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GUIDELINES FOR THE REVISION OF THE CONSERVATION MERIT BADGE

by

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CHAPTER I

INTRODUCTION

Scouting and Conservation

The surge in conservation activity which occurred in the early years of this century under the leadership of Theodore Roosevelt and Gifford Pinchot reflected a strong desire to stem the tide of rampant individualism which had drastically depleted our forests, wildlife, and other natural resources. In those early struggles against the Robber Barons, conservationists emerged with an essentially preservationist philosophy aimed at securing an adequate supply of resources for future generations. By opposing the evils of ultra-individualism, conservation became associated with the growing contemporary campaign for greater democracy.

The Boy Scout movement, which was born during these years, absorbed much of the spirit of conservation. It advocated the ideals of preservation and stewardship in the out-of-doors. It emphasized the importance of performing one's civic duties in the community. Conservation thus became deeply engrained in the early Scouting philosophy.

Since these early years, however, the orientation in the conservation movement has changed markedly, principally due to the advances in science and technology and the growth in public apathy. We are no longer faced with an imminent threat of a dwindling stock of basic resources. Simultaneously, though, our very technical sophistication and public indifference have created a plethora of hitherto unknown problems in the environment. Air pollution, water pollution, pesticides, radioactive contamination, for example, pose potentially more serious threats to our survival than the fears of the early conservationists. These are essentially questions of environmental quality, and conservation today has therefore taken a holistic approach to resource problems which stresses concern for the total environment rather than resource supply. This much more complicated approach demands more in terms of citizen awareness and action than the older orientation. A concerned, enlightened, and dedicated citizenry in the conservation ranks is mandatory for the success of the movement.

The Scouting attitude toward conservation, however, has not changed significantly since its inception. The emphasis of the Conservation of Natural Resources Merit Badge Pamphlet today remains much as it was in the 1912 edition - agrarian and preservationist. If Scouting is to discharge its obligation to train youth in citizenship skills, it must revise its conservation merit badge program. The Scouts must be made aware of the new and

challenging issues in conservation and must be equipped with the necessary skills to solve these problems effectively. The following pages will present suggested guidelines for meeting these objectives.

Background on Scouting

When the Boy Scouts of America was first incorporated in Washington, D. C. on February 8, 1910, it derived its main inspiration from the innovative work of Lord Baden-Powell of Gilwell in Great Britain. Under his charismatic leadership a tremendously popular new youth program called Scouting was just getting under way. The principal emphasis in this new movement was upon character development and training in citizenship skills. These lofty goals were to be achieved through the cultivation of the pioneer spirit in boys, by exposing them to the romance and adventure of the out-of-doors. "The underlying feature," wrote Baden-Powell,"is the spirit of the movement, and the key that unlocks this spirit is the romance of woodcraft and nature."[1]

Indeed, the very essence of Scouting originated in Baden-Powell's own vivid memories of his happy boyhood spent in roaming the forests and fields of his country home, exhausting his curiosity upon the countless wonders that he encountered in nature. In later years as an officer in the British army these skills of observation and scouting that he had learned as a boy were to bring him a distinguished military career in India and Africa,

1 Sir Robert Baden-Powell, Scoutmastership (New York: G.P. Putnam's Sons, 1920), p.6.

culminating in his great victory at the siege of Mafeking during the Boer War in 1900. Overnight he became a hero in the British Empire. Here was a man whom boys in particular could emulate, a man after their own heart, a man who as a hero-soldier, artist, journalist, musician, actor, author, raconteur and outdoor adventurer had done all the things that boys had ever dreamed of doing.

When Baden-Powell returned to England from South Africa in 1903, he found, much to his surprise, that a little book he had written prior to the siege of Mafeking, entitled Aids to Scouting, was very popular among boys and was being used in the schools to augment their education. He had written the book to improve the character and soldierly skills of his men in South Africa. It was based upon his deeply engrained love for the out-of-doors and his firm conviction that nature was the supreme teacher. To counteract the debilitating effects of civilization that were apparent among soldiers it presented a program of constructive, outdoor, scouting activity that was designed to increase the powers of self-reliance, responsibility, observation, and deduction.

Such a program appealed heartily to young boys and Baden-Powell was prevailed upon to revise his Aids to Scouting into a program that would be directly applicable to boys. After much combing of the pertinent literature and current developments in boys work and after holding an experimental Boy Scout camp at Brownsea Island

in 1907, Baden-Powell issued the first installment of Scouting for Boys in 1908. It was an instantaneous success. As E.E. Reynolds observed, boys were for the first time:

> encouraged to do just the things they wanted to do but had not been allowed to do. They were urged to light fires and cook outdoors; to go camping and exploring; to build huts and bridges; to play the detective in interpreting signs and tracks; to take part in scouting games combining the craft of the Red Indian with rough and tumble combats: in short, to enjoy the thrills of pioneering and backwoodsmanship .... The boy gang, or secret society, was transformed into the Patrol and surprisingly found itself encouraged instead of rebuked. Scouting was the answer to a hunger for outdoor life which no organization had been able to meet.[1]

Boys flocked to Scouting by the thousands and in 1909 the first, public demonstration of strength was held when on September 4 some 10,000 Scouts gathered at the Crystal Palace. By 1910 the movement had grown to such an extent that Baden-Powell had to resign from the military in order to give it his full attention.

Scouting quickly spread to other countries and in 1910, through the services of Chicago publisher, William D. Boyce, it was brought to America. By 1916 the Boy Scouts of America had gained such stature in the eyes of the American people that Congress granted the movement the rare privelege of a federal charter. Its contribution to the national welfare through a program of constructive outdoor activity was widely acclaimed.

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1 E.E. Reynolds, Baden-Powell: A Biography of Lord Baden-Powell of Gilwell (London: Oxford University Press, 1957), pp.147-148.

Since those early days over 25 million boys have participated in this creative educational experience in the out-of-doors, an educational experience that has never been intended to instruct so much as to inspire, to guide, and to help young boys to develop into the fullness of manhood.

The Conservation Merit Badge

As an outgrowth of this educational and character building goal, the merit badge program was developed to supplement the regular advancement requirements. It was designed to motivate Scouts for the learning of new and exciting skills and concepts that would prepare them for a life of responsible citizenship and service. The accent was to be upon quality, not quantity; the Scout was expected to develop a thorough knowledge in a given merit badge field, and to be able to apply it. Importance was not placed upon the number of badges earned but upon how much real power the Scout acquired.[1]

The outdoor orientation of Scouting made it only natural that a conservation merit badge should have been one of the first badges adopted. This program is administered under the Camping and Conservation Service Committee of the Program Division in the National Professional Staff. Mr. Theodore S. Pettit is the present director of the program. In each local council the program is directed by a volunteer counselor.

1 B.S.A., Official Handbook for Boys (New York: Doubleday, Page & Company, 1934), p.390.

In its earliest form the conservation merit badge had a very narrow, technical, and preservationist inclination.* Agrarian resources were stressed at the expense of urban resources, and the requirements centered upon knowing their characteristics, biology, and the proper techniques for their protection. With the passing years the program has been modified but still has kept its basic agrarian, preservationist character. Direct work in conservation projects, for example, was gradually introduced as an essential part of the program, but was focused entirely upon the agrarian environment. The 1942 edition of the pamphlet recognized the interrelationship among resources and their problems, but still concentrated principally on agrarian applications for conservation.** A minimum amount of material on the political and social realities surrounding conservation problems was also eventually included. Some understanding of the international ramifications of conservation was likewise added. Yet the principal emphasis has continued to lie upon the agrarian, scientific, and preservationist themes.

Especially in the matter of expressing the broad and intricate ecological interrelationships that exist among all of our natural resources, including man, the conservation merit badge pamphlet has been sadly defi-

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* See Appendix I for a sample requirement from 1912.

** See Appendix II for an excerpt.

cient. It has failed to recognize that in our rapidly changing and highly industrialized society conservation can not simply be a matter of strict preservation. The preponderance of virtue does not of necessity always lie with the "conservationists". As a nation we are unable to exploit a portion of our resources in order to maintain and advance our standard of living without some adverse impact upon our environment. Whatever we do, in effect, has some impact upon the quality of that environment, and given man's technological capabilities today, most of these effects are ruinous. The objective of conservation, therefore, must be to minimize the damage to the total environment, not to eliminate it altogether, for that would be virtually impossible. Such an objective requires a much more discriminating and realistic attitude toward environmental issues than the strictly preservationist point of view. It demands much clearer thinking about what kind of environment we want. It requires a broader approach to conservation problems that encompases the whole range of alternatives in the decision-making process, including a working knowledge of political and social realities as well as the scientific aspects of resource problems. It demands more of an emphasis upon quality rather than quantity considerations. Above all, such an objective requires greater participation on the part of all the citizenry in the solution of environmental problems.

Statement of the Problem

Essentially, therefore, the present conservation merit badge pamphlet is too narrow and static in its conception of conservation. It is primarily oriented toward the basic resources in the rural environment. It is concerned principally with preserving them in sufficient quantity. And it stresses the importance of professional and governmental action over individual initiative, involvement, and effectiveness. Conservation is viewed as a technical and scientific rather than as a sociological phenomenon.

In the light of these deficiencies the program has to be broadened and energized. There has to be a greater emphasis upon ECOLOGY, or the total environment: urban as well as agrarian resources have to be examined and their interrelationships explored. There must be more concern for environmental QUALITY considerations; that is, given the interlocking relationship among all our resource problems, judgments about the degree of environmental deterioration that we can tolerate become imperative. Just what kind of environment, in other words, do we want? Finally, there has to be a greater concentration upon political, social, and economic factors, and a strong insistence upon the need for individual initiative and COMMITMENT in the struggle for conservation: all of us have contributed to the problem, and only all of us working together can begin to solve it.

Relevance of a New Revision

A new revision of the Conservation of Natural Resources Merit Badge Pamphlet along these lines would be highly relevant in three directions:

(1) Relevance to Today's Conservation Movement

The present-day conservation movement is tinged with an air of crisis. In the words of Robert Rienow:

> Under the impact of a rocketing population, an insatiable spiral of economic expansion, as well as a gargantuan and pitiless technology, the very character of the concern of conservation has shifted. Once preoccupied with the quantity of resources, its attention is now focused on the quality of the environment. Once a question of supply, conservation is now an issue of survival - of species, of habitat, of mankind.[1]

If we are ever to begin dealing effectively with this momentous challenge, we must have concerned and involved citizens equal to the task. They must be reborn with an ecological conscience that eschews the deeply engrained doctrine doctrine of growth for growth's sake, and that recognizes the truth of Stewart Udall's maxim that less is truly more.[2]

With this reorientation of our sense of values and a deepening appreciation for the delicate balance of nature that sustains life, must come the demand for a planned, total, and integrated attack upon our environmental problems. Moreover, and most importantly, there

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1 Robert R. Rienow and Leona Rienow, "Conservation for Survival," Nation, 207:138-142, August 26, 1968, p.138.

2 Stewart L. Udall, 1976: Agenda for Tomorrow (New York: Harcourt, Brace & World, Inc., 1968), p.61.

must arise within each citizen the knowledge, concern, and motivation to dedicate himself actively to seeking their solution. By arousing the awareness of the need for these three elements in conservation today - ecology, quality, and commitment - a new revision of the conservation merit badge pamphlet would render an invaluable service.

(2) Relevance to the Scouts Themselves

A. Their Urban Background - Scouting is increasingly acquiring an urban complexion. As 31 December 1968 the membership included 1,944,641 Boy Scouts, 312,022 Explorers, and 2,351,356 Cub Scouts.[1] The members are generally from the more economically and socially privileged families, and 10% of them are non-white.[2] Approximately 82% of the membership live in urban areas and 18% in rural communities.[3] A 1960 survey reported that the largest proportion of troops was to be found in suburban areas and the smallest proportion in the large and small central cities (Table 1), while, conversely, the largest troops were located in the central cities followed by suburban troops and then the smaller troops of the adjacent and outlying areas (Table 2).[4]

1 B.S.A., 59th Annual Report to Congress,1968, 91st Congress, 1st Session, House Document No. 87 (Washington, D.C.: U.S. Government Printing Office, 1969), p.9.

2 University of Michigan Survey Research Center, A Study of Boy Scouts and Their Scoutmasters: A Report of Four National Surveys (New Brunswick, N.J.: National Council, B.S.A., 1968), p.11.

3 B.S.A., Bulletin from Rural Relationships Service,1965, p.1.

4 University of Michigan Survey Research Center, pp.108-109.

TABLE 1

Degree of Urbanization
of Troop Meeting Place

Location	Sample of Troops
large central cities	12%
small central cities	8%
suburban areas	35%
adjacent areas	21%
outlying areas	24%
	100

TABLE 2

Size of Troops by Degree of
Urbanization of Meeting Place

Number of Members	central cities	suburb areas	adjacent areas	outlying areas
$<$ 20	25%	25%	33%	52%
20 - 30	40	55	43	26
$\geq$ 30	40	19	24	22
	100	100	100	100

Compared with members of other youth organizations and nonmembers, the proportion of Scouts in urban areas is higher; in small central cities it is disproportionately high and in outlying areas it is disproportionately low (Table 3).[1]

There is also a continuing drive to extend Scouting even further into the urban environment. The Urban Relationships Service was established in 1961 to direct this effort. In cooperation with the Housing Assistance Administration and local organizations, such as low-income housing projects, neighborhood centers, settlement houses, churches, etc., significant advances are being made, especially within the inner city. In low-rent housing developments, for example, a program has been successfully established within most of the fifty states, with impressive results in terms of reducing juvenile delinquency and strengthening home and family life. Fresh and innovative concepts, such as the "block Scouting" program in the ghettos of Philadelphia, with their main concentration upon the inner-city environment, are meeting with enthusiastic acceptance.

Due to this increasing "urbanization" of the Scouting movement it is therefore imperative that the conservation merit badge pamphlet be revised in order that conservation may be made more meaningful to Scouts by being directly related to their community environment.

1 University of Michigan Survey Research Center, p.16.

TABLE 3

Degree of Urbanization
By Group Membership

	Group Membership		
Urbanization	Nonmember	Member Other	Scouts
large central cities	19%	17%	18%
small central cities	7%	11%	15%
suburban areas	26%	24%	29%
adjacent areas	21%	18%	24%
outlying areas	27%	30%	14%
	100	100	100

B. Their Dissatisfactions - It has also been observed that the Scouting program itself may stand in need of a good revision. Of the total 18,421,950 boys eligible for Scouting as of December 31, 1968, there were only 4,608,019 members.[1] In a study by Yankelovich in 1968 it was discovered that 2 or 3 boys out of 10 have negative impressions of Scouting, such as "too childish" or "initiative restricted", and that as boys grow older their negative impressions increase significantly.[2] Yankelovich also discovered that as the Scouts themselves mature there is a tendency for them to become disenchanted with the program.[3] The concentration upon the outdoors and the boys' belief that Scouting will help them to develop physically and morally may indeed prove to be a strong attraction for the younger boys, but it is likely to lack the challenge and the inspiration that older adolescents, striving for adulthood, are seeking.[4] In the words of the survey report: "As boys mature Scouting does not point the way toward contemporary American adulthood; it points the other way toward childhood."[5] To the Scouts it often

1 B.S.A., 59th Annual Report, p.67.

2 Daniel Yankelovich, Is Scouting in Tune with the Times? (New Brunswick, N.J.: National Council, B.S.A.,1968), p.8.

3 Yankelovich, p.2.

4 Yankelovich, pp.4-5.

5 Yankelovich, p.2.

seems too organized, boring, or involved with teaching useless information. Their interests in the formalized aspects of Scouting, such as working for advancement, and wearing the complete uniform, decline with age, while three other interests increase significantly; namely, 1) "Show what you can do on your own," 2) "Learn useful things towards a future occupation," and 3) "Be with boy-girl groups your own age."[1] (Figure I)

When Boy Scouts rated their program according to the opportunities it offered for satisfying these interests, on a valuable, such as "Learn useful things," it was given a very low score, while on "Doing outdoor things," one of their least valued interests, it received a very high rating (Table 4).[2]

It is thus clear that as the boys grow older they become more concerned with preparing for the future and their interests in the traditional Scouting activities decline (Tables 5 & 6). A new revision of the conservation merit badge pamphlet, stressing ecology, quality, and commitment, would help to counter this trend by introducing a more dynamic and demanding program that would match the Scouts' enthusiasm for involvement and adult responsibility.

(3) Relevance to the Scouting Philosophy

The learning theory behind Scouting has been

1 Yankelovich, p.4.

2 Yankelovich, p.5.

FIGURE I

Interests That Increase As Boys Grow Older

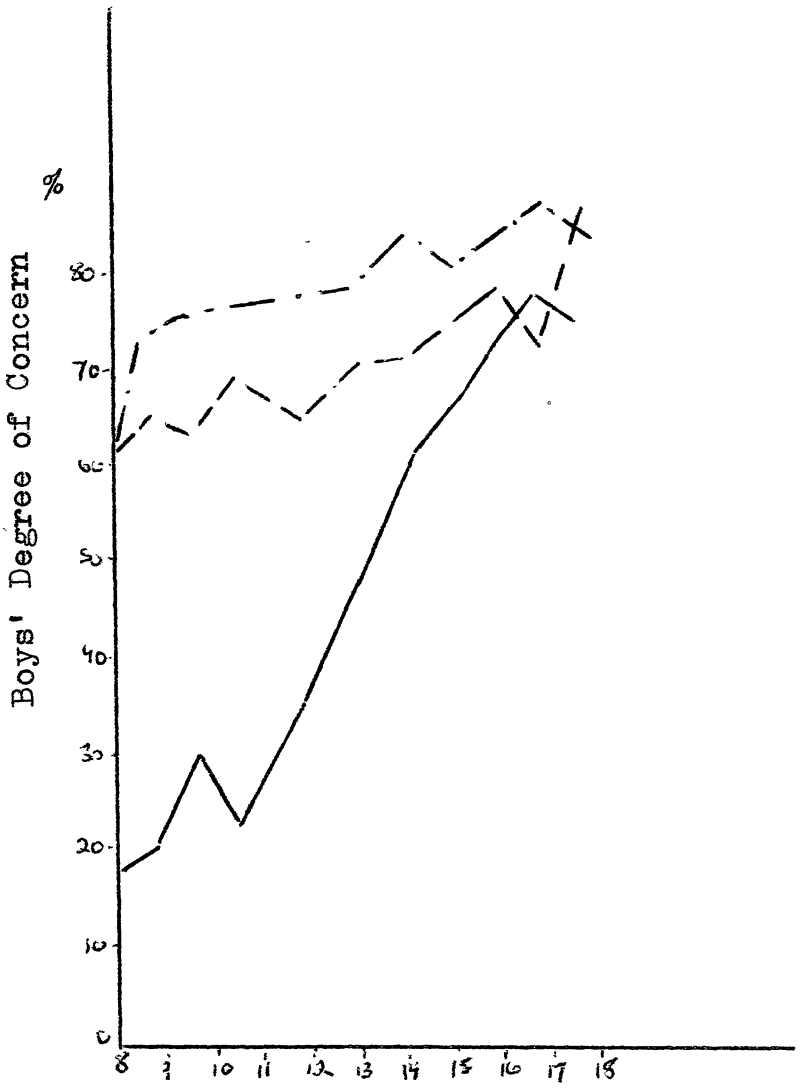

TABLE 4

Scout Ratings of Program Opportunities

Scouting Offers a Chance to..	8-10 Years Boys' Order of Importance %	11-14 Years Boys' Order of Importance %	15-18 Boys' Order of Importance %
Do outdoor things	87 (5)	89 (8)	87 (8)
Be with boyfriends	88 (7)	85 (7)	83 (7)
Develop for future	84 (3)	87 (1)	83 (2)
Learn leadership	77 (4)	78 (5)	72 (5)
Show your skills	71 (8)	75 (6)	72 (3)
Build up body	77 (1)	72 (3)	51 (4)
Learn team sports	73 (2)	67 (4)	57 (6)
Learn useful things	57 (6)	58 (2)	42 (1)

(The numbers in parentheses show the order of importance assigned to each interest by the boys.)

TABLE 5

Interests of Boys by Years

It is very important to....	All Boys	8-10 Years	11-14 Years	15-18 Years
Develop self for future	79%	78%	81%	77%
Learn useful things	77%	70%	77%	82%
Build up body	74%	84%	75%	64%
Learn team sports	71%	79%	73%	61%
Show what you can do	69%	63%	69%	73%
Learn leadership	69%	73%	71%	63%
Be with boys you like	61%	70%	65%	49%
Do outdoor things	56%	73%	60%	37%

TABLE 6

Boys' Approval of Scouting by Years

Like Scouting for ...	All Boys	8-10 Years	11-14 Years	15-18 Years
Giving badges	80%	92%	83%	68%
Having a regular magazine	69%	77%	74%	56%
Having regular meetings	61%	76%	60%	50%
Having special ceremonies	61%	77%	62%	46%

aptly criticized on two grounds.[1] Learning by doing through extrinsically motivated activity, such as working for merit badges, often results in only superficial learning and tends to be primarily geared toward attaining a specific award. The rewards in character development are usually limited. Secondly, the method of direct inculcation of ideals through ceremonial repetition of the Scout Oath and Law is criticized for its assumption that character can be instilled through mere verbalization. Ideals thus become emotionalized and accepted as moral absolutes rather than flexible, guiding principles that would assist the Scout in searching for the unique good in a particular situation. Without any intellectual content such morality training would lead toward rigid, mechanical, and sometimes extreme applications that may only satisfy the Scout's ego while completely ignoring social realities. A conformist rather than a creative morality would be produced. A consequence of this outcome is that Scouting takes the far too simplistic approach toward improving society of stressing individual regeneration rather than institutional reform.

A more positive learning method employed in Scouting is learning by doing through intrinsically motivated behavior. Indeed, this is the model for all learning activities in Scouting. In the words of Baden-Powell:

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1 E. Nicholson, Education and the Boy Scout Movement in America (New York: Teachers College, Columbia University, 1941), p.59.

"Happy citizenship developed through the impulse from within rather than through impression from without, individual efficiency encouraged and then harnessed for the good of the community - that is our scheme."[1] Such a method would achieve more inward growth; more intelligent, discriminating activity; a truer perception of what constitutes the "good" in given situations; and more lasting and meaningful impressions in terms of character development. A new revision of the conservation merit badge pamphlet, with its sharp concern for ecological harmony and human survival, and its emphasis upon individual commitment would be of inestimable value in promoting this more healthful aspect of the Scout training program.

The Author's Background

Realizing therefore the desirability and the relevance of a new revision of the conservation merit badge pamphlet, I shall develop in the following chapters some proposed guidelines that would be useful for such an undertaking. For the past year I have been enrolled as a graduate student in the Environmental Education Program of the School of Natural Resources at the University of Michigan. In addition, I have been through the Scouting ranks myself,and am presently working with a Girl Scouting unit in the development of a conservation education program.

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1 Baden-Powell, p.13.

Methodology

The procedure to be followed in the development of the guidelines will be the following:

(1) Chapter One

This will be introductory material. Here the reader will find a discussion of the conservation movement today, its nature and objectives. There will also appear a brief review of the current merit badge pamphlet, stressing and justifying the need for a new revision in order to harmonize with today's conservation themes.

(2) Chapter Two

After the new concept of conservation has been examined, it will be the purpose of this chapter to specify how it should be presented to the Scouts. The educational approach for the new conservation merit badge pamphlet is thus the subject of this chapter. Here will occur a statement of educational objectives, emphasizing the problem-solving skills, and a discussion of the techniques to be used in designing the new pamphlet, such as direct experience and a personalized and provocative format. A twofold approach toward learning, incorporating concepts from the associationist and Gestalt schools, will be emphasized.

(3) Chapter Three

The present conservation merit badge pamphlet will then come under closer scrutiny. Each of the 16 sections in the current booklet will be evaluated in terms

of the conservation and educational criteria developed in chapters one and two, respectively. The strengths and weaknesses from the standpoint of these criteria will be noted.

(4) Chapter Four

Next will be presented the writer's conception of how to prepare a new revision of the conservation merit badge pamphlet. There will be three major emphases in this chapter centering upon ecology, environmental quality, and the problem-solving skills. In each of these three categories there will be discussions of the information that is to be conveyed to the Scouts, reinforced with an analysis of the appropriate requirement activities. Considerable importance will be given to relating the content material to the Scouts' community environment. There will likewise be concentration upon the need for direct experience, relying upon the Scouts' own initiative and talents in order to achieve the pamphlet's educational objectives.

(5) Chapter Five

Finally, the last chapter will summarize the principal conclusions from the thesis. Particular stress will be laid upon the necessity for revising the requirement activities. Suggestions will also be made for facilitating an actual rewriting of the pamphlet, and a strategy for making this thesis available to the Boy Scouts of America will be presented.

CHAPTER II

EDUCATIONAL APPROACH

Educational Objectives

The ultimate objective of a new conservation merit badge pamphlet is to stimulate the Scout's participation in conservation activity. Three immediate objectives, however, have to be met in order to achieve this higher objective. First, the Scout must be made aware of his environment and its problems; that is, he must acquire sufficient information - ecological,political,and economic - to be able to understand his environment. Secondly, he must develop a real concern, or emotional predisposition, for engaging in environmental action projects. He must, in other words, be motivated to do something about environmental problems. Thirdly, the Scout must possess the necessary skills for effective problem-solving behavior. Too often people may be highly knowledgeable and concerned about environmental issues, but feel they are incapable of doing anything about them. They do not know how to proceed toward solving them. They are inadequately informed about the political, social, and economic realities surrounding the environmental cri-

sis. Consequently, Scouts will need training in the following areas: 1) learning to define the problem; 2) learning how to become informed about the issues from all perspectives; 3) learning to formulate all the alternative solutions; 4) learning how to develop the final plan of action; and 5) learning how to implement the final plan. Such training will enable the Scouts to capitalize upon their awareness of conservation issues, and to express their concerns in a meaningful and effective manner.

Educational Material

What kind of material, then, ought to be in the new merit badge pamphlet in order to reach these objectives? In the first place, the content material ought to be as personalized as possible. If one aim is to stimulate concern, nothing can perhaps accomplish this quite as well as direct involvement. The new pamphlet should certainly encourage this direct experience, but it should also complement it with an exciting and provocative booklet format and writing style. As Swan et al. have observed, there is no correlation between knowledge and concern about given issues.[1] There are, however, strong suggestions that positive correlations may arise between direct involvement and concern. The more, therefore, that the pamphlet itself through its composition

1 James A. Swan, An Analysis of Attitudes and Coping Strategies of High School Youth: Response to Air Pollution, unpublished Ph.D. Dissertation, University of Michigan, 1969, pp.20&100.

can convey the sense of direct experience, the more likely will it be able to arouse concern in its readers.

Secondly, the content material should concentrate upon developing a systematic understanding of conservation and environmental problems based upon principles, not upon technical, skill-oriented facts. For the facts about conservation are too numerous and too variable to be incorporated into one volume. If the principles, however, can be made exciting enough, then the Scout will pick up the details on his own. Facts will necessarily have to be presented, but the main emphasis should not be upon their memorization. Scouts should be directed to see the relationships between them, and to concentrate upon learning these general, overriding principles rather than the facts which merely illustrate them.

Principles will be retained longer than mere factual arrays, and will also be of more value to the Scout. For when faced with future circumstances similar to those under which the principles were learned, the Scout will be better able to interpret them and to gain the adequate understanding of the situation that is a necessary condition for effective action. Through their organizing and interpretive power, principles will enable the Scout, in the words of J.S. Bruner, to "leap the barrier from learning to thinking."[1] They will free him from the

1 J.S. Bruner, "Learning and Thinking," Readings in Educational Psychology, ed. R.K. Parker (Boston: Allyn and Bacon, Inc., 1968), p.261.

dry and meaningless task of digesting facts that are unrelated to reality and totally useless. They will impart meaning and significance to his world. A grasp on underlying principles will permit the Scout to assimilate his perceptions of the world into an organized whole that is the very basis of creative thinking, and of all forms of intelligent human activity.

Finally, the content material should provide activities that engage the Scout in actual problem-solving behavior. All the requirements in the pamphlet should thus relate to exercising the problem-solving skills. It is not enough merely to list the steps in the problem-solving process. Unless there is a genuine application of these skills, they will not be developed.

Educational Techniques

What then are some of the ways in which these desired characteristics in the new pamphlet can be presented to Scouts?

Educational theory usually distinguishes at least two main schools of thought on the nature of the teaching process. One is the S-R Associationist school and the other, the Insight, or Gestalt, tradition. The former stresses the importance of the environment acting upon the organism and the organism in turn reacting with conditional and unconditional responses. Through the mechanisms of contiguity between stimulus and response, varying schedules of reinforcement, and repetition, pat-

terns of behavior are built up that become automatic within the organism. Higher levels of human learning are explained as more complex chains of such stimulus - response connections. The Gestalt school, on the other hand, emphasizes the role of the individual as opposed to that of the environment. Learning is essentially understanding. It is viewed as the process by which the individual suddenly reorganizes his perception of the total stimulus situation, and in a flash of insight, without prior experience, proceeds to solve a particular problem without error.

The trouble with both these explanations, however, is that they are incomplete. The Associationist theory derogates the importance of human thought and volition, while the Gestalt school underestimates the significance of previous training and experience in the development of insight. Clearly, a more realistic approach toward learning theory would be a blend of both traditions. And this is the position adopted in this thesis. I will now examine some of the teaching techniques that reflect this dual attitude toward learning, and that will have considerable relevance for the proposed revision of the conservation merit badge pamphlet. These techniques can best be dealt with by viewing them within the context of a model of the teaching process.

(1) Motivation

Three elements appear to constitute the core of any

effective teaching method. The learner must first be motivated to learn. He must then be guided into undertaking learning activities. He must finally receive feedback from these activities that will fix their positive results permanently within his behavioral repertoire.

The requirement of motivation is especially critical for effective teaching. It is essential for two reasons: 1) to get the learner's attention and thereby initiate the education process; and 2) to maintain the learner's interest and involvement until the educational objective is achieved. All human activity originates from drives, or motivations, of some kind, whether consciously perceived or not by the individual. Unless educators can tap the appropriate drives within their students, their endeavors may well fail, or result in learning that is only superficial.

Psychologists have distinguished two basic categories of motives, and both are appropriate for our consideration. There are, first of all, the physiological drives based upon need reduction, such as the need for food that compels an organism to seek satisfaction. The instinct for survival is another such drive and has a distinct relevance to conservation activity. Secondly, there are motives that arise from inconsistencies and conflicts within an individual's intellectual system. The resolution of these drives depends largely upon the acquisition of knowledge that will relieve the tension. These drives that arise within an individual's cognitive

structure can be satisfied by instigating learning, or curiosity, behavior that acquires the necessary knowledge to restore cognitive balance. This "epistemic behavior will be intrinsically reinforced, and the knowledge derived from it retained, when it resolves conceptual conflict or, to use Dewey's expression, 'introduces a congruity.'"[1] Both forms of motivation are internally derived, and recognize the need for the development of insight as well as the linking of stimulus-response chains. All human behavior is governed by one or both of these motivations.

If an immediate objective of the new conservation merit badge pamphlet is to instill knowledge and concern about environmental issues, an appeal to motivation is clearly necessary. What techniques, however, should be employed? I think two fundamental approaches should be taken. First, the new pamphlet ought to have a provocative format. It should attempt to present the new concept of conservation (outlined in chapter one) in as personalized and straightforward a manner as possible. Both through the text and the pictures as well as through the activities, surprise, doubt, perplexity, bafflement, contradiction, challenge, excitement, etc. must be aroused within the Scout to shake up any complacency toward conservation, and to stimulate his interest and involvement in the merit badge program. Secondly, the new pamphlet

1 D.E. Berlyne, "Curiosity and Education," Learning and the Educational Process, ed. J.D. Krumboltz (Chicago: Rand McNally & Company, 1968), pp.77-78.

ought to relate its content material and requirement activities directly to the Scout's own community environment. When the individual Scout can be made to see right within his own community the effects of pollution, for example, we can be fairly confident that his interests will be aroused. In any event, once the Scout has become motivated to learn, he must then be guided into meaningful learning activities.

(2) Activities

The kinds of learning activities should be those in which the Scout learns by self-initiated behavior, not through external pressures and inducements. Learning is essentially a behavioral process, that is, the student learns to do something. It may be driving a car, playing a musical instrument, or retaining historical information. Whatever the objective, learning can not take place unless the student is actively involved in the educative process. He may, for instance, be forced into learning - that is, into active involvement - through conditioning procedures. His intended response to a conditional stimulus may be elicited by connecting that stimulus to the unconditional stimulus which normally evokes that response. This procedure, however, is an essentially passive approach to learning in that, although the individual is actively engaged in doing something, the learning activity is not really self-initiated. For the purpose of revising the conservation merit badge pamphlet it is neces-

sary to promote learning activity that harmonizes with self-interest. As much as possible the Scout himself must be led to initiate the chain of activities that leads to learning. The learning will therefore be more effective because it will be inspired from within, not elicited from without.

There are two techniques by which such learning activity may be encouraged in the new merit badge pamphlet. One is to apply the inquiry principle to lay the foundation for self-initiated, intellectual activity, and the other is to provide the opportunity for the physical application of learned material, thereby encouraging self-initiated, social, or project, activity. The first approach consists of using problem-solving and discovery principles and the second requires the use of direct experience. Both approaches can not be strictly separated, however, for the problem-solving and discovery methods applicable to the first technique are just as suitable, and perhaps more appropriate, for the second. For the sake of convenience, however, I shall only analyze the place of problem solving in reference to purely intellectual activity, recognizing at the same time that all the statements are likewise pertinent to its use with direct experience.

The problem-solving and discovery method may be viewed as a nonreproductive type of learning.[1] The

1 J.C. Jones, Learning (New York: Harcourt, Brace & World, Inc., 1967), p.161.

desired response, or solution, is not a part of the stimulus situation and the student must discover it for himself. In its actual application it can be considered to involve the operation of learning sets and the transfer of prior experience. It involves, in other words, the application of previously learned ways of thinking about a wide array of problems and the transfer of previously acquired knowledge in seeking the required solution.

This discovery method has a number of advantages. Recent research literature suggests that it:

> can substantially facilitate: 1) retention of new material, 2) the degree of understanding of new material as shown by appropriate transfer and adaptation to new situations, 3) the eagerness and skill with which information is sought, 4) efficiency at solving problems by directed thinking, and 5) recognition of solutions to problems once they have been attained.[1]

It produces a qualitatively different kind of learning that is based upon insight, understanding, and organized principles. By drawing upon intellectual motivation it is vitally important in fostering divergent and flexible thinking, characteristic of the creative personality.

In order to inaugurate this problem-solving behavior the new merit badge pamphlet will have to do three things. First, it will have to insure that the Scout has the prerequisite knowledge to be able to solve the problems; it must, therefore, present a progressive and orga-

1 Berlyne, p.83.

nized body of principles and information that can equip the Scout to begin the problem-solving process. Secondly, it will have to instruct the Scout to recall the appropriate principles for solution when the problem is introduced. Finally, it will have to guide, or channel, the Scout's discovery behavior to prevent excessive waste of energy in arriving at the solution. A minimum amount of guidance should include relating the general nature of the solution, and the goal, or purpose, of the Scout's activity. A more desirable kind of guidance would be to introduce the steps in the problem-solving process. They should be carefully explained and then illustrated through the use of case studies indicating how others have followed these procedures and what their accomplishments have been. Once the solution is reached it tends to be highly resistant to forgetting, and is immediately generalized as a higher order capability that is applicable to the solution of a wide variety of similar problem situations.

The second technique for stimulating self-motivated learning activity is the use of direct experience. Here the skills of problem solving, discussed above, can be fruitfully applied. For this technique will afford the Scout the opportunity to put his knowledge to practice, to apply what he has learned, and to broaden his understanding and awareness of conservation under real life circumstances. The revised pamphlet should particularly focus on this technique in its activities section, with the intention of developing conservation projects that

will relate the Scout directly to his community environment.

The best way to develop these projects is to let the Scouts themselves generate their own enterprises as much as possible. They must have a voice in choosing and planning their activities. This recognition that Scouts can handle responsibility is vital. It would be an affirmation of the role of youth power which is such an outstanding characteristic of today's conservation movement.

Both the techniques of direct experience and problem solving, discussed above, reflect the prominent role to be played by the Scouts themselves in the learning process. In the revised merit badge pamphlet, their vision, initiative, sense of responsibility, and enthusiasm must always be called into play whenever the occasion permits. Both techniques, moreover, represent an essentially Gestaltist orientation toward learning with their emphasis upon developing understanding. Yet they also exhibit an inherent appreciation for the value of the Associationist philosophy by acknowledging the importance of reinforcement in establishing desired behavior.

(3) Feedback

This reinforcement may be more properly termed feedback. It is the means by which the individual is able to determine that his performance in the learning situation

is correct or incorrect. In classical and instrumental conditioning experiments, feedback is the reward, or reinforcement, that follows the occurrence of the desired response, hence satisfying a basic need in the organism, and confirming that response as instrumental in procuring the reward. While this simple, mechanistic view of feedback is quite relevant to human learning and to the establishment of desired response patterns, its description of reinforcement and feedback may be a little misleading. For it seems to imply that all reinforcement must originate outside the learner; his environment, in other words, supplies the reward for successful learning. However, in many instances of human learning, the individual learner himself will be able to supply his own reinforcement. In solving problems, for example, he may be able to recall subordinate concepts and principles that will allow him to make an internal check of his responses for correctness. Feedback and reinforcement can thus come from within as well as from outside the individual.

Nevertheless, regardless of the source of feedback and reinforcement, feedback of some kind is essential for effective learning. Unless the learner is provided with some measure of his progress in his learning activities his motivation may flag and he may fail to achieve the desired response. Additionally, he will have to find at least some degree of success in his activity to assure his reaching the learning objective. If he never suc-

ceeds in solving a problem, for example, he may very well abandon the whole attempt. Reinforcement is therefore a critical element in effective teaching.

How can it be incorporated in a new conservation merit badge pamphlet? The most obvious way is to amplify the significance of sessions with the Scout's counselor. By stressing the importance of Scout-counselor interaction, perhaps through a preface written to the counselor directly, the pamphlet can provide a source of constant feedback. Encouraging contact with other resource people in the Scout's community is another means of furnishing reinforcement. Perhaps a more productive method would be to develop a set of guidelines that would assist the Scout in carrying out his projects with as much success as possible. Although the new merit badge pamphlet will stress the importance of individual Scout initiative and individual responsibility in all phases of the program, it would be highly advisable to have such guidelines in order to facilitate the expression of this initiative. The very fact that Scouts will be encouraged to carry out projects on their own will be a very strong factor in stimulating positive reinforcement in the new merit badge pamphlet. It could very well lead to that generalized love of learning and involvement which would be the strongest reinforcement of all.

Summary

We may conclude then that the new conservation

merit badge pamphlet ought to convey a knowledge of conservation and environmental problems consisting of principles, dynamically presented, and reinforced through the application of direct experience and the problem-solving skills. The ultimate objective should be to arouse concern and involvement in the fight for environmental quality.

The techniques to be used combine the reinforcement concept of the Associationist school with the demand for insight development in the Gestalt school. They likewise underscore the indispensability of enkindling the Scout's own initiative and sense of responsibility. Before we can describe specifically how these methods would be applied, we must first turn to an evaluation of the present pamphlet in the next chapter.

CHAPTER III

CRITIQUE OF THE CURRENT PAMPHLET

Introductory Statements

The procedure for appraising the present merit badge pamphlet will involve a consideration of the strengths and weaknesses of each of the 16 chapters in terms of the concept of conservation presented in chapter one and the concept of the proper teaching approach outlined in chapter two.* A brief synopsis of the contents of each chapter will preceed this evaluation. Each chapter is organized around a merit badge requirement, and contains a statement of that requirement, followed by factual material reinforced with pictures.

Let us first discuss the preface on page 7. This is a brief introduction to the concept of resource use, emphasizing our complete dependence upon earth for all the necessities of life. The spaceship picture is quite good from the standpoint of the implications it suggests about the meaning of conservation today. It accentuates the fact that we are dependent upon a finite supply of resources, and that in a sense the earth itself is a

* See Appendix III for a copy of the pamphlet.

giant spaceship, containing all the elements vital to life. The text reinforces this broad ecological perspective. However, there is not enough recognition of the importance of quality considerations in conservation; the theme is too much oriented toward our dependence upon a sufficient quantity of resources. There is no recognition of the existence of the environmental crisis facing us today. The preface does not acknowledge this critical situation nor the need for concerned citizen involvement in attacking pollution problems.

Moreover, the style of presentation in the preface is not personalized enough. The answers to questions it raises are much too obvious; the questions do not really challenge or excite the reader. While the emphasis upon the principle of our dependence upon earthly resources is good, it could have been presented more dynamically - perhaps by stressing the survival value of this dependence. The attempt to tie into the Scout's direct experience is also valuable. Again, though, the entire presentation lacks the stimulating and challenging note that a good introduction ought to have.

Chapter I - Our Natural Resources

Synopsis: This chapter discusses the uses for various resources, such as air, water, soil, plants and wildlife, and distinguishes between renewable and nonrenewable resources. Conservation is considered the process of preserving a sufficient quantity of these necessary resources.

A. Conservation

1) Strengths - This section is very good in showing our broad ecological dependence upon all kinds of resources through illustrations with specific examples. It also justifiably recognizes that there are only renewable and nonrenewable resources. A renewable resource is one which becomes available for use in different units in different time intervals, while a nonrenewable resource is one whose total physical quantity does not increase significantly over time. This distinction is important for Scouts to grasp.

2) Weaknesses - There is,however, a tendency not to see these resources per se within the context of the urban environment, to view them at arm's length, as it were, out in the country someplace and not really as a part of the urban scene. Resource quality is also mentioned in passing, but the real stress is upon quantity considerations in resource use; viz, the definition of conservation given on page 13. Man as a natural resource is also neglected. There is likewise little concern with active involvement in conservation as revealed in the activity requirements associated with this chapter; they are very static kinds of requirements that demand only the regurgitation of memorized fact.

B. Teaching Approach

1) Strengths - From the standpoint of drawing upon direct experience, this chapter is very good. The

examples of resource use can be directly appreciated by the Scout. The style of writing is often personalized and dynamic. Thus I think this chapter convincingly demonstrates our dependence upon natural resources with its concrete and familiar examples. Furthermore, there is also a good emphasis upon the development of two principles, or broad understandings; namely, the principle of human dependence upon resources, and the principle of renewable versus nonrenewable resources. Moreover, the pictures are very good illustrations of this interdependence between man and the land. Requirement 1b is also valuable because it could force the Scout to inquire into the specific ways in which resources are important and allows room for him to elaborate on their importance.*

2) Weaknesses - If the purpose of this chapter is to show our dependence upon natural resources and to distinguish between renewable and nonrenewable resources, it ought to have been so stated at the beginning of the text. Rather than simply stating the requirements first, the organization of this chapter could have been sharpened by specifying what it was that the text intended to convey. This would have furnished a means of internal reinforcement by which the Scout would have been able to make an ongoing check of his learning progress. By beginning with the requirements, this chapter distorts a potential learning experience into the tiresome activity of merely memorizing factual information for the sake of

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* See page 9 of the current pamphlet in Appendix III.

passing a test. Furthermore, this chapter tends to thwart the need for direct inquiry and independent thinking on the part of the reader by arbitrarily defining conservation. The definition is fairly narrow in its conception. Consequently, there is really not much concern for stimulating the Scout to do his own thinking. There is also no leeway in the requirements that would allow the Scout to do something more challenging and interesting in terms of heightening his understanding of the principles involved.

Chapter II - How Resources Are Related

Synopsis: Chapter two illustrates how various resources are interrelated. It concentrates upon agrarian types of resources, such as deer populations, and shows what adverse consequences can result when their balance is upset.

A. Conservation

1) Strengths - This chapter offers some good illustrations of the ecological balance that exists among some of our resources. Also, both in words and pictures, it presents a good account of what can happen when this balance is destroyed. Thus it expresses some indication of concern for quality as well as for quantity considerations in discussing conservation.

2) Weaknesses - There is no recognition of the place of urban resources in this ecological balance. This chapter tends to be agrarian-oriented in its examination

of this resource interdependence. There ought to be more concern for linking both rural and urban resources in the consideration of the balance of nature. Also, there is no explicit mention of the crucial responsibility that man has for maintaining this balance. As the dominant life form, he has to commit himself actively to the preservation of this ecological balance or it will perish through his neglect.

B. Teaching Approach

1) Strengths - The pictures are wonderfully graphic examples of what can happen when ecological interdependence is disregarded. The chapter is well-organized around this principle of interdependence.

2) Weaknesses - This chapter could have been made more pertinent and personalized for most Scouts by being more directly related to their generally urban environment. Also, more dynamic and dramatic examples of a disorganized ecosystem with its highly adverse consequences for man could have been chosen for the text. This chapter also offers a splendid opportunity for the use of direct inquiry and problem solving for understanding ecological relationships. There has been no attempt to stimulate this kind of thinking, however. Once again, the requirement for this chapter demands only the memorization of the body of the text, but does not encourage the reader to think through, for example, the possible consequences of interfering with a given pattern of inter-

relationships. The use of graphs and diagrams would have been helpful in establishing this basic concept of the dynamic equilibrium of the ecosystem. It probably would have been more instructive to have presented this principle of equilibrium and balance first and then to have encouraged the Scout's own initiative in discovering the adverse consequences of man's interference.

Chapter III - Managing Our Resources

Synopsis: This chapter is primarily concerned with developing an awareness of the need for resource management and of some of the practices used in such management. It touches on a broad array of resource problems - soil and water conservation; wildlife and fisheries management; forest management; the conservation of marine resources; and the utilization of mineral stocks.

A. Conservation

1) Strengths - From the standpoint of commitment and involvement this chapter is somewhat helpful for it shows some instances of what individuals can actually do on behalf of conservation. The stream improvement projects are one example. It also underscores the importance of understanding the ecology of a particular resource in order to manage it properly. Furthermore, by stressing the need for good management policies there is an inherent recognition of the need for adequate resource quality as well as quantity.

2) Weaknesses - The main weakness is that while

this chapter does show what can be done to manage resources, most of these practices can only be performed properly by professional resource managers. The proper management of fish populations, for example, is purely a technical matter. There is furthermore little appreciation of the need for public cooperation and assistance in carrying out these management policies. Consider, for example, the rather naive approach to public persuasion suggested on pages 25 and 26.* There is thus an aura of professionalism about resource management that could very well detract from our goal of achieving individual commitment and involvement in conservation activity. As a result of this technical, or professional, attitude toward resource management, there is little sense of crisis in viewing our environmental problems and of urgency in arousing people to begin solving them. Moreover, the concepts of ecology and quality are applied primarily to individual resources. There is no concern for managing the total environment in terms of a dynamic, interlocking ecology with the objective of obtaining a quality habitat for man. Urban resources, such as open space lands, are thus neglected and a holistic approach in management policy is overlooked.

B. Teaching Approach

1) Strengths - One important element in this chapter is its emphasis upon the principle of resource management. Resources are not limitless; they have to be managed

* See Appendix III.

if we are to continue having them in sufficient quantity and quality. The pictures are good illustrations of some of the techniques employed in resource management. The chapter also does well in presenting preliminary information necessary to understand the reasons for some resource management practices. Thus grasping the importance of habitat management in improving deer populations is essential for understanding the reasons for antlerless deer hunting. Some of this prerequisite information is well-organized and constitutes a repetition of what has been said in earlier sections, thereby creating effective learning conditions. Also, portions of the text are sufficiently provocative and personalized to arouse the reader's interest and motivate him to learn. The discussion of the abuse of our estuaries and marine resources is a case in point. The text also has a style of writing that is often quite personalized and thus effective in communicating new concepts.

2) Weaknesses - Once again the requirement activity is geared solely toward memorization. All the Scout has to do to satisfy it is to memorize the first paragraph of the chapter. Rather than stimulating the reader to do his own thinking about resource management issues, this chapter merely supplies him with a wealth of skill-oriented information intended to support the definition of resource management contained in the first paragraph. Moreover, there is no provision for suggesting activities that the Scout could do to reinforce this

concept of resource management. Instead, the impression is made that only professionals are qualified to do anything worthwhile in the resource management field. The Scout is not encouraged to apply what he has learned about management practices. There is very little personalized material to provoke serious thinking on his part about resource problems and the role he can play in solving them. There is likewise little attempt to account for resource management within the urban environment where most of the Scouts live. There is little direct connection, therefore, with the daily experience of most Scouts and little motivation for them to become involved with resource management problems. The organization of the entire chapter could also be improved. The contents of each section are fairly coherent, but the sections themselves are only loosely interrelated. Perhaps a brief synopsis of the chapter at the very beginning would help to tie everything together. and to impart a broad view of the entire ecosystem and the management problems it poses. The connections between resource problems hinted at in the text should be made more explicit. The Scout could then be made to realize that resource management is not simply a matter of handling individual and separate problems, but of coping with a host of ecological implications, all of which have to be considered when making management decisions.

Chapter IV - Fighting for Conservation

Synopsis: In this chapter we find a brief survey of the functions performed by various federal and state conservation agencies and private conservation organizations.

A. Conservation

1) Strengths - This chapter is helpful in promoting awareness of the need for involvement in conservation activities by showing the wide range of organizations presently involved.

2) Weaknesses - However, there is a failure to view our resource problems within a broad ecological context. For the importance of conservation work within the urban environment is overlooked by concentrating on the essentially agrarian-type activities performed by these agencies. Moreover, there tends to be a greater concern for individual resource quality rather than for the quality of the environment as a whole. Also, this chapter fosters the impression that our resource and environmental problems have to be attacked individually by calling in the proper agency. In fact what we need, however, is an integrated, goal-directed, and total approach to solving our problems that will incorporate the skills of these various agencies and organizations and the dedication of all the people. The importance of an organization like the President's Council of Environmental Quality Advisers ought to be mentioned in order to avoid the notion of a piecemeal approach to conservation problems.

B. Teaching Approach

1) Strengths - The last part of the requirement demands direct inquiry on the part of the Scout to obtain the answer. Furthermore, by relating the Scout directly to his community environment, it stimulates an interest and a relevance that the rest of the requirement lacks. The pictures are also good because they show Scouts in contact with some of the agencies' projects and lend additional significance to the content material. The organization around one principle, namely, the importance of governmental and private cooperation in attacking resource issues is also admirable.

2) Weaknesses - The major portion of the requirement (listing various conservation agencies and describing their functions) seems rather pointless. All it demands is more dry memorization that is not likely to contribute much to a fruitful learning experience. It would have been much more interesting and relevant to have presented some case studies, for example, of what some agencies have actually done or are doing. It would even have been better to have required the Scout to visit some project areas and perhaps to work with some of the people there, in order to give him more meaningful exposure to the work of conservation organizations.

Chapter V - Careers in Conservation

Synopsis: This chapter is simply a short description of how to find out about career positions in conservation.

A. Conservation

1) Strengths - It promotes interest in conservation on the part of those who would not consider this field unless they knew something about the employment possibilities. It also helps to encourage those readers already deeply concerned about resource problems to become more deeply involved by inquiring about the possibilities of professional work in conservation. A sense of dedicated commitment to conservation can thereby be nurtured.

2) Weaknesses - By focusing upon career opportunities it detracts from the important role that Scouts can play now in conservation without professional training. This type of involvement is desperately needed in the fight for conservation, and is not encouraged by this chapter. Again, the impression is left that only skilled professionals can do anything substantive on behalf of conservation.

B. Teaching Approach

1) Strengths - This chapter provides important reinforcement for those Scouts who do develop an interest in conservation work. It also stresses the need for individual initiative in seeking career information which is excellent. It sets out efficient guidelines to direct the Scout's inquiry activity.

2) Weaknesses - Otherwise, though, the requirement is fairly sterile. Its approach to learning about conservation careers is dry and uninteresting. A better

approach would be to have Scouts meet people who are actually in conservation work. Also,more pictures showing various duties of a professional conservationist could be included. Unlike the present picture, however, all illustrations should have captions adequately explaining what the person is doing.

Chapter VI - International Conservation

Synopsis: Included within this chapter are descriptions of various international resource problems, such as wildlife preservation, land deterioration, water shortages, and food supply. There are also some examples of steps that have been taken to solve some of these problems.

A. Conservation

1) Strengths - This chapter provides a much needed worldwide view of interrelations among natural resources and is therefore highly desirable. It significantly broadens the pamphlet's ecological perspective. It also heightens the reader's insight into environmental quality problems by showing how international demands can affect the balance of nature. Furthermore, the need for dedicated, international commitment to solve some of these problems is dramatically presented.

2) Weakenesses - There is no emphasis upon the urban aspects of worldwide environmental problems. Air pollution, for example, is not discussed. There is likewise little indication of what the individual Scout can do to help alleviate some of these international problems.

The reader is left with the feeling that only governments through cooperation can do anything toward seeking solutions. Individual commitment does not really seem too critical.

B. Teaching Approach

1) Strengths - The chapter is organized around one theme - the impact of international factors on resource problems, emphasizing the fact that conservation should become the concern of all mankind. Much of the text, moreover, is written in a lively and interesting style that can excite and motivate the reader with its dynamic examples of international resource exploitation.

2) Weaknesses - There is, however, the danger that by not stating more explicitly the implications of international factors for more familiar resource problems the Scout's interest and motivation may not be sustained. He may not see, for example, any real connection between problems that directly affect him and the need for international cooperation. Furthermore, by not designing requirement activities of a problem-solving nature and inquiry nature, there is a tendency for international problems to become that much more remote. Simply memorizing assorted facts about international conservation to be able to pass a test is not the most effective way to instill interest in and understanding of international resource problems. In addition, the pictures fail to communicate to the individual the importance of the various resources displayed. The captions could perhaps

be expanded to explain why these particular resources are valuable to the reader. As a whole, the chapter too could be better organized. Many elements seem to be out of place, such as the subsections on "Food Cooperation" and "Conservation in Africa". The connections between all the subsections could likewise be tightened and improved.

Chapter VII - The Water Cycle

Synopsis: The water cycle is briefly explained in this chapter and suggestions are made concerning the method one can use in fulfilling the requirement of sketching the course of a home water supply.

A. Conservation

1) Strengths - By concentrating upon the Scout's home water supply, this chapter encourages the understanding of the broad ecological concept of the water cycle in a manner that is directly meaningful to the individual Scout. He is encouraged to discover for himself the ecological implications of the water that he draws from his tap.

2) Weaknesses - There is very little effort to stress the importance of water quality. The major concern seems to be with indicating the source of the water supply. Also, there is no discussion of the relationship between man and the hydrologic cycle, and thus no explicit appreciation of the importance of individual commitment in preserving the cycle.

B. Teaching Approach

1) Strengths - The requirement for this chapter promotes inquiry behavior intended to stimulate the Scout's interest by relating him directly to his home environment. It also stimulates him to learn through direct experience with resource people in the water management field. The concentration upon the principle of the hydrologic cycle is also beneficial for it gives a broad and illuminating explanation about the source of the Scout's water supply.

2) Weaknesses - The drawings need better captions that explain succinctly their contents. They ought also to be arranged better and expanded to give a more progressive and comprehensive picture of the water cycle. They should also be explained in the text, perhaps with some of the factual material used in the subsection, "Water Management," on pages 21 and 22.* Such terms as "transpiration" ought to be defined. The picture on the front page is good for the way it summarizes the essence of a watershed, but it ought to be more clear. Many of its details are too small to be observed. Furthermore, the urban environment could perhaps be better represented in such an illustration, making it more relevant to the majority of Scouts. The style of writing,moreover, is not as exciting and personalized as it could be. Exploring the dynamics of the hydrologic cycle could be a fascinating experience for the reader by being related more

* See Appendix III.

to the urban environment.

Chapter VIII - Your Community's Water

Synopsis: This chapter merely asks the Scout to determine whether water supply is likely to be a problem in his community and suggests how to obtain this information.

A. Conservation

1) Strengths - It highlights man's dependence upon water and thus gives the Scout direct insight into the meaning of ecology. By concentrating upon the Scout's own community, it further brings in the urban element to broaden and elaborate his understanding of ecology.

2) Weaknesses - There is no drive toward commitment, no sense of the urgent need for individual involvement, to begin solving water supply problems. In addition, while the importance of water quality may be assumed as taken for granted, it is not made explicit as it ought to be.

B. Teaching Approach

1) Strengths - The requirement fosters learning activity of a problem-solving nature, and stimulates direct contact with the Scout's home environment. It also provides opportunity for the Scout to apply his own initiative and skills to obtaining the information. The suggested sources of information are helpful guidelines to assist him.

2) Weaknesses - The problem of water supply is a

very emotional, provocative, and challenging question. In this chapter it is not treated as dynamically and effectively as it could be. The picture of the water treatment plant is out of context; it would be better in the following chapter dealing with water quality. The other picture may well be appropriate, but it is hard to tell without an adequate explanatory caption. The entire chapter could be expanded to include more information about water supply issues.

Chapter IX - Water Pollution

Synopsis: Some of the principal causes and results of water pollution are recited, as well as some of the ways in which such pollution is controlled.

A. Conservation

1) Strengths - By discussing the human impact upon our water resources another aspect of ecology is introduced, man's dominance over nature and his responsibilities toward her. The analysis, moreover, brings the concept of resource management within the context of the urban environment. There is also a marked emphasis upon the importance of resource quality.

2) Weaknesses - The importance of individual involvement and dedication in preserving this quality, however, is not mentioned.

B. Teaching Approach

1) Strengths - The requirement promotes inquiry, or problem-solving, activity that is especially fruitful

because it centers upon the Scout's own community environment. It also encourages the Scout to devise his own methods of seeking the necessary information. Yet by suggesting that he talk to local officials, there is some effort toward furnishing helpful guidelines and a source of reinforcement. The pictures are highly appropriate, although the captions might be more explanatory. By their contrast, however, the pictures convey a compelling message about the importance of water quality. Portions of the text are likewise dramatic and highly personalized in style, namely, the discussion of the aesthetic effects of a polluted river. Again, as in the other chapters, there is a fairly consistent organization of the contents around one concept, or set of principles.

2) Weaknesses - The text itself, however, could be more tightly organized and expanded. The information presented is really not sufficient to explain water pollution or its abatement. For example, how does sewage waste contribute to pollution? And what are some of the methods of waste treatment? The factual material could also be presented in a more personalized and stimulating manner.

Chapter X - Resources From the Sea

Synopsis: The first part of this chapter is a general survey of some of the resource uses of the ocean. Part two is a discussion of the conservation problems in our coastal marshes and tidal estuaries.

A. Conservation

1) Strengths - By pointing out some of the bene-

fits derived from the sea, this chapter broadens the Scout's ecological perspective. The inclusion of marine resources extends his understanding of man's dependence upon the natural world. The discussion of the conservation problems in our estuaries enlarges his knowledge of man's impact upon his environment and of the importance of living in balance with nature. It also develops nicely some of the interrelationships that exist among resources through the concept of the food chain. The concern for resource quality is quite evident too in the discussion of estuarine problems.

2) Weaknesses - There is no feeling, however, for the importance of individual commitment and dedication in preserving these resources. The need for individuals to become aroused and involved in defending these resources is ignored. The section on pesticides could also be enlarged and updated.

B. Teaching Approach

1) Strengths - The dynamic and personalized style of presentation in the second part of the chapter is especially effective for stimulating awareness of and interest in marine resource problems. The mention of pesticides in the Antarctic and of their impact upon the eagle population in this country are particularly good elements in an effective and provocative style of writing. A good use is also made of direct experience by referring to marine resources with which the Scout would already be familiar in his own community environment. Both pictures are

likewise valuable in this respect because they exemplify uses of ocean resources that are probably within the Scout's realm of experience. The chapter as a whole is quite well-organized and develops its themes clearly and adequately. The concentration upon the "use" aspect and the "problem" aspect of marine resources is a proper focal point.

2) Weaknesses - The requirement for this chapter, however, could be improved. Presently it only encourages the Scout to memorize the contents of the chapter, but not really to do any independent thinking about the importance of ocean resources and their conservation problems. Granted, he could probably venture off into exploring a problem not discussed in the chapter, but when an answer is ready-made in the text, this tends to dampen the Scout's initiative. Instead, there ought to be some provision and encouragement for independent learning activity.

Chapter XI - Air Pollution

Synopsis: This chapter very briefly reports some of the causes of air pollution and some of the ways in which the pollution can be controlled.

A. Conservation

1) Strengths - The ecology of the urban environment is emphasized as well as the importance of quality considerations when dealing with air pollution problems.

2) Weaknesses - The importance of individual responsibility,which is especially crucial for combatting

air pollution is not discussed. The anti-pollution devices mentioned are useless if people will not use them.

B. Teaching Approach

1) Strengths - The picture is a good indicator of a major source of air pollution, but the caption could probably be strengthened, perhaps through the addition of factual data on automobile-caused pollution. For example, the 83 million cars in this nation cause 60% of the pollution in urban areas. Also, the organization of the text around the concepts of the causes and the prevention of air pollution is useful. The reference to familiar objects, or direct experience, in discussing causes and effects of air pollution is likewise valuable.

2) Weaknesses - A sense of crisis, however, is lacking. The story about air pollution is told in a matter-of-fact manner that is totally unrepresentative of the critical situation we are in today. We are pouring over 150 million tons of toxic material into our air each year, and may well face imminent disaster unless solutions are forthcoming. Nowhere in this chapter is there a feeling for the seriousness of this pollution problem. It could be portrayed much more dynamically, and provocatively. It could also be explained in more detail. The present treatment is much too cursory; the list of causes could be expanded. Some of the elementary chemistry involved in the sources of pollution could also be included. More alternative solutions need also to be considered, especially

the necessity for public cooperation. Finally, the requirement should be changed to promote inquiry activity that will give the Scout a deeper insight into the nature of the problem. At present, it only encourages memorization of the text and no real appreciation for the importance of air pollution.

Chapter XII - Using Our Land Wisely

Synopsis: This chapter focuses upon a very spirited analysis of our environmental quality problems. It discusses the continuing deterioration of the quality of the environment in terms of man's increasing power over nature and the corresponding decline in his contact with nature. It advocates that studies be undertaken to determine the best relationship between man and the land, so that both resources may be used wisely and ecological harmony restored.

A. Conservation

1) Strengths - The importance of preserving the ecological balance between human populations and their environment is forcefully stated with the recurring plea for more open space land and controlled development. The unfortunate consequences of ignoring ecology by squandering our land and water resources are vividly described. A strong ecological viewpoint is thus very much evident in this chapter. Furthermore, this is reinforced by the recognition that not only in our rural areas but also, and perhaps more importantly, in our urban areas we need

to restore our contact with the land through wise use and the provision of open space. A very broad and compelling ecological orientation is therefore one of the greatest virtues of this chapter. Another is the intense concern for environmental quality. Throughout the chapter, but especially in the first three subsections, there is a deep preoccupation with the need to preserve the quality of the "inner space that is our home." Accordingly, from the standpoint of the ecological and the quality criteria, this chapter is very satisfactory.

2) Weaknesses - There is very little effort, however, to impress upon the reader the importance and the efficacy of citizen involvement in achieving a quality environment. There is no discussion of realistic guidelines for effective citizen action. Especially in the subsection, "Open Space Projects," one gets the feeling that improving the urban environment is simply a matter of adopting city master plans and establishing zoning regulations. It is all highly impersonal, and there is no discussion of the vital role that the individual can and must fulfill.

B. Teaching Approach

1) Strengths - The requirement activity is well-conceived, because it stimulates the Scout to do some problem solving. In addition, possible answers can not be derived directly from the text and the Scout is forced

to develop his own arguments. It is also valuable because the options given furnish the Scout the opportunity to learn more about his own particular community environment. An additional strong feature about this chapter is that it is presented in a very provocative, dynamic, and motivating manner. A mood of crisis prevails throughout the text. The first subsection is especially noteworthy in this respect. It has a very personalized style of writing that makes the reader feel as though the author were purposefully addressing him. Factual material is also cited that is very thought provoking. Most of the illustrations seem appropriate; the ones on block cutting and water sampling, however, could have improved captions that tied them more closely to the theme of the chapter.

2) Weaknesses - Moreover, there ought to be some pictures that relate specifically to the urban environment. The text is very specific in dealing with the need for improving the quality of city life, but there are no pictures at all to supplement it. Also, the overall organization of the chapter could perhaps be tightened up. Some of the information about suburban farming, for example, in subsection four seems rather pointless. Much of the material too is redundant, although this might be viewed as an asset in terms of providing reinforcement for the reader. More explanation ought to be given such items as why pollutants upset the natural process of waste

breakdown in water bodies, and how urban open space can be provided. With a more coherent organization the chapter would be better able to convey its main principle of the need for harmony between man and the land.

Chapter XIII - De-Littering Projects

Synopsis: Guidelines for conducting anti-littering projects are presented in this chapter.

A. Conservation

1) Strengths - A great deal of emphasis is placed upon individual initiative and commitment. This chapter stresses that a Scout can and ought to make a significant contribution to conservation by helping to beautify his community. This chapter also encourages respect for environmental quality by listing the disadvantages of litter. It also promotes a healthy concern for the state of the urban envoronment where most of the littering occurs, thereby broadening one's understanding of the implications of ecology.

2) Weaknesses - There is no attempt to understand the political and social bases of litter. Likewise, the larger problem of waste treatment and recycling, of which littering is only a symptom, is disregarded. It ought to be discussed, and greater emphasis should also be placed upon what the individual Scout can do in his daily life to minimize waste and litter.

B. Teaching Approach

1) Strengths - The requirement involves the Scout

in doing a project on his own that will relate him directly to his community environment. He will therefore derive benefits from direct experience and from using his own initiative. Moreover, this type of project can be very successful in its immediate objectives and thus act as a reinforcement to spur the individual on to greater civic involvement. The suggestions for conducting de-littering projects are also pretty effective guidelines for action.

2) Weaknesses - The text could perhaps have a more dynamic appeal. It could include more facts and figures on the litter problem. The present illustration too could be substituted for something more motivating, like a thoroughly littered urban scene with an appropriate caption.

Chapter XIV - Conservation Laws

Synopsis: This chapter comprises a series of sources for the Scout to contact in order to learn about various conservation laws that affect him.

A. Conservation

1) Strengths - It stresses the important responsibilities the individual has to preserve our natural resources. It underscores the necessity of preserving environmental quality.

2) Weaknesses - It could develop more explicitly the importance of conservation laws from an ecological standpoint. In other words, they ought to be placed with-

in an ecological context.

B. Teaching Approach

1) Strengths - The requirement forces the Scout to go out on his own and gather the necessary information. It gives him direct experience with people associated to some extent with conservation.

2) Weaknesses - The content of the chapter, however, is very dry and uninteresting, and as such is not very palatable or desirable. The Scout may understandably approach it with reluctance as only a disagreeable task. The material should be made more interesting, perhaps through a discussion of the results of some of these laws. The picture in this regard is quite good, for it reveals one of the purposes of conservation laws. The caption, however, should be more explanatory and give some specifics about the birds we observe.

Chapter XV - Working For Conservation

Synopsis: This short chapter is a list of conservation projects from which the Scout has to choose any two to carry out either alone or with fellow Scouts.

A. Conservation

1) Strengths - It accentuates the importance of commitment by getting the Scout actually involved in conservation projects. It gives him an opportunity to see the operation of the principles of ecology at firsthand. Finally this chapter stimulates an active concern for en-

vironmental quality.

2) Weaknesses - There ought to be some projects that would give the Scouts some exposure to the hard political and social realities behind many of our environmental problems. Simply planting a row of trees can be an escapist kind of activity that refuses to face the truth in a given situation.

B. Teaching Approach

1) Strengths - The chapter emphasizes learning by doing, by bringing into play the Scout's own initiative and sense of responsibility in the development and execution of these projects. The suggested projects, moreover, are well within the Scout's capability and yet challenging enough to be stimulating. They also utilize the technique of direct experience by exposing the Scout to real life circumstances. And most importantly they provide their own reward; for upon their completion they will undoubtedly act as a very powerful reinforcement to this kind of activity and a strong inducement to its continuation.

2) Weaknesses - Provision ought to be made for the Scout to develop a project that may not be in this suggested list. Furthermore, among the suggested projects should be more pertaining to the urban environment.

Chapter XVI - Dramatizing Conservation

Synopsis: This last chapter presents some suggested activities and guidelines for spreading the word about conservation.

A. Conservation

1) Strengths - This chapter can further impress upon the Scout the need for concerned and involved citizens in the struggle for resource preservation and environmental quality. It also can bring out the importance of ecology and environmental quality by means of the project through which the Scout attempts to communicate to the public.

2) Weaknesses - The suggested projects do not really promote interpersonal contact. The Scout is not encouraged to confront people directly with his message about conservation. The problem of educating the public is thereby transformed into the relatively sterile and uninteresting task of sign-drawing and story-writing.

B. Teaching Approach

1) Strengths - Once again, actual involvement in conservation work means that the Scout is using his own initiative and talents. His knowledge and understanding are being broadened and deepened. Through direct experience he is learning firsthand the problems involved in public persuasion in his own community.

2) Weaknesses - The Scout should be allowed to do projects not specified in this requirement. More realistic and helpful guidelines for communicating with the public ought also to be supplied. Finally, the text ought to be more dynamic, personalized, and inspiring if the Scout is to be really enthusiastic about dramatizing conservation.

Summary

In terms of the conservation criteria the present merit badge pamphlet is much stronger on stressing ecological insight than it is on asserting the importance of quality considerations and the need for individual citizen commitment. Even when ecology is discussed, however, its application to the urban environment is often disregarded. The concept of conservation presented in the pamphlet is thus somewhat restricted. This is particularly unfortunate in view of the critical importance of conservation concerns in our country today. In order to do justice to the vitality of the movement, therefore, we need a new revision of the merit badge pamphlet that gives a fresh outlook on the field of conservation. It is an outlook that transcends the narrow, technical-professional view of conservation, with its stress upon resource biology and ecology, and presents a picture of an holistic approach toward resource issues which emphasizes environmental quality and citizen commitment.

The teaching technique to present this new image of conservation also needs revision. The current approach is to tie the content material to the fulfillment of specific requirements. Since many of these requirements are not of a problem-solving nature, learning becomes merely a matter of memorizing the textual material. Instead, learning ought to be a matter of acquiring new experiences. It should therefore be imbued with inspiration

and excitement. It should likewise involve the use of direct experience with actual work in conservation activities. Most importantly, it should stress the development of those necessary problem-solving skills with which citizens can effectively begin solving their environmental problems.

The current teaching approach does make some use of a personalized and dynamic appeal. It could be heightened, however, by better organization throughout the pamphlet, by the inclusion of more explanatory detail where missing, and by a writing style that is more personalized and provocative. Some use is also made of direct experience in the various projects that are suggested. But projects more directly related to the Scout's own environment ought to be included and room left for the Scout to use his own initiative in the development of more meaningful activities. Finally, there is also some emphasis upon problem-solving behavior, but it must be given greater priority. In particular, there ought to be more emphasis upon the discussion of alternative solutions to environmental problems. The Scout must be able to appreciate the problems from all sides and to recognize the consequences arising from their solution. Both in the activity requirements and in the text there ought to be developed more fully the problem-solving skills. It is not possible to include within the scope of one small pamphlet everything there is to know about conservation and environmental problems. Our knowledge

is constantly changing. But we can hope to train Scouts in the necessary skills that will enable them to become informed and effective citizens in the struggle for environmental quality. These skills and procedures ought to be spelled out clearly. Precisely how we can proceed to do this will be the subject of the following chapter.

CHAPTER IV

GUIDELINES FOR A NEW REVISION

Introduction

One prerequisite for the development of problem-solving skills is a thorough knowledge of the principles of ecology. Detailed and technical information is not necessary for the Scout to have an adequate understanding of ecology, but a grasp of some of the basic concepts involved is imperative. Once this knowledge has been acquired the Scout can then be taught specifically about the techniques for effective problem solving and citizen action. Included among these techniques would be the information-gathering skills that equip the Scout with political, social, and economic facts relating to his concerns. The Scout, in other words, must first be sensitized to his environment and its problems and then be introduced to methods he can use for solving these problems. In the following pages this twofold approach will be adopted in developing guidelines for the revision of the conservation merit badge pamphlet.

Ecological Background

(1) The Objectives

The first chapter in the new revision should begin to cultivate an understanding of ecology by exploring the dimensions of the natural ecosystem. For as Stanley Cain has observed: "The fundamental unit of ecology ... is the ecosystem: the organism, population or community and its environment."[1] Once the Scout has been made aware of the interrelatedness of living organisms and their environment his appreciation of the ecosystem should then be expanded by presenting the concept of the human ecosystem. Thus both the natural and the cultural aspects of ecological interdependence will be introduced to the Scout. The emphasis throughout the first chapter should consequently be upon the successive development of an understanding of ecological principles from their simpler to their more complicated form.

(2) Motivational Techniques

To begin this portion of the pamphlet there ought to be an inspiring and provocative picture, appropriately titled, on the frontispiece. It ought to portray man in harmonious balance with his environment (Figure II). Such a prelude to the concept of ecology would serve to motivate the Scout, arousing his interest and putting him in the proper attitude for the ensuing discussion. The chapter itself ought to be entitled: "The Balance of Nature".

Immediately preceding the body of the text there

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1 Stanley A. Cain, "Conservation of Resources," Encyclopedia of Science and Technology (New York: McGraw-Hill, 1964), p.112.

FIGURE II

The Balance of Nature

Conservation: A State of Harmony Between Man and Land.

should also be a stimulating quotation on the need for harmony between man and the land (Appendix IV). It should be suitable for the age level of the Scouts and should act as a further inducement for initiating learning behavior.

It would also be helpful, before commencing the discussion of ecology, to state the objectives of this first chapter. They ought to be spelled out concisely so the Scout will know what he will be expected to learn. Something like the following statement would be instructive: "Let us now investigate what we mean by the 'Balance of Nature' and see how in our daily lives we are all dependent upon nature's bounty".

Building upon the interest and attention aroused by this introductory material, the Scout should then be confronted with a series of examples showing the damage that can result when the ecological balance is upset. It is enough for a start merely to present a few case studies that will channel the Scout's thinking in the intended direction. There is no need to elaborate yet upon the ecological implications. Let the Scout draw his own conclusions. The pamphlet can clarify his understanding of ecology after it has shown him how ecological forces operate.

These case studies, perhaps six in number, should be reported in a lively and engaging manner in a kaleidoscopic fashion. They should, however, be carefully organized and ought to include mention of both the natural

and disturbed environmental conditions. The urban environment should be well represented, and if possible all the examples should be rooted in actual historical events. Good quality photographs, or other illustrations, would be highly desirable. These too should be arranged in sequence, with appropriate captions, to tell their story adequately. The pictorial displays on "The Dynamics of the Community" and "The Interdependence of Communities" by John Storer in his book, The Web of Life, would be admirable models to follow.[1]

There are a number of possible subjects that could be used as case studies. The story of the Kaibab deer herd in the present merit badge pamphlet could be used to advantage. The story of the demise of Lake Erie as reported by Gene Marine in America, the Raped would also be an effective narrative.[2] Another good example would be the fisher-porcupine-pine tree relationship in southern Oregon, described by the Rienows in their book, Moment in the Sun.[3] The destruction of San Francisco Bay; the fouling of our coastal waters with oil slicks; the rising number of deaths attributed to air pollution in our large urban areas; the overwhelming problems of waste disposal and open space for recreation: these are all problems that have arisen because urban man has

1 John H. Storer, The Web of Life (New York: The Devin-Adair Co., 1953), p.64 ff.

2 Gene Marine, America, the Raped (New York: Simon and Schuster, 1969), pp.101-104.

3 R. Rienow & Leona Train Rienow, Moment in the Sun (New York: The Dial Press, 1967), pp.34-35.

gotten out of balance with his environment. It is crucial that the Scout be exposed to these kinds of problems and issues right at the beginning of the pamphlet. This will set the necessary tone of crisis to be developed in later chapters, and should be sufficiently stimulating to attract the Scout's interest for the discussion of the ecosystem that is to follow.

(3) Explanation of Ecological Principles

These examples of ecological imbalance, then, should lead directly into a consideration of the concept of the ecosystem. The ecosystem should first be concisely defined and described. A good working definition would be: the web of life binding living organisms and their environment into a mutually interdependent relationship. This community theme could be accentuated through application of the spaceship analogy with its severe implications about the necessity for interdependence.[1] Some of the factors, both biotic and abiotic, which compose the environment should be noted. The differing scales on which the ecosystem can be conceived, from the biosphere down to the local communicty pond, should also be explained. It might also be mentioned that ecology is the particular science that studies the ecosystem.

The ecosystem should then be examined from two perspectives: its structure and function. Its four basic

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1 Eugene P. Odum, Ecology (New York: Holt, Rinehart and Winston, 1963), pp. 10-11.

constitutents - abiotic substances, producers, consumers, and decomposers - should be delineated.[1] The concepts of the ecological niche and habitat, and of species diversity and communities should likewise be explained.[2] The primary objective of this section should thus be to stress how organisms are adapted to their environments, some of them in highly specialized ways. In this connection, it would be worthwhile to illustrate adaptation with some specific examples of the characteristics and habits of certain organisms.

How the ecosystem functions should be the next topic for investigation. Here the one-way flow of energy and the cycling of materials through the ecosystem should be the main areas of concentration. Emphasis should accordingly be placed upon the importance of the food chain, the impact of limiting factors, and the principle of community succession. It ought to be pointed out how all these factors working together produce a state of dynamic equilibrium within the ecosystem, commonly known as the balance of nature.

Finally, the place of man and culture with respect to this balance of nature must be stressed. The central theme would be the gradual evolution of man from a position of subservience and harmony with nature to one of

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1 Marston Bates, The Forest and the Sea (New York: Random House, 1960), pp.147-148.

2 Odum, pp.34-35.

dominance. Through the power of his intellect man has partially been able to escape the controls of nature, inflicting grave damage on the environment and himself. In the words of John Storer: "Under the domination of his intellect, the world's life, and the environment of that life, seem to have reached a crossroads, and the choice of direction is for the future to decide."[1] The ecosystem in a very real sense has become the human ecosystem. How culture and nature interact in this human ecosystem should be examined. Man's essential ties to the natural world, however, and his overwhelming responsibility for maintaining that world must be clearly brought out. The institutions and decision-making processes man has developed for effective social action, as well as the impact of individual habits, should likewise be set forth as the appropriate paths toward responsible human behavior.

When explaining the structure and functioning of the ecosystem it would be extremely helpful to display some diagrams. A simple illustration, such as that of a food chain in Figure III, would be appropriate. There should be similar diagrams to elucidate ecological succession (the progressive evolution of a pond into a forested area, for example) and limiting factors, as well as the four basic elements in the ecosystem and the institutional aspects of the human ecosystem. In addition,

1 Storer, p.141.

FIGURE III

A Food Chain

Energy flows upward through the ecosystem.

it would be highly beneficial to have good quality photographs accompanying the text. Again, the excellent photographic sequence by John Storer in chapter ten of his book, The Web of Life, would be a classic model to emulate.[1]

In the actual writing itself the attempt should constantly be made to relate the Scout to familiar features in his own environment, by way of example. To heighten interest in the extent of man's ties to nature, for instance, there could be a discussion of how the individual's bodily and mental functions are intimately linked to nature's diurnal and seasonal cycles.[2] The concept of the spaceship earth and all that it connotes in terms of man's dependence upon nature could likewise be introduced. To make the concept of the ecosystem still more relevant, the Scout could also be taught to view his own community as a miniature ecosystem. The inputs to the system in terms of energy flow could be described in terms of the amounts of water and food and other materials need to sustain the community over a given period of time. The locations of the four basic elements for any ecosystem could likewise be noted for his community, and the Scout would thereby gain a greater appreciation for the intricate and far-reaching balance of nature that sustains life.

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1 Storer, pp.64ff.

2 Rene J. Dubos, "Man Adapting: His Limitations and Potentialities," Environment for Man: The Next Fifty Years, ed. W.R. Ewald Jr. (Bloomington: Indiana University Press, 1968), p.14.

It would also be effective,at the end of this section on the ecosystem, to present a short account of an actual ecosystem in operation, functioning normally in a balanced state of equilibrium. Then man should be brought on the scene. His appearance at first has no adverse effect upon the harmony of nature, but over time he begins to exploit the land wantonly with baleful consequences both to the environment and to himself. This short scenario might well be a brief sketch from American history and would be a fitting climax to this discussion of basic ecology.[1]

(4) Man's Dependence Upon Natural Resources

Now that the Scout has some understanding of ecology and its relation to today's environmental problems, the pamphlet should begin inquiring into the important role that natural resources play in our lives. It would be useful, first of all, to define precisely what natural resources are and to distinguish between renewable and nonrenewable resources. The definition should take note of the fact that natural resources are in a sense created by man, for the concept "resource" refers to the function which a thing or substance may perform, and this function necessarily depends upon man's judgment and the state of his technology and economics. Thus a natural resource is a function appraisal by man of his environment to attain certain specified objectives within the limits

1 Stewart L. Udall, The Quiet Crisis (New York: Holt, Rinehart & Winston, 1963), pp. 1-120.

of technology and social institutions. The concept of what constitutes a natural resource is therefore constantly changing.

Given this definition of the relative nature of a resource, the Scout should next be introduced to the wide spectrum of what today are commonly valued as natural resources. From the cosmic down to the microcosmic order, there are innumerable examples that can be cited. It should be clearly explained how all the major factors in the environment, from solar energy down to the soil, are essential to man's existence and useful for his purposes. These factors to be considered include: solar energy, the atmosphere, water resources, vegetation, animal life, and soil and mineral resources. In illustrating their uses the procedure used in chapter one of the present pamphlet would be a helpful guide. All illustrations, however, should relate as directly as possible to the Scout's own community environment. They should include a vivid account of the specific uses to which various resources are put, as well as some indication of the rates at which they are being consumed. The intention is to arouse within the Scout an intimate awareness and appreciation of the extent of man's dependence upon his environment.

In order to underscore this dependence upon resource utilization, it would be beneficial to translate its dimensions into personal, individual terms. Show the Scout just how important different resources are in his own daily life, and just how extensive is his use of

them. The first few pages in the Rienows' book, Moment in the Sun, give a perfect illustration of this technique. It would also be instructive to trace briefly some of the historical trends in resource consumption, such as the rapidly rising demand curve for energy resources.[1] Here graphic illustrations would be particularly appropriate. Pictures could likewise be used to good effect in depicting resource utilization. Those in the first chapter of the present pamphlet, for example, are well-chosen but there could be more scenes dealing with the urban environment. Another successful measure would be to choose some seemingly inconsequential feature in the Scout's community, such as a marsh, and explain all the intricacies of the important role it plays in that environment. In as simple and yet dynamic a way as possible the new pamphlet must thus awaken the Scout to the importance of natural resources in his own life and his own community.

The very critical problem of resource supply should be the next subject of concern. Recognizing the vital role of resources in our society, the Scout should now be given some insight into the difficulties connected with their adequate provision. Specific aspects of man's ecologically disruptive influence should be reviewed. The problem of waste should be discussed and related specifically to the Scout's own usage habits. Practices can be suggested to discourage excessive wastefulness. Reference should also be made to the impact of a burgeoning world population. Above all, the discussion should point

1 Harrison Brown, The Next Hundred Years (New York: Viking Press, 1966), pp.95-97.

out how imperative is the need for world-wide population control. Technology alone will not be sufficient to insure an adequate supply of resources for the future.[1] It is on this problem of the population explosion that the principal focus should lie. For this is ultimately the crux of the entire conservation dilemma.

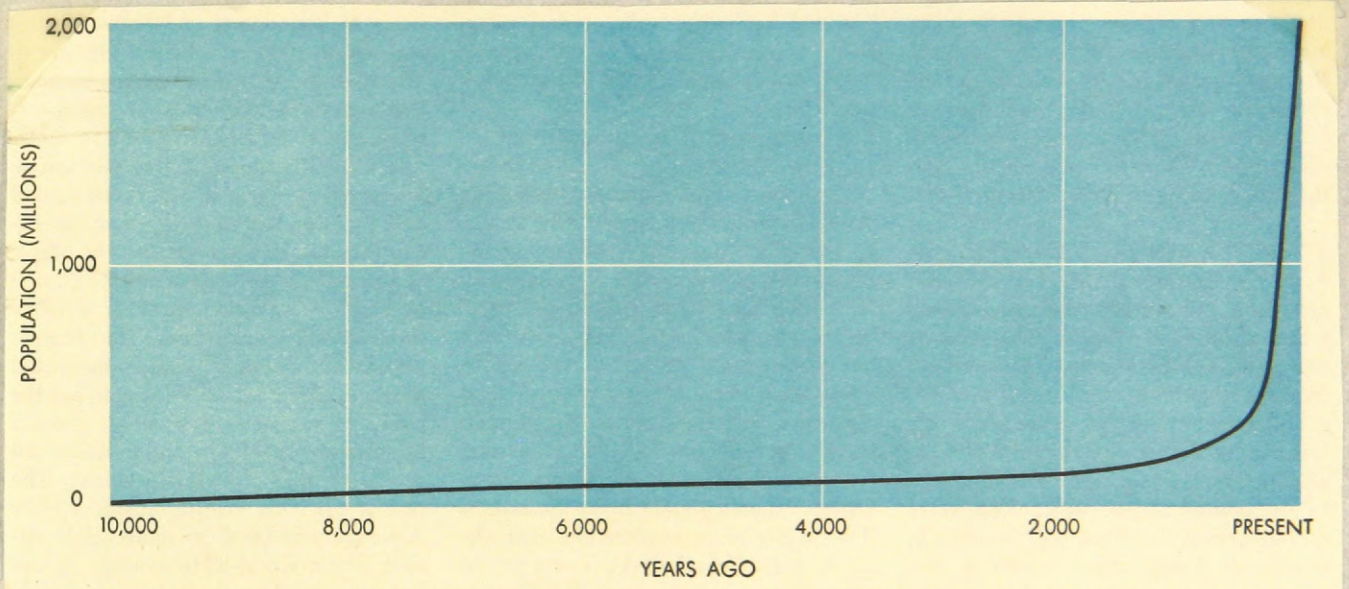
(5) Natural Resources and the Population Problem

In discussing the population problem the pamphlet should first introduce the basic principle of the relative fixity of the world's stock of resources and the marked instability in the human population, resulting in less resources per capita as the population increases. The history of the growth of the human population should then be briefly described. This could be highlighted by an appropriate graphic illustration (Figure IV). Perhaps interesting comparisons could be drawn from animal population studies. Particular emphasis should next be placed upon the growth of the United States population. Then should follow a brief discussion of the cause of today's population problem, namely, a low death rate with an accompanying high birth rate. Next should come a short but dynamic sketch of the impact of present population pressures on resource utilization. It could be noted, for example, that presently two thirds of the world's 3.5 billion people are malnutritioned or starving. A more effective tack would be to refer the Scout to exam-

1 P.R. Ehrlich & J.P. Holdren, "Population and Panaceas: A Technological Perspective," BioScience, 19(12):16, Dec., 1969.

FIGURE IV

Growth of the Human Population



ARITHMETIC POPULATION CURVE plots the growth of human population from 10,000 years ago to the present. Such a curve suggests that the population figure remained close to the base line for an indefinite period from the remote past to about 500 years ago, and that it has surged abruptly during the last 500 years as a result of the scientific-industrial revolution.

ples of population-caused problems within his own community environment. Finally, some projections of future population trends and their consequences can be presented, along with a series of questions to stimulate the Scout's thinking about man's proper place in the balance of nature. For example, some pertinent questions might be: 1) Will disease, famine and warfare eventually bring human populations back into balance, or will man be able voluntarily to control his numbers? 2) How will the quality of life in America be affected with a population of 400 million by the year 2000? 3) What effect will unchecked population expansion have on international relationships? These and many more similar questions should be posed in order to challenge the Scout's thinking about the steps that need to be taken to assure adequate supplies of the world's resources for present and future generations.

(6) Conservation: Its Definition and History

Since conservation addresses itself directly to resolving these kinds of issues, it would be fitting now to discuss some of its conceptual and historical aspects. It must first be defined, but in doing so one must recognize the ambiguous and relative nature of the term. A good working definition should be formulated, one relating specifically to "wise use". (Appendix V) Then the ambiguity in the phrase , "wise use," should be discussed, particularly as it concerns one of the dominant conflicts

in the conservation field, the discrepancy between "development" and "nature preservation".[1] Here would be a good opportunity to prick the Scout's imagination by asking him to debate the merits on both sides of this dispute with respect to the question of what constitutes human welfare.

The view of conservation as a way of life, or philosophy, should also be taken into account. For as Steward Udall has noted: "Beyond all plans and programs, true conservation is ultimately something of the mind - an ideal of men who cherish their past and believe in their future."[2] Aldo Leopold's ideal of conservation as a land ethic, or a state of harmony between man and the land, is thus very important to convey to the Scout.[3] When the Scout can be made to recognize his ultimate unity with nature, and learn to love the land, he will be gaining a much deeper appreciation for the true meaning of conservation.

This appreciation can be enhanced by briefly summarizing the highlights in the history of American conservation. These can be considered under four headings:[4]

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1 O.C. Herfindahl, "What Is Conservation," Readings in Resource Management and Conservation, ed. I. Burton & R.W. Kates (Chicago: The University of Chicago Press, 1967), p.231.

2 Udall, p.200.

3 Aldo Leopold, A Sand County Almanac (New York: Oxford University Press, 1949), p.207.

4 R. Nash, ed., The American Environment: Readings in the History of Conservation (Reading, Mass.: Addison-Wesley Publishing Co., 1968), pp.v-vii.

1) The Period of Resource Exploitation and the influence of the early conservationists, such as G.P. Marsh, John W. Powell, Henry David Thoreau, and John Muir; 2) The Classical Period under Theodore Roosevelt with special emphasis upon the work of Gifford Pinchot; 3) Conservation Between the Wars with particular attention to the achievements of FDR; and finally, 4) Recent Trends in Conservation especially as they relate to environmental quality. In this last category, it should intentionally be pointed out how important youth involvement is becoming as the lifeblood of the movement. It would also be profitable to direct the Scout's reflections toward various conservation organizations that he might encounter within his own community, to give him a taste of the reality of today's conservation movement. As a purely technical matter, it might also be helpful to include pictures of a few of the leading figures in the history of the movement, each bearing a typical quotation. The aim, in any case, must be to breathe life into the movement and not simply to present the dry bones of historical fact.

(7) Activity Requirements

In order to reinforce the concepts about conservation and ecology that the Scout has learned, he must now participate in some meaningful activity requirements. It is important that these be of an investigative nature, calling upon the display of the Scout's own initiative and

talents, what Norman Marsh has dubbed a "direct experience approach to learning".[1] The objective is to give the Scout a firsthand exposure to an actual ecosystem. In developing the specific programs, there should be a conscious effort to suggest activities that will engage all of the Scout's senses. If we are seeking to educate the complete individual, we must appeal to all his faculties. In this regard, we should encourage group activity as much as possible. For this would give the Scout experience in the necessary social skills that can greatly increase his effectiveness.

The activities themselves must for the most part be entirely recommended, not mandatory. The Scout should be encouraged to pursue his own interests. There will be a few requirements which must of necessity be fulfilled, but these are only to insure that the Scout has a grasp on basic ecological principles. Examples of such requirements would be: 1) Select a biological community native to your locale, identify a significant food chain and tell how it functions; 2) From this same biotic community find three samples each of a renewable, and a nonrenewable resource; and 3) Define the term "ecological niche" and explain how it contributes to the stability of the ecosystem. These requirements would be fulfilled in the presence of the counselor.

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1 Norman F. Marsh, Outdoor Education on Your School Grounds (Sacramento: Office of Conservation Education, 1967), p.3.

As for the suggested activities, these should focus on two main objectives, elucidating both the natural and the human ecosystems. The Scout will be asked to do at least one activity in each of these two areas, regardless of whether the activities are of his own choosing or are from the pamphlet's list of recommended activities. The Scout will have to put some kind of creative effort into satisfying the requirements, and will present the results of his effort to his counselor for criticism and discussion. He will be encouraged to work with others. Accompanying the list of suggested activities in the pamphlet will be a few helpful hints to get the Scout started on the right track, such items as, "Be sure to consult professional resource people in your community like the local conservation officer or your biology teacher when searching out information." The suggested activities, aimed at enlivening the Scout's comprehension of the ecosystem and man's dependence upon it, are to be presented in the form of relevant problems. Some possible activities include the following:

A. Concerning the Natural Ecosystem

1) Are there any ways in which energy is being wasted in your community? Investigate with your fellow Scouts and make recommendations to your city council to remedy any problems you encounter. What do your investigations suggest about the nature of energy? 2) Is man capable of escaping nature's controls? Is he subject to the impact of limiting factors? Identify elements or situations in

your community to support your conclusions. 3) How aware would you say your fellow Scouts are about the vital interrelationships between all living organisms and their environment? Make a short survey and summarize its results. 4) Can you see any connection between cleaning city streets early in the spring and maintaining the purity of community rivers? Illustrate your answer with charts and other material. 5) How is it possible for DDT to get into fish hundreds of miles at sea and into penguins in the Antarctic when they were not exposed to the actual spraying? Do the necessary research and then make a diagrammatic sketch of your conclusions.

B. Concerning the Human Ecosystem

1) How is the hydrologic cycle important in your community's water supply? Make a model of its operation. In what ways does man interfere with this cycle? In particular, see how the water supply problem shapes up in your community, and what some of the possible solutions are. 2) Has your community's environment been vastly altered from presettlement days? Talk with some of the older citizens in your area, consult records and write up a descriptive report. 3) How might the development of mineral resources help raise the level of living in a depressed area such as Applachia and harm the environment? 4) Is there any evidence in your community of man's having exceeded the carrying capacity of the land? Take a classmate survey and see what your peers think. 5) Would you say that your community is pretty much self-suf-

ficient? Inquire from some of the merchants around town and some of your city officials. See where all the vital necessities actually come from.

All these activities are only suggestions, and whatever the Scout decides to undertake, it is up to his counselor to guide him into a full and relevant understanding of the pertinent ecological implications.

Environmental Quality Background

(1) The Objectives

After an inquiry into basic ecology it now becomes necessary to look more at the problem side of the environment. Environmental quality concerns constitute the main thrust of the conservation movement today. Thus it is necessary to acquaint the Scout with some of the basic issues involved in environmental quality problems. These issues must be presented in such a way as to illuminate the Scout's understanding of his own community's conditions.

(2) Motivational Techniques

To begin this second chapter there should again be a provocative and absorbing picture with an explanatory caption. It ought to depict man in an unwholesome and chaotic environment, preferably an urban scene.(Figure V) A suitable title for this chapter would be: "The Polluted Environment".

Immediately preceding the body of the text should occur the following quotation: "What a citizen sees every

FIGURE V

The Polluted Environment

The demands of urban America threaten our environment.

day is his America. If it is attractive it adds to the quality of his life. If it is ugly it can degrade his existence."[1] Then, just before launching into the content material, there should appear a short statement of the objectives of this chapter, such as the following: "We will now familiarize ourselves with some critical environmental problems that may very well be facing your own community."

First, refresh the Scout's memory of the concept of ecological balance and harmony. Include, however, the element of quality, stressing not only the seriousness of a sufficient quantity of resources, but also, and more importantly, the necessity for resources of an adequate quality. Not only do we need huge quantities of water, for example, but we also require water that is pure and fit for human consumption.

Following this discussion should appear a dramatic series of case studies revealing what can happen when the quality of the environment deteriorates. As much as possible these studies should focus upon the community environment, since that is where the majority of Scouts live and where most of the environmental quality problems arise. There should be approximately five or six examples, each centering upon a different topic. They ought to be presented in a provocative, personalized, and

1 Lyndon B. Johnson, "Natural Beauty - Message from the President of the United States," in Nash, The American Environment, p.173.

absorbing format with ample pictures or other illustrations to heighten their appeal. They must also be grounded on actual historical events, the more recent the better.

Whenever possible it would be best to choose examples that may not necessarily be in the national spotlight, but would nonetheless be very effective in communicating the story of the impact of environmental decay. Expediency, however,will perhaps dictate that only the major issues will be discussed. In any case, certain specific areas of concern ought to be covered. They include: air pollution, water pollution, aesthetic pollution, pesticide pollution, and noise pollution. Others can be considered if space permits. In presenting each case study the following organization is suggested: 1) The location and origin of the problem, the facts surrounding its occurrence; 2) A general explanation of the ecological principles involved and the impact of the problem on man; 3) What corrective action, if any, is being taken; and 4) The relevance of this problem to the Scout. With regard to air pollution, a pertinent case study could discuss the smog deaths in London and New York, or the effects of aerial contaminants on vegetation, such as at Copperhill, Tennessee, or Sudbury, Ontario, or Trail, British Columbia. For water pollution, a more thorough analysis of the situation in the Great Lakes would be appropriate. Aesthetic pollution could concentrate on the solid waste disposal problem and the litter problem. The

pesticide problem can be handled by considering the interaction between farming and fishing interests in Lake Michigan. As for noise pollution, a suitable subject would be the ramifications of exhaust noise from cars and motorcycles. Whatever specific examples are chosen, there should always be a conscious effort to relate the material to the Scout's own community environment.

The Scout, however, should not be left with the impression that only those environmental quality problems that are mentioned are the only ones that exist. It must be pointed out that the problems are in fact legion, and that even some of the seemingly insignificant things he does every day contribute to the total picture of environmental deterioration. In this connection there ought to be a listing of these common practices so that the Scout can gain some idea of his own personal impact. The items on this list might include: littering, excessive water use, excessive use of paper products, burning trash outdoors, and riding motorcycles or scooters. The fact that all environmental problems are interlinked and that a total, integrated approach toward solving environmental problems with recycling as an alternative to pollution is required should also be stressed. By concentrating only on the solution of a single issue one may only end up by aggravating a whole complex of other problems. Solving the problem of solid waste disposal through burning, for example, may only exacerbate the air pollution problem.

(3) Explanation of Environmental Quality Problems

Now that the Scout has some idea of the extent and the effects of various quality problems, it becomes necessary to give him a deeper insight into the actual mechanics of some of these problems. Precisely how, for example, does auto exhaust give rise to air pollution? The subject of each case study ought to be thoroughly scrutinized. Thus for air pollution the following topics should be explained: the kinds of pollutants (particulate, chemical, photochemical), where they come from, how they inflict damage on human populations and their environments, some of the ways to control them, and the status of the problem in the United States today. The current pamphlet treats these topics, but very uninterestingly, and in a matter-of-fact manner that does not really explain anything in detail. On the subject of water pollution the following points deserve attention: the kinds of pollution (organic, inert wastes, toxic, thermal, and radioactive), the biological effects of these pollutants, some of the control measures (primary, secondary, tertiary treatments), and the current status of the problem. For aesthetic pollution it would be well to concentrate on the dimensions of the solid waste disposal problem. Very graphic illustrations of the predicament involved in handling these wastes should be presented. Statistics should be given about the amount of waste generated by each American. The Scout could also survey his own contributions to the garbage pail. Recycling

as an efficient solution should be discussed. Regarding pesticide pollution, the following items should be investigated: the categories of pesticides and their characteristics (chlorinated hydrocarbons and organic phosphates), why they are employed, the elimination of non-target organisms, accumulation in the food chain, lowered reproductive potential in birds, development of resistance in insect pests, various synergistic effects, pesticide migration throughout the world, accumulation in the ecosystem, and various delayed responses such as genetic changes. Alternatives to pesticide use should also be discussed. Noise pollution is best treated by reviewing the physiological and psychological effects on humans of increased levels of stress.[1] When discussing the details of all these different problems, it is essential to make the explanations as direct and vivid as possible. The Scout should be able to see how all these issues affect him and the quality of his environment.

The strictly scientific, or technical, aspects of these problems, however, should not overshadow the importance of the political, social, and economic factors that also contribute to their existence. The Scout should likewise be made aware of these. The interagency rivalry of a bureaucracy, for example, the social mores of a consumer nation, and the failure to adequately define public welfare in purely economic terms are some of the

1 S.M. Farber, "Quality of Living - Stress and Creativity," Future Environments of North America, ed. F.F. Darling & J.P. Milton (Garden City, N.Y.: The Natural History Press, 1966), pp. 342-354.

important considerations the Scout should bear in mind. Such considerations moreover are perhaps the most important concerns of today's conservation movement. For we have the necessary technology to tackle our pollution problems. What we lack is clear understanding of human nature that would enable us to apply this technology. Until we gain this deeper human insight, all the technical expertise in the world will be of little avail in the war against environmental pollution.

Although completely eliminating these pollution problems would be highly desirable, it is important to assert that any such hopes would be entirely illusory. We can not hope to rid ourselves of all our environmental quality problems if we expect to maintain and advance our present standard of living. There will always be deleterious consequences for the environment. Surely these consequences can be mitigated, but they can not be eliminated. The question, therefore, is not whether there ought to be environmental pollution, but rather what kind and how much. It is a matter of establishing specific tolerance ranges, whose limits we will not exceed. This requires a total, integrated approach toward environmental planning at the regional and national level. The Scout should at least be made aware of this controversial aspect of the whole environmental quality issue.

(4) Man's Dependence Upon a Quality Environment

Then, even though acknowledging the impossibility of achieving a totally pure environment, the attempt should be made to inspire the Scout to seek a quality environment. This can be accomplished by relating in a specific and factual manner the extent to which man is dependent upon such an environment. Both reasons of health and aesthetics can be cited. In the case of the former, it could be pointed out, as Rene Dubos has so ably done, that although man can seemingly adapt to various forms of environmental pollution and stress, in the long run pathological afflictions like chronic bronchitis and other types of pulmonary disease are bound to appear.[1] Moreover, by constantly eradicating species of plants and animals, thereby simplifying our ecosystem, we run the risk of impoverishing the gene pool and being unable to adapt to critical situations. By thus destroying nature's balance man is threatening the fragile web of life which gave him birth, and which alone can sustain his existence. Furthermore, he is robbing his existence of much of its meaning and worth. Through ravaging objects of wild beauty he denys the nobler aspects of human nature. He denys the truth of Muir's observation that: "In God's wildness lies the hope of the world..."[2]

1 Rene J. Dubos, So Human an Animal, (New York: Charles Scribner's Sons, 1968), pp.150-152.

2 E.W. Teale, The Wilderness World of John Muir, (Boston: Houghton Mifflin Company, 1954), p.315.

That man needs this wildness - even if it is only a few open space parks in a city environment - is evident from the rapidly increasing recreational demand for natural areas. The Scout must be made to see the utter necessity for retaining some of this wildness, for aesthetic as well as for biological reasons.

(5) An Agenda for Environmental Quality

In addition, he must be given a more specific idea of just what the term "quality environment" denotes. What are some of the characteristics that could constitute a "quality environment"? Here it would be appropriate to list some of the more important of these characteristics, paying particular attention to the requirements of the urban environment. It is important, however, to avoid a narrow definition of "quality". The purpose here is only to indicate what some of the desirable features of a quality environment might be. The Scout should be stimulated to draw his own conclusions and make his own definitions. The following agenda for environmental quality should be regarded as tentative: 1) Water - Dwindling supplies of usable water and pollution in every major stream and lake necessitate the development of effective desalination and recycling methods, together with the installation of efficient municipal and industrial waste treatment facilities and the separation of sanitary and storm sewers. The polluters, moreover, should be restrained from carrying out their activities without regard for the public interest.

Wetlands and estuaries too must be saved from reckless real estate developers. 2) Air - Rising levels of pollution have a high positive correlation with emphysema, bronchitis, lung cancer and death, and inflict damage on our food, clothing and shelter. The internal combustion engine is the worst contributor and must be improved or replaced. Forms of mass transportation must also be developed. Industrial emissions must likewise be curtailed. Strict noise pollution ordinances must be enacted. 3) Land - Soil erosion and chemical pollution are destroying the productivity of the land. The land is being misused and buried in garbage and litter. There is an urgent necessity for imaginative land use planning, for limiting our use of pesticides,and for revising our tax structure to alleviate litter and solid waste problems. We must also increase our efforts to preserve parks, playgrounds, and wild areas. 4) Wildlife - Some eighty-nine species of birds and mammals are considered endangered. More and more of their habitat is being usurped by our expanding population. There must be a dedicated effort to preserve and extend wildlife habitat. 5) Trees - Our timber resources are being overexploited as we match of exceed the allowable cut. Urban areas frequently neglect the value of shade trees and woodlots. Better management of these renewable resources is indispensable. 6) People - The present population growth rate is intolerable. It produces an exhaustive drain on all our resources and detracts markedly from the finer qualities

of life. Strict birth control measures must be instigated immediately, and families must pledge themselves not to have more than two children.

The importance of international cooperation in attacking these various issues should be stated. These issues should also be clearly explained and, when possible, made relevant to the Scout's own community environment. Reference, for example, could be made to the smoky haze frequently found in cities, when discussing the problem of air pollution. Finally, it would be instructive to pose a few problems in actual resource allocation and use in order that the Scout might attain a more insightful appreciation for the problem of providing a quality environment. These problems ought to focus on such questions as how do you put dollar signs on intangible values. Thus the Scout would get practice in forming his own definition of a quality environment. The Storm King controversy in New York, or the Alaskan pipeline altercation, might be ideal case studies.[1] All the pertinent facts and alternatives in the given situations should be disclosed, and then the Scout should be asked to reach a decision on what should be done. His decision can then be compared with the actual outcomes. Such realistic procedures would impart a deeper understanding of the possibilities and problems inherent in the search for environmental quality.

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1 Marine, pp.86-97.

(6) The New Conservation

Because conservation is so deeply involved today with this quest for environmental quality, it would be well to re-emphasize the role that quality concerns play in the modern conservation movement. It must be pointed out that conservation here in America is not just oriented toward the preservation and improvement of basic resources. Indeed, in many instances science and technology have eased any fears about particular resource shortages in the foreseeable future. Instead, the major emphasis now tends to be upon quality, not upon quantity, and upon quality of the total environment rather than the quality of individual resources. Moreover, the scope of this concern embraces not only the natural areas, but more importantly the urban areas where the majority of our citizens dwell. Today's conservation message is also tinged with a note of urgency; many competent authorities are predicting the downfall of our civilization unless the tide of environmental pollution is reversed. Among the supporters of the new conservation, however, are increasing numbers of youth who refuse to believe that the future is hopeless, and are determined to halt the destruction of the environment. The new conservation movement itself calls more and more upon the dedication of individuals in the effort to combat pollution, and to create a quality environment. For in the last analysis only dedicated and selfless individuals working together can make the difference between success and failure.

In order to convince the Scout of these new trends in conservation, it would be worthwhile to refer him to his daily newspaper where he could see for himself how often conservation topics concerned with environmental quality do appear. He could likewise be directed to a local conservation organization where he could learn firsthand the goals and objectives of the new conservation.

(7) Activity Requirements

Activity requirements should now be presented that would enrich the Scout's understanding of the problem of environmental quality. These requirements should be of two kinds. The first set should be informative in nature; its purpose is solely to implant a more relevant and detailed comprehension of environmental quality issues. It is on the basis of this knowledge that the Scout will be able to apply the problem-solving skills to be learned in the third chapter of the new revision. The second kind of requirement should enlighten the Scout about some of the things he can do everyday to reduce environmental pollution. Generally speaking, none of the requirements ought to be mandatory, although a few of them would necessarily have to be so in order for the counselor to judge the Scout's perception of some of the essential concepts involved. Examples of such requirements would be: 1) Describe the biological effects

of water pollution and some of the treatment methods; 2) What are the sources and results of air pollution, and how can the problem be controlled? 3) What are some of the consequences of using pesticides and some of the alternatives to their use? When introducing all the requirement activities it is important to try and relate them to the Scout's own community to make them more relevant. They should also be conducive to direct inquiry behavior that will call forth the Scout's own initiative and skills. He should thus be encouraged to pursue his own interests, choosing activities that appeal to him, though it will be necessary for him to do at least one of each kind of activity, regardless of whether or not it was suggested in the pamphlet. He should likewise be encouraged to work in groups. In sessions with the counselor the Scout will present the results of his activities, thereby completing all these requirements.

When recommending various activities of the first type (informative), a few helpful action guidelines ought also to be offered. These would help the Scout in fulfilling his requirement. Such suggestions might include: "Check with your local chamber of commerce or one of your community's service clubs for information." Among the possible requirements of an informative nature could be the following: 1) Choose a natural body of water in your community and have the local water treatment plant run an

analysis on it. You might want to compare results between a number of samples from various water sources.[1] 2) With your fellow Scouts investigate the degree of air pollution experienced by your community in different locations by hanging clean cloths in the open for one month, by measuring dust deposits, or by setting out sensitive plants.[2] 3) Where are the solid wastes being disposed of in your town? Are the methods adequate? What do you think could be done to improve the situation? 4) Randomly choose a section of your community and collect samples of the kinds of litter found. Take snapshots to support your findings. Estimate the amount of litter deposited daily in your community and suggest practical means for managing the problem. 5) Is there a local noise pollution ordinance? If so, what are its provisions and how effective is it? Can it be strengthened? How? Tape record the noise level in your community and present it to a city council meeting. 6) Are pesticides used in your city? What have been some of their consequences? Construct a graph showing the rate of pesticide use in recent years. 7) Make a survey of the number of parks and natural areas in your community. What are the features peculiar to each and how is each park used? Can you think of ways to improve them, or of other areas that ought to be set aside as parks and open space? All these activities are essen-

1 R.E. Brown, Techniques for Teaching Conservation Education (Minneapolis, Minn.: Burgess Publishing Company, 1966), pp.101-106.

2 Brown, Ibid., pp.96-100.

tially a form of environmental monitoring and could provide a continuing flow of information on local environmental conditions. For this reason group activity ought to be especially encouraged.

The second type of activity requirement concerns individual contributions to environmental quality. There are a number of things here that the Scout himself can do to improve his local environment.[1] He should encourage others to follow his example. To combat air pollution, for example, he could: 1) walk, or bicycle, rather than ride in a car; 2) stop burning trash outside, start a compost pile instead; or 3) cease smoking. On behalf of improved water quality the Scout could: 1) encourage the use of detergents low in phosphate content; 2) refrain from using colored tissue or colored paper; 3) prevent oil leakage onto streets from the family car; 4) limit the application of salt on street and sidewalk; and 5) pick up trash and litter along a local stream bank. The solid waste and litter problem could be diminished by: 1) using returnable rather than disposable containers; 2) refusing to buy products with excessive packaging; 3) reusing paper bags and other containers; 4) using handkerchiefs and cloth napkins; 5) keeping one's own yard free of litter; 6) planting flowers and other plants within the community; and 7) painting over graffiti on bridges, walls, and other structures. To counter pesticide pollution, the Scout could: 1) remove weeds by

1 William B. Stapp, et al, Guidelines for Citizen Action on Environmental Problems (Ann Arbor: ENACT, 1970), pp.1-7.

hand instead of with herbicides; 2) use pesticides only when absolutely necessary and when other alternatives are not feasible; 3) plant mixtures of plants rather than a monoculture; and 4) buy farm products with blemishes. For noise pollution some suggested activities include: 1) making sure one's own appliances and other machinery do not add to the problem; and 2) supporting, or proposing, local noise pollution ordinances.

Besides suggesting these constructive activities, it would be well to provide the names and addresses of several conservation organizations and agencies so that the Scout will have a further source of information and advice. It would also be advantageous to foster the spirit of cooperative activity, getting the Scout involved with others in the drive for environmental quality. Wherever possible, the Scout should be able to present some concrete results to his counselor as the fruit of his activity. They may only amount to pictures or written reports, but at least they will furnish the counselor a more objective means for judging performance, and will provide the Scout with satisfying tokens of achievement.

Commitment and the Problem-Solving Skills

(1) The Objectives

Up to this point the Scout has been gaining some insight into the nature and importance of ecology, and the magnitude of some critical environmental problems. It remains now to instruct him in the techniques he can

use to apply this knowledge and begin solving these problems. Many of these techniques are essentially information-gathering skills that would furnish the Scout with the political, economic, and sociological facts necessary to reach reasonable solutions. This chapter is thus concerned with the development of the problem-solving skills.

(2) Motivational Techniques

At the beginning of this chapter there ought to be a captivating picture, with caption, showing youths engaged in conservation activity (Figure VI). The chapter itself could be entitled "Saving Our Environment". Just before the body of the text should appear a stirring quotation, such as the following: "Action for ecological integrity has to be viewed as a process of endless discovery. To map the terrain, one must cover the terrain. There is no manual ready to guide, only a world to discover."[1] The objectives of this chapter should also be simply stated. For example, "Let us now think about some of the methods we can use to begin clearing up some of these environmental problems." As in the previous two chapters, the attempt should likewise be made here to relate the ensuing discussion to the Scout's own community environment and realm of experience.

In order to set the stage for the introduction of

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1 Ralph Nader, "Introduction," Ecotactics, ed., J.G. Mitchell & C.L. Stallings (New York: Pocket Books, 1970), p.19.

FIGURE VI

Saving Our Environment

Concerned Citizen Action is Needed.

the problem-solving skills, it is desirable to review the concept of ecology, and perhaps to restate it in more vigorous terms. Primary emphasis ought to be placed upon the stewardship that man must exercise over the land. There is no need to delve into great detail; a general type of statement similar to the following would be sufficient:

> There are elements of tragedy in man's abuse of nature and of his own promise. Yet the increasing recognition of America's environmental crisis constitutes abundant ground for hope. There is still opportunity to repair the damaged fabric of life if Americans begin to consider themselves part of the earth's interlocking, interdependent natural system. Americans who learned in the frontier era to 'conquer' nature now need to learn new techniques of cooperating with nature.1

Such sentiments would hopefully evoke the Scout's interest in becoming involved in the campaign for environmental quality. This discussion could be accompanied by pictures showing the dramatic beneficial effects resulting from concerned citizen action.[2] Examples relating to the urban environment should be cited. Throughout this section should run a common thread of argument accenting the crisis we all are facing and the burden of responsible action we all must share.

(3) Youth Involvement

To provide an additional inducement to civic ac-

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1 From Sea to Shining Sea: A Report on the American Environment - Our Natural Heritage (Washington,D.C.: The President's Council on Recreation and Natural Beauty, 1968), p.21.

2 Ibid., p.45.

tion and an illustration of what can be accomplished, the pamphlet must next recite some significant examples of what some youths have already done. Brief case studies of conservation activities would be valuable. Perhaps the most striking example would be a description of the origin, operation and outcome of the National Youth Conference on Natural Beauty and Conservation held in Washington, D.C. on June 26-29, 1966.[1] This conference, representing some 20 million American youth in ten major organizations, was entirely run by its youthful delegates from the very beginning. Convened to consider the role of youth in the recently adopted national program for beautification initiated by the White House Conference on Natural Beauty, it boldly advanced a wide-ranging and imaginative set of proposals for membership action. Conservation education, parks and open space, roadside control, water and waterfronts, air pollution, anti-litter, and city beautification were all subjects of concern. As a result of the conference's deliberations young people throughout the nation have embarked on an ambitious series of environmental action projects. Among their achievements:

> In Greeley, Colo., Eddie Benavidez, 17, led fellow members of his Boys' Club in repairing and repainting underpasses and signs damaged by vandals. The project was supported by law enforcement agencies and the Chamber of Commerce.

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1 A Report to the Nation: National Youth Conference on Natural Beauty and Conservation (Washington,D.C.: Xerox Corporation, 1966), pp.1-36.

> In Bridgeton, N.J., Don LaRue, a 17-year-old Future Farmer, led a project to redevelop a downtown alley as a pedestrian entrance to a shopping area. The project was assisted by the City Council and Chamber of Commerce.
>
> In Mellen, Wis., 16-year-old Arthur Anderson and other members of his 4-H Club worked with the Neighborhood Youth Corps to restore a run-down park in the center of town. Eight adult community groups helped. For years adult groups had considered restoring the park but lacked a catalyst. 1

By presenting such accomplishments as these, the pamphlet could show the Scout that he is capable of making a significant contribution. More than in any other way he could be directly convinced that the conservation movement today does have a place for youth.

(4) Guidelines for Citizen Action

If the Scout is to act effectively, however, it will be essential to equip him with a series of action guidelines, or problem-solving skills. Young people often have the necessary enthusiasm and energy for carrying out conservation activities, but they lack the knowledge of how to organize their time and effort. This has been the experience of many of the participants in the National Youth Conference on Natural Beauty and Conservation. It is therefore important that the Scout be given some instruction in how to go about planning and implementing a conservation project.

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1 From Sea to Shining Sea, p.258.

The following guidelines should prove helpful:[1]

I. DEFINE THE PROBLEM - After making a survey of your community's environmental problems, select one and concisely describe it.

II. BECOME INFORMED - Seek as much information about your problem as you can, political, economic, and social as well as ecological. Know who the influential persons are in your community and how to reach and motivate them. (It would be well here to include a brief discussion of pertinent political and economic principles, such as a review of city government structures, and an explanation of the theory of a common property resource.) Keep your information up to date and try to draw upon as many sources as possible: radio, television, newspapers, magazines, public meetings and hearings, government officials and agencies (local, state, federal), state universities, public libraries, etc.. Firsthand observation of the situation is an especially valuable source of information. It is also well to discuss the problem with those who may take a position different from yours. Not only does this approach give you a broader perspective on the issue at hand, it may also provide the opportunity for an acceptable compromise solution to the problem. In this respect, it is particularly important to work directly with those who are intimately affected by this problem and have an obvious stake in

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1 Stapp, pp.6-7.

its outcome. In order to avoid any jealousy or conflict it would also be advisable to contact persons who have previously been involved in working on the problem. Consolidated efforts are often more effective than individual endeavors.

III. FORMULATE ALTERNATIVE SOLUTIONS - Before deciding upon what plan of action to adopt, you should investigate all the possible courses of action that exist. Then select the one that is most consistent with the public welfare, your objectives, and your capabilities.

IV. DEVELOP A PLAN - When selecting your plan, think big. Select the plan that is best able to do the job. It should include a time table for the various phases of your project, so that your time can be budgeted to best advantage. You should also compose a list of influential persons to be contacted and decide upon the means you will use for obtaining public support, such as: letters to the editor, editorials, newspapers, radio and TV announcements and documentaries, panel discussions, public meetings, handbills, and organized speaking tours. A financial budget would also be needed. If you are working with others, each person should have his own specific duties and committee assignments.

V. IMPLEMENTATION - Now you carry out your plan of action. Stick with your objectives, and be willing to modify your program in order to meet them. Once the project is completed you must be prepared to assume any

maintenance responsibilities. Finally, it would be useful to make an overall evaluation and assessment of the merit of your project, indicating your strengths and weaknesses. This would serve as a practical reference for any future projects you may undertake.

Presenting these guidelines alone, however, would be inadequate. There ought to be also some discussion of the problems and opportunities the Scout could encounter in transacting his project. Why, in other words, have some youths failed in their efforts? The following points would be worthy of mention: 1) uncooperative and uninterested city officials, 2) jealousy and rivalry from other conservationists, 3) public apathy or opposition, 4) vandalism of your project, 5) loss of enthusiasm and a lack of care in carrying out your project, and 6) a failure to continue an ongoing project. Too often the adult world is more concerned with telling young people what to do rather than with listening to their opinions. It is important to convey to the Scout some sense of these difficulties that may hinder his progress. But it is more important to make him realize the tremendous opportunities for service that are available. The rewards in terms of public acclamation and personal satisfaction should be forcefully expressed. It should also be pointed out how cooperative most people actually are when asked for advice or assistance in performing a public service. The more precise the Scout's comprehension of social realities, therefore, the greater his chances for success.

(5) The Conservation Project

The only requirement in this chapter will be that the Scout utilize the problem-solving skills outlined above to carry out at least one major conservation in his own community. The project should be of his own choosing, and would not necessarily have to be selected from suggested projects in the pamphlet. The Scout should also be encouraged to work with other individuals. The projects suggested in the pamphlet should be of the following nature:

> Find a dirty hillside, creek, canyon, beach, or roadside. (You won't have to look far.) Tell the landowner you're going to clean it up. Call the ... newspapers, TV, radio, and tell them what you're doing. Call the city refuse collection department. Ask how to recycle the various types of waste you expect to collect. If it can't be recycled, why not? If it can, separate the garbage into piles of paper, glass, aluminum or tin cans, plastic, scrap iron, etc. Are any of the containers returnable? Why not? Where does the refuse collection department take the solid waste materials it picks up? Where does this waste wind up? In the air above an incinerator, or buried in a marsh? (Disseminate your information to your community.) 1

Some other possible activity areas could be: 1) Designing and implementing a beautification plan for an abandoned lot, 2) Taking an inventory of local polluters, appraising their impact upon the environment, and initiating corrective measures, 3) Carrying out a wildlife improvement project, 4) Conducting a community-wide

1 From Ecotactics, pp.255-256.

campaign to reduce litter, 5) Promoting citizen restraint in the use of various resources, and 6) Establishing a local community youth center for environmental action. Before embarking on his project, the Scout should discuss it with his counselor. He should be encouraged, however, to think big and to settle upon a project that will really make a lasting and significant contribution to his community.

When the project is under way, the Scout should constantly communicate the information he gathers and his progress to the public via radio, TV, papers, etc. Public support should be sought continuously. After his project has been completed, the Scout should write up a report on it in order to receive his merit badge. This report will function as a permanent record of the Scout's venture, and if published could stimulate other endeavors on behalf of environmental conservation. The local community newspaper would be an excellent place to seek publication. In fact, it may be a good idea to require that the Scout have his article printed in the paper. Most papers usually do have columns reserved for Scouting news. This would be an effective way to publicize his activities, and would instill in the Scout a sense of accomplishment and pride in a job well done.

Summary

The task of revising the Conservation Merit Badge Pamphlet is thus viewed as having two objectives. The

pamphlet must first enlighten the Scout about his environment, politically and socially, as well as ecologically. Secondly, it must provide instruction in the steps that can be taken to solve the problems encountered. The preceding pages have developed suggested guidelines for meeting both these objectives.

CHAPTER V

SUMMARY

This thesis has been concerned with the need for modernizing the Boy Scout Conservation Merit Badge Program. In chapter one a new, more dynamic concept of conservation and its applicability to Scouting was discussed. Conservation today has been recognized as vitally involved with ecology, environmental quality and citizen action. These same characteristics were shown to be important to the Scouting Conservation Merit Badge Program with respect to the Scout's own environment, his interests, and the nature of the Scouting philosophy.

In chapter two appeared a discussion of the appropriate learning theory to be employed when revising the merit badge pamphlet. Emphasis was placed upon revitalizing the teaching approach by stressing the role of personalized presentations, direct experience, and problem-solving activities. It was further asserted that whenever possible the Scout himself should be relied upon to provide the initiative for learning behavior. The ultimate objective of the pamphlet was not

to force the Scout to memorize factual material but to encourage him to become involved in today's conservation issues.

Chapter three detailed the strengths and weaknesses of each of the 16 chapters in the current Conservation of Natural Resources Merit Badge Pamphlet, in terms of the conservation and education criteria outlined in the preceding two chapters of this thesis. From the standpoint of conservation, the present pamphlet was found to be much stronger in emphasizing ecological concerns than environmental quality and citizen action. Environmental quality problems were generally not considered to be very serious, and little confidence was expressed in the ability of individual citizens to do anything significant. The pamphlet did, however, show how resources and man are interrelated, but its conception of ecology was limited, generally ignoring the urban implications. Also, the teaching technique utilized was considered to be uninspiring and too conducive to rote memorization and superficial learning. Greater emphasis upon direct experience and the problem-solving skills was recommended.

In chapter four appeared a set of guidelines for revising the merit badge pamphlet. These guidelines met the criteria established in chapter one by recognizing the necessity for a broader interpretation of ecology, an urgent concern for environmental quality, and a steadfast dedication to individual commitment. They also satisfied

the requirements of chapter two by employing the techniques of personalized presentations, direct experience, and problem-solving behavior. The suggested activities reflected the new, more urban and problem-solving orientation of the proposed revision. The activities in the current pamphlet were found to be too agrarian and not really concerned with crucial environmental problems. They did not stimulate the Scout to use his initiative and to engage in conservation activity on a continuing basis. The activities in these guidelines, however, such as the delittering project and the environmental action center, were especially chosen to inspire the Scout to become totally involved in conservation work, to approach it from a sociological, political, and economic viewpoint as well as a scientific and technical perspective. The aim was to stimulate the Scout to contribute significantly toward the improvement of the quality of his environment. The main assumption underlying the development of these guidelines has been that the Scout must first be introduced to the facts and principles about his environment and its problems before he can be exposed to problem-solving methods and participate effectively in the search for a quality environment.

In order to implement these guidelines it is necessary that they be brought to the attention of the Boy Scouts of America in an efficient manner. There are three organizations within Scouting's administrative frame-

work that should be contacted. They are: The Forestry and Conservation Advisory Panel of the National Standing Properties Committee; the Conservation SubCommittee of the National Standing Program Committee; and the Camping and Conservation Service of the Program Division of the National Professional Staff.

A copy of the thesis with a covering letter should be sent to these committees through a definite channel of communication. This would facilitate its acceptance by gathering support from each level of authority. To start the process it would be desirable to request the opportunity to present the thesis in person before the local Portage Trails Council. From there these guidelines should be sent to the Regional Executive for Region 7, to the office of the Chief Scout Executive, to the Program Division, and then to the Camping and Conservation Service where it will be transferred to the Director of Conservation and to the other two organizations for their recommendations. Endorsement of the thesis and letters of support from Scout leaders along the chain of command and by noted conservation authorities would enhance its chances of acceptance. The author should also offer to make himself available for any consultations that may be necessary.

These guidelines could also probably be useful for the revision of other merit badges. There are certainly others to which the problem-solving approach would be applicable, such as agriculture, botany, business, citizen-

ship in the community, forestry, nature, public health, wildlife management, and zoology. The merit badge system needs to promote the Scout's active involvement in his community, and the problem-solving techniques discussed in this thesis would be an excellent model to consider.

When actually revising the conservation pamphlet along these guidelines, a few more words of advice may be in order. It would first of all be highly beneficial to go to the Scouts themselves and ask them what they think ought to be included in the merit badge program. This could be accomplished through a sample survey of those Scouts who presently hold the merit badge, or by means of a sampling of all Scouts eligible to enter the program. All reasonable steps should be taken to insure that the Scouts , and perhaps even the boys eligible for Scouting, are given the opportunity to contribute substantively to the new revision.

In additon to consulting the Scouts themselves, it would be well to solicit the services of environmental education specialists. These people would be able to offer expert assistance in the development of an effective pamphlet. They are to be found in many of the larger universities and in state departments of public instruction, and are more than eager to help the cause of conservation education.

After a program has been tentatively developed, it should be tested to insure that its objectives are being

fulfilled. A group of volunteer Scouts could be used for this purpose. Feedback from this testing should be incorporated into the further refinement of the pamphlet program, and the testing repeated until a satisfactory program is achieved.

The finished product, however, should not be considered the ultimate result. A policy of regularly reviewing, scrutinizing, and renewing the merit badge pamphlet should be initiated. This could be undertaken by the Director, or Assistant Director, of Conservation in the Camping and Conservation Service of the Program Division. It could also be the responsibility of a group of selected experts, outside of professional Scouting, to review and to update the pamphlet. Whoever does review the booklet should be intimately acquainted with the current trends in conservation, and sufficiently capable of communicating them to young people. Without this recurrent updating the merit badge pamphlet would certainly fail in one of its principal objectives, namely, keeping young persons informed and involved in what is perhaps the most pressing issue mankind has yet faced - the struggle to save his environment.

Revising the Conservation of Natural Resources Merit Badge pamphlet is therefore a very critical affair, and never has the need for a thorough revision been so great. We must have concerned and involved citizens in order to win the fight for the preservation of the environment. The

challenges facing man are serious, and they are growing every day. The dynamic range and depth of today's conservation movement must be faithfully conveyed to Scouts if we are to enlist their energies in the struggle. It is hoped that the proposals and comments presented in the preceding pages will be of value in meeting this obligation.

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APPENDIX I

REQUIREMENT 1 FROM 1912 CONSERVATION MERIT BADGE

"Be able to recognize in the forest all important commercial trees in your neighborhood; distinguish the lumber from each and tell for what purpose each is best suited; tell the age of old blazes on trees which mark a boundary or trail; recognize the difference in the forest between good and bad logging, giving reasons why one is good and another bad; tell whether a tree is dying from injury by fire, insects, by disease or by a combination of these causes; know what tools to use, and how to fight fires in hilly or in flat country. Collect the seeds of two commercial trees, clean and store them, and know how and when to plant them."

APPENDIX II

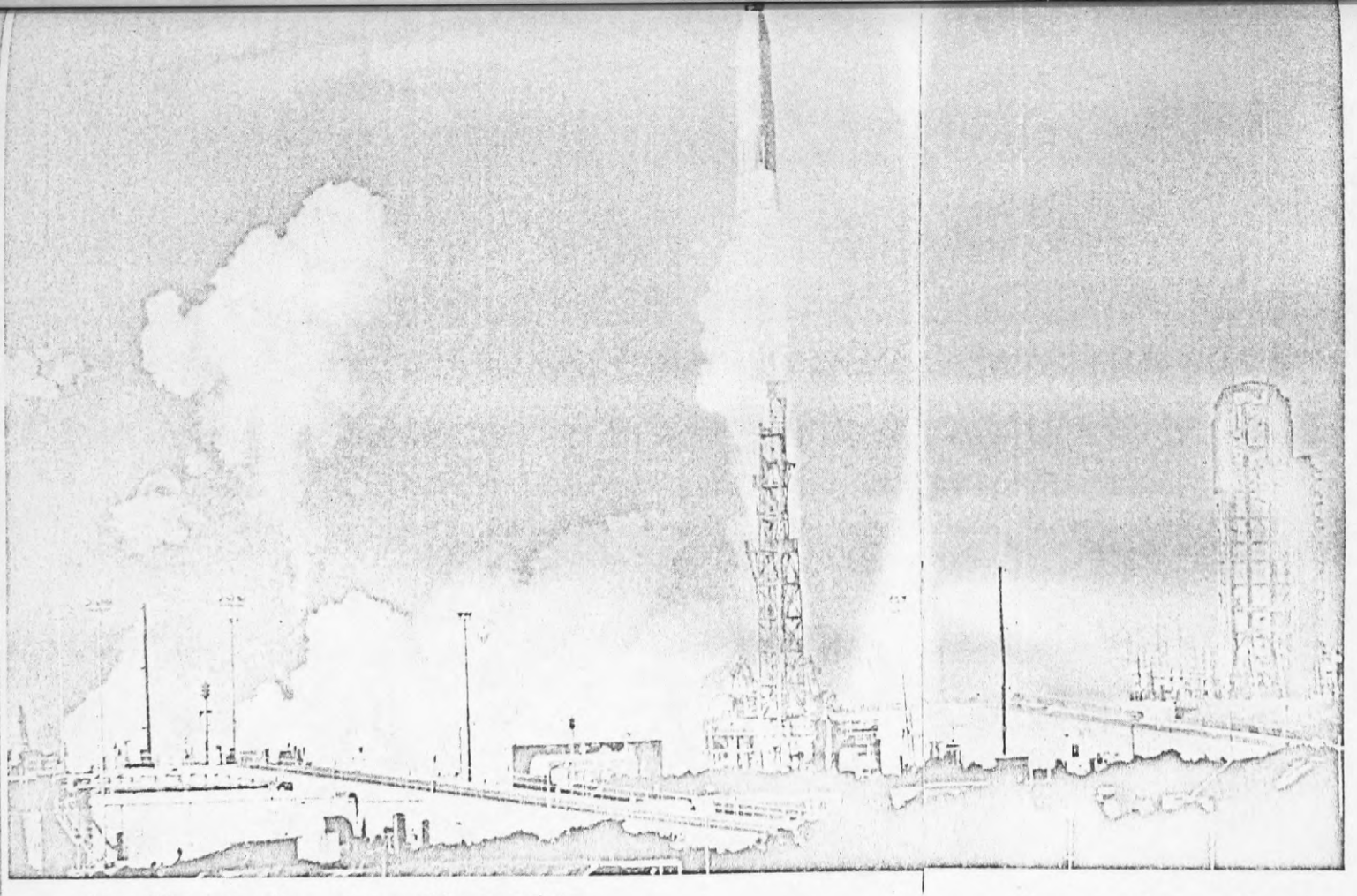
FROM THE 1942 MERIT BADGE PAMPHLET

"Because conservation problems are tied together in this way, each one of us must do his part, however small, to restore and maintain nature's balance. Every farmer and private owner of land has the responsibility of seeing that his property is wisely managed, both because this will bring him the greatest returns, and because it guards the rights of other men and future generations.

If you love wildlife and are expert in the ways of nature, you will help guard America's woods, fields, streams, and marshes, the birds and animals and fish that you have learned to know. For we understand now that conditions which destroy the natural environment of birds and fish and animals are the same conditions which destroy the resources on which depend the happiness and prosperity of man."

APPENDIX III

THE MERIT BADGE PAMPHLET



Many different mineral resources are used in a space shot.

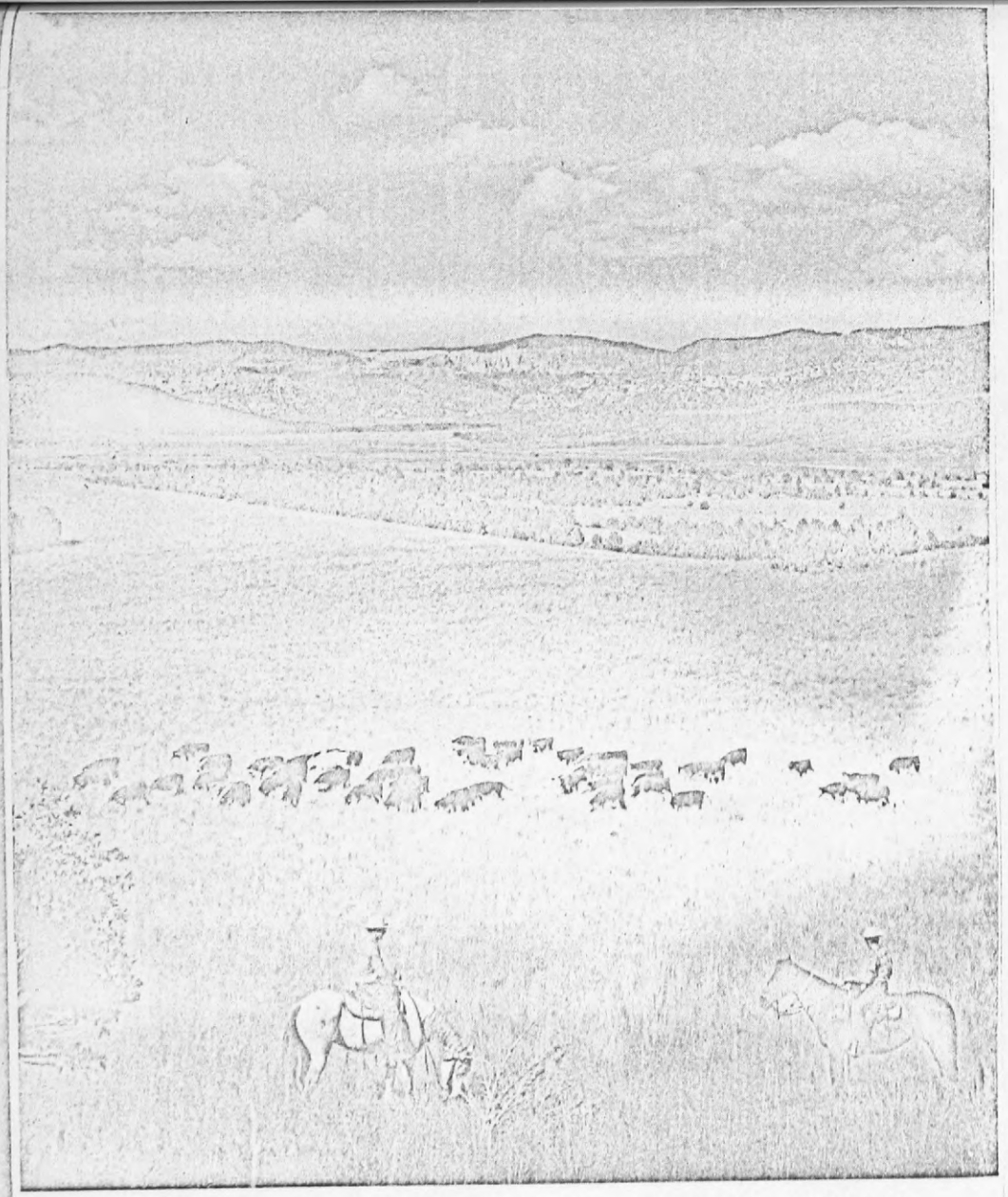
The next time you hear of a new satellite being launched at Cape Kennedy, the next time you see vapor trails in the sky, left by jet planes flying faster than the speed of sound, the next time you read about preparations to land a man on the moon; stop for a moment and ask yourself this question, "Would all this be possible were it not for the natural resources of the earth?"

The next time you eat your dinner or ride in an automobile, the next time you press a switch to get light or heat, the next time you look at your favorite television show; stop for a moment and think, "Would I be doing these things if it were not for the natural resources of this great country of ours?"

Satellites or jet planes are not made of raw materials from outer space. Astronauts do not eat food grown in outer space. Like your food, clothing, heat, and television set, theirs, too, as well as all the raw materials in their rocket and capsule, come from the resources of the earth.

We live in the space age, but we still depend on the earth's air, soil, water, fuel, minerals, plants, and animals for everything we have.

We live in the strongest nation in the world. We are proud of our heritage as a democracy. Our prosperity, our strength, and our astonishing scientific accomplishments are due in a large part to the abundant resources of our country. We will continue to be strong and prosperous only as long as our natural resources are productive and we and many generations yet to come all do our part to use them wisely and improve their quality.



Grasslands are a very important renewable natural resource.

Our natural resources

1a Define the terms "conservation," "renewable natural resources," and "nonrenewable natural resources" and give three examples of each.

1b State five examples to show how our natural resources are vital to the strength and welfare of our country.

Air

Air is one of our basic natural resources. Life on earth would not be possible without air that is composed of nitrogen, oxygen, carbon dioxide, and other gases. We need the oxygen in the air to breathe. Green plants in the presence of sunlight use carbon dioxide from the air. Some plants take nitrogen from the air and add it to the soil.

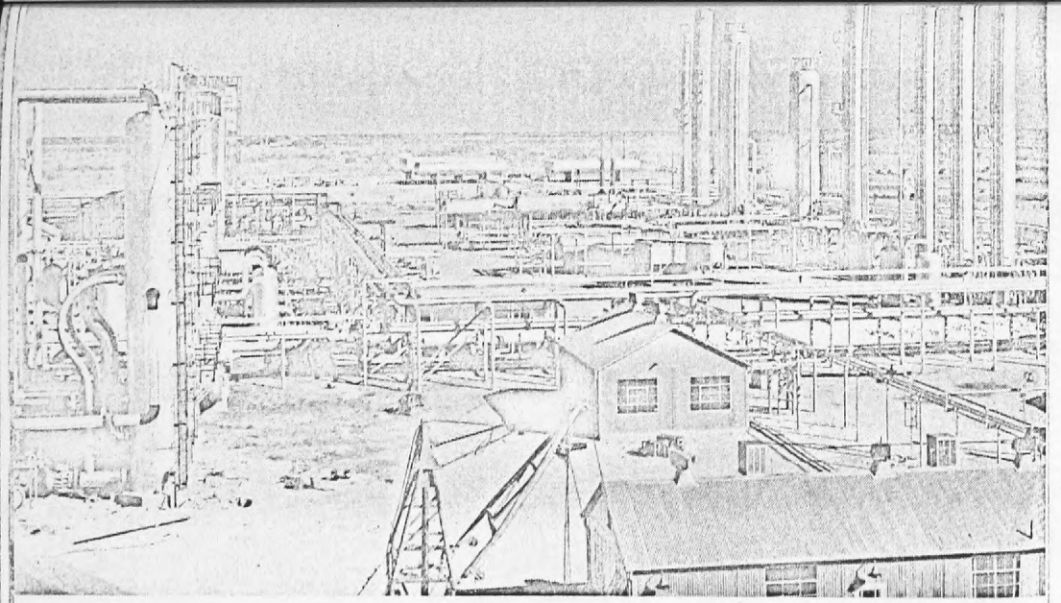
The air in our atmosphere filters the hot rays of the sun and thus keeps the earth from becoming too hot. Air in motion becomes *weather*, with its rain, snow, sleet, and other forms of precipitation that provide us with water—another basic natural resource.

But air is useful in other ways, too. It is an important raw material of some plastics and is used in many different manufacturing processes.

Air pollution is becoming an increasingly serious national problem, as we shall see later.

Water

The importance of water as a natural resource can be illustrated by the fact that we use some 270 billion gallons each day in the United States. That does not count the billions and billions of other gallons used in hydroelectric plants to produce electric power. The average family of four people uses between 250 and 300 gallons of water daily for household purposes. One of the reasons we are a great industrial nation is because of our supply of water—water used to produce power, water used in many different manufacturing processes, and



Mineral resources like petroleum are not renewable.

water used for inexpensive transportation.

All of our agricultural crops demand water, and many of them are supplied with water through special irrigation systems.

Each year millions of people flock to ocean, lake, or stream to find healthful relaxation in fishing, swimming, and boating. Some of our waters are tremendously important as sources of food.

But water, too, poses a national conservation problem that we will examine more closely later on.

Mineral Resources

Our abundant mineral and fuel resources are vital to the strength of our country. Natural gas, oil, and coal provide us with power—power to operate factories, power to move jet planes and diesel engines and family automobiles. Our fuel resources heat our homes and produce the power to cool them in hot weather. Some 116 billion gallons of crude oil and 430 million tons of coal are used as fuel each year in the United States.

That amounts to 580 gallons of oil for each man, woman, and child, and more than 2 tons of coal for each one of us.

Our mineral resources—from iron, aluminum, copper, nickel, zinc, and lead to gold, silver, platinum, and molybdenum—have all played a very important role in making this country what it is. Just look around your home, your schoolroom, your community, to see how many commonplace things had their origin in mineral resources.

But these resources, too, are a conservation problem. Right now, we are dependent on other countries for such minerals as copper, lead, zinc, tin, iron, chromium, bauxite, and manganese.

Soil

It is a little frightening to think that a very large part of our food comes from a rather thin layer of topsoil covering our country. For not only do grains and vegetables depend upon topsoil for growth, but our milk, eggs, cheese, meat, wool, and leather come from animals that eat plants that, in turn, need topsoil to grow.

But there is one comforting thought. With the right kind of conservation practices, soil can be built up and restored. Soil can produce food and fiber each year and in the process be improved.

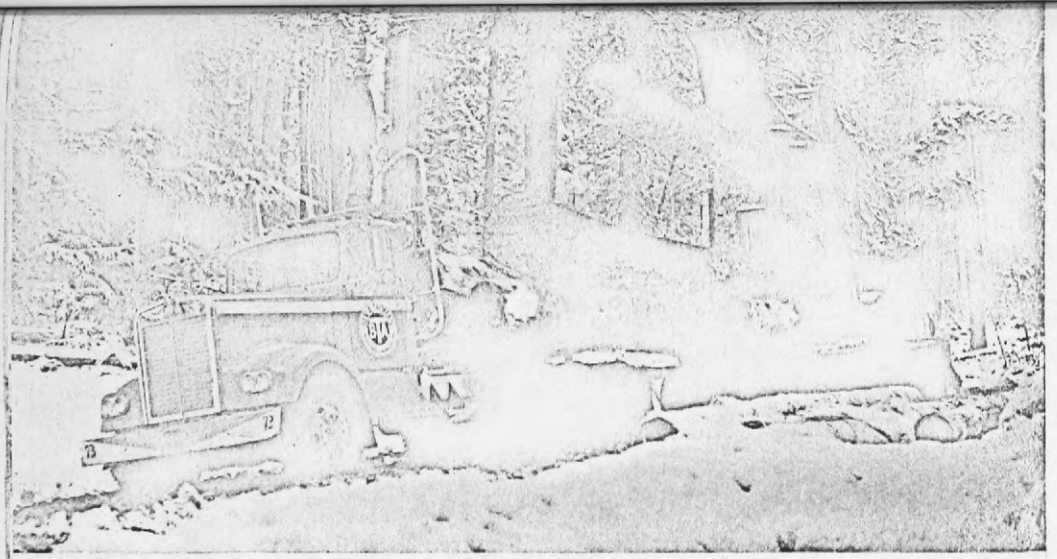
Soil is one of our renewable natural resources. Air, water, animals, and trees and other plants are also renewable natural resources. They can be restored to produce the things we need, and their quality can be improved in the process.

On the other hand, nonrenewable natural resources, once they are used up, are gone forever. A gallon of gasoline, once it goes through the engine of an automobile, cannot be reclaimed. Mineral resources are nonrenewable natural resources. They are available for use in certain quantities. The conservation job is to make that quantity go as far as possible and to take the best possible care of things made from mineral products. Another answer, in part, is providing substitutes such as plastics.

Plant Life Resources

Plant life resources are vital to us in many ways.

The crop plants, grown by farmers on approximately 15 percent of the total land area of the United States (2,271,000,000 acres), furnish us with most of the food and much of the fiber we need. These croplands also support a wide variety of wildlife by providing food and cover. These lands on which crops are grown annually must be used carefully and cared for properly if the soil and water resources from which plants grow are to remain productive.



Forests provide thousands of important products.

The vast forests that cover our land provide us with thousands of useful and important products from lumber, paper, plastics, and explosives to resin, turpentine, and food. Aside from that, they are important in watershed protection, catching the rain and enabling it to soak slowly into the ground to replenish our vast groundwater reservoirs. Forests provide homes for many kinds of wildlife and are important for hiking, camping, and other kinds of healthy outdoor recreation.

Our grassland resources are vital, too, for from the prairies come much of our food and clothing. Beef, lamb, wool, and leather come from the animals that graze on the country's grasslands.

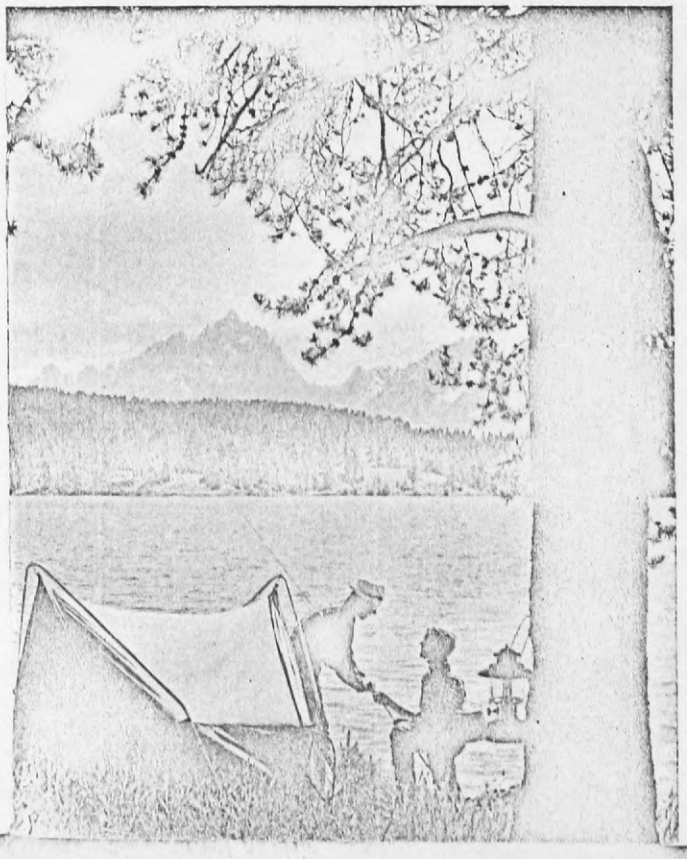
Forests and grasslands are renewable natural resources. Trees may be cut and the rangeland grazed, but with the right kind of conservation planning they will be productive forever.

Fish and Wildlife Resources

Our fish and wildlife resources are important in several ways. The rabbit, deer, and quail and the bass, trout, and flounder provide many millions of hours of healthful relaxation each year for hunters and fishermen, who spend billions of dollars in pursuit of their hobbies. These same animals supply a substantial amount of food, too, for those skilled enough to harvest them.

Other animals, such as the menhaden, are the basis of many million dollar industries. The menhaden, a small bony fish, is netted on the Atlantic and Gulf coasts for its oil which is used in paints, cosmetics, chicken and cattle feed, and other products.

Still other animals provide fur, and many, such as shrimp and oysters, provide food. All animals are important in one way or another as parts of our own living community. Conservation is wise management of a natural resource to provide high, continuous yields contributing to our own national well-being.



Our national parks preserve wilderness areas for recreation.

Carelessness destroys thousands of acres of timber yearly.

How Resources Are Related

1c Give three examples to show how our resources are interrelated.

There is no question that our natural resources are vital to our own individual lives and well-being and also to the strength and welfare of our country. Now let us see how these resources are closely interrelated.

Many of our conservation problems have arisen because man has not understood or has almost completely disregarded these interrelationships.

A forest fire on a timbered mountainside destroys more than lumber or so many cords of pulpwood. It also destroys the food, cover, and nesting sites for wildlife so that these animals must die or move away.

In addition, the soil protection is gone, and heavy rains may wash ashes and silt into a stream or river. This may make the water unfit for fish. Also, with the plant cover gone on the watershed, the stream may flood during wet seasons, and it may dry up or get too low and warm for fish during dry seasons. The floods may destroy property downstream, or fill in the stream with silt so that it is too shallow. The silt may also cover fish eggs and prevent their hatching.

Upsetting Nature's Balance

A classic conservation story that illustrates interrelationships took place in the north rim of the Grand Canyon in Arizona in the early 1900's. This area had long supported a herd of deer. Living in the forest also were wolves and mountain lions that ate the deer.

In 1906 all hunting in the area was prohibited by law, and at the same time Government hunters were sent in to kill those animals that might eat deer. Thus, the deer were protected against both natural enemies and man.

The deer increased. There were some 4,000 deer in 1906,

After the fire comes erosion.

and by 1924 the herd was estimated at 100,000. This was more than the land could support. The deer literally ate themselves out of house and home, and by 1924 and 1925 deer were starving to death by the thousands. One writer described the forest as looking as if a swarm of locusts had eaten every leaf and twig and growing thing in it.

Many sportsmen believe that hawks, owls, foxes, coyotes, and other meat-eating animals are responsible for low numbers of game animals such as quail, pheasants, or rabbits. They concentrate on removal of as many predators as possible so that game populations may increase.

But in the process, rodents upon which the predators depend for a large part of their diet begin to multiply. The increase in rodents causes problems for farmers. The mice not only eat large amounts of hay, grain products, and other crops; but in places where fruit orchards grow, they eat the bark of fruit trees and thus kill the trees. There are many other examples

of damage by rodents amounting to thousands of dollars after a concentrated effort to kill off the predator population.

Understanding the interrelations of air, soil, water, plants, animals, and their environment is essential to a full understanding of conservation problems and their solution.

A silted stream results from soil erosion.

Soil conservation expert measures soil depth and quality.

Managing Our Resources

2a Explain what is meant by "resource management."

Resource management means planning and establishment of conservation practices and measures on the land that will assure continuous productivity of valuable plant and animal life and an adequate supply of good water. Such practices should also improve the quality and quantity of renewable natural resources.

Soil is the basic renewable resource. The proper soil is needed by most plants, and all animals need plants for survival, either as direct food or, in the case of carnivorous or meat-eating animals, to feed those animals that in turn become food. Plants also provide many kinds of wildlife with the shelter they need.

Plants help rain to percolate into the ground, maintaining the groundwater supply, and they protect the soil by preventing rapid surface runoff of rainwater that causes soil erosion.

The soil provides nutrients for streams and ponds, and these nutrients enrich the water so fish and other aquatic life will multiply and flourish.

Our Living Soil

How can the soil resource be managed—what can we do with this ground we walk on to make it more productive for the longest possible time?

Men who are charged with the responsibility for managing the soil resource—called soil conservationists—know that soil is alive. This uppermost layer of the earth's crust is literally crawling with tiny animals, most of which can be seen only with a microscope. There are also many small worms, grubs, and other creatures that you can see and feel when you scoop up a handful of ordinary soil.

All of these little animals are busy breaking down the plant and animal matter in the soil—releasing nutrients to make the soil richer—so it will grow more

Large gullies can be controlled with proper conservation practices.

plants that will then support more animals. And so it goes—year after year, century after century—unless man in his ignorance interrupts the cycle. The living soil becomes sick when the natural processes are interrupted.

Suppose a farmer plants the same type of crop in one field year after year. Eventually, the particular type of crop being planted will use up most of the nutrients it needs, and the soil will no longer be able to produce as it once did. To remedy such depletion of fertility usually requires adding organic or chemical fertilizers such as manure, lime, phosphorous, and other nutrients; somewhat like doctors giving vitamins or minerals to humans when they become anemic.

Of course, the best idea is to prevent such problems in the soil. Rotating crops, as most farmers do, will replace some nutrients while others are being used. Sometimes not farming a particular field for several years will allow it to recover much of its former richness.

Checking Erosion

Erosion is one of the greatest enemies of soil and, therefore, of all renewable natural resources. Water that runs off the land at too rapid a pace will carry soil particles along. If allowed to go unchecked, this washing action will produce deep gullies. And, unless there is some protective plant cover for the land, hard winds may blow tons of valuable topsoil away.

Gullies can usually be prevented on cultivated lands by farming on the contour. This means plowing in such a way that a furrow will be at about the same elevation from one end to the other. When land is carelessly plowed so the furrows run up and down the hills, they become natural runoff channels that allow erosion to begin. On the other hand, contour farming or plowing across the slope of the land slows down the runoff and allows it to soak into the soil.

After a gully starts, piling brush in it will slow down the runoff and serve as an anchor for vines and other vegetation that can be planted to hold the remaining soil in place. Small dams can be built to hold back the water and let sediment settle out. Unfortunately, only mechanical means such as filling in with soil from somewhere else will effectively cover such scars, and thousands of years may be required to completely undo the damage.

Wind erosion is particularly serious in some areas of our country. In the Great Plains, extensive farming operations and the lack of trees or hills to slow down the wind create conditions where wind erosion can do much damage. Leaving stubble in the fields, strip farming, or planting trees as windbreaks or shelterbelts will help hold the wind erosion down to a minimum.

Water Management

Water is perhaps our most vital resource and no civilization can long survive without proper water management. Many historians say that ancient Babylon fell because the canals that carried water from the Euphrates River filled with silt.

The rainfall that replenishes our water supplies does not fall uniformly throughout the Nation. Some areas such as the rainforests of the Pacific Northwest may have more than 100 inches of precipitation a year, while desert areas may receive less than 5 inches.

In many parts of the Nation, particularly in the Great Plains, people depend primarily on wells for their water supply. Even large cities sometime take most of their needed water from deep wells. Unfortunately, the groundwater resource is being used faster than it is being replenished in some areas.

It has been estimated that one-half of the Nation's rainfall evap-

Even small dams help to protect our water resources.

orates; one-sixth is surface runoff through streams; one-sixth is used and transpired back into the atmosphere by plants; and one-sixth percolates into the ground to join the vast underground reservoirs.

Basically, the rain that runs off the land finds its way to the sea by surface or underground drainage. Nearly two-thirds of the precipitation that falls on the land either evaporates or is transpired by plants back into the atmosphere. From the sea, moisture is drawn back into the atmosphere by the heat of the sun where it again forms clouds that eventually deposit their cargo back into the ocean or over land.

Man actually manages less than 10 percent of the total supply of water that falls as rain, sleet, and snow.

Water Resource Specialists

Management of the water resource includes many specialized professions. A water chemist in a modern sewage disposal plant is a water manager because he must see that the discharge from his plant is as clean as he can make it in order not to pollute rivers and streams. An irrigation engineer manages water in his work of providing this vital ingredient for arid farming lands. Farmers who try to prevent a speedy runoff of water from well-drained land are managing this resource as are those who put in drain tiles to carry excessive water away from poorly drained croplands.

The objective is to manage the water resource for man's long-range benefit. How this objective is accomplished requires measures fitted to specific situations. One thing is certain: Our nation faces a shortage of usable water in the not-too-distant future, and all of us must learn to manage this resource wisely or we may fall as did ancient Babylon.

The Value of Forests

When the early colonists first settled along the eastern shores of our continent, they recognized the value of the vast forests they found. Here were timbers for shipbuilding, tall trees for masts, logs for homes and fuel, and nuts and fruits to eat. In many areas, however, the forest was a nuisance that had to be cleared in order to farm the land.

Forests provide us with many products that are vital to our way of life. This page you are reading was made from wood pulp. Wood to build houses and make fine gunstocks, boats, and furniture; turpentine to thin paints; the maple syrup you like on hotcakes; and many other products come from forests.

Forests have other values that are not so obvious. Many of our wild animals need forests for shelter and food. Forests act to slow down surface runoff, and this helps keep streams clear as well as helping to provide a continuous water supply. Forests are also valuable in controlling soil erosion and as grazing lands for sheep and cattle.

Multiple-Use Management

National forests are now managed on what is called a multiple-use basis. This means that consideration is given to timber harvest, grazing, watershed protection, wildlife, recreation, and other uses. In some places, of course, one kind of forest use may be so important that all other uses are subordinate. An example might be a forest whose primary function is to protect a watershed that supplies water for a large community. It's possible that timber harvest, grazing, or other uses will damage this watershed, so these practices might be forbidden. This would represent sound forest management.

In most cases, however, all these various forest uses can be permitted. Commercial lumber-

Clearing brush to raise food plants for wildlife.

ing activities in a forest open up areas to the sunlight, and this allows the growth of low-growing plants that are valuable to wildlife, especially deer. Taking out a certain number of trees can, in some situations, increase the amount of usable water. When snow or rain hits the forest canopy, some will evaporate. As it sifts, melts, and drips down to the ground, more will evaporate. Cleared spaces in the forest floor that allow more precipitation to fall directly on the forest floor slow down this evaporation. On the other hand, too much timber cutting in certain types of terrain may permit rapid runoff and erosion, because some trees help to hold the soil in place and allow the water to soak into the ground.

Scientific timber harvests on commercial forest lands of the United States are meeting today's needs for forest products, and there is a favorable timber balance. However, many conservationists are concerned for the future. Our human population is growing rapidly, and this means that more forest products will be needed with less land to grow them on. To meet this challenge, managers of the forest resource are seeking to make better use of timber products so nothing will be wasted. They are planting millions of trees each year and looking for better ways to control forest fires, harmful forest insects, and tree diseases.

Our Wildlife Resources

Wise management of all the resources discussed so far is of direct benefit to fish and wildlife. Actually, you have to manage those things that affect wildlife—the plants they eat and that hide them from enemies and the streams and other water areas they must have. Most of all it requires "managing" those people who can have the greatest effect on fish and wildlife. They are the developers who want to build houses on every plot of land without leaving open spaces for wild creatures; farmers who "clean farm" so there are no brushy fencerows, woodlots, or brush piles; and hunters who take too much game—or in some cases, not enough.

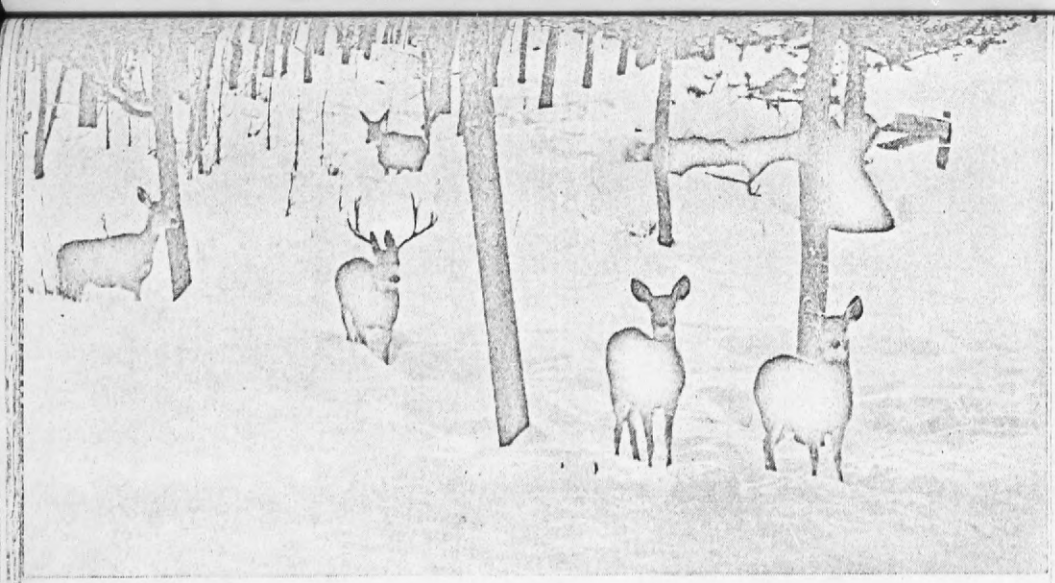
Wild animals are products of their environment. Their numbers and the condition of individuals depend ultimately upon soil and water, and the resulting pattern of vegetation. However, man has now altered the face of the earth to the point where his activities have become the factor that limits the well-being of all living things, including himself.

Since managing wildlife means managing their habitat, it is obvious that present and future numbers of the earth's creatures depend largely upon land-use practices. Supplies of game and fur should be considered important in the plans for agriculture, forestry, grazing, and other kinds of land management.

This relationship between land and wildlife has not been widely recognized. Many game management plans continue to emphasize such things as artificial stocking or predator control, rather than the more beneficial course of improving living conditions for wildlife. Most attempts to increase or decrease the numbers of specific animals by "direct" methods have been costly and leave little to show for the effort.

Studying, Persuading, Doing

Any project to improve the situation for a particular species of wildlife should go through three stages. The first of these involves studying the animals to find out what needs to be done—this is called wildlife research. The second stage is to convince the public of these needs, because without public support, under our democratic system of government, little can be accomplished. Usually if a planned project is clearly explained through news-



Deer populations can be too great for winter food supply.

papers, radio, TV, public meetings, and other means, people will understand and go along with the plan. Then all that's left is the third stage—the doing or management phase that puts the research findings into effect.

A classic example is management of our most popular big game animal – the white-tailed deer. In many parts of their range, there are too many deer. This may sound surprising to hunters who can't find one during the hunting season, but it's true. Each winter, thousands of deer may die from starvation because their range is too poor. On the surface there might be several ways of solving this problem, but researchers have found that only one method will do the job—the deer population has to be reduced.

What is the best system of cutting back the deer population so the range will carry healthy deer through the harsh winters? Biologists know that one male deer (buck) can mate with many does. Shooting many bucks will not do the job because the remaining bucks will mate with all the available does and the population the following year will still be too large for the land.

The best solution is to shoot the does during the hunting season, but many hunters and the public at large don't like this. It's perfectly acceptable to shoot female quail, female ducks, female rabbits, and female squirrels—but many people see red when the idea of shooting female deer is mentioned.

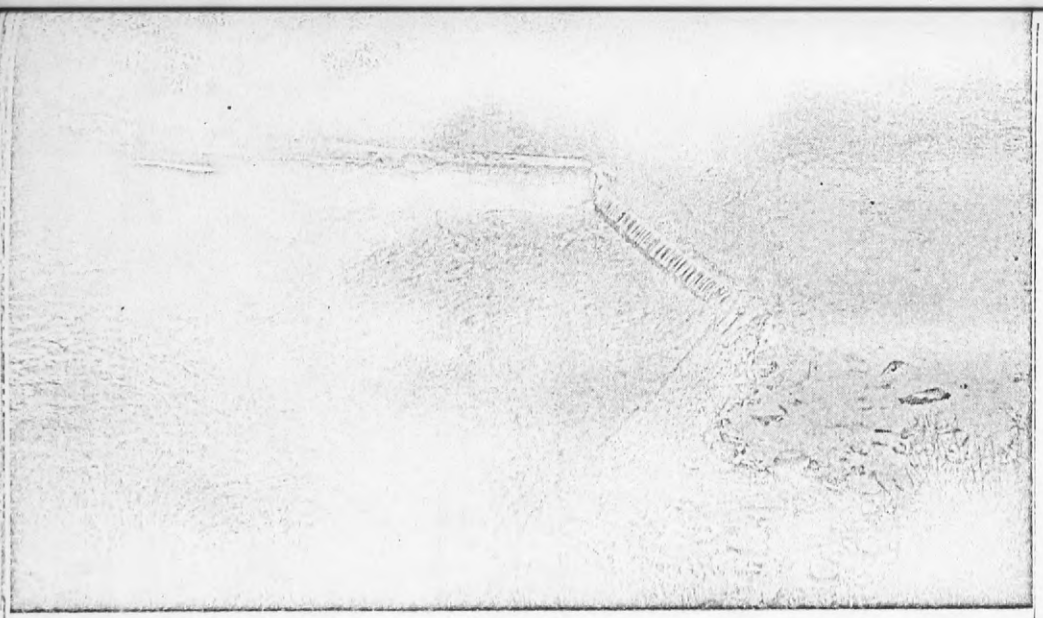
People find it difficult to believe that shooting the does will actually produce better deer hunting. Here's how it works. Shooting a number of does quickly reduces the deer herd, now and indirectly the following spring when fawning time arrives. A smaller herd allows succulent plants that have been overbrowsed to recover so the range begins to improve. With a lower population and an improving range, the deer will be healthier and better able to survive the winters. Healthy does frequently have twin fawns, and there will still be enough deer for the hunters in the fall. With sound hunting regulations, the kill of deer will take animals that would probably die during the winter and the remaining animals will have an easier time of it. Hunters will be able to take more deer, the range will be improved, and the deer themselves will be in much better shape.

This is a tough package to sell the public; but, in places where doe hunting (sometimes called antlerless deer hunting) is allowed, it has paid off. After a concerted campaign through newspaper stories, TV appearances by deer biologists, and other means of reaching the public, a doe hunting season can be planned based on how much control the deer population needs. Perhaps a full-length antlerless deer season is needed, or the necessary control might be possible through 1 week of doe hunting near the end of the regular season. This way hunters who haven't been successful in shooting a buck can perhaps collect a doe before the season ends.

Managing Land for Fish

Freshwater fishery resources are also dependent to a great extent on how well the land is managed. Streams that are full of silt, deposited there by surface runoff, are not suitable for the more desirable kinds of fish. Where there is little vegetational cover on the land, streams usually run high during the spring and go practically dry in summer, and such waters usually get too warm during the low-water periods for fish that require cooler temperatures.

There are some direct things that can be done, however, to improve streams and lakes for fish. Sometimes a farm pond or larger lake will seem to produce only



Small check dam improves fishing.

small fish. More often than not, the problem is one of too many fish of certain species, and overcrowding prevents them from getting enough to eat.

Fish differ decidedly from birds and mammals, because they are cold-blooded rather than warm-blooded creatures. For this reason, they only grow in relation to the amount of food available to each individual and the water temperature. When food is short or temperature low, the growth rate slows down drastically and, in severe circumstances, may even stop. Add food and/or raise the water temperature and the fish usually begin to grow again. A water area whose fish have stopped growing has what is known as a stunted population. Fish that are too small to keep may be old enough to reproduce and, therefore, make the situation even worse because it just adds more fish to compete for the inadequate food.

Fish managers add fertilizer to such waters, and this enrichment triggers the growth of tiny animals and plants that are called plankton. Plankton is the basis of all other life in freshwater and in the sea. Many small fish, crustaceans, and insects eat plankton and then, in turn, become food for larger creatures. This continues until at the top of this food pyramid are the large predacious fish such as bass and pike. When these large fish die, their bodies decompose, releasing into the water nutrients that trigger the growth of more plankton. This is known as a food chain and, as with all chains, it can be no stronger than its weakest link.

A Delicate Balance

If there were no plankton, none of these creatures could live. If there were no large predator fish, the intermediate-sized fish would increase until they wiped out their food supply and a stunted population would result. It's a delicate balance of nature, and fish managers use many techniques to keep the scales from tipping too far one way or the other or to tip it in a desired direction.

Suppose a certain lake has a stunted population of bluegills, one of the intermediate species of fish. Fertilizing the lake to cause more plankton to grow would help provide more food for the bluegills, but bluegills reproduce so fast this probably would not be enough. A fishery biologist might then introduce more predator fish such as bass to eat some of the bluegills. This would probably help but, if the bluegill population has a good start as most of them do, it's doubtful if the predator fish could ever control them. A situation such as this might call for draining the lake to kill the bluegills and then filling it and restocking with the correct number of bluegills and bass. There are also special chemicals that can be used to kill these fish but most of them also kill the wanted fish. Fishery research scientists are hard at work trying to find chemicals that are very specific in that they kill only those fish you want to kill.

Fishing regulations are another method of managing the fishery resource. With fish such as trout, which are prized by most anglers, restrictive regulations to limit the catch are usually needed. But what about a prolific species such as bluegills? Under some circumstances, it's entirely possible to lift all restrictions as to season, length, and the number that can be caught and still not be able to take enough bluegills.

Stream improvement projects such as piling rocks in trout streams to create pools frequently help. The water splashing over the rocks picks up oxygen from the air, and a high oxygen content is important to fish, par-

ticularly during the summer. The dams not only hold water back to form pools, but the water running over them will dig out other deep holes. Propping flat rocks up on other stones in the pools will create hiding places for fish.

Scientists are constantly finding new and better ways of managing our freshwater fishery resource. But until man learns not to build roads down the middle of trout streams or pollute broad, meandering rivers, turning them into biological deserts or abuse the land until the water that drains from it is unfit for any living creature, this resource will become too scarce for all but the privileged few who can afford private fishing areas.

Our Last Frontier

The seas are this planet's last great frontier. And man is making the same mistakes with this valuable natural resource that he made with forests, wildlife, the soil, and others that he once considered inexhaustible. Fish, shellfish, and other sea creatures are already in trouble in certain areas. For example, estuaries, the places where freshwater streams meet the sea, are becoming polluted because the inflowing freshwater is polluted. Another threat to estuaries is the dredging and filling carried on by contractors and developers to create new land along these usually shallow shores.

Few of these men or, for that matter, few persons realize the importance of these extensive half-water, half-land areas. At least 65 percent of the Nation's commercial fish and shellfish resources, including shrimp, oysters, and flounder, plus striped bass and most of the other saltwater fish sought by sport fishermen, live in estuaries during part or all of their lives. Ducks, geese, and shorebirds use coastal marshes for nesting or wintering places, and many valuable furbearers and other kinds of wildlife make their homes in such areas.

Man's misuse of the sea has also extended far offshore. Oil carelessly dumped from ships sometimes forms vast "slicks" that are deadly to fish and seabirds. Many important food fishes are being taken in excessive numbers, and in some cases the numbers of traditionally sport fish such as marlin and sailfish are being decimated for food. Blue whales have now been cut back to where biologists say none should be killed for at least 50 years to let the population rebuild.

Most of the problems involving whales, fur seals, and fish that can be caught on the high seas require treaties between our country and foreign nations, because we only control a narrow part of the sea along our shores. Such international conservation problems will be discussed more completely in a later chapter.

Minerals—A One-Time Crop

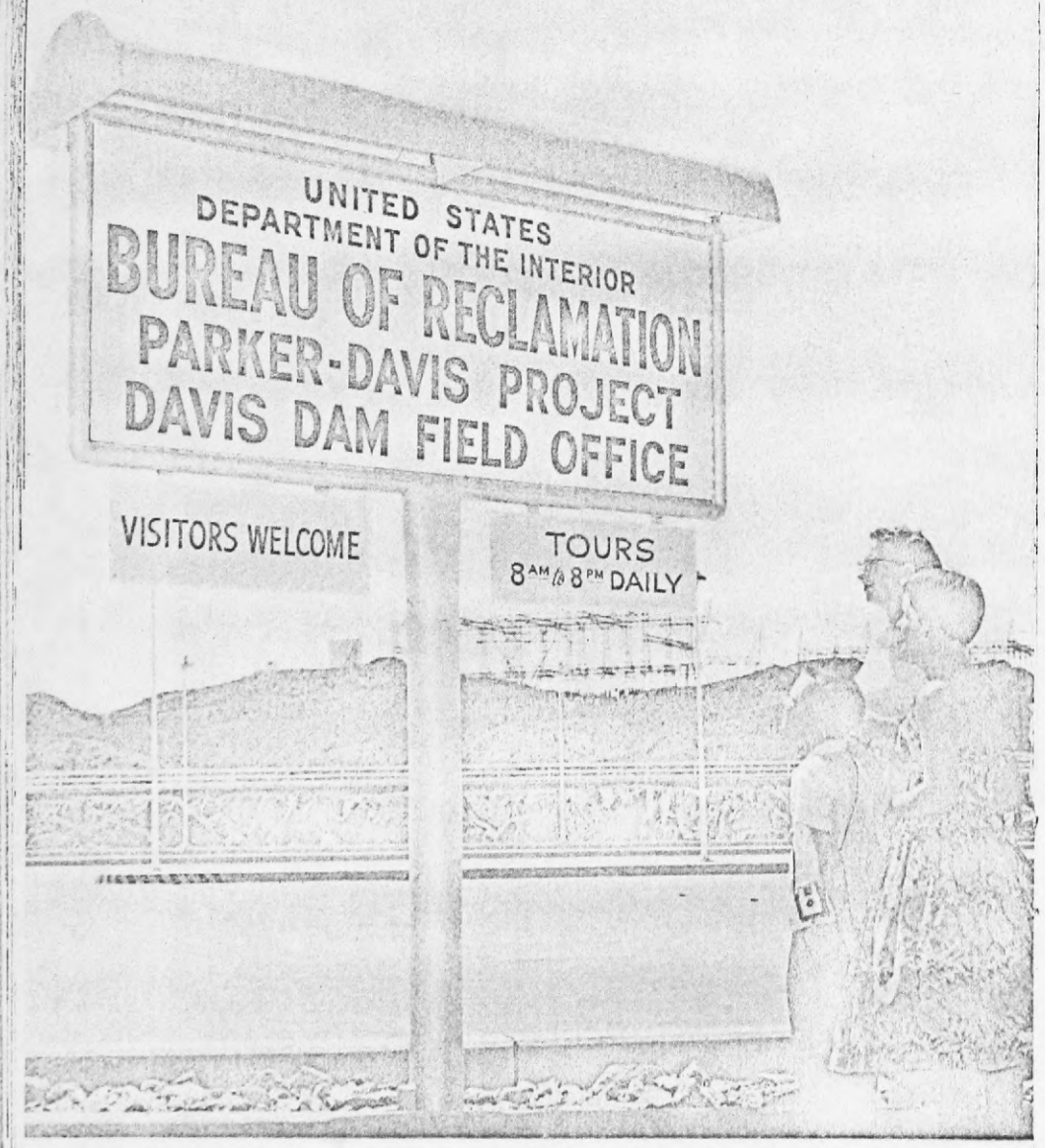
The industrial strength and security of our country depend on an adequate and continuing supply of minerals – metals such as iron and copper; nonmetals such as salt, sulfur, and asbestos; and fuels that include coal, oil, and natural gas. The expanding human population, a rising standard of living, and the unstable political condition of the world are causing national concern over the supply of the nonrenewable natural resources.

Large buildings, roads, and cars are built mainly of mineral products; energy to heat homes and schools and to power automobiles is mostly from minerals; farming frequently requires mineral fertilizers; the Nation's economic and military security are based on the ability to obtain and utilize metals, nonmetals, and mineral fuels.

The supply of minerals presents problems entirely different from those having to do with materials such as lumber and leather that come from vegetable and animal sources. Minerals are a one-time crop, while the products of agriculture, grazing land, forests, and fisheries continue to be available indefinitely under proper management. Nevertheless, the possibilities of new discoveries and better methods of recovery seemingly keep the supply or reserve of minerals at the same approximate level. For example, recoverable reserves of petroleum in the United States have remained at about 12 times the annual production for many years, despite increased usage of gasoline and other petroleum products. This steady reserve level comes both from the discovery of new oil pools and from improved techniques that allow a higher recovery from older fields. Likewise, ore reserves of many metals have been sustained by improved mining and smelting methods that have made it profitable to mine ores of lower grades.

Reclamation is an important factor in conserving the mineral supply. For example, although the gasoline powering an automobile and the lead added to this gasoline are consumed beyond reclamation, lead in the same automobile's battery has an extended life because about 85 percent of all lead in auto batteries is reclaimed and used again.

Basically, conservation of minerals means using them wisely. This in turn requires nearly complete recovery of materials from the earth, recovery only when these materials are needed, storage of waste products for later treatment when even better reclaiming techniques are developed, and greater utilization of substitutes such as using concrete for steel in building bridges.



A visit to a conservation project in your area will be both interesting and exciting.

Fighting for Conservation

2b List five Federal conservation agencies; the principal conservation agencies in your State; and five private (nongovernmental) conservation organizations. Tell what they do. Describe three successful conservation projects in your area.

U.S. Department of Agriculture

Forest Service.—Organized in 1906, this agency manages 154 national forests comprising over 186 million acres in 41 States and Puerto Rico. The Forest Service also conducts research projects in forest and wild land management through nine forest and range experiment stations and at the Forest Products Laboratory at Madison, Wis. The Forest Service cooperates with the Advertising Council and the Association of State Foresters in conducting the Smokey Bear fire prevention campaign.

Soil Conservation Service.—Established in 1935, this agency provides landowners and users with technical and other assistance in making and carrying through land use and conservation plans. The Service administers flood control and river basin investigation activities of the Department of Agriculture and provides Federal help under the Watershed Protection and Flood Prevention Act of 1954 (Public Law 566). The Soil Conservation Service is charged also with administration of the Great Plains Conservation Program and leadership in developing outdoor recreation on rural nonfederal lands.

Agricultural Research Service.—This agency organizes and directs a national program of research on field crops, insects that damage plant crops, soil management, and the economics of our country's agriculture.

Extension Service.—Established in 1914, this agency carries out a nationwide educational pro-

The tree farm system encourages woodland owners to practice good forestry methods.

gram primarily in rural communities. It assists the 4-H program through county 4-H agents.

U.S. Department of the Interior

Bureau of Commercial Fisheries.—This agency's primary duty is to serve the well-being of the commercial fisheries of the United States – and to do this without destroying or depleting the Nation's fishery resources. The Bureau carries out its responsibilities in many ways: It finds concentrations of fish; devises the best way to catch and keep them wholesome; studies economical ways of unloading, freezing, processing, and distributing fishery products throughout the Nation; and provides information to the public ranging from preparation to price of fish.

Bureau of Land Management.—Established in 1946, this agency is responsible for the conservation, development, and management of natural resources on the 477 million acres of the national land reserve. It also manages the Federal lands on the Outer Continental Shelf.

Bureau of Mines.—This agency promotes the wise development and use of the Nation's mineral resources, and safe and healthful working conditions in the mineral industries.

Bureau of Reclamation.—This agency investigates, constructs, and operates irrigation works for the storage, diversion, and development of waters in the Western States. It also sells electric power.

Bureau of Sport Fisheries and Wildlife. – This agency contributes to the well-being and recreation of millions of Americans by improving fishing on Federal lands and Indian reservations, research on fish and fishing waters for better angling, studying ways to make land produce more wildlife, research on migratory waterfowl problems, finding out how pesticides can help protect crops without harming fish and wildlife, protecting rare species of fish and wildlife, enforcing Federal wildlife laws, and operating more than 300 national wildlife refuges and 100 national fish hatcheries.

Geological Survey.—Established in 1879, the Survey is primarily a fact-finding agency that collects and makes available information on mineral and water resources and provides topographic maps of the country.

National Park Service.—Established in 1916, this Service supervises the management and operation of national parks, monuments, historic sites, national military parks, national battlefield parks, and national recreation areas. Its primary function is to "conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations."

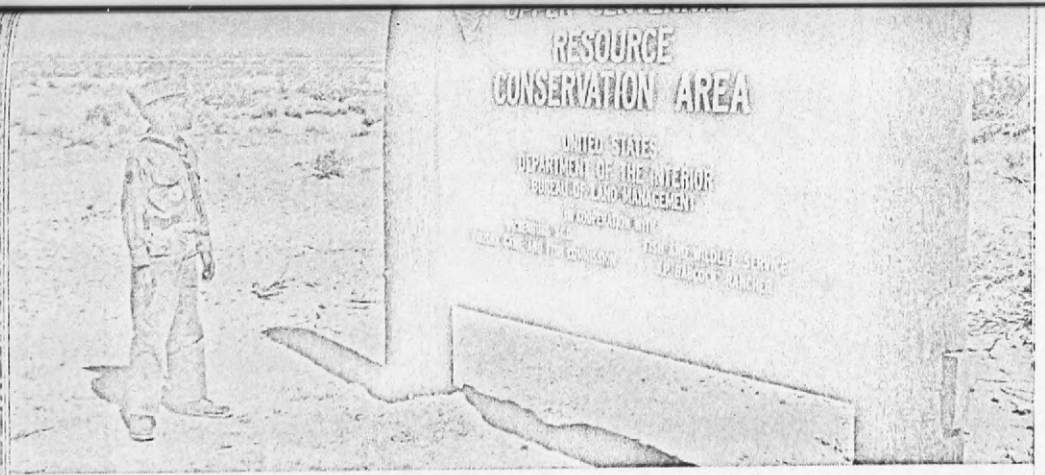
Water Pollution Control Administration.—This agency administers the Federal Government's effort to control, prevent, and abate water pollution. These goals are met through research, technical and financial assistance to States and cities, establishment of water quality standards, and enforcement of these water quality standards.

U.S. Department of Defense

Army Corps of Engineers.—This agency protects the navigable waters of the Nation and in doing so carries out projects to prevent shore erosion along the ocean fronts, builds dams to control floods, constructs dikes to contain flood waters in river channels, and administers a permit system covering dredging and filling in coastal areas where navigation might be affected.

State Conservation Agencies

State agencies concerned with conservation generally have a name similar to "*(State name)* Department of Conservation" or



There are many Federal, State, and private conservation agencies and organizations at work in this country.

"Conservation Commission." Within the department may be divisions of forestry, fish and game, parks, geology, soil and water, and agriculture. Write to your State capital and ask for a copy of the last annual report or other publication that explains the organization and functions of the department.

Private Conservation Organizations

There are a great many National, regional, State, and local private conservation organizations, far too many to list here. Following is a list of a few of the National organizations. For a more complete list see "Directory of Conservation Organizations," National Wildlife Federation, 1412 16th Street NW., Washington, D.C. 20036; cost is $1.

American Forest Products Industries.—Organized in 1941. Supported by forest industries and woodland owners. Its purpose is to encourage woodland owners to practice good forestry and to keep the public informed about activities of the forest industries. It sponsors the Keep Green and Tree Farm Programs and a special Scout award.

American Forestry Association.—Organized in 1875. This organization promotes the intelligent management and use of forests and the related soil, wildlife, and outdoor recreation resources.

Ducks Unlimited.—Organized in 1937. This organization is primarily concerned with increasing and managing migratory waterfowl resources through purchase and management of nesting areas in Canada.

Izaak Walton League of America.—Organized in 1922. This organization promotes the development of sound land and water management practices at the National, State, and local levels. Many local league chapters sponsor Scout units.

National Association of Soil and Water Conservation Districts.—Organized in 1946. This organization represents the more than 3,000 local soil and water districts across the country and provides assistance to those districts. It works with other National organizations, and many local districts are sponsors of Scout units.

National Audubon Society.—Organized in 1905. This organization is dedicated to the advancement of public understanding of the value and need of the conservation of soil, water, plants, and wildlife and the relation of their intelligent use to human progress. The Audubon Society owns and operates wildlife sanctuaries, Audubon wardens patrol some 1 million acres of land and water, and the society operates teacher and youth leader training camps.

National Wildlife Federation.—Organized in 1936. This is an organization of State wildlife federations and conservation leagues. It carries on a program of conservation education, grants scholarships for studies in conservation, works with other agencies and organizations in the promotion of sound conservation planning and practices. It sponsors Wildlife Week each year and issues special wildlife conservation stamps.

Society of American Foresters, Soil Conservation Society of America, Wildlife Society, American Fisheries Society.—These are professional societies for those who work in the various fields of conservation. They are concerned with maintaining high standards in this field as well as advancing the science of conservation in all fields.

Sport Fishing Institute.—Organized in 1949. Its purpose is to promote and assist in the conservation, development, and wise use of our national recreational fisheries resources; it promotes and encourages educational activities in fish conservation and has made many financial grants to the Boy Scouts of America.

Conservation provides many interesting careers. Shown here is a soil expert from the Bureau of Land Management.

Careers in Conservation

2c Describe the duties of three career positions in natural resource conservation.

Career positions in conservation are many and varied. Even an incomplete list might take several pages in this booklet.

Most high school guidance counselors have information on the type of training required for various conservation career positions and the duties of the men in those positions.

The books *Conservationists and What They Do* by C. William Harrison and *Careers in Conservation* by Henry Clepper, both contain a great deal of information about conservation careers.

Although there are many subprofessional jobs in the different fields of conservation – maintenance, construction, clerking, etc. –most of the better-paying jobs require a college degree.

Additional information on careers in natural resource conservation is included in the free Government pamphlets listed in the bibliography of this book. They are free from the originating agency.

Other reading materials on conservation can be obtained from your public libraries.

Fur seals have been saved by international cooperation.

International Conservation

3a Name three international or worldwide conservation problems and describe one.

3b Give one example of international cooperation in solving a conservation problem.

Conserving natural resources is not just an American problem. Many countries are also facing shortages of vital resources, and a shortage in one country will usually have an effect on others.

For example, Japan has little commercial timber, so the Japanese buy lumber and other forest products from the United States and Canada. Our country buys some oil from Middle Eastern countries which generally have more "black gold" than they can use. Therefore, we are using another country's resources to supplement our own dwindling supply. Still other countries are using resources of ours that may one day be sorely needed.

Conservation of natural resources then becomes a problem affecting all mankind.

Some international conservation problems are more serious than others. Most of these involve fish and wildlife resources, or air and water pollution.

Animals Threatened

It is a terrible and irreplaceable loss when a species of wildlife becomes extinct. Yet a number of species in many parts of the world are rapidly disappearing. Africa's leopards – among the most magnificent cats in the world – have long been an important game animal, but as long as license requirements limited the kill, leopards were not in serious trouble.

Then leopard-skin coats became stylish for American and European women. This brought on illegal hunting of leopards, with poachers smuggling the skins to furriers who turned them

Whales would soon be extinct without international programs to protect them.

into coats, hats, and other items of apparel. The leopard, at least in Africa, is now threatened with extinction.

The United States was once a proud whaling nation. The great Yankee whalers, who roamed the world's oceans from the Arctic ice to balmy tropics, made colorful history. Yet these brave adventurers, who added so much color and romance to the history of our nation, were in a way pirates almost equal to those who flew the Jolly Roger. It's unlikely they knew the damage they were doing, but before the end of the 19th century they had despoiled a great natural resource which has never recovered.

In this century whaling has done almost equal damage to an even greater whale resource in the Southern Hemisphere, too elusive for exploitation by whaling techniques of earlier times. By the early 1930's, it was evident that international control was needed, and the first International Whaling Convention was signed in 1931. Except for interruption by World War II, the International Whaling Commission has been trying desperately ever since to halt overfishing of whales. Until recently, these efforts met with little success.

Whaling differs from most fisheries in that single animals are so valuable they can be caught profitably one by one. Whales also have a very low reproductive potential, and scientific studies have shown that only about 10 percent of the population can be harvested each year. Using modern methods, whales can be harvested at a much faster rate than they can reproduce. Once overfished, the population can recover only very slowly. Blue whales and humpback whales no longer exist in fishable numbers in the Antarctic, and whaling fleets have turned to the North Pacific where the same thing may happen unless strict international controls are enforced.

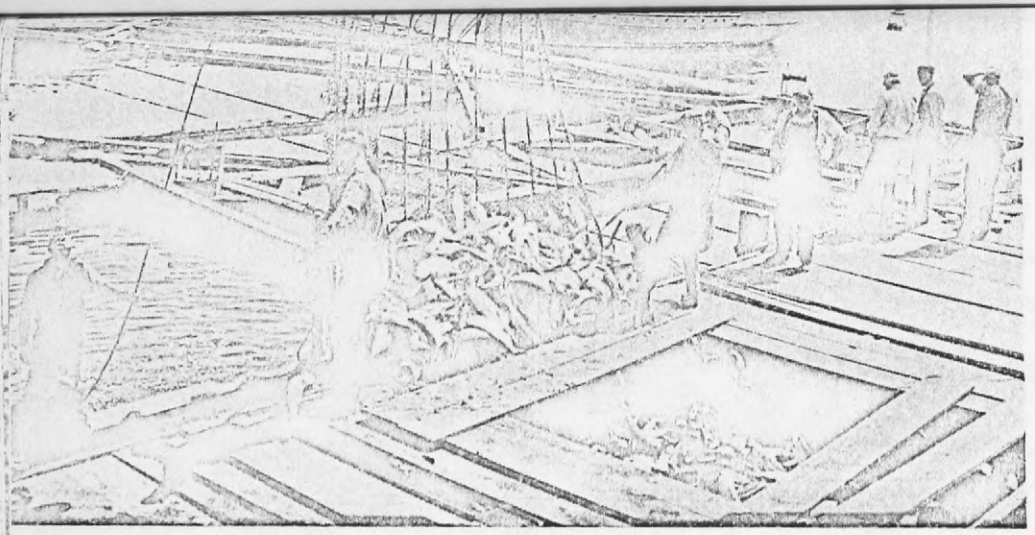
Land and Water Problems

Soil erosion is a problem in many parts of the world. India, a country with the second highest population in the world, has difficulties growing enough food for its people. Famine is always a threat. Poor farming practices down through the centuries have allowed erosion and other damaging factors to severely reduce the fertility of India's soil resources. North Africa used to be the breadbasket of the Roman Empire, because most of the wheat used by Rome was grown there. Now much of this area is arid desert. Again poor land practices such as overgrazing were the culprits.

Much of the burden of feeding these countries must fall on the shoulders of countries such as ours. But can we continue feeding millions of people in other parts of the world when our own population is growing so rapidly? We may soon need all the food we can grow just for our own people. American soil conservationists are now at work in many foreign lands to help them to better feed their people.

Water is another conservation problem of international significance. Almost every country on this planet has water problems—too much in some areas, not enough in others. One of the things that makes the Nile Valley in Egypt so fertile is the periodic flooding by that great river. Modern fertilizers can maintain the richness of the soil, but water to irrigate lands farther from the river is needed by Egypt to feed its growing population. Russian engineers have now helped to build a huge dam on the upper Nile to provide the needed irrigation water.

Several countries in the Middle East – Israel, Kuwait, and others—have a great sea at their front doors but are suffering from a shortage of freshwater. Saltwater conversion plants developed by the United States for



Many nations cooperate to prevent depletion of food from the sea.

these countries use a variety of processes to convert salt water from the ocean into freshwater suitable for human use.

The testing of atomic bombs and the peaceful use of atomic energy may become a threat to international conservation. Radiation from atomic fallout may damage plants and animals or render some areas unfit for human habitation. Disposal of atomic wastes from nuclear power plants is already causing trouble. Burying wastes underground may contaminate the soil and dumping at sea may kill fish and other sea creatures. As marvelous as these scientific advances are, most of them create problems in conserving natural resources and our environment.

International Cooperation

The North Atlantic is one of the world's great fishing areas. Fishing fleets from many nations depend on this fishery for their catches. Realizing the danger of overfishing the available stocks of fish in the North Atlantic, the nations fishing there have agreed to certain conservation measures, one of the most important a rule on the minimum size of mesh in the fishing nets so young fish can swim through and escape.

One of the most successful examples of international cooperation in managing a natural resource involves the United States, Canada, and Mexico. Ducks, geese, swans, robins, sandpipers, and many other birds fly from nesting grounds in Canada to wintering areas in the United States or Mexico. Realizing the value of these migratory bird resources and that some form of protection from nesting grounds to wintering areas was needed, officials of the United States and Great Britain (acting for Canada) signed a treaty in 1916 to protect birds that migrate between Canada and the United States. In 1936, a similar treaty was signed with Mexico.

Under these treaties, migratory birds cannot be hunted or harmed in any way except as provided by laws issued by the three countries. These treaties provided additional protection for all migratory birds and also focused attention on the value these birds and other wild creatures have for man.

Food Cooperation

A number of countries have a shortage of animal protein to feed their people. One method of providing needed protein has been developed in the United States. Called Marine Protein Concentrate, this flourlike substance is manufactured from fish which are not otherwise important for food. A small amount of this tasteless, odorless "fish flour" in bread and other foods adds large quantities of valuable protein to the diet.

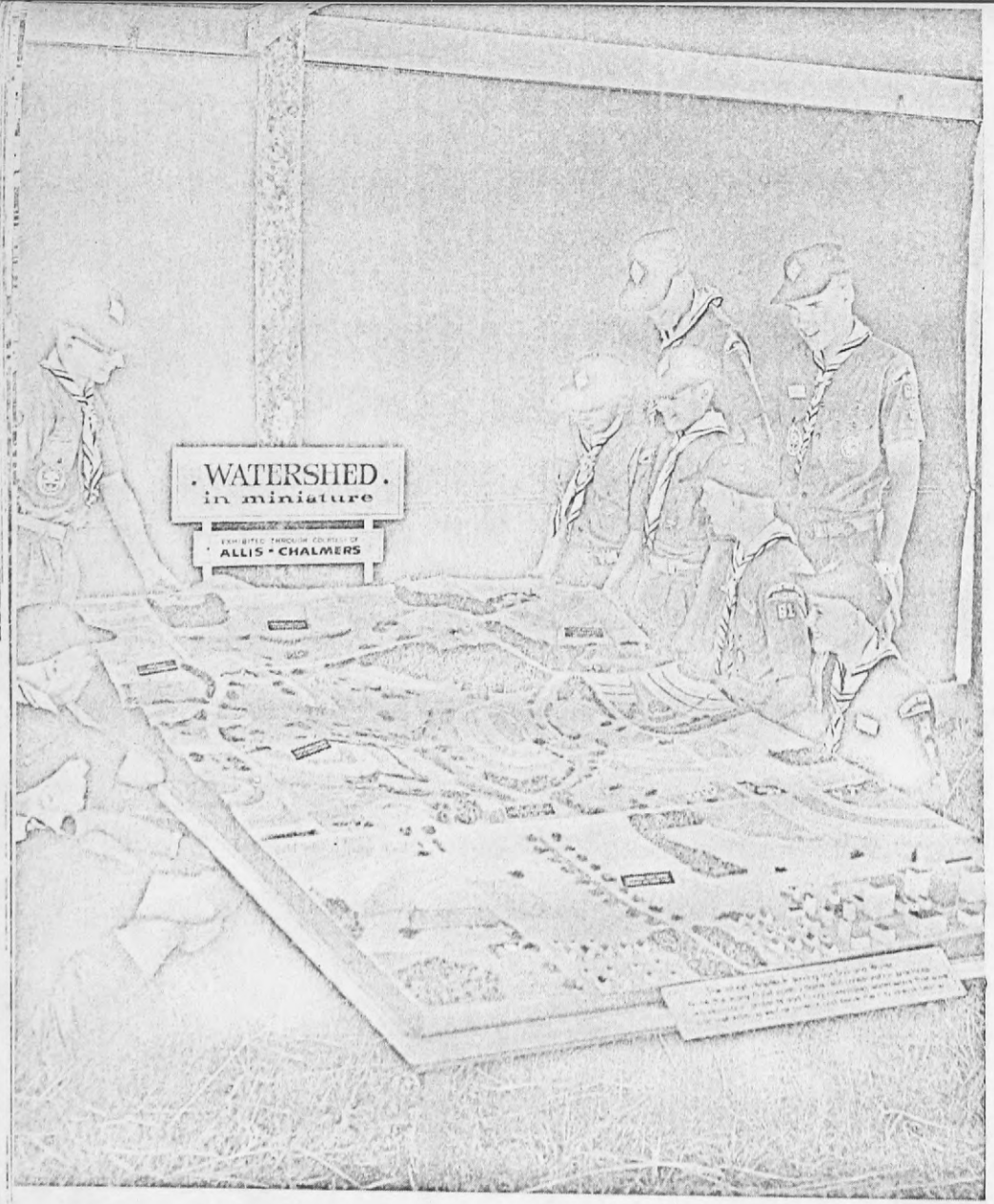
Conservation in Africa

In Africa, vast land areas once home to huge herds of antelope and other hoofed animals have been cleared to make rangelands for livestock. This is a loss to the rest of the world, because almost everyone wants to visit Africa and look at the many kinds of wildlife there.

Many landowners in Africa now "harvest" hoofed animals on a sustained yield basis—never killing more than the natural production can replace.

African nations have also followed the United States' lead in developing national parks. These areas are wildlife sanctuaries that preserve huge tracts of the African wilderness.

Developing African nations are showing great enthusiasm and understanding for the need to conserve their natural resources. Their feeling for the land is almost reverent, and reverence may be a prerequisite to intelligent use of the land. An old African chief when asked, "Whose land is this?" replied, "This land belongs to my people. Some are buried in it, some live on it, but most of them are yet to be born."



Jamboree Scouts study a watershed model.

The Water Cycle

4a Make a sketch to show the course of your home water supply from watershed to water tap and on to receiving stream (including passage through waste treatment facilities, if any).

Your home water supply may come from one or more of several sources, depending upon where you live. You may have your own water supply – a well drilled in your yard, perhaps, or a spring. The chances are, though, that your water comes from a community supply managed by either a private organization or a city or other governmental agency.

In that case, your household water may come from a reservoir, deep wells, a river or lake, or even a combination of these sources. It is possible, too, that your water comes from a point hundreds of miles away.

But wherever your water supply originates–either as groundwater from wells or surface water runoff into reservoirs or rivers, it originally fell to earth as rain or snow.

This water is always treated to prevent contamination from getting into the water supply.

One of the most important things to understand about water conservation is "the hydrologic cycle" or "water cycle."

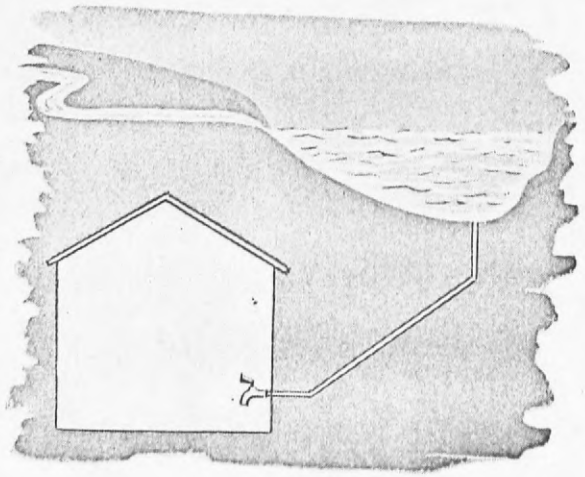
Study the illustration of the hydrologic cycle. It will be helpful to you in drawing the sketch called for in this requirement.

The next thing to understand in meeting this requirement is that word "watershed." A watershed is an area of land all of whose precipitation drains into one river or river system. Thus there are tremendous watersheds and quite small watersheds. A small watershed might be only a few acres, while a large one runs to many thousands of square miles.

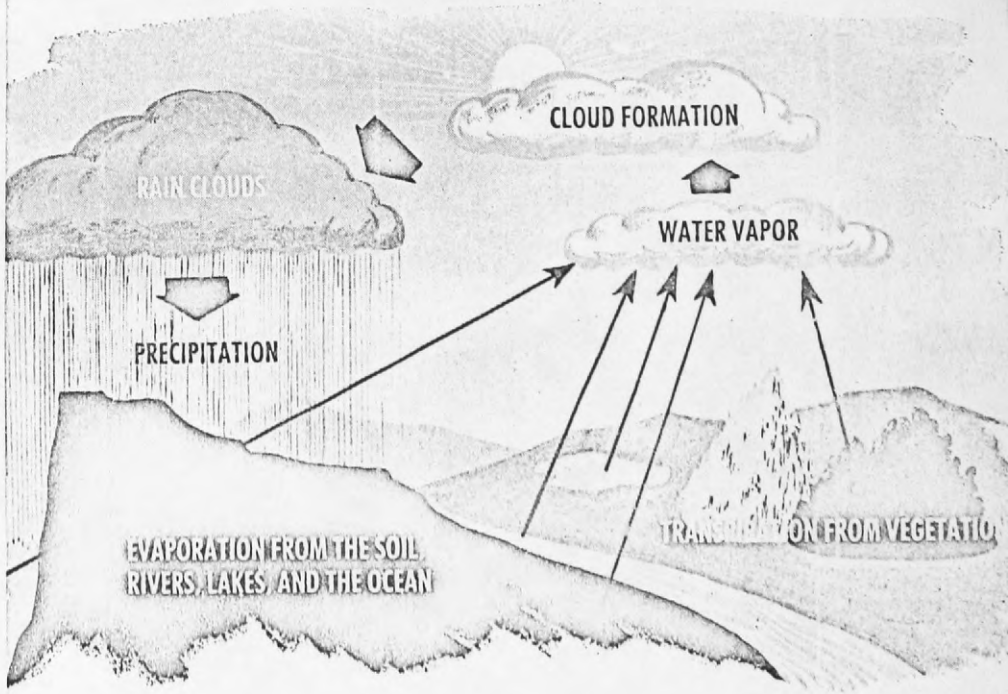
If you do not know where your home water supply comes from, ask your family or a neighbor. If you have your own supply,

such as a well or spring, they probably can show you the watershed involved and explain the pumping system. If not, your local Soil Conservation Service man or county agent can help you with the information.

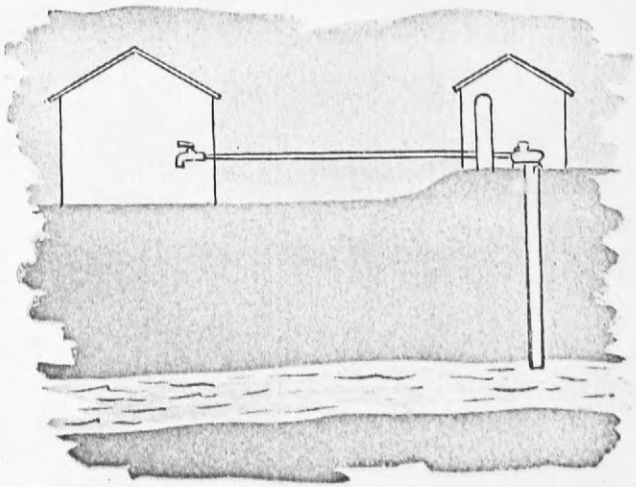
If your water comes from a community supply, your parents pay for it and can tell you the name of company or agency involved. You can then write to them, go to their office, or call them on the telephone to get the information you need to draw the sketch.

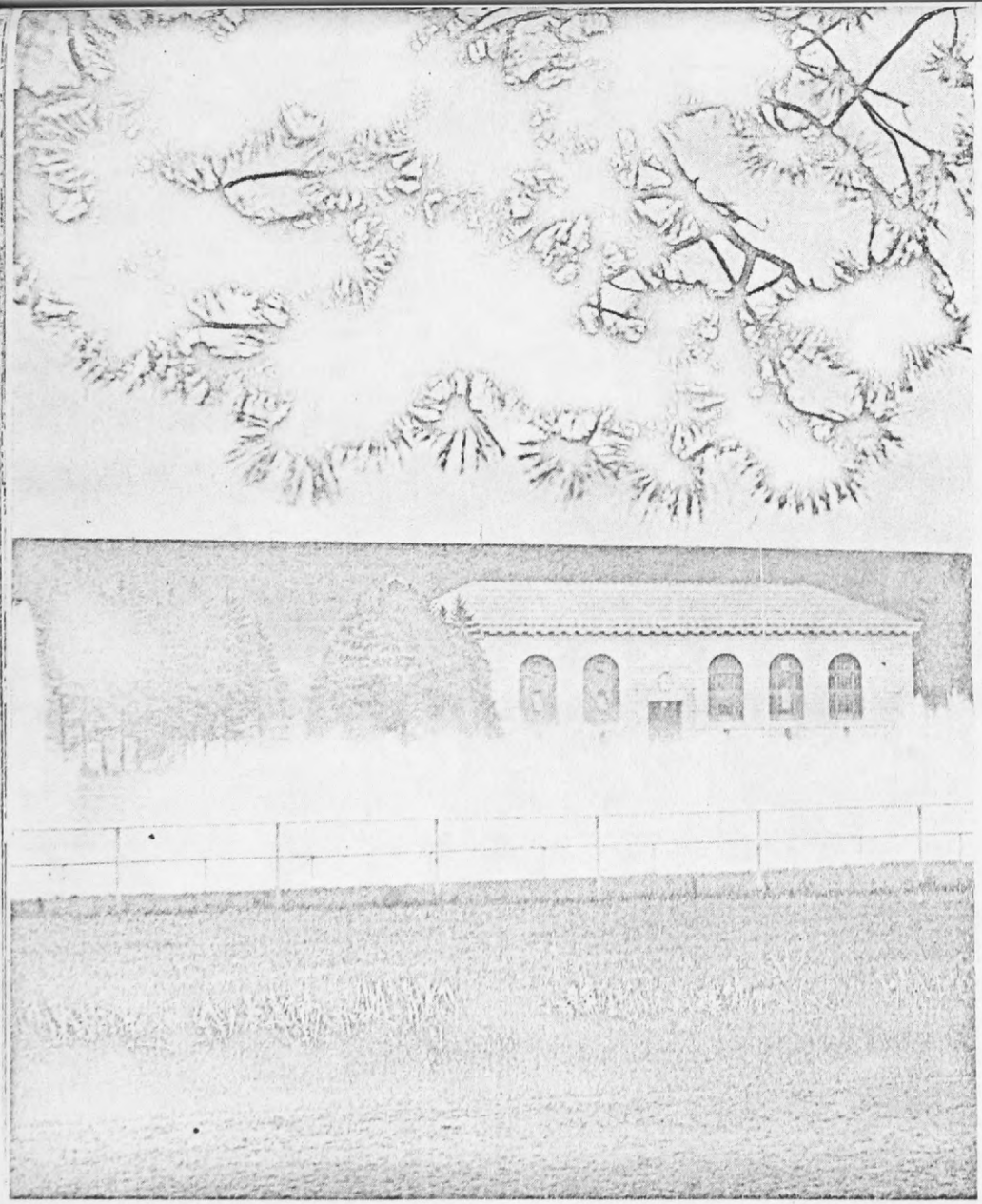


Some communities receive their water by gravity from high-level reservoirs. They all have water-treatment plants rather than the direct pipeline shown here.



Other communities pump their water from a lake or stream to a treatment plant and on to the consumer.





Aeration process at New York water-treatment plant.

Your Community's Water

4b Find out if water supply is likely to be a problem in your community in the future and explain why.

The agency or private company that supplies your water can answer this question. Check with them. Your local Soil Conservation Service expert, county agent, or State conservation department representative may also be able to help you. A local geologist or your State geologist, usually located in your State capital, may also answer the question. Check also with your city, county, or local planning commission or similar agency.

Water supplies must be geared to the future.

Clear mountain streams provide beauty and recreation.

Water Pollution

4c Define water pollution and give the principal causes and results of water pollution nationally and in your community. Find out what steps, if any, are taken to control pollution in your area and tell what additional steps might be taken.

The principal causes of water pollution are:

- Silt and soil washing into streams and rivers from poorly managed watershed areas.
- Highway construction, building construction, and similar unprotected watershed areas.
- Sewage from individual homes or community disposal plants dumped into rivers or streams.
- Wastes of many kinds from industrial plants, dumped into rivers, lakes, or streams.

In recent years, another type of pollution has developed, called "thermal pollution." Some types of industrial plants use river water to produce power or in manufacturing. In the process, the temperature of the water is raised considerably, and it goes back into the river at a higher temperature than when it came out. This increase in temperature may affect the biology of the river and have a harmful effect on fish life.

The principal results of water pollution are:

- Fish life may be completely or partly destroyed, or the species of fish that live in a polluted stream or river may change from desirable game fish to less desirable rough fish.
- The polluted water may be unfit for swimming, boating, or other recreation because of odor from pollution or because it is a health hazard.
- Polluted water may not be usable by many industries that need pure water for their manufacturing. The cost of making the water fit for use may

be too high, and an industry will move elsewhere.

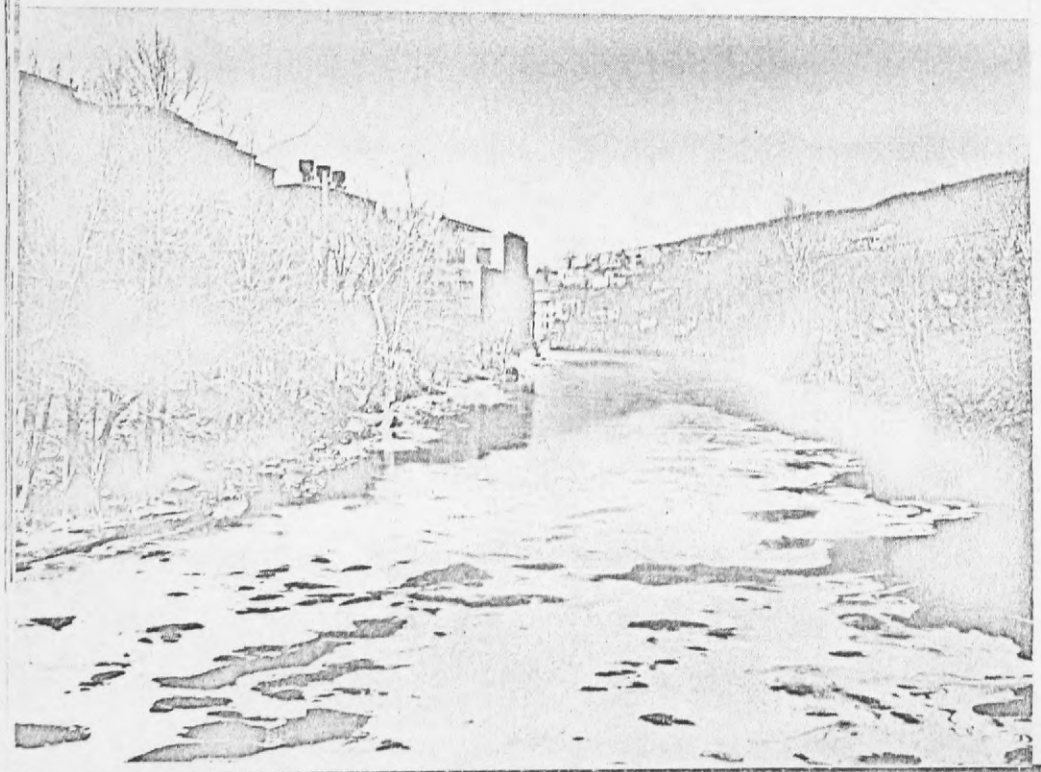
On top of that, a river running brown with silt, white with detergent suds, or any other color of the rainbow from industrial pollution is not pleasant to look at, compared with the clear water of an unpolluted river.

Prevention and correction of water pollution problems are largely local concerns, involving local laws, since the sources of the pollution and the damage that it does usually fall within an area governed by a city or town or, perhaps, a county. When pollution covers a wider area, state agencies and even the Federal Water Pollution Control Administration are involved.

Some of the preventive measures include laws controlling industrial waste disposal, sewage disposal, disposal of shipping wastes (such as oil spillage from tankers), etc.

The purpose of this requirement is for you to become acquainted with water pollution controls in your area by talking to your local authorities. Water pollution caused by poor land use is explained further on page 68.

A polluted stream is an eyesore and a health menace.



Polluted water is deadly to wildlife.

Fishing is a source of food and healthful recreation.

Resources From the Sea

5 Give three examples of ocean resources. Choose one and discuss the conservation problems involved.

The United States has one of the longest oceanic or saltwater coastlines of any country and, therefore, has readily available many of the natural resources of the oceans. These resources are tremendously important to us and will become more important in the future.

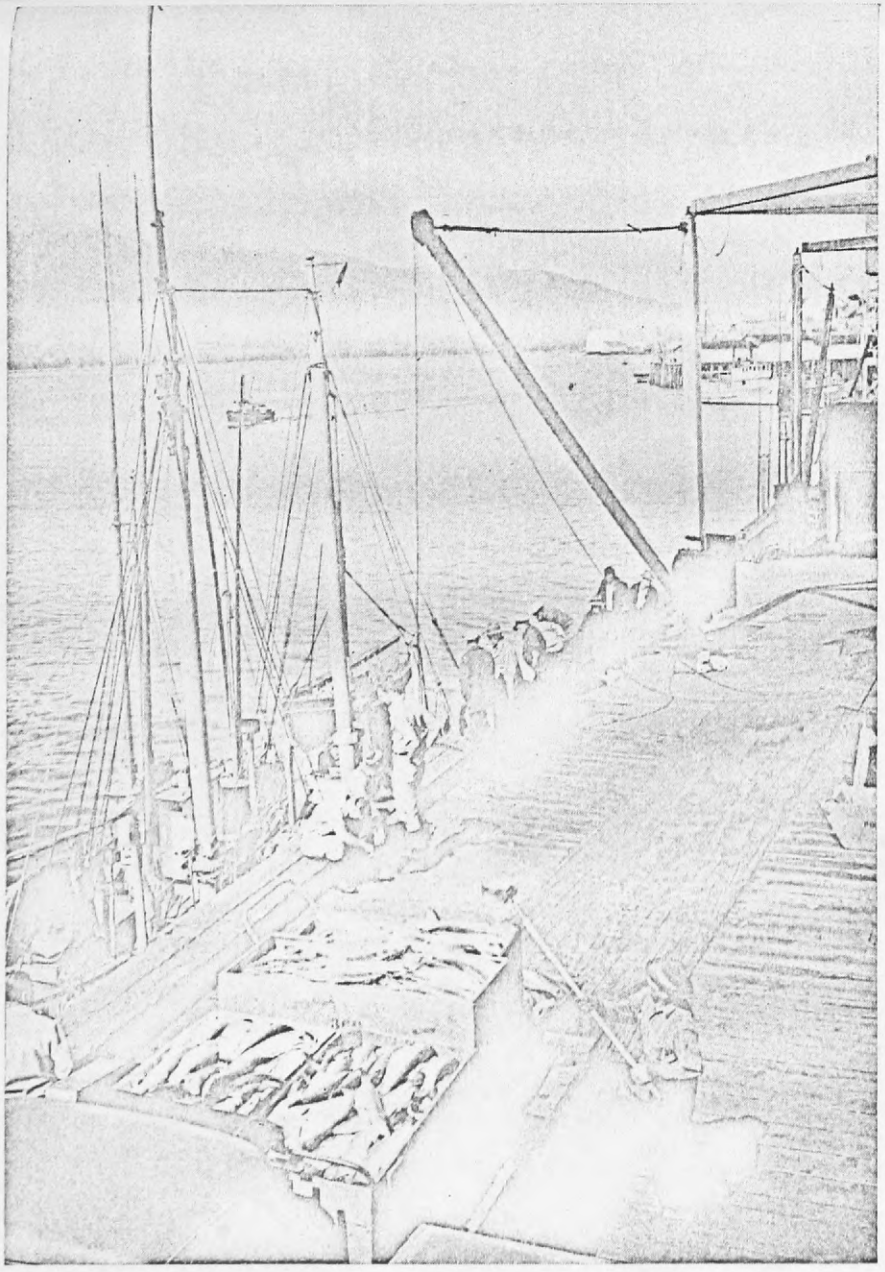
The first resources that come to mind, in thinking of the importance of the oceans, are fish and other marine life that supply us with food. Tuna, salmon, mackerel, cod, flounder, herring, and sardines are only some of the saltwater fish that can be found in any supermarket. In addition, lobsters, clams, crabs, and oysters are marine animals that provide us with food. Probably the biggest commercial fishery in the United States in terms of numbers of fish caught and the dollar value of the catch is the menhaden industry.

It is possible that in future years, much of the protein eaten by the peoples of the world will come from the oceans. Marine plant and animal life is rich in protein and minerals needed by man and is easily available.

The oceans and their shorelines provide resources other than food, recreation being one.

Each year, millions of Americans flock to our shores for healthy relaxation—fishing, swimming, boating, or just sitting in the sun. Sport fishing alone is a tremendously important oceanic recreation resource.

Important now, and bound to be much more so in the future, the oceans are sources of freshwater, only limited by the means of recovery. There are some problems still to be solved, but chances are good that in the future many people will depend upon the oceans for their home water supplies. Some areas of the world, including places in the United States, are using desali-



Loading fish for market.

nated ocean water now.

The oceans are also sources of some minerals that are needed by man. Salt, used in manufacturing and in foods, is one mineral reclaimed from the ocean. Others are iodine, magnesium, chlorine and bromine. Millions of gallons of oil are being pumped from deep beneath the floor of the Gulf of Mexico each year, and from beneath the Pacific Ocean off California.

The oceans are also important for transportation. Freighters and tankers constantly sail the oceans of the world, moving hundreds of millions of tons of raw materials or manufactured products from one place to another.

Marine Conservation Problems

But oceanic resources are not without their conservation problems, and because many countries border the oceans, many of these problems are international.

One of the more serious facing this country today is the drainage or other destruction of our coastal marshes and estuaries. Once, there were many more miles of tidewater estuaries and marshes than there are now. But they were drained or filled to provide sites for industrial plants, housing developments, recreation areas, highways, airports, and other symbols of civilization.

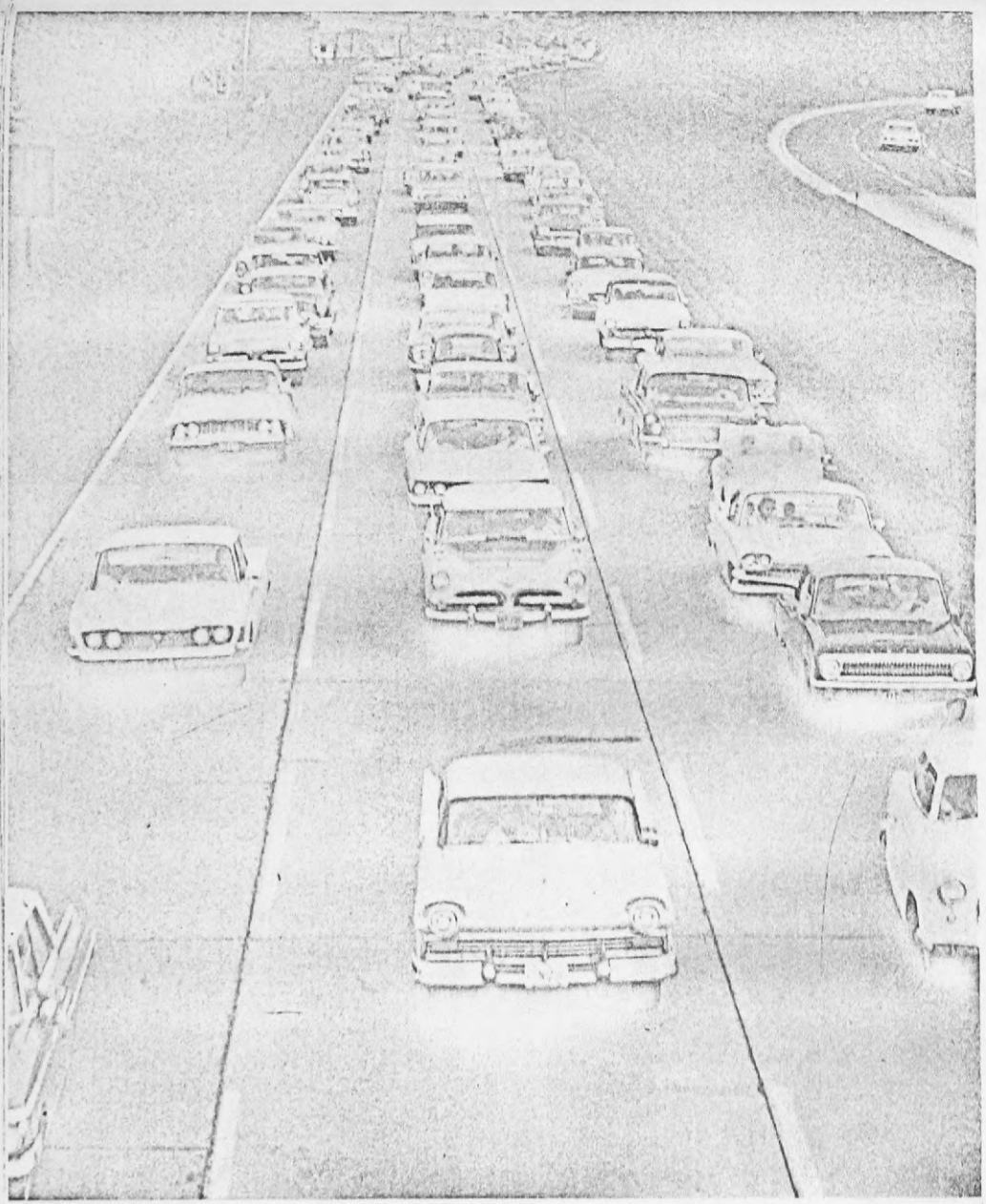
This destruction of estuaries and marshes has been very harmful to many kinds of fish, shellfish, birds, and mammals, as mentioned previously. Polluted rivers running into saltwater also have a harmful effect.

Many kinds of marine fishes spawn or spend part of their lives in the shallow salt or brackish waters of estuaries and tidal creeks. When these estuaries and creeks are polluted or destroyed, the fish suffer, and in some cases this may set up a chain reaction.

Chemicals used in agricultural insect control wash into streams and rivers and then into estuaries and through marshes. These chemicals are absorbed in the bodies of fish that spend part of their lives there.

These fish may be eaten by birds such as ospreys, eagles, or pelicans while in the bays or estuaries, or later on by other birds or larger fish when they move out into the oceans. Traces of these chemicals have been found in tuna far offshore and in penguins in the Antarctic far from where chemicals were originally used. Part of the reason for a serious decline in the numbers of ospreys and eagles is believed to be due to these chemicals.

Ducks and geese also have suffered from the destruction of coastal marshes. In some cases, the nesting grounds of waterfowl have been destroyed; in other cases feeding and wintering areas are now gone.



Automobiles are a major source of air pollution.

Air Pollution

6 Explain the major causes of air pollution and tell how they might be prevented.

Pollution of the air is a major national conservation problem. It is said to cost us $11 billion a year. And this figure does not take into account health problems from dust, sand, and pollen.

Air pollution comes from commercial and industrial plants, motor vehicles, incinerators, home heating units, and other things essential to our lives. To understand how air pollution may be controlled, it is necessary first to look more closely at the materials that pollute air and where they come from.

There are, basically, two classes of materials that pollute air: small solid or liquid particles and gases or vapors.

Solid particles in the air may be dust or pollen that affect the health of many people, or they may be the unburned products of some industrial processes or trash in open fires or incinerators. These soil clothing, furniture, homes, and other buildings and, in sufficient quantity, they cut down visibility and may contribute to respiratory disease.

An example of gas or vapor pollution is sulfur dioxide from burning coal in home or factory. This gas corrodes certain materials and irritates the eyes or nose. Carbon monoxide, also a cause of pollution, comes from automobile exhausts and is a serious health hazard.

The first type of pollution may be controlled by prohibiting the open burning of trash and by requiring that certain devices be installed on chimneys that prevent solid or liquid particles from being introduced into the air.

The second type may be controlled by using devices on chimneys and smokestacks that remove the gas from the air moving up the chimney. Devices have already been developed that help cut down pollution from automobile exhausts. But much more needs to be done, both in elimination of pollution and in locating its causes.

Wise land use is the result of careful planning.

Using Our Land Wisely

7 Tell how good land-use planning is important to five of the following: community planners, highway builders, camp planners, small landowners, farmers, ranchers, recreation planners, industrial and housing developers, fishermen and hunters.

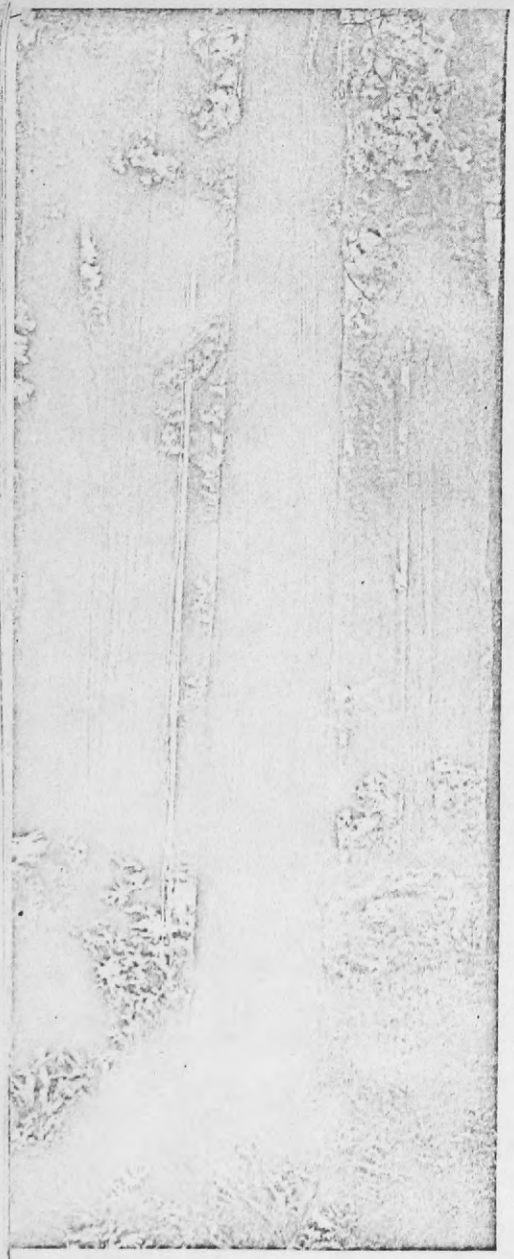
In the 300 years since Europeans landed in North America, the face of the land has been greatly altered. Many of the changes have lowered the quality of the land and most of them, unfortunately, are irreversible.

At first the problem of providing food, fiber, timber, and other raw materials kept men close to the land. Today, specialization has cut these intimate ties. Where farming was once a way of life, it is now an industry—one in which fewer and fewer individuals are engaged and almost entirely by mechanized methods.

America's shift from a predominately rural to a city population has made a "sandwich" of much of our land, buttering our soil with concrete and asphalt, piling people, and then hanging a pall of polluted air overall. But the city's people still seek relaxation, refreshment, and "re-creation" in the out-of-doors. This search has now developed into a $20 billion annual recreation industry.

Some scientists say that shortages of space, food, and essential raw materials are only an illusion. The proper application of scientific knowledge, they claim, can easily meet the needs of a population three times greater than now. But look at what kind of world it will be—well-fed but horribly crowded.

The very successes of science have presented a new set of problems. Accomplishments in minerals and energy, in electronics and aircraft, in autos and agriculture have lifted man to new material wealth. But in the pro-



Wilderness areas are a priceless natural resource.

cess he has lost ground in the attempt to provide an environment that will renew daily the meaning of human enterprise.

A lopsided performance has allowed us to control the atom and to invade outer space, but the inner space that is our home has been sadly neglected.

Our industries can produce a wide range of goods and machines, but in doing so they have multiplied waste products that befoul the land.

The hazards appear on every hand. Many new machines and processes pollute our very air and water, and indiscriminate use of pesticides can threaten both men and wildlife. That roaring symbol of the age, the auto, in satisfying the demand for more mobility, has added to the congestion and unpleasantness of both cities and countrysides.

With the passing of each year, neglect piles new problems on the nation's doorstep. Man's massive ability to overpower the natural world has also multiplied his capacity to damage the resources making up our environment.

Our Wilderness

Wilderness is a vital part of new conservation thought. Before World War II, most Americans took the outdoors for granted. But pressures were growing each year to spoil the few remaining wilderness areas, and Americans accustomed to outdoor recreation as a way of life, with access to public areas for hunting, fishing, hiking, and swimming, found opportunities narrowing by the month.

The importance we give wilderness areas will measure our reverence for the land. If this stewardship fails, wilderness will have to be rationed as to the number of visitors to preserve the wilderness quality. The rest of our outdoor experience may have to be found at packed amusement parks, shoulder-to-shoulder beaches, and table-to-table picnic grounds.

It is an alarming fact that Americans are becoming the litter champions of the world, aided by an incredible array of boxes, bottles, cans, gadgets, and a thousand varieties of paper products. If current trends continue unchecked, in another generation a trash pile or piece of junk will be within a stone's throw of any person standing anywhere on the American continent.

While our countrysides are shrinking, the cities too often are wastelands where human needs are ignored and unsolved problems are allowed to accumulate. As cities have sprawled outward into the countryside, blight has followed.

Our Shrinking Space

There is an urgent need for studies to determine the ideal relationship between human population and the land. At present, our country is heading for a standing-room-only environment. The amount of open space available per person is decreasing at a faster rate than the country's population increases.

Over a million acres of land are lost each year to urban or city development, and these lands are valuable from a conservation viewpoint. Until recently, the abundance of our natural resources seemed to make it unnecessary to consider the consequences of water pollution or to protect land and water for conservation reasons. Land near cities was considered too valuable to leave open just for conservation projects.

So hills stripped of trees and slopes terraced to make way for homes led to serious erosion. Streams became laden with silt and channels were filled, causing floods to become more frequent and severe. Marshes choked with debris and floodplains developed unwisely were no longer able to act as sponges to absorb excess

Block cutting is practical in western states.

water. Sewage-polluted streams killed fish and shellfish and seeped into aquifers (underground water courses), making wells unsafe. It is increasingly common for drinking water to be brought into urban areas from far away, and for these cities to compete with one another for sources of water.

Indiscriminate destruction of open land not only is a cause of flooding and pollution, but results in loss of lands that have built-in value. Some of the most productive land for vegetables, fruit, and nuts is near California and New Jersey cities. Wild areas close to cities have value as laboratories where students or scientists can study botany or wildlife near their schools. The scenic beauty of many of these areas is a precious asset worth protecting for its own sake.

The Need for Control

All open space land preserved for esthetic purposes does not have to be owned by the local or Federal Government, if there is control of its use to make sure it remains open. Floodplains, forests, and wetlands may be privately owned and also used for crops, grazing, or other purposes consistent with conservation objectives. Other lands may be publicly owned and used for recreation. These lands offer opportunities for picnicking, hiking, nature study, exploration, cycling, riding, and boating.

Farms near cities are vanishing as high-quality agricultural land is sold for development. Suburban farmers fit their operations to rising land values and the nearness of the city. They may lease cropland from owners of country estates, or own a small amount of land and farm it intensively for the urban market. Suburban farmers may be "gentlemen farmers" with enough money to raise horses or beef cattle as a hobby, or they may be dairy farmers enjoying the advantage of being near the city and its demand for milk.

Most of the foods produced on suburban farms can be raised just as well elsewhere. However, a special combination of climate and land may grow certain farm crops that cannot be matched anywhere. Much of the best vegetable cropland is located near cities.

Suburban agricultural land can fill several needs. In private ownership, it is a means of shaping development and preserving scenic countryside for bicycling and pleasure driving. With limited public access, recreation on farms can make money for the farmer. Farm ponds may produce 100 to 200 pounds of fish per acre each year, and many farmers now add to their income by charging the public a small fee to fish. Farm marshes can produce waterfowl, muskrats, and mink. Proper cropping and fence planting can encourage wildlife and provide an excellent habitat for game birds.

Forests cover a relatively small portion of suburban land, but many woodlands have grown up to blanket land bypassed by development or abandoned for farming. The suburban forests and woodlands are not important for their crop value. They are valuable for protecting watersheds--adding to suburban water supplies and reducing flood hazards. Tree cover reduces the surface runoff of water, aids the soil in retaining water, and decreases soil erosion.

Forested land set aside to conserve water is also likely to be useful for other open space purposes. It may be a visual buffer to separate land uses. It may be very desirable for riding, hiking, fishing, skiing, picnics, camping, and nature study.

Wetlands near cities may be preserved for both conservation and recreation reasons. They reduce floods and drought by absorbing excess runoff and releasing the water to streams during low-flow periods. In addition,

Water pollution experts obtaining samples for testing.

they provide food and cover for fish and waterfowl. Salt marsh wetlands also are very fertile, producing marsh hay, wild rice, blueberries, cranberries, and peat moss, as well as fish and shellfish. People enjoy wetlands for fishing, hunting, bird watching, and nature study. An example is the Tinicum Marsh Wildlife Preserve, a wetland area within the city of Philadelphia. A popular spot, it averages over 30,000 visitors a year to its bird watching and nature trails.

The Danger of Water Pollution

Uncontrolled development of residential and industrial areas adds to the pollution of water sources for urban areas. Such pollution occurs when too many septic tanks are allowed, when developed hillsides drain sewage into supplies of freshwater, and when too much unsewered commercial activity is permitted near streams and other bodies of water. The effect of this pollution can be reduced through well-planned open spaces with carefully controlled development.

The effects of widespread water pollution are already being felt throughout the country. Communities on polluted streams must have expensive programs to import water from unpolluted areas. They stand to lose profitable water-oriented recreation and are unable to attract industries that require clean water.

Urban areas across the country are already competing for water. The average daily use of water in most of the United States is now higher than the dependable low flow of the rivers supplying water. Each time the water is reused and returned to rivers and lakes, these water areas are less able to break down wastes. As a result, pollution increases and fish die. This is due to a reduction in the oxygen in the water, an increase in inorganic wastes, an increase in the temperature of the water from industrial use, and continual addition of new pollution.

The growing need for water for factories, homes, and recreation requires that local officials give urgent attention to the cleanup and preservation of nearby lakes and streams.

Open Space Projects

Megalopolis, the city without end, is almost here. The boundaries between once-separated cities and neighborhoods now are marked only by streets. Neighborhood and community pride is difficult to create or even to maintain where these conditions exist. Human development and nature existing side by side will soon disappear, except at rapidly receding city edges.

The forces of city expansion cannot be controlled overnight by an open space program or any other single public action. But, by developing plans for future growth and then putting these

New recreational areas must be established and maintained for future Americans.

plans to work, the forces of expansion can be channeled along more pleasant and efficient trails.

There are several approaches to urban development by the use of open space projects. One is to preserve open space permanently so that development is shaped around it. A second is to preserve open space temporarily until it is ready for development. By this means, the timing and direction of urban growth could be controlled. The open land may be purchased and used for immediate recreation needs, then sold at a later date; or it may be preserved temporarily by zoning techniques. This is sometimes done by establishing a park or refuge.

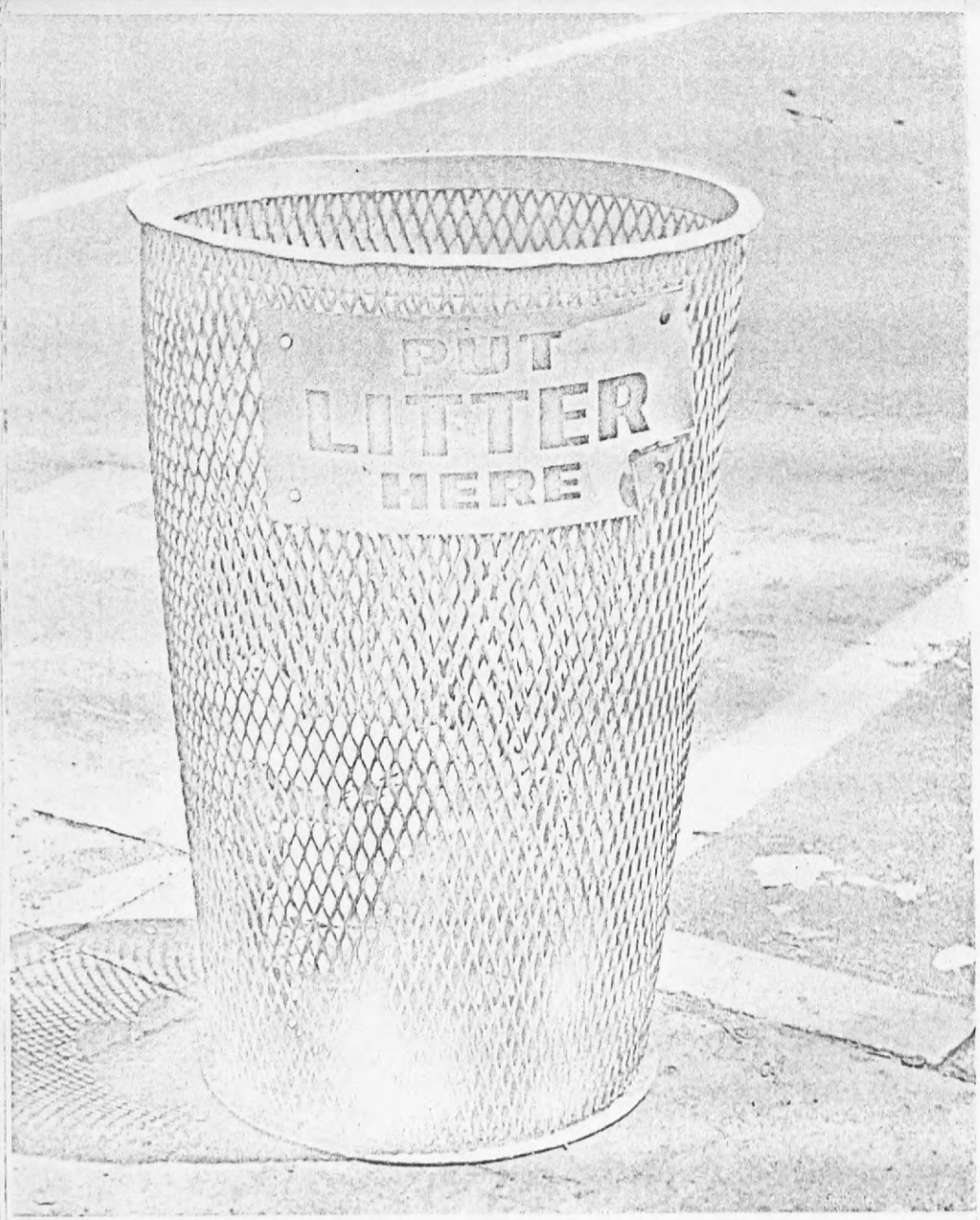
Such control of the timing for city development by gradual release of open space lands has not been tried on a large scale by an American city. In fact, large lot zoning is often used by local governments to prevent development from taking place at all, causing leapfrogging and expansion elsewhere. In Europe, many cities have followed time development plans. Early in this century, Stockholm, Sweden, purchased all of the land around the city. As the population increases, the city turns large areas into newly created communities—complete with shopping areas and rapid transportation to the central city.

The technique most often used by American cities is outright purchase of park lands in areas where development will not be allowed. The shape and size of these lands depend on what the community wants. Some open spaces serve conservation purposes and follow the natural topography—ridgelines and bodies of water. In other areas, land to be purchased will serve as an undeveloped natural buffer between planned clusters of homes and shopping areas.

Such concentrated urban centers are easy to service. They require fewer roads, shorter utility and sewerlines, and offer easier access for police and fire companies, and public transportation. Second, they place people nearer their jobs, stores, and entertainment centers. Finally, these communities offer residents a sense of identity and easy access to the natural environment which surrounds them.

The preservation of open space need not be on such a large scale as large greenbelts surrounding new towns. It may be on the community scale, separating an industrial area from a residential community. It may be a strip of green separating a large highway from a small community. Or it may consist of a well-planned network of small parks providing visual relief from development.

As its race for inner space goes into the final stretch, the United States has the opportunity to plan the best relationship of human beings to their environment. There is a strong need for developing the best man-to-land ratio—a ratio that results in the highest and best use of both the land and man.



"Don't be a Litterbug"; place trash in proper containers.

De-Littering Projects

8a Locate and observe some examples of the litter problems in your community. Carry out a project to help make your community cleaner.

Litter—paper, trash, cans, bottles, etc.—strewn along roadsides, streets, lakeshores, campsites, and picnic areas costs many millions of dollars per year to clean up. More than that, it frequently becomes a health or safety hazard and causes fires and automobile accidents. Litter makes many otherwise beautiful scenic areas most unattractive indeed. To investigate the litter problem in your community, first look around by yourself. Are sidewalks, streets, gutters, or roadsides covered with trash? Are there empty lots or alleys that are filled with litter? Is the schoolyard clean, and the sidewalks leading to it? Can you see a problem caused by careless people littering your community?

You might check with your highway or sanitation department, the mayor's office, or the county commissioners' office to see if litter is a problem and how great a problem it might be. Ask too, if there is a special commission or program in the city, town, or State aimed at preventing litter.

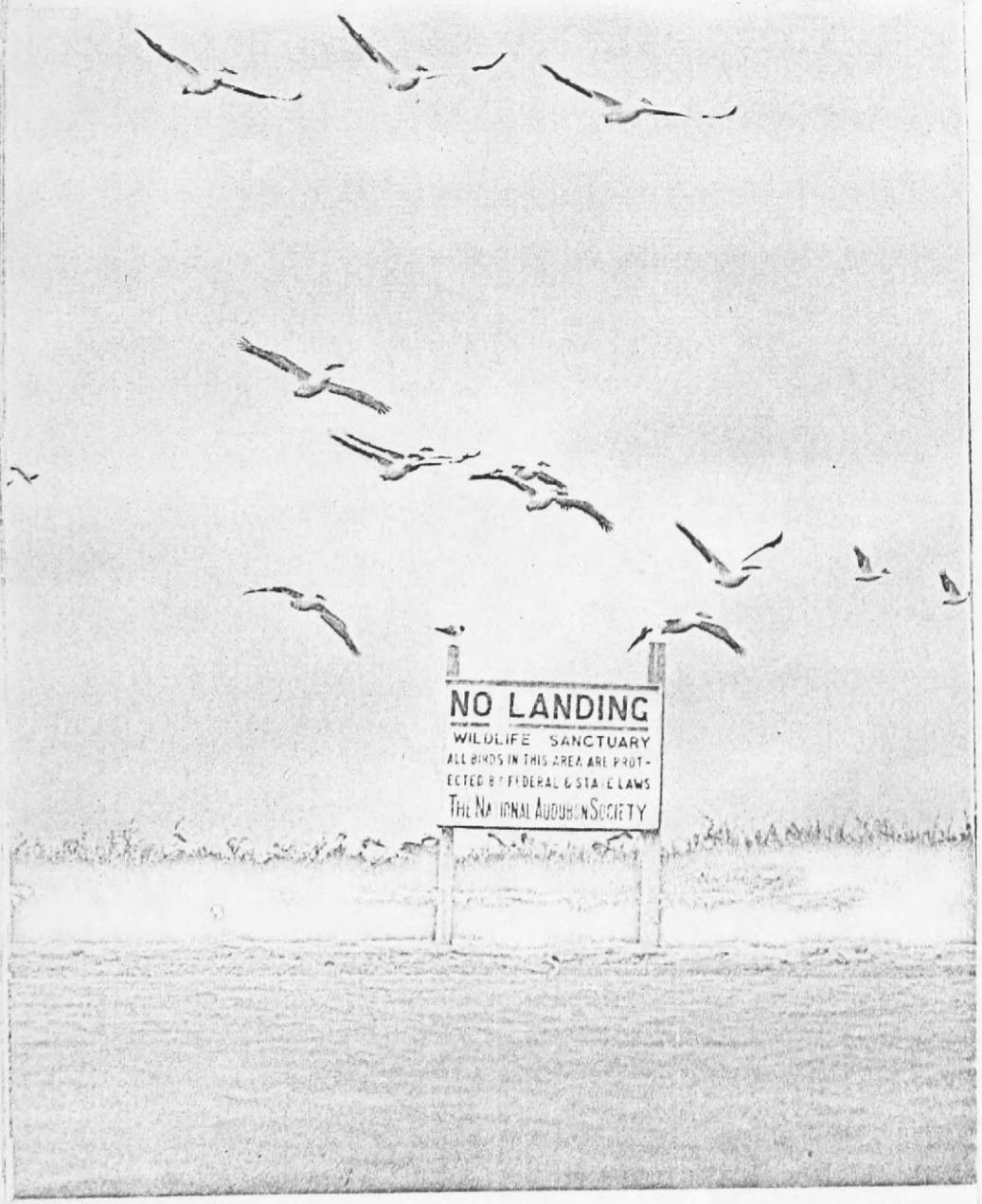
What You Can Do

There are many things you can do to help eliminate litter. First, do not be a litterbug yourself. Place your litter in the proper trash container, or carry it with you until you see a container. Encourage your parents and friends to do the same thing. Make a tote-litter bag for your car and for a neighbor's car. Make a tote-litter bag and use it on camping trips or hikes to carry your trash back out of the woods to a proper container.

Make "Don't Be a Litterbug" posters and get permission to place them in store windows or on public bulletin boards. Talk with your teacher or other school officials about showing a special anti-litter movie in a school assembly program.

Take part in a community cleanup campaign. With your patrol or troop, clean up a section of roadside or an empty lot, or offer your services to a park superintendent to help clean up.

For other ideas, and information on films, write to: Keep America Beautiful, 99 Park Avenue, New York, N. Y.



Game laws help to protect our wildlife resources.

Conservation Laws

8b Report to your troop or patrol on the conservation laws that affect you in your community or camp. Discuss: fire permits; fines for littering; and laws on fishing, hunting, water conservation, and air pollution.

To meet this requirement talk first with your counselor. He will be able to help you get started. After that, you must do a little letterwriting, telephone calling, and personal research.

Fish and game laws.—A local fishing tackle store may have copies of the State laws, or write to your State Fish and Game Department in the State capital, or ask your local game protector.

Fire permits.—Ask your local fire department or fire warden, or write to your State forestry department in the State capital.

Water conservation.—Ask your local water supply agency office, mayor's office, or county office.

Litter laws.—Ask your local mayor's office, township or county office, police or State police department, highway department. If you cannot get the information locally, write to your State Attorney General's office in the State capital.

Air pollution laws.—Same list as for litter laws, except for the highway department.

Working for Conservation

9 After getting the approval of your counselor, carry out two of the following conservation projects alone or with other Scouts.

(a) Plant trees, shrubs, vines, or other natural cover to reduce soil erosion.

(b) Build gully control structures or water bars to stop erosion in a gully or trail.

(c) Riprap or plant natural cover to stop erosion on streambank or lakeshore.

(d) Plant 50 pulp- or timber-yielding trees.

(e) Plant 10 ornamental trees or shrubs to help beautify your yard, park, or community.

(f) Build and put out two nest or den boxes or bird feeders or one birdbath. Report on what birds or other animals used them. Plant 25 food shrubs for wildlife.

(g) Build a brush pile suitable for wildlife as described in this pamphlet.

(h) Plant a hedgerow 50 feet long, suitable for wildlife cover.

(i) Select one natural resource such as air, minerals or fuels, water, soil, forests, grasslands, fish, wildlife or scenic wilderness or recreational area. Write an essay of 750 words that explains these points: (1) the importance of the resource; (2) the conservation problems of that resource; (3) what is being done to solve these problems; (4) how this resource affects other resources.

(j) Carry out a woodlot improvement or development project on 2 acres.

(k) Carry out a fish conservation project in a stream, lake, or pond.

(l) Attend an established conservation training camp for at least a week.

(m) Carry out a conservation project — approved in advance by the proper authorities—in a park, nature center, or on school property.

Dramatizing Conservation

10 Select one conservation problem in your community or camp and do one of the following things to make other people aware of the problem:

(a) Build a window display or an exhibit for a store, school, church, or other prominent place.

(b) Write and submit a story and have it used by the local paper, school paper, troop paper, radio, or TV.

(c) Set up a demonstration project in camp as a model for others to follow.

The purpose of this requirement is to give you experience in spreading the word about conservation of natural resources—to the members of your patrol and troop, other Scouts and Explorers, and the general public in your community. Conservation is a subject that has to be continually promoted to prevent thoughtless waste or destruction of nature's gifts.

You can do the project for this requirement at any time of year, or you may want to tie it to a troop activity like summer camp, Boy Scout Week, the annual Scout show, parents' night, or a camporee or rally.

Scouts have many opportunities to influence public opinion about conservation and natural resources. You may help to develop a Boy Scout Week window display on a conservation theme or a conservation booth at your Scout show. News about your troop or patrol activities and your conservation projects is welcomed by local papers to stimulate public interest in conservation projects.

APPENDIX IV

AN OPENING STATEMENT

"There is beauty in the sound of the words 'good earth'. They suggest a picture of the elements and forces of nature working in harmony. The imagination of men through all ages has been fired by the concept of an 'earth-symphony'. Today we know the concept of poets and philosophers in earlier times is a reality. Nature may be a thing of beauty and is indeed a symphony, but above and below and within its own immutable essences, its distances, its apparent quietness and changelessness it is an active, purposeful, coordinated machine. Each part is dependent upon another, all are related to the movement of the whole. Forests, grasslands, soils, water, animal life - without one of these the earth will die - will become dead as the moon. This is provable beyond questioning. Parts of the earth once living and productive, have thus died at the hand of man. Others are now dying. If we cause more to die, nature will compensate for this in her own way, inexorably, as already she has begun to do."

--Fairfield Osborn
Our Plundered Planet

APPENDIX V

A DEFINITION OF CONSERVATION

"Conservation ... can be defined as the wise use of our natural environment: it is, in the final analysis, the highest form of national thrift - the prevention of waste and despoilment while preserving, improving and renewing the quality and usefulness of all our resources."

---President John F. Kennedy
Conservation Message to Congress

(Quoted in Udall, The Quiet Crisis, p.185.)