level, for Latin America and for Asia. Dr. Max L. Moorhead is chairman of Advisory Committee for Latin-American Area Study; and Dr. Percy W. Buchanan, for Asiatic Area Study.

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