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AVOCATIONAL HORTICULTURE IN GENERAL EDUCATION:
RATIONALE AND DESIRED OUTCOMES

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AVOCATIONAL HORTICULTURE IN GENERAL EDUCATION: RATIONALE AND DESIRED OUTCOMES

By

David Gilbert Tompkins

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ABSTRACT

AVOCATIONAL HORTICULTURE IN GENERAL EDUCATION:
RATIONALE AND SELECTED OUTCOMES

By

David Gilbert Tompkins

School curricula are often criticized for failing to provide a balance of learnings. If the general education curriculum was broadened to include learnings which cause the theoretical disciplines to have added practical impact, then students will be equipped to function more effectively in their avocational life as well as their vocational life.

Two goals formed the purpose of this descriptive study.

1. To develop a rationale for offering avocational horticulture in the general education curriculum of schools.
2. To establish a possible practical content base for avocational horticulture.

Though not a major emphasis of the study, the study processes stand as one model for curriculum development in general education. Additionally an attempt was made to suggest ways in which general education in avocational horticulture could be provided, not only by schools but also by other agencies and partnerships.

A rationale was developed for avocational horticulture which considered the role of plants in meeting the needs of individuals and society. Major elements of the rationale were supported by appropriate literature. In summary

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the rationale is:

> Sociologic, technologic, and economic change create an increased need for enhancing people-plant interactions. Although not educated to the task, people have increased their uses of horticultural materials. As an agency empowered to educate for effective living, schools have a role in meeting the needs of society and the needs of the individual within that society. For our present and future students, it is increasingly important to blend the theoretical and the practical, the aesthetic and the cognitive in the curriculum. Horticultural experiences, when provided for general education purposes, can provide a vehicle for this blending and therefore can enrich the lives of individuals.

An analysis-of-activities approach was used to carry out the search for avocational horticulture content. Through this process an 85 item research inventory was developed which consisted of five main task areas (lawns, trees and shrubs, indoor gardening, gardening, and miscellaneous). Content items were validated by an expert jury comprised of cooperative extension agents and horticulture educators.

Data were examined from two perspectives: first, from the point of content identification and secondly, from a critical view of the processes used.

Content and Process Findings

1. Fifty-five of the 85 horticultural tasks were rated very important to important by 75 per cent or more of the jurors and thus qualified as potential content.

2. Fifty-four additional task statements were proposed by jurors. Thirty-one of the suggestions were provided by cooperative extension jurors and 23 were provided by horticulture educators.

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3. In three of the five task areas horticulture educators rated the content tasks from a different perspective than that of the cooperative extension agents.

4. Jurors provided 65 comments related to task items.

5. Juror comments revealed that task items were not discrete.

Conclusions

The rationale and proposed content stand as a nucleus for curriculum development. Those 55 items which received jurors high ranking and the 54 added tasks form a constellation of practical content for avocational horticulture. Additional steps such as that of providing knowledge components and sequencing are necessary before avocational horticulture becomes a teachable curriculum. Use of an open-ended inventory provided stimulation for jurors to add tasks and to make comments. It appears as though an analysis-of-activities process is a useful method for identifying avocational horticulture content. In addition to the rationale and proposed content, recommendations were made to aid schools in providing general education in avocational horticulture by using agencies and expertise already available in the community.

DEDICATION

This study is dedicated to my family; to Melanie, Valerie, Todd and Carrie for continuous, though friendly chiding, and to my wife Joan for her love and sacrifice throughout the experience.

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Correspondence with Charles Lewis of Morton Arboretum provided early encouragement. It was he who provided the important concept of plant-man-interactions. His comments and articles led to the writings of Hugh Iltis and to the work of Peter Wotowiec director of the Cleveland horticulture program.

Thanks are due William Urash of the Erie County Cooperative Extension Office, the jurors, and the local experts for, although they did not know me, they were willing to help.

Editorial assistance was provided by Marguerite Iobst and Shirley Westcott. Preliminary and final typing was done by Sue Young and Lois Fobes respectively. Printing of the research inventory was done by Charles Leehan.

Additionally appreciation is extended to Shirley Brehm, Martin Hetherington, Gilbert Mouser, and James Gallagher for serving as committee members. Special recognition is due Charles A. Blackman for his work as chairman. His support provided the necessary link to keep the study alive despite time and distance.

And finally, there were two whose passing strengthened my determination to finish the study. Tribute is due Julian Smith because he shared many wonderful ideals, and to my father because he taught me to appreciate them.

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CHAPTER I

THE PROBLEM

Need for the Study

Schools are designed to achieve multiple purposes. One of the major challenges facing our public school systems is that of maintaining an optimal balance between or among the major categories of these purposes: the academic, the vocational, and the avocational. Additionally, environmental concern has pressured schools to close the gap between man and nature, and to set the stage for decision making processes. Advancing technology produces both stress and leisure. Neither of these factors is reflected proportionately in the curriculum of schools.

Recently, when James S. Coleman was asked how he would modify his famous report of 1960, he spoke of inequalities in the present offerings of schools. He felt that one of the current sources of inequalities of educational opportunity at the secondary level was the "narrow focusing of education on cognitive skills rather than on all of the capabilities young people will need to have to become adults."[1] It is true that schools seldom allot a large

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[1]Harold G. Shane, "An Interview with James S. Coleman on the Problems of Youth," Today's Education, Volume 64, Number 2 (March-April 1975), p. 80.

portion of their time to concrete or practical things, such as fixing a faucet or planting a garden.[2]

To varying degrees schools have provided learning experiences in the practical dimensions of life. The criticism remains that schools do not address those useful forms of learning which contribute to the total well-being of the individual. Coleman holds this up as a flaw in institutionalized education in America, adding that schools fail to "give enough attention to those dimensions of learning in which our youth can find the most satisfaction, motivation and real world success."[3]

It is by tradition that schools are called upon to solve the problems of society. This, however, is not without criticism. O'Toole suggests that it is "unsound to build educational policies around the apparent crises of the day."[4] He supports this view with the argument that society is faced with underemployment due to the large percentage of workers who are overeducated for the jobs now available to them. The solution he suggests for schools is a "change away from economic efficiency (how much more money will be earned with a certain type of degree) and towards

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[2]Harry S. Broudy, General Education: The Search for a Rationale, Bloomington, Indiana: Phi Delta Kappa Educational Foundation, 1974, p. 47.

[3]Harold G. Shane, p. 80.

[4]James O'Toole, "Schools Won't Change Society," (remarks quoted from a symposium on education), Voice, November 17, 1975, p. 3.

human resources development, or preparing students for life and personal satisfaction."[5]

Certainly one could ask if the school has a role to fill in the practical education of students. In that portion of the curriculum referred to as general education schools have already assumed partial responsibility. But Schwab adds a caution to this with these remarks,

> "If one decides to take at all seriously the suggestion that his enquiries expand to include the practical in education, to include determination of aims and means of education in close connection with one another, objections to the specialism become very serious, for the aims of one part of education can never be wisely chosen apart from consideration of the aims of all other parts of the curriculum."[6]

General education can be viewed in several different ways. Broudy sees it as "an invitation to take a few steps on the road to connoisseurship in all departments of life; to find one's way around knowingly on many maps; to use the best stencils the culture has produced."[7] His concept of general education is one of providing many opportunities, any one of which could lead one to be a buff or connoisseur in some area of interest. He goes on to speak of the satisfaction which comes to individuals who find such interests. As he puts it, "in the domains of one's

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[5]O'Toole, p. 3.

[6]Joseph Schwab, "Decisions and Choice the Coming Duty of Science Teaching", Journal of Research in Science Teaching, Vol. 11, No. 4, 1974, p. 316.

[7]Harry Broudy, 1974, p. 47.

expertise, one makes fine distinctions, details are noticed, and one is constantly on the lookout for new specimens."[8] It is in this conception that one could see general education as providing avocational escape from the demands of life.

In seeking an expanded role for schools in practical learning, it should be possible to answer in part the challenge that schools provide education for leisure. Despite the long standing mandate that schools should provide for the wise use of leisure, critics continue to point out shortcomings in this regard. Schools could make a significant response to leisure by providing for learning useful in the avocational dimension of an individual's life. Leisure pursuits can offer much to the physical and mental well-being of an individual. This would be an opportunity to meet practical as well as personal needs.

What then of the need for avocational horticulture in the general education curriculum? Is the time right? Culturally, the knowledge and practices which were once commonly available when man lived close to the land are no longer within easy reach. Environmentally, the quality of man's immediate surroundings is continuing to be changed. The pressure of daily living in a highly technological society, while it provides greater leisure, carries with it the cost of increased stress on man and his environment.

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[8]Broudy, p. 47.

Can plant culture activities be used as a means to develop environmental sensitivities in learners? Is it possible that students can experience simple responsibilities for life through the care of plants and thus develop an inner sense of worth and purpose?

There are many facets in the role of schools. It would seem necessary that a balance exist among those facets so that the knowledge components do not out weigh the elements of practical value, nor should these facets hinder the process of culturing the personal dimensions of the learner.

If schools have a role in developing the affective dimensions of students then consideration must be given to the varieties of ways that this may be done. If it can be shown that plant culture activities offer a mechanism to shape those affective learnings of students then schools should seek opportunities to make use of these avenues. A rationale would be a means to seek evidences of the benefits of plant culture to man and thus aid in developing support for the offering of avocational horticulture in the general education curriculum.

If there is a need for individuals to garden and landscape then there is a need to supply the learning necessary to carry out the common plant culture tasks which individuals face. The sale of horticultural goods to home owners and hobbyists indicates strong involvement on the part of the public. At present, to the extent that the

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practical knowledge gap in plant culture is being met at all, it is being met through a variety of non-school sources. Although schools have not been active in supplying avocational horticulture learning, there may be merit in looking at the ways in which they could assume this role.

Traditionally most horticulture in public schools is taught with a vocational emphasis. Thus the majority of persons who will someday engage in gardening or other horticulturally related activities is by-passed. Because avocational horticulture is not widely taught, there is no established content base nor is there an accepted rationale for its place in the general education curriculum.

Statement of Purpose

There are two goals for this study:

1. To develop a rationale for offering avocational horticulture in the general education curriculum of schools.
2. To establish a possible practical content base for avocational horticulture.

It is proposed that a rationale can be established which will argue the need and value of providing individuals with an exposure to plants and the means necessary to nurture them. Additionally efforts are directed toward identifying those practical horticultural tasks which might be of greatest value to the hobbyist or home owner. The emphasis is on practical activities which would enable a person to plant, maintain and enjoy plants in his surroundings.

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While not a major emphasis of the study, the process of developing a rationale and seeking content does provide one model for curriculum development in general education. Also, an attempt is made to suggest additional ways in which avocational horticulture needs can be met, not only through schools but also through other agencies and partnerships.

Procedures

The rationale is developed through a review of appropriate literature. Evidence is sought which indicates the benefits of plant culture experiences to man. An attempt is made to identify the responsibility of schools for general education in horticulture.

A search for practical horticulture content is made of popular gardening books, periodicals, pamphlets and other studies. From these sources an inventory of practical horticulture tasks is developed, and then reviewed by a local jury of experts. In the search for practical horticulture content the procedure used is a modification of the analysis-of-activities approach. Often this approach is used to identify content for vocational programs.

The preliminary practical horticulture inventory is modified according to the evaluations of the local experts. Their comments and ratings are used to structure the research inventory.

Final identification of content is made by submitting the practical horticulture task inventory to an expert jury composed of two sub groups. Cooperative extension agents and horticulture educators form the two sub groups.

Definitions

Horticulture - "is that segment of agriculture concerned with the production, utilization and improvement of fruits, vegetables, flowers and ornamental plants. It involves the breeding, propagation, production, nutrition, harvesting, handling, storage, and processing of food crops and decorative plants, the aesthetic use of plants in the landscape and home for personal pleasure or for the enhancement of the environment."[9]

Gardening - is a dimension of horticulture which is normally done out of doors, and which involves ornamental or food plants. It can be distinguished from agriculture because it is usually done on a small scale, one acre or less, and without design for commercial profit.

Avocational horticulture - those practical activities with plants, valued for their contribution to the general education of individuals. Many of the activities may have value in vocational horticulture, but not by design.

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[9]Ken Keeley, "Horticulture, "College of Agriculture," Pennsylvania State University, September 1974, p. 1., (script of a tape used in the Career Development Center).

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General education - "those phases of learning which should be the common experience of all men and women."[10] Examples of general education areas of the curriculum are Home Economics, Social Studies, Math, Science, and English. This would include both theoretical and practical aspects.

Task area - those wide scope horticulture functions most often carried out by home owners and hobbyists. Generally they are represented by plant categories such as lawns, trees, shrubs or vegetable gardens.

Tasks - those component manipulative activities which enable one to carry out avocational horticulture functions. For example, if the task area were lawns then mowing, fertilizing and watering would be examples of tasks necessary to maintain lawns.

Analysis of activities approach - a process through which jobs or tasks are reduced to component activities for the purpose of identifying, in some systematic way, the steps needed to complete a job or task.

Limitations and Assumptions

Limitations

The study is descriptive in nature. Data and findings should be generalized with caution. The target population of this study is kindergarten to twelth grade. This limitation

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[10]Carter V. Good, (Editor), Dictionary of Education, New York: McGraw-Hill Book Company, 3rd ed., 1973, p. 258.

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should not imply that plant culture experiences may not be valid for other age groups but instead it is meant to focus on the traditional age range of school populations.

Jurors have been used as a part of the content validation process; however their selection, though a potential source of objectivity, also becomes a limitation. Particularly this is so in the sense that they were selected as recognized leadership from the field of horticulture discipline and practice. This deliberate choice thus may have limited their ability to weigh all the other objectives of general education.

Although the sharper focus will be placed upon Home Economics and Industrial Arts as examples of curriculum areas which use a measure of practical activities it should be pointed out that science courses could serve as similar examples.

No attempt is made to develop a course or to organize course materials, nor is there an effort to prescribe instructional strategies to attain competency based skills. The content base which is sought is by intent that of practical activities. Thus, while there are implications for a knowledge component, a refined set of objectives is not one of the proposed outcomes of this study but a step which would follow the study.

Because the study is primarily directed at a practical component of general education, the search for practical content is made directly of common sources and practices

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rather than the discipline. No effort is made to modify existing vocational curriculum in horticulture.

Assumptions

The following assumptions guide the study.

1. Current societal conditions and individual needs are such that it is possible to support the inclusion of avocational horticulture in the general education curriculum of schools.
2. Public schools have a responsibility to restore or develop in man a more appropriate behavior toward the environment.
3. Plant-growing experiences may cause individuals to adopt an appropriate perspective on the environment and the living things which are found in the environment.
4. Schools should provide a balanced offering of cognitive and affective learning.
5. When curriculum is developed to meet avocational or affective needs it may be more suitable to focus on ordinary life activities as a mechanism to bring theoretical subject matter into practice.
6. In order for education to be considered general it must be of value to most individuals.

In summary the assumptions are that through "hands-on activity" with living plants, individuals will gain useful skills to occupy their leisure moments. In turn the

experiences of caring for ornamental plants, fruits and vegetables may re-establish contact between man and the essential elements of his early heritage and thus become an enabling factor leading to a broader educational outcome for the individual. It is hoped that these opportunities might bring out a heightened sensitivity to the natural world and a new behavior toward elements of the environment.

In some measure these assumptions and limitations help to establish the frame within which the study is cast. Limits and biases evident from the start are provided for those who may seek to make use of the outcomes.

Background

Frequently man is considered apart from the environment. Sommer suggests a shortcoming in this view with the question, "Does man have a natural biotope, a kind of environment that he requires for his physical or mental well-being?"[11] Hugh Iltis, noted botanist, feels that many of the dysfunctions experienced by man rise out of his insulation from the environmental elements which originally shaped him. Man's return to the woods as a camper, fisherman, or hunter is seen by Iltis as a response to some internal force, suggesting that man may well have a deep

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[11]Robert Sommer, "Man's Proximate Environment," Journal of Social Issues, 22, No. 4, 1966, p. 68.

seated need for nature.[12]

In speaking of the good which comes from exposure to the out-of-doors, Kelley put it this way..."I am convinced that there is some sort of bond between the human organism and the earth from which he sprang."[13] He did take note regarding the lack of scientific proof for this view. Eleven years later Iltis suggested that the "need for nature" be objectively documented. He went on to say that "there are a multitude of subjective indications, from religion, art, and music to gardening and psychiatry, that suggest man to be indivisible from the living natural environment around him."[14]

Foregoing proof of this relationship, Iltis, as evidenced by the following quote, sets this as a goal for biology.

> "Even without knowing the precise physiological or neurological details on which these needs are based we must respect them as the forces which have moulded our species both physicially and psychologically. It shall be the true role of biology to make our life livable and human by insisting that our inherited needs for natural pattern, natural form, and natural diversity are not abandoned where ever we may be in favour of a capricious technological hell."[15]

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[12]Hugh Iltis, "Flowers and Human Ecology," New Movements in the Study and Teaching of Biology, Ed, by Cyril Selmes, Maurice Temple Smith, London, 1974, pp. 294-295.

[13]Earl Kelley, "As We See It," in Education in and for the Outdoors, Washington, D.C., AAHPER, 1963, p. 58.

[14]Iltis, 1974, p. 311.

[15]Iltis, 1974, p. 314.

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When one reads of the influences credited to the experiences of raising plants it becomes easy to speculate that plants are part of the bond between man and earth. The American Horticultural Society is so convinced of this that they have commissioned a program aimed at understanding and utilizing the interactions between people and plants. "Surveys and studies have shown there is a relationship between citizens and better environments when people are involved in gardening." This has been shown to be particularly true in the inner city, where gardening "inspires individuals to perceive themselves and their surroundings in a new and better way."[16]

Historically the linkage between man, plant and soil can be traced back nearly 10,000 years. Excellent records of agriculture-horticulture as an established discipline can be found in the Egyptian culture about 3,000 B.C.[17] In addition to using plants for nourishment, man has included them in his environment to satisfy other needs. Beauty and symmetry are personal constructs not easily defined, yet these are two attributes of plants which obviously bring pleasure to man. Man's esthetic use of plants probably began long before the Hanging Gardens of Babylon. It is this esthetic use of plants which

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[16]Joan Lee Faust, "Around the Garden," The New York Times, 1 July 1973, p. 30.

[17]Jules Janick, Horticultural Science, 2nd ed., (San Francisco: W. H. Freeman and Company, 1972), p. 9.

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distinguishes horticulture from other agricultural activities.[18]

Currently, there is no question that the American public is utilizing more plant material in their environments. "In 1974, Americans bought 11 million dollars worth of house plants. According to the Society of American Florists and Horticulturalists, that represents a 64 per cent increase over 1973."[19] Seed houses which supply the home gardener have experienced sales in excess of the victory garden era of World War II.

The increased use of plants has placed a strain on horticulture industries. Instructional programs have been geared up to meet the increased need. The surge has been met in secondary schools by an increase in vocational ornamental horticulture offerings. According to data collected in Pennsylvania, the number of instructors teaching high school ornamental horticulture was 50 in 1966-67 increasing to 106 in 1969-70.[20] This same pattern has been reported in similar studies in Michigan, California, and Indiana.

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[18]Janick, 1972, p. 4.

[19]Debbie Wallace, "Plant Hospital Provides Good Pot-side Manner," The Erie Times News, 17 December 1975, Section C, p. 5.

[20]Richard F. Stinson, "Curriculum Materials for High School Ornamental Horticulture Programs," HortScience, Volume 7, Number 1, February 1972, p. 46.

The increased utilization of ornamental plants, home vegetable gardening and the house plant interest may be representative of several societal pressures. Perhaps the most obvious might be the recent interest in the environment. Some suggest that the "return to nature" trend is a manifestation of man's need to counterbalance his world of machine, schedule and production. Although empirical evidence is limited, the tremendous rise in outdoor recreation denotes the time and desire to seek escape from the work world.

Denisen listed a number of reasons which may have contributed to the recent increased emphasis on plants. He attributed it to "increased leisure time, more interest in outdoor activities, beautification programs, nutrition programs, social programs and horticultural therapy."[21] In addition to these factors one should probably list economic forces, particularly the inflationary rise in the cost of food and services.

Another cause to consider would be the steady shift of population from cities to the suburbs as well as an increasing tendency of late for growth in rural areas. No doubt this, coupled with the continued rise in the "do-it-yourself," movement helps to explain the increased use of ornamental plants.

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[21]Ervin L. Denisen, "Introduction to the Symposium," HortScience, Volume 7, Number 1, February, 1972, p. 43.

If there is need for practical horticulture skills in the life of man, then from what sources should these needs be met? At present they are being met through advice from neighbors and friends, garden articles, books, pamphlets, garden center persons, cooperative extension personnel, garden clubs, and educational television programs. Thus far schools have played a limited role in providing for avocational horticulture.

The narrow view that man may have application for avocational horticulture skills is not sufficient to support a role of horticulture in general education. But, if it can be shown that there is a more fundamental role of plant culture skills; perhaps one of providing a vehicle to nuture a wide range of personally fulfilling learnings, then there may be a place for avocational horticulture in the general education curriculum of schools.

Significance of the Study

Several factors in this study may be significant. To date no rationale has been offered to include horticulture as a general education experience in schools. The effort to do this stems from the assumption that schools should do more to strike a balance between practical and theoretical aspects of the general education curriculum. The essential effort is to explore the use of plant culture activities as enabling experiences in the general education curriculum.

Another factor is that of content selection. The process of content selection in general education is not nearly so fixed as that of vocational education. Through the application of the analysis-of-activities model a systematic attempt is made to identify practical content for general education. The use of life activities as a source of curriculum content is not new; however, it is unique to the development of curriculum for avocational horticulture. Though not intended, the summation of the search for a rationale and practical content may stand as one model for developing general education curricula.

In seeking approval of content an unusual blend of knowledgable persons needs to be tapped. When seeking vocational content it is common to draw on the resources of the specific industry. In this case a landscaper, a garden club president, three garden center managers, five horticulture educators and eight cooperative extension agents[22] have input to either the preliminary or final task inventory. Rather than weight the search for content toward the discipline an attempt is made to weight the content selection process toward practicality.

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[22]The Cooperative Extension Service of the U.S. Department of Agriculture is operationally attached to the various land grant colleges having agricultural programs. Persons associated with this program are titled Cooperative Extension Agents, but for convenience in this study they will also be referred to as extension agents.

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Overview of the Study

The historic background of horticulture in public schools and the nature of some representative programs are reviewed in Chapter two. Additionally, the role of a rationale in the development of curriculum is examined. Considerable time is given to a review of studies and methods which have been used to determine curriculum content.

In Chapter three the method used in developing the rationale and the practical task inventory is presented. Selection of jurors and the methods of data analysis are also included.

Chapter four is the depository of supportive arguments for the rationale to provide avocational horticulture in general education. Elements of the rationale are drawn from the following sources: societal conditions, the role of plants in the life of man, the needs of individuals, and the role of schools.

A summary of the data gathered through circulation of the horticultural task inventory is presented in Chapter five. Procedures such as ranking of task items and analysis of juror comments are used to evaluate study processes and assumptions.

Chapter six is the concluding chapter. It contains a summary of the entire study. A section of the chapter, entitled reflections, is used to provide a mechanism for

dealing with questions and observations which emerged during the study.

At this time the emphasis on horticulture in public schools is strongly vocational. More often than not, reference to horticulture rises out of the context of agricultural education. As will be noted in the literature review, not many schools have programs with provisions for horticulture as general education.

CHAPTER II

REVIEW OF LITERATURE

Three distinct areas form the basis for this study: the history of horticulture in American schools, the place of a rationale in the curriculum development process, and the nature of content selection processes which have been used in vocational and general education.

Questions have been used to guide the development of the first section on the history of horticulture in schools. What has been the nature of horticulture in American schools? Are there examples of horticulture serving a role in general education? Through the examination of existing programs, it is hoped to identify methods which were used to determine content.

History of Horticulture in Schools

Historically, five general forms of horticulture education have been visible: (1) practical or applied botany, (2) school gardening, (3) agriculture education, (4) vocational ornamental horticulture, and (5) avocational horticulture. Horticultural education in schools has never achieved nationwide acceptance; however, there is currently an expanding emphasis centered on vocational preparation.

Curriculum in the early high schools (1860-1880) usually included two natural sciences, botany and zoology. In the study of botany, practical tasks such as grafting,

raising plants from cuttings, and the growing of plants provided an applied nature to the course.

The Normal-School influence is credited with fostering new courses in the elementary schools. Among these agriculture was included as a content subject, and school gardening was added as an expression subject.[1] School gardening, which provided opportunities to encounter many of the skills necessary to grow plants held the closest relationship to horticulture.

Non-vocational horticulture as a part of general education was not unique to American education. Blum, in reviewing trends in non-vocational agriculture, referred to the use of gardening by Pestalozzi, who evidently used it both as pre-vocational training and also as a means for character education. Another early proponent was J. A. Comenius, a 17th century educator, who advocated relating education to everyday life by emphasizing contact with objects of the student's near environment.[2]

Horticulture since 1900 Early leaders in public school horticulture were Cleveland, Ohio, Los Angeles, California and Boston, Massachusetts. Their respective dates of

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[1]E. P. Cubberly, Public Education in the United States, rev. ed. Boston: Houghton Mifflin Company, 1934, p. 518.

[2]Abraham A. Blum, "Trends in Non-Vocational Agriculture-An International Review," The Agriculture Education Magazine, volume 45, number 4, October 1972, p. 86.

inception were 1904, 1908, and 1918. The Cleveland program, because it is a model program, will be discussed last and in greatest depth.

To continue the studies initiated in elementary schools during the early 1900's, the Boston School Committee established a state-aided instructional program in agriculture and horticulture at the high school level.[3] Currently, students studying horticulture in the Boston program major in either floriculture or landscape gardening. A supervised occupational program gives their curriculum a vocational emphasis.

In the Los Angeles City school district, horticulture was included as part of the agricultural education program. The horticulture program has been available in their comprehensive junior and senior high schools since 1908.[4] Early emphasis was directed toward agricultural production, which shifted with the growth of metropolitan Los Angeles. Today the emphasis is both vocational and avocational.[5]

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[3]Edmund C. Sprissler, "A Look at Agricultural Education in Boston-The First Fifty Years," (The Agricultural Education Magazine, October, 1968), p. 88.

[4]Ronald D. Regan, "A Comprehensive Program of Agricultural Education in Los Angeles," (The Agricultural Education Magazine, October, 1968) p. 84.

[5]Ivan L. Wolfson, "Agricultural Education for Elementary and Junior High School Students," (The Agricultural Education Magazine, May 1970) p. 275.

Upon comparison, the present elementary horticulture programs in both Cleveland and Los Angeles are substantially different. "Resources and man's environment form the theme of the Los Angeles program."[6] As will be shown later, the Cleveland program concentrates on plant growth and culture. There is, however, opportunity for some of the same objectives to be met in both programs.

Horticulture courses provided for the junior and senior high students of Los Angeles are summarized in Table 2.1. The tabled information reveals a concentration of horticulture offerings in the secondary schools. It is worth noting that Los Angeles schools are among the few offering the avocational or general education aspects of horticulture.

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[6]Wolfson, p. 274.

Table 2.1

Horticulture in the Los Angeles Agriculture Education Curriculum[7]

Grade level	Course title	Content description
Grade 7 (all boys)	Exploratory Horticulture (required)	Provides experiences, fundamental skills, and knowledge in the production, care and maintenance of plant material, insect identification and control; Safe use of tools and equipment; Lab experiences in soils, water and plant nutrition. Overview of agricultural sciences for career exploration
Jr. high girls	Floriculture (elective)	Information on plant growth Horticultural practices Experiences in corsage construction, floral arranging Use of ornamental plantings in home beautification
Grade 8-9 (students interested in Hort.)	Horticulture (two year elective)	Experiences in plant propagation. Lath-houses and greenhouse practices. Introductory landscape. Use of plant materials. Plant identification. Horticultural application to home use and beautification
Grade 10	General Horticulture Vocational Horticulture	
Grade 11	Horticultural Mechanics Floriculture	Principally vocational preparation
Grade 12	Plant and Soil Science Landscape design, layout and construction	

[7]Wolfson, May, 1970, pp. 273-275.

Wolfson, in writing about the Los Angeles program of agricultural education in general education, provides a partial rationale for avocational horticulture. He suggests that students receive their first exposure to plant growth within the plant sciences. In view of the nature of our urban societies, this experience could easily be denied to many. He feels that, "Youth in cities need to have opportunities to participate in activities which awaken and develop an understanding of the need for natural beauty in their surroundings."[8]

The Cleveland Horticulture Program

Perhaps the most renowned public school horticulture program in the nation is that operated by the school district of Cleveland, Ohio. Its greatest strength is found in the school gardening program which has been in operation since 1904. Peter Wotowiec, the current supervisor of horticulture education, describes their elementary program as having three parts: garden science, home gardens, and tract gardens.[9]

The elementary gardening program, called garden science, is used throughout the district. Essentials of that program have been presented in Table 2.2 on the next

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[8]Wolfson, May, 1970, p. 275.

[9]....."Pioneer Horticulture Program in Elementary Schools," (The Agricultural Education Magazine, May, 1970) p. 279.

page. Teachers are given the necessary materials for the lessons and classroom support through a district-wide communications network. Classroom science starts at an early age with structured growth experiences of a practical nature.

Table 2.2

Elementary Level Gardening Program Cleveland, Ohio[10]

Grade level	Course title	Content description
Kindergarten		Indoor seed sowing
Grade 1	Garden Science	Plant growing
Grade 2		
Grade 3	Garden Science	Rocks and soil Potting Dutch bulbs Lilies for Easter Constructing and maintaining a terrarium Forcing Paper White Narcissus Christmas trees and greens Making softwood cuttings A home garden Planting cool season crops Planting warm season crops Summer garden care
Grade 4		
Grade 5		
Grade 6		

The second phase of their elementary horticulture program embodies a unique home school connection. Students in grade three through six may volunteer for Home Gardening.

[10]Peter J. Wotowiec, "Pioneer Horticulture Program in Elementary Schools," (The Agricultural Education Magazine, May 1970), p. 279.

Those who wish, enroll in March for the gardening program. The student pays a small fee to receive a garden kit which includes seeds and other essential gardening material.[11]

Student gardens are planted at home. Teacher advisors visit the student gardeners twice during the summer. In addition to the stimulation of the teacher visitation, there is an elaborate system of recognition which climaxes in a city-wide Garden Fair held at the Garden Center of Greater Cleveland. In addition to this, the Cleveland Plain Dealer supplies tickets to a Cleveland Indians' baseball game for every working gardener. Despite the voluntary nature of the program, it annually attracts over 10,000 students.[12]

Supplemental to the home garden program is the Tract Garden program which is available to students in grades three through twelve. The Cleveland school district provides over 33 acres of land adjacent to school sites throughout the city. The tract program is open to any student within walking distance of the plots. Again for a small fee, the plot, seeds, fertilizer and necessary material are supplied to the student. Specific teachers are placed in charge of the tracts, and they meet twice

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[11]Wotowiec, p. 279.

[12]Wotowiec, May, 1970, p. 279.

weekly during the summer with students of common ages. Participants in this program are also eligible for the awards system.

Values of the three horticulture programs are difficult to establish. Wotowiec describes some of the benefits as follows: "Gardening is a very relevant way of teaching youngsters how and where they fit into the environment," and additionally he feels that their gardening program provides a vehicle for student, parent, teacher and community interaction that is missing in the traditional school framework.[13]

Out of the nucleus of a strong school gardening program, a multi-dimensional horticulture curriculum has evolved. In the fall of 1961, a pilot program in vocational horticulture was instituted. As of 1974 vocational enrollment had risen to 600 students. According to their supervisor of horticultural education, the vocational program is designed "to prepare high school age people for entry employment in any aspect of horticulture."[14]

A capsule summary of the history and substance of the Cleveland program has been provided by Fleck.[15]

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[13]Wotowiec, p. 279.

[14]Peter J. Wotowiec, "Vocational Horticulture in Cleveland after Thirteen Years," (The Agricultural Education Magazine, January, 1975, p. 153.

[15]V. J. Fleck, "Horticulture Education in Cleveland," (The Agricultural Education Magazine, October, 1968), p. 81.

1904 - School garden program began
1911 - Horticulture as a specialized subject became available in some schools
1930 - Adult courses in horticulture include: gardening, landscaping, and flower arranging
1962 - Vocational horticulture as a three-year program for grades 10-11-12
1965 - Post-high school technical program

The Cleveland program of horticulture has grown out of avocational beginnings, contrary to the way current programs are growing. Though they have a vocational program, it is overshadowed by the avocational. Strands of the general education program in the elementary school have been preserved in the middle high school years. Pre-vocational courses are available for ninth and tenth grade students who may take one or two semester courses. Those offerings include conservation, flower arranging, and home horticulture.[16]

College Avocational Horticulture Programs

At the college level there are some examples of avocational horticulture which have evolved out of a strong vocational program, just the reverse of Cleveland's program. For example, Pennsylvania State University offers a track in their horticulture curriculum entitled "Leisure Time Horticulture." Course titles offered in this track are: "Flower Arrangement, Outdoor Ornamental Plants, Indoor

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[16]Fleck, 1968, p. 82.

Plant Culture, Fruit and Vegetable Culture, Turf Management, Principles of Landscape Planning, and Plant Materials,"[17]

Pennsylvania State University, in providing avocational horticulture courses, have anticipated student interest and need in this area. Their leisure time horticulture courses compare favorably to the activities and plant groups most often used by hobbyists and home owners. As such, it could stand as one definition of what might be included in providing for avocational horticulture.

Another indication that an audience awaits the availability of avocational horticulture is evidenced by the popularity of a course for non-horticulture majors at Michigan State University. Taylor reports that the course "Indoor Plants and Flowers," was offered as a laboratory course for non-majors in the spring term of 1966. The enrollment grew from 58 initially to 320 over the four terms of 1970-71, with a large number of students turned away.[18] Student evaluations at the close of the course reflected the enthusiasm generated within the course. Novelty probably contributed to course popularity, but the fact

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[17]R. William Hepler, "Major in Horticulture," College of Agriculture, Pennsylvania State University, September, 1974, p. 8.

[18]J. L. Taylor, "Teaching Horticulture to non-majors in Elementary Education and Home Economics," Horticulture Science, Volume 7, Number 1, February, 1972, p. 52.

that the majority of all student grown plants were taken home depicts attachment for the processes and material substance of the course.

Although it is not evident yet, the expansion of vocational horticulture in high schools may have a similar effect on stimulating the development of avocational horticulture. This appeared to be the case in the two programs just mentioned.

Vocational Horticulture in High Schools

As reported in Chapter one, the number of instructors teaching high school ornamental horticulture more than doubled in the four-year period 1966-70. The reason for the growth appears to be legislative. Through the substance of the Vocational Education Act of 1963, the responsibility for vocational and technical education in ornamental horticulture was placed within the agriculture education curriculum.[19] The decision limited the impact to schools with existing agricultural programs.

In a positive vein the act helped the related horticulture industries, who were at this time growing rapidly. Unfortunately, agriculture education is not a common element in most urban or suburban school curricula.

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[19]Robert White and Ralph Woodin, "The Education of Ornamental Horticulture Technicians in Ohio," (Research Series in Agriculture Education, Columbus, Ohio, September, 1967), p. 7.

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Ironically, the market for landscape workers, nursery workers, arborists and garden center workers was in the heavily populated areas. Thus, while the need for horticulture skills increased in urban centers, the training gap was being met in rural school systems.

As so often happens, federal legislation stimulated research studies related to the funded areas. Those studies dealing with horticultural education were usually directed toward determining the skills necessary to fill a particular vocational niche. To illustrate this point a few typical studies have been reviewed.

One of these studies was conducted by Shipley and Hemp to "determine what agricultural mechanics knowledges and skills are needed for entry-level employment in nursery management, greenhouse management, turf management and landscape management occupational areas."[20] They used a questionnaire containing 85 knowledges and skills in horticultural mechanics. Two response groups, (secondary school teachers of ornamental horticulture occupations and managers of ornamental horticulture businesses) were asked to rate the survey.

Perhaps the most extensive search for vocational content was that conducted by Berkey and Drake. Their study, which is discussed in more detail later in this

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[20]Edward Shipley and Paul Hemp, "Horticultural Mechanics Competencies," (The Agricultural Education Magazine, August, 1974, p. 44.

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chapter, involved an elaborate task analysis of nine horticulture businesses in New York State.[21] Contrary to the previous study, Berkey and Drake dealt only with industry personnel.

Paul Hemp directed another project which derived content in a different manner. Under a U.S. Office of Education grant, a research team and vocational horticulture teachers prepared laboratory exercises for vocational ornamental horticulture students. During the 1966-67 school year the participating teachers field-tested and evaluated the exercises. The exercises were prepared as part of the University of Illinois Summer Institute for Teachers of Ornamental Horticulture.[22]

The main content areas chosen for the exercises were: flowers and house plants, turf management, landscape maintenance, plant propagation, plant growth and development and horticultural mechanics.[23]

Regardless of the vocational content examined, the similarity between it and the business area for which the person is being trained is apparent. Because a vocation is the goal of instruction, the content selection process

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[21]Arthur Berkey and William Drake, "An Analysis of Tasks Performed in the Ornamental Horticulture Industry," New York State College of Agriculture at Cornell University, Ithaca, June, 1972, p. 1.

[22]Paul E. Hemp, Fifty Laboratory Exercises for Vocational Ornamental Horticulture Students, The Interstate Printers, Danville, Illinois, 1968, p. iii.

[23]Hemp, 1968, p. ix-x.

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is quite different from that used in selecting content for a discipline such as math or science.

Content in vocational horticulture tends to differ from that of avocational horticulture in that it usually includes a work experience. The following courses are typical of a vocational program:

> Career guidance and orientation
> Business management
> Greenhouse management and production
> Landscape planning and maintenance
> Floral arrangement and design
> Nursery production and management
> Turf growing and maintenance
> Related mechanics and construction
> Cooperative work experience with an employer.[24]

These courses form the content areas of Agricultural Career Education as it is offered in six high schools in New York City. Though representative, it is a broader program than one offered in a rural area where they may specialize in nursery production or landscaping.

It appears that schools have an established role in vocational horticulture. However vocational preparation in horticulture is not as widespread as many of the common vocations. With a continually increasing interest in gardening and landscaping one can predict an increased need to prepare individuals in vocational horticulture.

This is not the case with avocational horticulture. Of course no federal funds were ever made available as

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[24]George Chrein, "Agricultural Career Education in the City of New York," (The Agricultural Education Magazine, January, 1975, p. 150.

they were in vocational areas. It is not surprising that school responses to horticulture as general education have at best been minimal. Although needs in this regard have partially been met by other agencies.

Non-school Sources of Avocational Horticulture

Those fortunate to live in areas where strong centers of horticulture (such as the Brooklyn Botanical Gardens or the National Arboretum) are located, can usually avail themselves of a wide range of unique educational programs. In many instances nature centers provide basic gardening experiences for youngsters.

In urban areas, community action groups have been instrumental in establishing gardening through block gardens and neighborhood beautification projects. Much of the credit for this type of activity is probably due to the wave of environmental concern. This, along with pressure for a "green revolution," has done much to popularize horticultural activities.

The efforts of some local garden clubs have provided youngsters with educational programs through junior garden clubs. A unique variation of this is found in, "Hilltop, The Junior Garden Workship," which was founded in 1948 as a joint project between Indiana University and the city of Bloomington, Indiana.[25]

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[25]Barbara Shalucha, "Horticultural Science in General Education," American Society for Horticultural Science, St. Joseph, Michigan, September, 1966, p. 59.

Additionally, general education in horticulture is provided in scouting through merit badge requirements and through 4-H and local cooperative extension service programs. Public service television programming occasionally deals with general knowledge in horticulture. "Crocket's Victory Garden," produced in Boston, by Public Service Broadcasting, provides a wide variety of practical gardening information.

Implications for This Study

Although it appears that there are ample opportunities to acquire practical horticulture skills, this is not the case. Rarely can one find the full range of programs previously mentioned, in any one place. The only widespread major programs in horticulture are vocational. Content for vocational horticulture has been derived from an analysis of entry behavior needed by respective industries. Impetus for these programs has come from federal funding and pressure from the related horticulture industries.

Unfortunately, no similar force stands behind avocational preparation in horticulture. Where present, avocational horticulture has risen from a different rationale. The principle arguments have been that horticulture activities have a place in the natural science curriculum, that horticulture activities have worth for leisure, and that horticulture activities have utility for general education.

Avocational horticulture in schools, though infrequent, has taken many forms. Some examples have been school gardening, plant growth as part of life sciences, and general horticulture. It is not clear how content for avocational horticulture has been established, although it appears to have evolved from the perceived needs of individuals for practical gardening skills. No studies relating to the establishment of content for avocational horticulture were found.

Support for the addition of avocational horticulture to an already crowded curriculum would require establishing the utility of practical horticulture activities for individuals and society. One example of support can be found in Barbara Shalucha's statement that, "Gardening experiences provided young people enduring links with the land and sound life values for useful citizenship."[26] But this is only one element in support of a curriculum addition. A complete rationale is what's needed.

Rationale: Its' Place in Curriculum Development

A number of questions have been used to guide the literature search in curriculum related to design, rationale, and content. Those questions are as follows: What is the nature of the curriculum development process? What part does a rationale play in curriculum? In what broad ways has curriculum content been established?

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[26]Shalucha, 1966, p. 59.

Curriculum design

Any proposal to add a new course or to modify an emphasis in a school program involves the curriculum process. The essential process is called curriculum design. It must be acknowledged that the concept of curriculum design has been the subject of much writing and debate. In 1967, because of the confusion and disagreement with the definition of curriculum design, the Association for Supervision and Curriculum Development established a commission of curriculum design.

Perhaps it would be sufficient to briefly review a few definitions of curriculum design from the literature. One classic definition is that of Taba:

> "Curriculum design is a statement which identifies the elements of the curriculum, states what their relationships are to each other, and indicates the principles of organization and the requirements of that organization for the administrative conditions under which it is to operate. A design, of course, needs to be supported with and to make explicit a curriculum theory which establishes the sources to consider and the principles to apply."[27]

A simpler definition of curriculum design is found in the book Strategies of Curriculum Development. "Curriculum design is a statement of the pattern of relationships which exist among the elements of curriculum as they are

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[27]Hilda Taba, Curriculum Development, New York: Harcourt Brace and World, 1962, p. 421.

used to make one consistent set of decisions about the nature of the curriculum of the child."[28]

If one really focuses on the child, it is difficult to find a curriculum design which includes all the necessary attributes. As all who deal in education need be reminded, "Learning is an inside out activity,"[29] yet the criticism of curriculum programs is that they tend to be prepared for groups rather than the individual.[30] Designs omit consideration for the motivation and learning environments of the individual. Nor does such planning account for individual experiences and perception. At best, curriculum design is a compromise with many significant aspects of learning unaccounted for. Nonetheless, to approach development of curriculum without a design would be unproductive.

It would be possible to dwell on the concept of curriculum design at the expense of pressing toward the needs of this study. For the purposes of this study, curriculum design will be defined as a particular pattern of considerations and choices leading to the production of curriculum.

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[28]Virgil E. Herrick, Strategies of Curriculum Development, Columbus, Ohio, Charles E. Merrill, 1965, p. 18.

[29]Kimball Wiles, The Changing Curriculum of the American High School, Prentice-Hall, Inc., New Jersey, 1963, p. 117.

[30]Jack Frymier, Curriculum Development in a Changing World, Syracuse University Press, New York, 1969, p. 81.

Place of the Rationale in Curriculum Design

In the chapter on "The Concept of Curriculum Design," efforts of the staff which developed the program of the General College at the University of Minnesota are described. They suggested as their first proposition that "Any curriculum design or plan, if it is to become effective in improving curriculum, must make explicit and clear the bases upon which curriculum decisions are made."[31]

In an article intended to guide producers and evaluators of curriculum projects, the rationale was considered essential. The reason given for this position was that the rationale provided the framework for decisions on the choice of objectives and subject matter.[32]

Stevens and Morrissett expanded on the utility of the rationale in writing of their curriculum analysis system. They felt that a rationale should answer the following questions:

> "What are the authors' assumptions about the goals of education with respect to the individual and to society? Are there explicit or implied assumptions about the nature of society and how man is related to society? Are the goals and assumptions internally consistent? What are the authors' views on how the curriculum contributes to the goals for the individual and for society?"[33]

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[31]V. Herrick, 1965, p. 23.

[32]Louise Tyler and M. Klein, "Recommendations for Curriculum and Instruction Materials," Curriculum Theory Network, I, Summer, 1968, p. 5.

[33]W. Stevens and I. Morrissett, "A System for Analyzing Social Science Curricula," Curriculum Theory Network, I, Summer, 1968, p. 32.

Their expectations for the rationale make it clear that it must constitute a first step in the curriculum design process.

Rationale: Functions to be Served

Any rationale for horticulture as an addition to the general education curriculum must take account of two sources. Koopman expresses it this way: "Curriculum development finds one of its sources in the nature of society and the other in the nature and needs of the learner."[34] The justification for a program would, at the outset, require a suitable rationale.

Sources reviewed set the following criteria as functions to be served by the rationale.

1. It sets forth assumptions about the goals of education with respect to the individual and society.
2. It sets forth assumptions about the nature of society and man's relationship to society.
3. It sets forth the way in which the curriculum contributes to the goals for the individual and for society.
4. It should indicate the internal consistency between the goals and assumptions.
5. It sets forth the framework for decisions on the choice of subject matter and objectives.
6. It substantiates the value of the objectives and indicates the source from which they will be derived.
7. It supports the basis for content and describes the selection of organizing elements.

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[34]G. Robert Koopman, Curriculum Development, (The Center for Applied Research in Education, New York, 1966), p. 44.

With these functions, the rationale has a critical early role in the formulation of curriculum.

A clearly formulated rationale will present reasoning and documentation for several curriculum variables. It will substantiate the value of the objectives and indicate the source from which the objectives would be derived. Additionally, it would support the basis for the selection of content and describe the selection of the organizing elements.[35]

Implications for This Study

The first decision to be made when designing curriculum appears to be that of establishing a rationale for the proposed change. Once this is done, the stage is set for numerous other decisions. Perhaps the one category which best amplifies the rationale is content. One can look back upon the rationale as a broad goals statement and look to the content selected as the avenues through which those goals may be obtained.

Content Selection

The primary problem in content selection is one of determining beforehand what it is that should be provided the learner, given the parameters of needs, goals and objectives. Because learning is such a personal activity,

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[35]Tyler and Klein, "Recommendations for Curriculum and Instruction Materials," Curriculum Theory Network, I, Summer 1968, p. 7.

it is not possible to do this in an ideal way. It is doubtful that any content selection process can allow for the full range of learner variables. At best, content selection represents a compromise, but the compromises should be evident upon reflecting back to the rationale.

Approaches to Content Selection

Historically, several approaches have been used to determine content. The method used for a particular curriculum depends primarily on how the curriculum is classified. According to Krug, "the most widely used curriculum classification schemes are based on, (1) subjects, (2) broad fields, (3) problems or areas of living, and (4) experiences.[36] In both the subject and the broad fields pattern, the approach to content selection is based upon the disciplines and the choices of scholars. In the areas of living and experiences pattern, the focus is directed to the learner.

The subject approach to the selection of curriculum content is restrictive to both learners and teachers. When teachers select new textbooks, though they may have desired content in mind, they are at the mercy of publishers. Selection of content for textbooks is usually left up to authors and editors. The teacher's choice is then made on the basis of what to leave out or supplement.

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[36] Edward A. Krug, Curriculum Planning, rev. ed., New York: Harper & Row, 1957, p. 132.

Until recently, the process of content selection in academic subjects was closed to teachers and students. Two of the good features to come out of the curriculum movement of 1951-1965 were that teams were formed to do the writing, and that some of the members were teachers. Secondly, dissemination of new curricula included provisions for field testing the materials with students. Teachers were able to provide feedback to the writers based upon use of trial materials.

A curriculum pattern which shifts the emphasis to the needs of the learner is the "problems-of-living" approach. While not the most common curriculum pattern in schools, experiences of this nature are visible in such courses as family life education, consumer and driver education. When employing the problems of living approach, difficulty arises when one asks the question, who shall select the problems to be studied, the learner or the adult? In the view of Kelley, "the particulars of subject matter must be those for which the learner can find functional use in his own concrete world."[37]

The answer as to where the focus of a curriculum pattern should be placed probably rests somewhere between the needs of society and the needs of the learner. It would seem, however, that the nearer one came to meeting needs of individuals, the simpler it would be to motivate

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[37]Earl Kelley, Education for What is Real, New York: Harper & Row Publishers, 1947, p. 101.

them to learn.

It is not an objective of this study to review all manners of content selection processes, but rather to concentrate on those processes which have been used in determining content for activity-oriented programs which center around tasks of life.

Placing the focus on selection of content which is life activity centered automatically introduces several assumptions. One assumption is that life activities are a logical and acceptable source of content. Tyler would agree, claiming that identifying the activities of contemporary life is the best way to determine educational objectives. Tyler's position, however, is tempered by his caution that identifying adult activities does not indicate that they are desirable, nor that they will be activities of the future, or that they necessarily account for children's needs and interests.[38] A second assumption is that individuals exposed to the selected activities will have a place for them in their life. It is much easier to make these assumptions when working with one who has chosen a particular vocation. It then is a matter of learning the tasks and skills necessary to carry out the vocation.

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[38]Ralph Tyler, as quoted by, (George Willis, "Curriculum Theory and the Context of Curriculum," Curriculum Theory Network, 6, pp. 42-43.

The idea that it is valid to expose students to real life experiences is not new. It recurs throughout the history of education. In the 1860's "object teaching" promoted by the Swiss teacher Pestalozzi, "stressed the importance of learning through direct acquaintance with the actual objects of knowledge."[39] More recently, in the article "Enduring Elements in the Educational Thought of John Dewey," - Childs noted that "Dewey tried to emphasize a curriculum where emphasis was on experience in which young learn significant attitudes and subject matters through their own purposeful interactions with things and people in actual life situations."[40]

Harry Broudy refers to this form of general education as "a specific-task-oriented common education." In his words, "It is schooling for life as lived by all normal inhabitants of the community. It familiarizes the young with the generic tasks of adulthood."[41] His notion is somewhat out of step with what is customarily offered in the general education curriculum of schools. Basic math, English and science rarely deal in the specific tasks of

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[39]Carl Gross and Charles Chandler, The History of American Education Through Readings, Boston: D. C. Heath, 1964, p. 199.

[40]John L. Childs, ...The Univ. of Mich. School of Education Bulletin, Vol. 31, No. 2, November 1959, p. 22.

[41]Harry Broudy, General Education: The Search for a Rationale, The Phi Delta Educational Foundation, Bloomington, Indiana, 1974, p. 10.

everyday living. The assumption in these areas seems to be that learning will transfer into practical application when required in life. This assumption contradicts the premise, held by educational psychologists, that transfer of learning is facilitated by similarity of circumstances. It should not be surprising that general math experiences contribute little to the balancing of a check book.

Justification for Real Life Activities as Content

What is the value of planning curriculum around real life activities and the carrying out of real life tasks? One answer can be found in the work of the Swiss psychologist Jean Piaget. He feels that, "It is absolutely necessary that learners have at their disposal concrete material experiences (and not merely pictures), and that they form their own hypotheses and verify them (or not verify them) themselves through their own active manipulations."[42] Although the theories of Piaget are directed at the cognitive development of children, they relate well to observable adult behavior. Ideally, teenagers and adults should be comfortable working in the world of symbols, yet their typical behavior when confronted with a new device is to try it first before reading the instructions. Perhaps it is reasonable to assume that this would occur, since much of our early learning is manipulative.

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[42]Jean Piaget, (in the forward of) Piaget in the Classroom, ed. Milton Schwebel and Jane Raph, New York: Basic Books, 1973, p. X.

Physical activities like those of riding a bike or swimming become much more a fixed part of one's ability to perform than the abstract knowledge which is framed in symbols. One of the strengths of action oriented programs such as home economics, industrial arts and general science is the placement of learners in an environment of real objects instead of the world of symbols. Hands-on-experiences with concrete things provide the opportunity to develop abstractions out of real experiences. For many, the functional concept of an internal combustion engine does not take form until one is allowed to manipulate and dismantle one. Or as Dale puts it, "We must realize that there is a continuing interaction between the concrete and the abstract; the greater the depth of the concrete experience, the greater the height of the abstraction."[43]

Two general education areas in schools which deal in part with the needs of the learner to cope with certain tasks in his everyday life are home economics and industrial arts. Of the two, the home economics curriculum is much more task-of-living oriented; however, both make wide usage of manipulative skills which have carry over to life. The broad goal of home economics is considered to be "education for family living."[44] Content selection for home economics

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[43]Edgar Dale, Building a Learning Environment, Phi Delta Kappa Inc., 1972, Bloomington, Indiana, p. 48.

[44]Beulah I. Coon, Home Economics Instruction in the Secondary Schools, New York: 1965, The Center for Applied Research in Education, p. 5.

seems to have evolved out of reasoned objectives and lists of recommended activities provided by state and national study groups.

Substance for industrial arts has been gathered under the broad aim to "prepare young people to live in our industrial society."[45] The rationale given for industrial arts is that "Every growing youngster needs many opportunities to learn to work with tools and materials. This is part of his heritage. He also needs to learn about the industrial society in which he will work and live."[46] The general education provided by industrial arts has a more practical basis, perhaps due in part to its focus on tools and processes rather than a scholarly discipline.

Content Selection for Industrial Arts

Over the years the industrial arts curriculum has evolved from programs for the manual arts, and vocational training. Today the industrial arts curriculum is firmly set apart from that of vocational education. Looking back to some of the ways in which content has been selected, there will be some tendency to blur this

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[45]John L. Feirer and John R. Lindbeck, Industrial Arts Education, New York: 1964, The Center for Applied Research in Education, p. 1.

[46]William J. Micheels, (in the forward of), Industrial Arts Education, 1964, p. V.

present day distinction. As will be shown, the goals of the industrial arts curriculum are clearly that of general education.

One of the earliest descriptions of the selection of content for industrial arts has been traced back to 1868. A Russian, Victor Della Vos, established a technique for analyzing tool processes and construction methods. In brief, his plan involved analyzing shop operations into their elementary processes, arranging them in sequential order, and making them the basis for instruction and drill.[47] His scheme of analysis made practical classes in manual arts or shop work systematic in their approach to learning tool skills. Another important contribution of his system was the idea that one could identify content through an analysis-of-activities. This same general mode of content establishment was to carry into the twentieth century where it became an analysis of trade in order to establish content.

According to Silvius and Bohn, Robert Selvidge presented a clarification of the process of instructional analysis in his book, How to Teach a Trade. Through Selvidge's works, and that of Verne C. Fryklund the instructional analysis approach to the identification of content became widely accepted, especially in college

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[47]Feirer and Lindbeck, 1964, pp. 6-8.

courses where the objective was to teach industrial arts teachers to identify content for a subject or activity.[48]

In their historic review of the approach (identification of content through analysis), Silvius and Bohn conclude that as a research approach, it is sound for identifying teachable content for the following activities:

1. To prepare a person for a payroll job in business or industry.
2. To prepare a person to work as a technician in industry, business, or the professions.
3. For the related instruction in organized apprenticeships.
4. For upgrading skilled workers in community occupations.
5. For practical activities that are taught in American schools for general education purposes.[49]

Item number five has the most significance for the purposes of this study. Although suggested for general education, the analysis approach has been used almost exclusively in vocational content identification, with the exception being the determination of content in industrial arts.

Basically, the analysis method involves identifying the manipulative phases of a job or activity. In the method described by Silvius and Bohn, each job was viewed as a structure of operations. Operations are often repeated by workers as they perform different jobs.

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[48] H. Silvius and R. Bohn, Organizing Course Materials for Industrial Education, Bloomington, Illinois: 1961, McKnight & McKnight Publishing Company, pp. 193-195.

[49] Silvius and Bohn, 1961, p. 195.

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In their book, Organizing Course Materials for Industrial Education, Silvius and Bohn provide eleven guidelines for applying the research technique for identifying the repetitive manipulative operations for a vocational subject or an industrial arts activity. A conceptual grasp of the method can be obtained by considering the first three guidelines along with an example of the application. The first three guidelines are as follows:

1. That the title for an operation is a statement to describe a segment of what the student should be able to do in using his hands, tools, and machines; to do such things as shape, form, repair, assemble, and test work.
2. That an operation is one unit of the manipulative work in an instructional analysis which should not always be considered synonymous with a unit of instruction for some course.
3. That the operations are the basic fundamentals of a vocational or technical subject or an activity in the practical arts. The operation is the transferable unit from one job to another.[50]

It might be appropriate to define the word job in the sense that it is used in the analysis method just described. The term job is used interchangably with the term project. In this way building a bird feeder would represent any or all of the following terms, project, activity, or job.

The following examples illustrate the application of the analysis technique to the making of an aluminum tray and a free form wooden tray.

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[50]Silvius and Bohn, p. 196.

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Aluminum Tray	Free Form Wooden Tray
1. Develop design	1. Design tray
2. Plan procedure	2. Plan procedure
3. Shape metal	3. Select and cut stock
4. Buff metal surface	4. Plane a surface
5. Design and transfer the pattern	5. Transfer design to stock
6. Etch the design	6. Cut tray to shape on bandsaw
	7. Shape exterior
	8. Gouge interior to shape
	9. Sand
	10. Apply suitable finish[51]

Even though the jobs involved the use of different materials, they included several common operations. Under this system content is inherent in the tools, materials, and processes used to work the materials. Once one decides upon the job to be done and the materials to be used, the manipulative actions can easily be established.

Shortly after Silvius and Bohn's text on Organizing Course Materials, Mager's book on preparing behaviorally based instructional objectives received wide attention. Mager's approach to the determination of content was one of asking the teacher to identify the desired terminal behavior on the part of the students. According to Mager, terminal behavior could be defined by:

> A. Identifying and naming the observable act that will be accepted as evidence that the learner has achieved the objective.
> B. Describing the conditions (given restrictions) necessary to exclude acts that will not be accepted as evidence that the learner has achieved the objective.[52]

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[51]Silvius and Bohn, pp. 202-203.

[52]Robert F. Mager, Preparing Instructional Objectives, (Palo Alto, California, Fearon Publishers, Inc., 1962) p. 43.

Behavioral or performance based objectives became popular in a variety of curriculum areas. Proponents suggested that competency skills should form the content of any course of instruction. Gagne' supported this view when he suggested that course or curriculum ".....content may be defined as descriptions of the expected capabilities of students in specified domains of human activity."[53]

Mager's work contributed greatly to the trend of providing performance-based instruction, but more important to this study was his collaboration with Kenneth Beach to provide a systematized method for developing vocational instruction. The strategy used was still one of performance orientation.

Basically, their method called for the selection of a job for which a brief job description would be written. The second step involved listing all the tasks which would be carried out in the performance of that specific job. In their usage a job represents a particular vocation such as a machinist, welder, or landscape gardener.

Once the tasks of the job were established, the steps used in carrying out a particular task were defined. This stage was called a task analysis. Using their method, the vocation of landscape gardener can be shown as follows:

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[53]Tyler, R., Gagne' and Scriven, Perspectives of Curriculum Evaluation, (Chicago: Rand McNally, 1967), p. 21.

Tasks making up the job of landscape gardener.

1. Maintains lawns
2. Prunes trees and shrubs
3. Plants seeds and bulbs
4. And so on

Task analysis of maintaining lawns.

A. Fertilizes and supplies soil amendments as needed
B. Recognizes weeds and removes them
C. Cuts the grass
D. And so on

Identifying the tasks and the task analysis are the critical parts of this approach.[54] Once this is done, course objectives are formed from the information which has been gathered.

A Comparison: Instructional Analysis vs. Task Analysis

In large measure the system presented by Mager and Beach is like that described by Silvius and Bohn. A job in the system proposed by Silvius and Bohn would be the equivalent of a task in the Mager-Beach method. Operations would equate to the sub-parts identified through task analysis in the Mager-Beach method. The essential departure is the extension of the task analysis system to the preparation of behavioral objectives. Since, however, the instructional analysis system of Silvius and Bohn would lead to the instruction of manipulative operations, its output would also be visible as forms of behavior.

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[54]Robert F. Mager, and Kenneth M. Beach, Developing Vocational Instruction, (Palo Alto: Fearon Publishers, 1967), pp. 7-10.

Additional Studies to Determine Vocational Content

Several studies have been carried out using either the analysis-of-instruction approach or the task analysis approach. In all cases these were studies to determine content for vocational purposes.

A study by Gleason used a slight modification. He sought to determine what a specific vocational curriculum should contain by applying a functions-of-the industry approach. He asked selected industry and educational leaders, identified as experts, to specify the functions of an industry. Additionally they were asked to specify the activities and competencies required to successfully perform specific functions within that industry.[55] Those chosen as experts were asked to react to a survey questionnaire and to rate the items according to their perceptions of suitability.

In a similar study at about the same time period, Berkey used what he called the functions-activities theory to pick out the essential activities performed in functions of the farm machinery industry. He chose to focus on the functions-activities theory because, in his judgement, it avoided the intermediate step of defining competencies in terms of activities, and it enabled one to identify

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[55]William E. Gleason, Functions of Industry Approach to Curriculum for Vocational Education, PhD. Thesis, Michigan State University, 1967, p. 14.

activities common to the performance of functions in one or more occupations.[56]

For the purpose of his study he defined function as "a process involving closely related activities within a single industry which is essential for the success of the industry," and activity as "a specific operation involved in the performance of a function."[57] The following examples of these definitions have been taken from his study in order to illustrate the definitions. The Retail Sales Function would be made up of activities such as selling all saleable units using sustained systematic sales campaign, and using self-service sales merchandising.

Berkey's approach was that of establishing various functions in the farm machinery industry and listing activities within those functions. He submitted his activities list to a jury of 21 experts, 14 of them drawn from the farm machinery industry (7 dealership managers, 7 industry advisors) and 7 from education. In the process of personally interviewing the jurors, they were asked to rate the activities on a four point forced-choice scale. Values were assigned as follows: (0) of no importance, (1) of some importance, (2) important,

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[56]Arthur L. Berkey, The Importance of Activities Performed in Functions of the Farm Machinery Industry as a Basis for Training Programs, PhD. Thesis, Michigan State University, 1967, pp. 9-10.

[57]Berkey, 1967, p. 61.

(3) essential.[58] Jurors were allowed to add additional activities to the inventory. Those activities which were rated as having some degree of importance to the performance of the function by over 50 per cent of the total jury were considered acceptable.

In carrying out his study, Berkey tested four hypotheses which were designed to test for consensus among and between his three jury groups. In all, his study closely paralleled that of Gleason.

Content Identification From Horticulture Businesses

Berkey modified his functions-activities theory somewhat when he joined Drake to carry out a study of the ornamental horticulture industry in New York state. Actually, the method employed was that of Mager's system of task analysis. Essentially they carried out a detailed task analysis of nine types of horticulture businesses. The businesses studied were: (1) retail florist, (2) farm and garden supply store, (3) landscape services, (4) greenhouse production, (5) nursery production, (6) turf production, (sod farms), (7) arborists services, (8) wholesale florists, and (9) golf courses.[59]

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[58]Berkey, 1967, p. 89.

[59]Arthur Berkey and William Drake, An Analysis of Tasks Performed in the Ornamental Horticulture Industry, (Ithaca, New York: Cornell Institute for Career Education, June 1972), p. 1.

The procedure in their study was to interview a selected sample of employers in each type of business. Employers were asked to provide data for tasks performed in their industry and to give the conditions of performance. Through a jury screening process, a large number of tasks was agreed upon for each of the nine horticulture industries. Each task was categorized as to the equipment required, strength required to carry it out, type of physical activity required (kneeling, talking, etc.), amount of supervision required, degree of association with other workers, and the working conditions (inside, outside, noise, hazards and so forth).

For comparison purposes the following portion has been taken from the task section dealing with the business of Landscape Services.

G. Planting a Landscape

Task Statement

Control weeds and soil insects with chemicals
Till soil for lawn seed bed
Seed a lawn
Add mulch to protect new seedlings
Plant flowers and shrubs
Plant trees
Support woody plants by guying, staking, or cabling
Set stones
Install drain tile
Construct walls, walks, and outbuildings
Construct paved roads and drives
Place sod
Water new plantings including sod
Dispose of paper and refuse
Final clean up and check of landscape job[60]

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[60]Berkey and Drake, pp. 36-38.

This study goes well beyond those studies previously mentioned by considering factors required in carrying out each task. Yet it resembles them in that it too represents an analysis of an industry with the intent to identify manipulative activities which are carried out in doing a particular job. Beside the use of task analysis, Mager's influence is evidenced in their suggestion that the task analysis would provide "a direct basis for the development of performance objectives for both in-service and pre-service programs."[61] In suggesting how their study might be used, Berkey and Drake have completely overlooked any application of a general education nature. Perhaps their narrowed vision resulted from the goal of looking at horticulture industries.

Reflection on the Content Selection Processes Presented

Upon examination there is evidence of a common thread in the approaches reviewed thus far. All focus on determining small units of action which make up each job, task or function. In the Silvius and Bohn approach, operations were the repeatable units in various jobs, while in Mager and Beach's approach, task analysis was used to find the repeatable units needed to carry out a given task. Under Berkey's functions-activities theory, activities were the smallest unit of action. Additionally, all three approaches

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[61]Berkey and Drake, 1972, p. 2.

sought to determine those repeatable units which would carry across several jobs, tasks or functions. In essence, all three methods were designed to reduce a job to its smallest repeatable unit expressed in action words.

Summary of Studies to Determine Content by Analysis

As can be seen, numerous studies have been done with the express purpose of establishing content for vocational programs. In each, the common element was the identification of small manipulative activities which enable one to carry out a function or complete a job.

One example of an analysis approach to the establishment of content in general education was that described by Silvius and Bohn. Their approach, "instructional analysis," has been used primarily in providing content for industrial arts. By comparison, it differs more in terminology than in principle.

Use of analysis provides a systematic method for establishing activity-oriented content. It does not, however, identify the knowledge components. Once the manipulative activities have been established, experts should be able to supply the knowledge fabric thus enabling an individual to carry out the manipulative skill with understanding.

Implications of the Literature Search

No studies have been done for the purpose of establishing avocational content in horticulture. This is not surprising in view of the limited number of schools providing

avocational horticulture. Except in the case of school gardening, the place of horticulture in general education has never been justified. However, before content is sought, curriculum development processes dictate the establishment of a rationale. Significant content decisions must be consistent with the rationale.

The question of procedure for selecting content for a given curriculum is challenging. Even within a strong subject area like biology, one finds disagreement over the way in which content should be selected. When the focus is that of general education, perhaps the learner and not a scholarly knowledge pool, should be the prime consideration.

Studies reviewed, although principally used to determine vocational content, appear to have utility in identifying practical activities for general education. It should be possible to use an analysis-of-activities approach in the establishment of possible content for nonvocational horticulture. This judgment is based in part upon the utility the analysis-of-activities process has had in the identification of activities for the general education program of Industrial Arts.

One difficulty in using the analysis method would be in establishing the job or functions area. When making an analysis of an industry, there is an ongoing pattern of established functions for which people are employed. Additionally, an employer can be asked to validate the

activities once they are identified. This points up a second difficulty, and that is the need to seek a different source to evaluate the preliminary task areas and activities.

One could look for practical content in horticulture within the practices of the industry; however, it should also be available in the form of observable practices in daily life. In addition to the practices of home owners and hobbyists, there is a wealth of practical content available to the lay person in the form of contemporary books, magazines, and pamphlets.

In searching for general education content in the common tasks of life, the assumption must be made that these activities have value to a majority of persons. This notion is quite different from the rationale governing the selection of vocational content. Vocational content must have occupational validity. Efforts in this study will be directed toward identifying horticulture content which is avocationally valid.

Once the functional or task areas of avocational horticulture have been established, then application of the analysis-of-activities approach should be useful for the identification of task content. As in the studies carried out by: Berkey,[62] Gleason,[63] Berkey and Drake,[64] Shipley

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[62]Berkey, 1967, pp. 38-40, 67.

[63]Gleason, 1967, pp. 14, 40, 46-47.

[64]Berkey and Drake, 1972, p. 1, 3-5.

and Hemp,[65] a jury can be used to verify content items. However, for this study, jurors should be selected for their expertise in horticulture as practiced by lay persons rather than their expertise in specific horticulture industries. If the jurors who rate the practical horticulture tasks are biased toward practicality as opposed to theory, then they should be in a better position to make judgments regarding as items avocational suitability.

In summary the second phase of this study will develop an approach utilizing an analysis of common horticulture practices. The purpose is to discern content appropriate to curriculum development for educational programs of avocational horticulture in general education.

Earlier, the nature of horticulture in schools was examined. This was done to look for examples of horticulture curriculum and to identify the way in which curriculum content was determined. Content selection processes were not visible in the material reviewed.

Because avocational horticulture is not commonly found in schools, it was necessary to consider the steps needed when suggesting a curriculum change. The development of a rationale was found to be a critical early step in the curriculum process. Once established, the rationale becomes the base for most of the curriculum decisions.

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[65]Shipley and Hemp, 1974, p. 44.

Overview of Chapter Three

In Chapter three the steps used in developing a rationale for avocational horticulture in general education are presented. Similarly, the mechanism used to establish practical content in horticulture is described. Also included are the steps used in gathering content, selecting jurors, and making an analysis. Study processes which have been used to identify vocational content will be modified to use in the verification of practical content for general education purposes.

CHAPTER III

SOURCES OF DATA

Introduction

Presently, public school emphasis on horticulture is vocational. Course content in vocational horticulture tends to be predicated on requirements of the horticulture industry. Consequently, the suggestion that avocational horticulture could fill a need in the general education curriculum is made without an established content base.

When the need for a new program or emphasis is perceived, broad questions arise for the curriculum developer. For example, what are the needs of society and the individual which would lend support in reason for the change? By what means should curriculum content be determined and from what point or points of view? In part some of these questions can be answered with a carefully designed rationale.

Problem Restatement

The purpose of this study was twofold: (1) to develop a rationale for offering avocational horticulture as part of the general education curriculum and (2) to identify those broad scope horticultural task areas and tasks which might form an acceptable content base for general education experiences in horticulture.

Design

The nature of this study was descriptive. Data were drawn from the literature and from individuals who were

asked to serve as a review panel or as jurors. Because these data represent opinions and biases of the individuals selected, caution is urged in generalizing the findings.

Procedures

Roots of the Rationale

Support for avocational horticulture in general education was sought by drawing upon the needs of the learner and the nature of society. In order to do this, the focus of the rationale was placed on plants. Two perspectives were chosen; the first involved the role of plants in the life of man, and the second involved the role of schools in meeting specific needs of man and society.

Evidence of man's interactions with plants was gathered from the literature. A wide range of examples were selected which highlighted man's use of plants, particularly in non-food ways. Additionally, those societal conditions which were thought to contribute to man's increased use of plants were examined. Consideration was given for the way in which plant culture activities could meet the needs of man and thus provide a buffer to societal pressures.

Finally, thought was given to the role of schools. An attempt was made to set out those responsibilities of schools which would support avocational horticulture in general education. The view was not limited to schools alone, but also considered the benefits of avocational horticulture to the student.

Identification of Practical Horticulture Tasks

Because there was a limited amount of avocational horticulture being taught in public schools, there was a need to define it as an area of study. For the purpose of this study, avocational horticulture has been defined as: those practical activities with plants valued for their contribution to the general education of individuals.

In order to provide a content base for avocational horticulture, it was proposed that those horticultural tasks commonly practiced by home owners and hobbyists be identified. This was done in three steps.

First, a broad range of contemporary gardening literature was surveyed with the purpose of identifying broad scope horticulture task areas and their related tasks. The types of sources used were government pamphlets, both state, and federal, which had been prepared for the hobbyist or home owner, popular gardening books and periodicals, and previous studies involving content establishment for vocational horticulture.

Once the task areas were identified, a large item pool of tasks was gathered. The item pool was reduced to a workable list for use in a practical horticulture task inventory, through the following criteria. 1. The task should involve plants and culture activities frequently used by the hobbyist or home owner. 2. The task should not require extensive training or highly specialized

equipment. 3. The tasks should involve plants and materials commonly available to the layman. 4. Where possible, the tasks should have carry-over to the culture of several different types of plants.

After screening, the list of practical horticulture tasks was fashioned into a preliminary inventory. Tasks were clustered within the broad task areas of lawns, trees and shrubs, indoor gardening, outdoor gardening (flowers, fruits and vegetables) and miscellaneous. Each task was set up to be rated on an open-ended scale consisting of five categories.

A panel of five experts was asked to rate each task according to their perceptions of its importance to individuals who might want to practice avocational horticulture. Panelists were asked to rate each of the tasks using the following scale values and definitions:

(3) Very Important - a rating of very important indicates that an individual should be able to carry out this task.

(2) Important - a rating of important indicates that most individuals would carry out this task.

(1) Some Importance - a rating of some importance indicates that occasionally this task will be practiced by an individual.

(0) Not Important - a rating of not important indicates that most individuals would not practice this task.

(0) Not Acceptable for Rating - respondents checking this category were asked to comment on their dissatisfaction with the task as presented.

In addition to the provision for rating the tasks, space was provided for respondents to add tasks within all of the five task areas.

Selection of Review Panel Experts

Since the content of avocational horticulture was targeted toward general education, it was deemed necessary to involve persons with considerable practical experience to serve as an objective filter for the preliminary inventory items. The review panel of five persons was composed of three knowledge sources. Three panel members were owners and managers of garden centers. A professional landscaper was selected as a fourth member and the fifth was president of the combined garden clubs of Erie County.

Garden Center managers were valued because they were considered to be on the interface between the horticulture industries and the needs of the public. Beside the supplying of plants, tools and supportive products, garden center managers were considered to function as information sources particularly as related to common tasks carried out by the avocational gardener. In the latter role they were assumed experts in general practice.

The value of a landscaper was considered to be his position to appraise what the home owner was doing for himself horticulturally as opposed to what was most often provided through his services. Additionally, it was thought that he would encounter questioning from home owners while in the process of supplying landscaping services.

A garden club president was selected to represent the avid hobby gardener. Garden clubs were assumed to represent one of the broadest on-going sources of horticultural education for the layman. Individuals who have elected garden club membership usually have done so in an effort to increase their involvement in avocational horticulture.

Responses from the review panel were used to eliminate unsuitable items from the trial inventory. Their ability to do this was predicated on their knowledge of the practical horticulture tasks carried out by home owners and hobbyists.

Circulation and Rating of the Preliminary Inventory

The preliminary horticulture task inventory and a cover letter were hand-carried to each panel member. Purposes of the study were explained and then panelists were asked if they would agree to rate the preliminary inventory. Arrangements were made to return and pick up the completed inventory.

Once completed the inventory items were scored on a 3, 2, 1, 0 basis. Mean values were calculated for each item. Those items with a mean of less than 1.0 were considered unacceptable and were dropped from the inventory.

Task items suggested by panelists were added to the research form of the inventory if they met the original screening criteria.

The final research form of the horticultural task inventory represented two levels of screening: First, by application of stated criteria and second by the ratings of an expert review panel. When the preliminary screening was completed, the inventory was prepared for circulation to an expert jury composed of cooperative extension agents and horticulture educators.

Jury Selection for Inventory Rating

A jury of thirteen persons considered experts in their knowledge of horticulture was selected to rate and criticize the research form of the horticultural task inventory. The jury was deliberately chosen to represent a discipline knowledge component and a practical application component. Because two distinct groups of experts were chosen, it may be more suitable to think of the jurors as two sub-juries. Five horticulture educators represented one sub-jury; the other sub-group of eight persons consisted of cooperative extension agents from the state of Pennsylvania.

Horticulture Educators[1] Jurors in this group represented four universities having well-known departments of horticulture and one large metropolitan school district. The land grant universities represented were Cornell, Michigan State, Pennsylvania State and Ohio State. The fifth juror was the director of horticultural education in the Cleveland public schools.

An essential assumption governing the selection of these individuals was that they would be expert judges of horticulture as a discipline. It was assumed that their background in horticulture equipped them to evaluate task statements for completeness. Additionally, in accepting the theory that each discipline has its own structure, the hort-educator would be in the best position to relate practical task statements to that structure.

Hort-educators were limited to a four-state area in order to stay within an area having similar plants and climate conditions. Consequently, practical horticulture tasks judged acceptable by these jurors may not have the same applicability in another region.

The inclusion of the director of horticulture education for the Cleveland schools was done because of the district's long history of horticultural offerings. It

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[1]Horticulture educators are those degree holding persons who have been trained in horticulture and who now fill at least partial roles in education. A short form title hort-educator is used in the balance of the study.

was hoped to capitalize on his background in horticulture and his current knowledge of the horticulture curriculum in the Cleveland schools.

Extension Jurors Sub-jury group two comprised of eight persons was chosen from the Pennsylvania Cooperative Extension Service. William Urash of the Erie County Extension Office helped in the selection of extension jurors. He was particularly valuable in recommending extension agents whose responsibility included home or hobby gardening. Care was taken to see that the three largest metropolitan areas of Pennsylvania (Erie, Philadelphia, Pittsburgh) were represented. Five extension personnel were picked to represent the suburban and small town populations. No attempt was made to select jurors according to a precise population formula; however those extension offices whose principal function was that of serving farm needs were omitted.

By charter the Cooperative Extension Service has a responsibility to communicate the latest agricultural and home economic information to the citizenry. Cooperative Extension jurors were considered experts because of their role in handling the problems of home and hobby gardeners. Specifically, they were prized for their service in linking the knowledge pool of the land grant university and its supportive services to the residents of the state. It was assumed that they encountered large numbers of questions

from home and hobby gardeners regarding problems in the culturing of plants.

Extension jurors were limited to the state of Pennsylvania both as a matter of convenience and in an attempt to limit variables introduced by state differences in extension emphasis. It must be granted beforehand that the responses of the Pennsylvania extension agents probably reflect the directives of The Pennsylvania State University. For example, in Pennsylvania strong emphasis is placed on soil testing because acid soils tend to be a problem. Conversely, the Extension Service of Ohio may place emphasis on other tasks because of differences in soils and climate.

Cooperative extension jurors were considered to represent a strong practical position on horticultural topics while retaining a sound knowledge base supported by the literature and consulting service provided them by the university.

The decision to establish a thirteen-member jury unequally composed of five horticulture educators and eight cooperative extension service personnel was made with intent. It was hoped that the rating of the practical horticulture task inventory would be weighted in a practical direction by the responses of the extension personnel. In considering tasks valuable to general education, the assumption was made that actual tasks carried out in life were of value in the planning of curriculum.

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Distribution of the Inventory

Perspective jurors were contacted by phone. At that time the nature of the study was explained. They were asked if they would agree to rate an 85-item practical task inventory.

Within the week the inventory was mailed to each juror. The mailing included a follow-up letter confirming the call and setting out the nature of their participation. Included with the materials was a self-addressed and posted return envelope. Plans were made to follow up the mailing with a phone call if the inventory was not returned within one month.

Jurors were instructed to rate items by the same scale that the review panel used. The inventory was again left open for comment on those items judged unacceptable for rating. Respondents were encouraged to add additional task items wherever they saw the need.

Questions of Data and Process

Questions of the Data

As this study was not one of experimental design but rather one of a descriptive nature, data were gathered to explore questions. Only in the question of similarities or differences between the sub-juries was it considered suitable to put the question in the form of a testable hypothesis.

The following questions have been provided to aid in the analysis of data.

1. Which task items by topic area were judged important or very important by more than 75 per cent of the jurors?
2. What apparent groupings of task items occur when task items are grouped by similarity of item mean?
3. Are there differences in task item clusters when examined on the basis of sub-jury response?
4. What additional task items have been proposed by the jurors?

Questions of Process

It was assumed that the jury of experts picked to rate the practical horticulture task inventory was representative of two knowledge sources. In order to examine the interactions between the two sets of jurors the following procedures were applied. The question whether the jury did in fact represent two sub groups can be tested by the following directional hypotheses:

Null Hypothesis The rankings of task items within topic areas by hort-educators and extension agents are mutually independent.

Alternate Hypothesis There is a tendency for the higher rankings of items by hort-educators to be paired with higher rankings by extension agents.

In Chapter five these hypotheses have been restated to apply to each of the five specific task areas. As such they form a process to check out the nature of the jurors rather than the data.

An additional question of process relates to the mechanism of the inventory, and that is; what were the design problems of the practical horticulture task inventory as revealed by juror comments and ratings?

Methods of Analysis

Item data provided by respondents was summarized according to the Mermac Test and Questionnaire System.[2] Under this system it is suggested that item data from questionnaires with no known correct answers be summarized by providing a frequency distribution of responses and a weighted mean.

Responses were reported by sub jury with a mean calculated on each item. Then items were ranked by mean with average rankings assigned in the case of ties. For example, if two items ranked fourth they would be assigned a ranking of 4.5.

The Spearman Rank Correlation statistic, sometimes called rho (r_s), was used as a measure of association between the tasks as ranked by hort-educators and extension

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[2]Lawrence M. Aleamoni, Educational and Psychological Measurement, Volume 31, 1971, pp. 777-778.

jurors. Comparisons were made of rankings by task area. For example, in the task area of lawns, the mean rankings given to the individual tasks by hort-educators was compared with the mean rankings given by the extension jurors.

A one-tailed directional test was selected because it was assumed that there would be a positive relationship in the ranking across the two sub-juries. Since the inventory items were screened previously by an expert review panel, it was believed that the most frequent ratings would be on the high end of the scale.

Alpha levels were set at .05. Values of rho (r_s) equal to or greater than tabled values of rho for given values of N were considered to occur so rarely by chance alone that there was an implied relationship between the way tasks were rated by sub-juries.

Because jurors were not randomly chosen from the population of hort-educators or extension agents, the use of the Spearman Rank Correlation statistic was purely descriptive. Thus no generalizations should be extended as implications regarding populations of hort-educators or cooperative extension agents.

Responses have been reported by sub-jury so that comparisons could be made of the clustering of task items among and between sub-juries. It was expected that responses would be more uniform within groups than between them. The clustering and ranking of items was used to look for similarities and differences in sub-jury response.

In looking for comparisons between sub-juries, it was felt that differences in response would be more useful than similarities. For this reason an index of disparity was used to identify those tasks where sub-jury ranking differed by five or more units. The index of disparity values were arrived at by squaring the difference between rankings.

In order for a particular task item to be considered as possible content for avocational horticulture it had to be rated very important (3) or important (2) by more than 75 per cent of the respondents. Full jury response included thirteen ratings per item; therefore, a total of ten or greater responses in the two categories mentioned was necessary for acceptance.

Ratings, comments and additional tasks were used to appraise the effectiveness of the horticulture task inventory as a content identification tool. Weaknesses of the inventory were determined primarily on the basis of the comments made.

Comments and additional task items provided by jurors have been included in tabular form. Items and comments have been clustered and reported according to the sub-jury making the contribution. It should be noted that jurors were not advised of the original task selection criteria, and thus items suggested by them may not match those of the inventory.

The research form of the inventory and the names of the jurors appear in the appendix. Tabled data considered useful in answering questions proposed in this chapter can be found in Chapter five.

Summary

To achieve the second purpose of the study, that of identifying possible practical content in horticulture which might be valuable in developing curriculum for avocational horticulture, a process similar to that used in the selection of vocational content was proposed. Steps used to identify broad scope horticulture task areas with avocational value were presented. Methods used in the development of the horticulture task inventory were described. This process included a criteria screen and an expert review panel.

The mechanism for having the research inventory rated by a thirteen-member jury was discussed. In this procedure two additional knowledge sources were selected to apply their judgment to the proposed items of practical content. Hort-educators prized for their knowledge of horticulture as a discipline comprised one knowledge source. The other sub-jury was made up of cooperative extension agents who were valued for their practical expertise in horticulture.

Questions and steps for handling data analysis were provided. Nonparametric descriptive statistics were proposed because of the small sample size. The threshold of

acceptability for avocational content was set at greater than 75 per cent of the jurors rating a task as very important or important. Allowance was made to accumulate comments and task suggestions for the purpose of evaluating the inventory, and to serve as a mechanism to gather additional content from the expert jury.

Overview of Chapter Four

The rationale for presenting horticulture as a general education experience is provided in Chapter four. Arguments will be given regarding the contributions which can be made through avocational horticulture. Additionally those dimensions of horticulture which are within the present definition of the school's role will be indicated.

CHAPTER IV

ELEMENTS OF A RATIONALE

Introduction

As was noted in Chapter two the rationale has a critical early role in the formulation of curriculum. By its nature a rationale should form support in reason for the proposed curriculum. But this does not insure that what develops will meet the ideal, as Schwab so aptly points out.

> "We choose, in brief, the weightings of desiderata and the choices of curriculum they dictate which are right for the concrete here - now, for present problems and needs, seen in the light of existent or possible resources and handicaps, we cannot choose a perennially right ordering of desiderata or a perennially right curriculum."[1]

In developing a rationale for avocational horticulture as a part of the general education curriculum the following major elements are considered. Evidence is presented which indicates a history of man-plant interactions. Information is given to support a need for increased plant culture by man as a result of current societal conditions. An attempt is made to show how plant culture activities meet the needs of man. Particular interest is given to the ways in which plant culture activities might serve as enabling mechanisms for broader learning. Finally an exploration is made of the

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[1]Joseph J. Schwab, "Decision and Choice the Coming Duty of Science Teaching," Journal of Research in Science Teaching, Vol. 11, No. 4, p. 315.

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mandates to school to see if there is a role for avocational horticulture in the general education curriculum.

The evidence of man's interaction with plants is provided in part one. Consideration is made of early man's relationships to the plants around him. Contemporary evidence of man-plant interactions is provided through examination of the type area sought by man in his leisure and by the examination of the non-food plants he chooses for his surroundings, and perhaps the strongest evidence of plant interaction is found in man's propensity for gardening.

Part 1: Evidence of Man's Interaction with Plants

Man's Early Relationship with Plants

In his book The Naked Ape, Morris traces the evolution of man in an attempt to show how his biological features came into being and how they influence our present behaviors. As he points out, "we are still humble animals, subject to all the basic laws of animal behavior."[2] Morris traces a simplistic pattern of man from a plant eater to a carnivore to a participant in modern technology.

Both Morris and Iltis argue that man was more biologically suited to his early environment of plants than he is to the present day technological environment. The

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[2]Desmond Morris, The Naked Ape, New York: McGraw-Hill, 1967, p. 252.

following quote by Iltis emphasizes the difference between past and present day environments.

> "Man, the animal evolved in nature among plants, shrubs, trees, flowers and fruits, in a seasonal climate in which the living ecosystem was an integral part of his most basic being and functioning."[3]

Present Day Evidence of Man's Interactions with Plants

In moments of leisure, man can be seen returning to plant-rich areas. Why do humans seek out wooded campgrounds? Wyman suggests that: "Americans have an inbred love of the forest with its green trees, fresh air and water, and the springy carpet of rich forest soil. It is part of our heritage."[4] Evidence of his point can be found in the summer occupancy of wooded campgrounds in Europe and North America.

To emphasize man's current perceptions of plants, Butz quoted the following study: "In a survey to determine which of twenty-six items people considered most important to their happiness, 59 percent of those answering checked "green grass and trees around me."[5] He felt that regardless of where we lived there was a touch of farmer in all of us -- "a love for growing things."

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[3]Hugh Iltis, "In Short, In Hort: A Comment by Hugh Iltis," HortScience, 8 (December 1973), p. 454.

[4]Donald Wyman, "Parks, Malls, Roadsides: Public Plantings," in Landscapes for Living, (U.S.D.A. Yearbook, 1972), p. 76.

[5]Earl L. Butz, "Forward," in Landscapes for Living, p. XXXIII.

Rather than a love for growing things, Ward and Dubos would suggest that this is a recognition in man that he inhabits two worlds. One "is the natural world of plants and animals, of soils and airs and waters which preceded him by billions of years and of which he is a part."[6] The other is the social and technological world he created.

The production of non-food plants to meet the aesthetic and practical needs of man is one of the tasks of the horticulture industry. In fact it is this aspect (the use of plants for pleasure) which tends to set horticulture apart from agriculture. The degree to which man is involved with non-food plants is revealed in the estimate that national sales of ornamental plants and flowers amounts to nearly five billion dollars yearly.[7]

A research report on the nursery and floriculture industries in Michigan estimates a continued rise through 1985. They project that by 1985 annual sales of the landscape horticulture industries, which include nursery production, landscape construction, garden centers, and landscape maintenance will be in excess of $140 million.[8]

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[6]Barbara Ward and Rene Dubos, Only One Earth - The Care and Maintenance of a Small Planet, New York: W. W. Norton, 1972, p. 1.

[7]Earl Butz, USDA Yearbook, 1972, p. XXXIV.

[8]Harold Davidson, "Michigan's Nursery Industry - Now and in 1985," Research Report 189 Agricultural Business, February 1973, Cooperative Extension Service, East Lansing, Michigan, p. 3.

The reasons given for predicting that the demand for ornamental plants will increase are: increasing suburban populations, increased educational levels, increased leisure time and the availability of money for discretionary spending.[9] Phenomenal growth of the garden center business seems to support the reasons given. Sales from Michigan garden centers are reported to have increased 300 percent between 1958 and 1967.[10]

The Michigan floriculture industry, which includes cut flowers, bedding plants and potted plants is also on the rise. This is not surprising in view of the new emphasis on greening America. House plants in particular have increased in popularity as evidenced by the wealth of current books and articles. House plants are now being sold in malls, chain stores and even supermarkets.

Gardening as Evidence of Man's Interaction with Plants

Another example of man's affiliation with plants is that of gardening, particularly vegetable gardening. At no time since the victory garden era of World War II has gardening been more popular. In 1944 the U.S. Department of Agriculture estimated that approximately 40 million people were involved in gardening.[11] By 1973 a Gallup poll

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[9]Harold Davidson, 1973, p. 3.

[10]Davidson, p. 3.

[11]....., "Small Gardens in Europe Make Cities Livable," Landscape for Living, USDA Yearbook, 1972, p.314.

found 40 million persons (representing 4 households in 10) raising some of their own food. Another 30 million people expressed an interest to garden if they had the land.[12]

Gardens are being developed in a wide range of settings. The governor of Pennsylvania has offered areas of unused public lands for use as anti-inflation gardens. Community gardens have evolved nationwide, many of them rising out of unusual partnerships. In Ann Arbor, Michigan, the Huron Valley National Bank and the University of Michigan teamed up to form a gardening group.[13] Industries and academic communities have joined the trend to garden. It's not new to all, however. Dow Chemical Company of Midland, Michigan, has had an employee garden for thirty-four years.[14] Graduate students in horticulture at Michigan State University have managed a successful rental garden plot project (Spartan Gardens) for over ten years.

In part two, those societal conditions thought to increase man's need for exposure to plant culture will be considered. Factors such as environmental quality, lack of diversity, urbanism, technology and inflation are

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[12]George Gallup, "Soaring Food Prices Swell Ranks of Home Vegetable Gardeners," American Institute of Public Opinion, June 27, 1973, Princeton, New Jersey, p. 3.

[13]Diane Young, Gardens for All - Guide to a Greener and Happier Community, Charlotte, Vermont, Garden Way, March 1973, p. 12.

[14]Joan Marks, "Lunch-Hour Gardens Relieve Office Tensions," The New York Times, Sunday, July 7, 1974, p.27.

discussed. Implications of these factors will be reflected against the relief which plant culture offers to man.

Part 2: The Need for Increased Exposure to Plant Culture is Fostered by Current Societal Conditions

Changes in the Nature of Man's Environment

In the words of Glass, "Every new scientific discovery, every new advance in technology creates long-term effects and side effects, which subtract substantially from whatever immediate benefits accrue."[15] Glass may have over stated the case, however examples such as that of DDT or PCB have generated the notoriety to make this opinion seem valid.

Technology alone should not be blamed for present conditions. Schwab suggests that some of the present dilemma comes from our failure to "have no effective institutions for consideration of contingencies. Above all, for the formulation of practical problems."[16] He cites "the absurd collision of efforts to abate environmental spoliation with our efforts to meet the energy crisis as an unimportant, merely conspicuous example."[17] In the view of Commoner, "Ecological survival does not mean the abandonment of technology. Rather, it requires that

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[15]Bentley Glass, "The Scientist: Trustee for Humanity," BioScience, April 1977, Vol. 27, No. 4, p. 277.

[16]Schwab, 1974, p. 317.

[17]Schwab, 1974, p. 317.

technology be derived from a scientific analysis that is appropriate to the natural world on which technology intrudes."[18]

Social pressures arise out of environmental conditions. In fact this is the second world man lives in. The first was conceptualized by Ward and Dubos as the "natural world" and "the other is the world of social institutions and artifacts he (man) builds for himself, using his tools and engines, his science and his dreams to fashion an environment obedient to human purpose and direction."[19] Unfortunately, cities, at least some, are examples of man's mistakes with his second world.

Stress of Urbanism

The causes of urban problems are numerous and varied. Both Morris and Toynbee liken cities to a form of entrapment. In Toynbee's words "A city that outdistances man's walking powers is a trap for man. It threatens to become a prison from which he cannot escape unless he has mechanical means of transport, the thoroughfares for carrying these, and the purchasing power for commanding the use of artificial means of communication."[20] Desmond Morris

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[18]Barry Commoner, The Closing Circle, New York: Alfred A. Knopf, 1972, p. 189.

[19]Ward and Dubos, 1972, p. 1.

[20]Arnold Toynbee, "Has Man's Metropolitan Environment Any Precedents?" Ekistics, Vol. 133, p. 385.

described cities as comparable to human zoos. He suggests that man has trapped himself with "his own brainy brilliance".[21]

Efforts to study the effects of urbanisms range from behavioralistic to empirical. Milgram feels that city life produces certain behaviors in man through overloading him with inputs. This overloading, he contends, leads to adaptive mechanisms which are visible as specific behaviors of city life.[22] Some of these behaviors are thought to be visible in the form of crime, racial tension, and blighted neighborhoods.

Stresses of Technology

Technology has undergone an exponential change; a condition which Glass partially explains with the following statement. "Our scientific knowledge in this century has increased by approximately six doublings and is now some 64 times as great as in 1900. By the end of the century, it may well be 250 times as great."[23] Increases in scientific knowledge foster technological change which in turn seems to produce a societal or cultural change.

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[21]Desmond Morris, The Human Zoo, New York: McGraw-Hill, 1969, p. 8.

[22]Stanley Milgram, "The Experience of Living in Cities", Science, March 13, 1970, Vol. 167 No. 3924, p. 1468.

[23]Bentley Glass, "The Scientist: Trustee for Humanity," BioScience, April 1977, Vol. 27, No. 4, p. 278.

One sociologist credits technological innovation with being the most powerful cause of social change since the industrial revolution.[24] It is the expanding rate of change which is a central element of Toffler's book Future Shock. In it he defined "future shock as the distress, both physical and psychological, that arises from an overload of the human organism's physical adaptive systems and its decision-making processes."[25]

According to an article in Psychology Today "medical and psychological problems caused by stress have become the number one health problem in the last decade."[26] In particular the disorders of heart disease, cancer, arthritis, and respiratory diseases were grouped in the category of stress induced. Although technology cannot be assigned total responsibility for these disorders, there is evidence to suggest at least indirect linkage.

The effect of technology on man is one of positive and negative impact. Transportation can be used to demonstrate this notion. Through jet aircraft, rapid travel became a reality. Similarly, rocket propulsion has allowed man to travel to the moon. Out of these developments

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[24]Book Team Two, Society Today, 2nd. Ed. Cynthia Farden editor, Delmar California: CRM Books, 1973, p. 450.

[25]Alvin Toffler, Future Shock, New York: Random House, 1970, p. 290.

[26]Kenneth R. Pelletier, "Mind as Healer, Mind as Slayer," Psychology Today, February 1977, Vol. 10, No. 9, p. 35.

came terms such as "jetlag" and "weightlessness."

Manned space flight prompted intensive studies of wide ranging environmental factors and their impact on the human organism. The biological rhythms of man was just one of the areas under study. One such study involved keeping men in an experimental chamber where they were subjected to eighteen hour days. Some of the findings were that it "rendered the men potentially vulnerable to certain kinds of infection, -- it seemed to leave them somnolent yet restless and emotionally tense."[27]

In writing of biological rhythms, Luce suggests that "technologically advanced people tend to ignore cycles of day and night with rapid east-west travel and night life." It is his view that, "we may need to know even more about our time-structure because we are no longer in tune with the slow tempo of the natural environment."[28] His view is consistent with that of Toffler who feels that there are "discoverable limits to the amount of change that the human organism can absorb."[29]

Increased Leisure

The rise in industrialization and automation has diminished the amount of time man must spend in labor both

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[27]Gay Gaer Luce, Body Time-Physiological Rhythms and Social Stress, New York: Random House, 1971, pp. 40-41.

[28]Gay Gaer Luce, Biological Rhythms in Human and Animal Physiology, New York: Dover Publications, 1971, p. 151.

[29]Alvin Toffler, Future Shock, p. 290.

in the home and industry. Prospects for increased leisure are good in the face of liberalized contracts allowing earlier retirement and the continued increase in life spans.[30] Unless the employment picture changes, unemployment will continue as a generator of leisure for a small per cent of the United States work force.

A new pressure for leisure rises out of underemployment. For some this will be a source of frustration which may require creative use of leisure. Helmer forecasted this in 1966 with his comments directed to social planners, saying:

> "Within prosperous countries, such as the United States, there is a distinct and growing threat that increased automation, coupled with an obsolete and aimless system of education, will lead to a restratification of society in which a large middle class may find itself without suitable employment and without adequate means of filling its leisure time enjoyably and constructively."[31]

Man will have increased time to pursue avocational activities, but will he have the stimulation to find the myriad of self-fulfilling avenues?

Inflationary Rise in the Cost of Food and Services

According to Reese, inflation has been "endemic in the United States since 1939." He suggests that "prices today

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[30]Charles Tillman, "Teaching Agricultural Outdoor Programs in an Urban Setting", The Agricultural Education Magazine, January 1975, Vol. 47, No. 7, p. 160.

[31]Olaf Helmer, Social Technology, New York: Basic Books, 1966, p. 3.

are four to four and one-half times higher than in 1939."[32]

As the cost of goods and services increase there seems to be a corresponding effort on the part of the consumer to counteract the rise. Intensification of the do-it-yourself approach is partially credited to inflationary conditions. In 1975 many people turned to canning as a buffer to the rising cost of food only to find a shortage of jar lids. The home canning container industry was unable to meet the demands of summer, 1975. Not all the canning represented home gardening, but it did reflect a concerted effort to blunt rising food costs.

The return to home canning appears to be expanding. W. Stanley Stuart, Jr., Vice President of Ball Corporation at Muncie, Indiana, predicts that, "About 41 percent of all American households will do some home canning in 1976."[33] According to him this represents a 37 per cent increase over 1975.

Home gardening was another choice of crowded consumers looking for ways to save money. Several surveys indicate that people felt gardening was a way to save money. Sales of seed reflected increases over the past three years.

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[32]Jim E. Reese, "The New Inflation," Journal of Economic Issues, June 1977, Vol. XL, No. 2, p. 285.

[33]....., "Grow it Yourself" Craze Getting Bigger Than Ever," U.S.News & World Report, LXXX, No. 13 (March 29, 1976), p. 60.

If a person overlooks the work involved, experts predict that it is possible to save between $200 to $400 on a home garden which is 20 by 30 feet.[34]

Just as food costs have risen, so too have those in the service industries. Labor costs, whatever the service, generally run twice the cost of materials. The landscaping cost of planting a newly constructed home can run 5 to 10 per cent of the construction price. The average new construction cost was quoted in 1976 by Dan Rather as $46,000, reportedly double that of ten years ago.[35] Thus landscaping a home may cost $2,300 - $4,600 if done professionally. But a home gardener can provide landscaping at a fraction of that cost.

There are a number of societal factors which emphasize a need to find new solutions to man's problems. Schwab feels that "Our current problems of inflation, or unbridled consumption of irreplacable natural resources, and of deterioration of the environment merely make vivid what has been visible for a long time. The American people, including the leaders it chooses, are reluctant to make choices and decisions."[36]

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[34] U.S. News & World Report, p. 60.

[35] Dan Rather, CBS Evening News, Saturday evening, August 14, 1976, Erie, Pennsylvania, Channel 35 Television.

[36] Joseph Schwab, 1974, p. 317.

Contemporary society mirrors several changes which have the potential to induce stress in humans. Through his decisions and his ability to develop technologies, man has produced changes in the environment. Among many things machines are credited with allowing urbanism, of altering time schedules, and of reducing the time that must be spent at work. In addition to technology, inflation is another societal stress which seems to force humanity into finding alternatives. One of these alternatives may be found in plants or plant culture. Plants offer the chance for humans to turn from objects of their creation to objects that are part of the natural world.

In part three, evidence will be provided for the benefits accrued by man when he involves himself with plant culture. Particular emphasis will be directed to therapeutic use of plants and planting activities.

Part 3: Evidence That Plant Culture Activities Meet the Needs of Man

Horticultural Activities Provide Meaningful Leisure Pursuits

Gardening, in all its forms, has long been considered a suitable activity for leisure time. Even today, as gardening gains in popularity, many people are gardening for no other reason than that it is an enjoyable pastime. Butz quoted a study done by Medical Economics which revealed that of those doctors surveyed, 40 per cent gardened in

their leisure time.[37] Almost 200 years earlier (1789) "Benjamin Rush in a lecture for medical students recommended that those who intended to serve rural areas, establish themselves on small farms. He suggested that the principal attention be directed to grass and horticulture because these afforded the most amusement, required only moderate labor and would interfere the least with the practice of medicine."[38]

One hundred years later in England, a law was passed which provided for leasing land to be used as small gardens. The measure was developed to relieve unhealthy conditions of the poor and unemployed. Industrialization had drawn workers from the countryside into the cities where conditions of pollution, crowding and poverty prevailed. The English hoped the gardens would provide a link to the countryside and perhaps improve the quality of life.[39]

In 1921, when the eight-hour work day was established in France, gardening was looked to as one means for workers to use their time profitably. According to Watson: "Labor inspectors were asked to report cases in which employers had taken the initiative in providing gardens for their

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[37]Earl L. Butz, "Forward" in Landscape for Living, USDA Yearbook, 1972, p. XXXIII.

[38]Reva D. Zischke, Applications of Horticulture as a Means of Therapy, M.S.Thesis, Department of Agriculture, Michigan State University, 1956, p. 11.

[39]Jeanne Davis and Richard Mcardle, "Small Gardens in Europe Make Cities Livable," USDA Yearbook, 1972, p. 313.

employees."[40] The impact of these efforts are now visible to present-day travelers, who often comment on the considerable use of gardening by the Europeans.

There are many reasons to consider turning to plants as a source of leisure activity. Wise use of one's leisure is actually preventive therapy. Perhaps it should not be surprising that so many doctors rely on gardening as a leisure outlet.

Plants Provide Personal Benefits and Comforts

Activities with growing plants have and are being used today for the purpose of bringing relief to troubled minds and bodies. Tereshkovich, in doing a review of horticultural therapy, has defined the single word "hort-therapy" as rehabilitation through contact with nature.[41] The return an individual experiences when involved with growing plants is illustrated in many programs.

Plant culture activities have been used extensively in rehabilitation programs. Some of the institutions using hort-therapy are prisons, hospitals, schools and senior citizen homes. In all these uses, the key question is, what is there in the nurturing of plants that produces the therapeutic effect? Answers to this question are not known

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[40]Donald Watson and Alice Burlingame, Therapy Through Horticulture, New York: MacMillan Company, 1960, p. 11.

[41]George Tereshkovich, "Horticultural Therapy: A Review," HortScience, Volume 8, No. 6, December 1973, p.460.

in the scientific sense, but rather in the gross behavioral view.

Beneficial effects of man's association with plants is claimed in many projects. One of these is the Odyssey House Horticultural Sciences Project carried out on Ward's Island in the East River between Manhattan and Queens. They are seeking to show "that some people who have been involved with drugs and have lost interest in the business of living--and being parents can re-awaken those instincts by nurturing growing things."[42] Another example is found in Pennsylvania where the director of a federally funded horticultural therapy program for problem juveniles reports that they have not had a single incident of aggression, either verbal or physical, since their program started.[43]

The unique aspect of therapy through plants probably originates in these dimensions. In caring for plants, the focus is shifted from self to another living object. There are human connotations in watering, fertilizing and pruning plants. Through the act of nurturing plants one can observe a growth process which parallels the basic concepts of human development. Plants require responsibility and long term commitment unlike that of inanimate projects. With plants there is no rush, as their cycle introduces

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[42]Alice Evans, "Digging Plants Instead of Drugs," The New York Times, Sunday, December 14, 1975, p. 43.

[43]Martin Cotton, "Horticultural Therapy," Horticulture, LII, No. 9, September 1975, p. 24.

one to a more casual, less demanding pace.

Plants make the lives of man richer through their esthetic contributions. The professional landscape designer has the task of combining the attributes of site, building and plants to achieve a harmoniously pleasing setting for man. Plants can be used for enframement, to lead the eye away or toward something, to provide transition, to soften harsh lines, to screen, to provide a unifying element and much more. Because plants are living, their characteristics are ever changing. For this reason the task of placing plants to achieve desired effects is more difficult than that of the artist working in oils. The ornamentally pleasing usage of plants is not prone to happen by accident but more often comes from a comprehensive knowledge of plants and what they will become over the seasons.

There is much circumstantial evidence to indicate that man can meet many personal needs through experiences with green plants. The hobby potential for horticultural activities is vast. Even if these activities do not become an all-consuming hobby, gardening or raising house plants or developing a quality lawn can serve as profitable outlets for man's leisure. Therapeutic claims for horticultural activities go a long way toward assuring that one will not come away from plant-growing experiences unchanged.

The roles and mandates for schools will be used to support the proposal to include avocational horticulture in the general education curriculum. For example, in part four the school's role in environmental education is considered. Additionally stresses of urban living and technology will be examined with a view toward general education in horticulture as a mechanism to partially soften the impact.

Part 4: Rationale for Avocational Horticulture in General Education

Schools Have a Mandate to Provide for Environmental Education

By 1970, concern for the environment had reached such proportion that the federal government began to respond with legislation. Most significant for schools was the passage of Public Law 91-516, The Environmental Education Act, which was signed October 30, 1970. The act "was created to encourage the development of programs dealing with the process of relating man to his environment."[44] Even before the Environmental Education Act was passed, many states had made their own plans to provide environmental programs. Some included strict mandates, while others simply suggested programs.

Funding made available through the act stimulated almost 2,000 proposals to the U. S. Office of Education.

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[44] Editor, "Environmental Education National Council Submits Annual Report," SMEAC Newsletter-Environmental Education, Columbus, Ohio, Volume 2, No. 6, (1971-72), p. 1.

Under this stimulus, the state of Michigan established a task force to develop a master plan for environmental education. The first edition of Michigan's master plan was transmitted to the governor on January 15, 1973.[45] Similar plans were developed throughout the United States. Even before Michigan's master plan, "Environmental Quality" was an educational goal. In fact Goal Eleven in the Common Goals of Michigan Education reads as follows: "Michigan education must develop within each individual the knowledge and respect necessary for the appreciation, maintenance, protection, and improvement of the physical environment."[46]

According to Hurd, part of the environmental problem is that "Today, youth struggles to find sources of knowledge that are meaningful for generating new insights into the relation of human beings with the realities of nature."[47] One of many answers to this problem may be found in providing individuals with experiences growing plants. Through the activities of nurturing plants, man stands to renew a vital relationship of his evolutionary

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[45]William B. Stapp, (Letter of Transmital), Michigan's Environmental Future, A Master Plan for Environmental Education, Governor's Task Force, First Ed., 1973, p. iii.

[46]Michigan Department of Education, September 1971, p. 7.

[47]Paul De Hart Hurd, "Science, Technology and Society: New Goals for Inter Disciplinary Science Teaching," The Science Teacher, Volume 42, No. 21, February 1975, p. 27.

past. This relationship is the critical partnership of the living world.

Years ago the opportunity to have experiences with growing plants was common. Urbanization and industrialization have taken many families away from the soil. Not only has this process contributed directly to declining environmental quality but also it has reduced man's sensitivity to the natural world. Dubos points out that, "all students of primitive life have noted that the senses of human beings who live close to nature are much keener than those of civilized man."[48] He goes on to say that "modern man retains the same potentialities for keeness of perception that his distant ancestors had, as demonstrated by the fact that persons who have removed themselves from technicized environments commonly display increased ability to perceive colors, sounds and odors."[49]

Environmentalists contend that awareness, knowledge of relationships (food and life cycles), and knowledge of the intricate dependencies are necessary if we are to reverse the state of the environment. Though primarily a Biologist, Glass reiterates the same point. "We must learn very soon to endure the thought that human survival itself, not merely our pleasure or comfort, depends on the preservation

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[48]Rene Dubos, So Human an Animal, New York: Charles Scribner's Sons, 1968, p. 112.

[49]....., 1968, p. 112.

of our relations with the rest of life on earth and on the maintenance of the great cycles of nature that restore the life-giving properties of our environment."[50] There is no guarantee that knowledge will result in more intelligent behavior; however, responsible decisions will not rise out of ignorance.

Schools have a Mandate to Educate for Leisure

Long before the environmental clamor, schools were charged with responsibility to educate for leisure. The sixth Cardinal Principal (1918) was to provide for a "worthy use of leisure."[51] This goal was restated again by the Educational Policies Commission in their report entitled "Imperative Needs of Youth" published in 1947.[52]

Today the mandate to educate for leisure would fall under a broader heading such as personal fulfillment. Within a highly impersonal technological society there is greater need than ever to find creative outlets. Those who are forced to cope with occupations which do not allow them to identify with the whole need opportunities to do things

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[50]Bentley Glass, 1977, p. 278.

[51]....."Commission on the Reorganization of Secondary Education of the National Education Association," Bulletin No. 35, Washington, D.C., 1918, p. 12.

[52]....."Imperative Needs of Youth," National Association of Secondary School Principals, Volume 31, No. 145, March 1947, p. 2.

over which they have some control.[53]

The range of leisure activities open to an individual depends, in large measure, on the amount of exposure he or she has been given. Article six of the "Charter for Leisure" states that:

> "Everyman has a right to the opportunity for learning how to enjoy his leisure time. Family, school, and community should instruct him in the art of exploiting his leisure time in the most sensible fashion. In schools, classes, and courses of instruction, children, adolescents, and adults must be given the opportunity to develop the skills, attitudes, and understandings essential for leisure literacy."[54]

For almost sixty years, schools have had a mandate to educate for leisure, but it has not been a priority. As Miller points out in her article justifying school farms and gardens: "For the most part schools are ignoring their charge to provide children and youth with learning opportunities which will achieve the goal of worthy use of leisure time."[55]

There is a Place for Real Life Activities in the Curriculum

Broudy, in criticizing current educational procedures, feels that "logically organized subject matter is abstract

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[53]Robert Dubin, "Industrial Workers' World: A Study of the 'Central Life Interests' of Industrial Workers," in Erwin O. Smigel (ed.), Work and Leisure, New Haven, Conn.: College and University Press, 1963, pp. 53-72.

[54]....., "Charter for Leisure," Journal of Health Physical Education Recreation, Volume 42, No. 2, February 1971, p. 28.

[55]Peggy Miller, School Gardens and Farms--Aspects of Outdoor Education, (ERIC) Las Cruces, New Mexico, 1970, p.2.

and remote from daily life."[56] As was pointed out earlier (in Chapter 1), Coleman also viewed the school's concentration on cognitive skills as a present day failing.

Wilhelms criticized the school's preoccupation with subject matter. He suggests that subject fields are looked upon as, "a body of information rather than as a body of purposes and goals." According to him, "the details, which will mostly be forgotten anyway, get in the way of the big ideas. The potential development of the person himself is sacrificed to the acquisition of knowledge and skill he will probably never need or use."[57] He recommends that new approaches be tried which are "close to the concrete realities of ordinary life and to the problems of our society."[58] His argument is directed at general education, that education needed by every student.

Ordinary daily life tasks are not commonplace in school curricula. The reason for this is offered by Broudy. He feels that: "Whatever becomes formalized into a logical system of ideas cannot be picked up by imitating the activities of the elders."[59] Instead, the resultant

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[56]Harry S. Broudy, General Education: The Search for a Rationale, The Phi Delta Kappa Foundation, Bloomington, Indiana, 1974, p. 22.

[57]Fred T. Wilhelms, What Should the Schools Teach? Phi Delta Kappa Education Foundation, Bloomington, Indiana, 1972, p. 24.

[58]Wilhelms, p. 23.

[59]Harry S. Broudy, 1974, p. 10.

curriculum is one of symbol skills emphasizing subject areas rather than developing the individual.

These criticisms have been in existence for many years as evidenced by this commentary by Bailey.

> ".....educational practice has been so dominated by the bogy of mental discipline that enthusiasms have been neglected. Yesterday a man said to me that he had taken the botany in a great university but graduated without a love of plants, and had taken the astronomy without having learned the glory of the heavens."
>
> Liberty Hyde Bailey, 1905[60]

His comment stresses a need for wholeness in learning, an attention to the range of outcomes that learning experiences should have.

The last main element of support for the rationale is treated from a student view point in part five. Ideas such as horticulture as an avenue to emphasize environmental relationships and plant culture as leisure activity are used to depict student benefits which may be derived through avocational horticulture.

Part 5: Contributions of Avocational Horticulture to General Education

Horticultural Activities Emphasize Environmental Relationships

Charles Lewis, horticulturist at Morton Arboretum, raises a potentially useful question with this hypothesis: "Through plants, can we and our children learn respect for the inter-relationships of biological systems necessary

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[60] The Outlook to Nature, p. 184.

for survival of this living planet?"[61] A major premise of outdoor educators answers this question in principle. "Learning from and through nature is and always has been a part of the developmental process of human beings."[62] To learn about plants would not be an application of this principle. One must go through the physical envolvement of growing plants. This is the investment which pays off in learning.

Students who make the physical investment of planting seeds usually return to check on the progress of things planted by their own hand. Although not many seeds are impressive, the growth which erupts is one of the marvels of nature. This can serve as a vehicle to emphasize the life needs of plants. Also, some plant types pass through a complete life cycle in a relatively short time, thus providing students the chance to see one of nature's essential patterns. In this way a newly developing plant can become a reward for physical investment as well as a tool for providing basic ecological relationships.

Students have Aesthetic and Emotional Needs Which can be Met Through Horticultural Activities

Abraham Maslow describes the basic needs of individuals as "physiological, safety, love, esteem, and self-

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[61]Charles A. Lewis, "People-Plant Interaction a New Horticultural Perspective," American Horticulturist, Volume 52, No. 21, Summer 1973, p. 24.

[62]Julian Smith, and others, Outdoor Education, Englewood Cliffs: Prentice-Hall, Inc., 1963, p. 14.

actualization."[63] The successes of horticulture therapy probably are due to the way in which plant culture activities relate to the basic inner needs of man.

"Horticulture has long been valued and appreciated in older civilizations for what it can do to satisfy the physical, mental, and spiritual needs of man."[64] The therapeutic value of plants is attributed to the one-to-one relationship established between the patient and the growing plant. The dividend from care and attention seems to produce changes in both organisms.

In the act of maintaining a vegetable garden or caring for a lawn, it is possible to let go the concerns and stresses of the day. These and other activities with growing plants put man in touch with a new and slower rhythm. Self-esteem and satisfaction radiate from the one-to-one contact with a growing thing. There is both anticipation and mystery with each seed that is tucked into the soil. The act of planting takes the focus outside one's self and places the reward on tomorrow.

The key to unlocking the plant-man interaction is exposure and knowledge. A little child will gravitate to a beautiful flower, but it's a long step to the successful

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[63]Abraham Maslow, "A Theory of Human Motivation," Psychological Review, Vol. 50, No. 4, July 1943, p. 394.

[64]Donald Watson and Alice Burlingame, Therapy Through Horticulture, New York: MacMillan Company, 1960, p. V. In the forward by H. B. Tukey.

cultivation of that very same flower. That long step is one of developing knowledges, attitudes and practical skills. Plants have a place in the culture of man, and schools have a legitimate function to transmit that culture.

Plant Culture Provides Students with Avenues to Leisure Activity

Our technology has given us more leisure than we have been prepared to use. Predictions are that leisure will increase, and if the energy crisis worsens, man will have to look closer to home for his sources of recreation. It is time for schools to prepare students in ways that will allow them to find self-fulfillment through leisure.

The range of plant culture activities is broad, but perhaps it is gardening which is most often practiced. Gardening can be as demanding as the needs and time of the individual will allow. Even the lazy gardener picks up a degree of healthful exercise. Once involved, many are finding gardening to be a form of recreation which is both creative and rewarding.

Within the embrace of horticulture, one can find countless hobby possibilities. Raising cacti, bottle gardening, culturing African violets, and hybridizing plants are but a few. For some these hobby ventures can become all-consuming, and for the retired individual, they have a way of making tomorrow important.

Each Student is a Potential Horticultural Consumer

Sales of ornamental plants and flowers are estimated at nearly five billion dollars per year. Home gardening is enjoying a renewed popularity possibly surpassing even the victory garden era of World War II. Yearly, large sums of money are spent on the maintenance of home lawns and plantings. People are purchasing house plants in record numbers.

Home and hobby needs have created large markets for horticultural supplies. Part of this may be attributed to the development of the do-it-yourself movement and the trend of returning to nature. Economic conditions favor both home gardens and do-it-yourself landscaping. Regardless of the economic outlook, it is a rare individual who does not find himself purchasing some horticulturally related product.

Horticultural Skills have Utility in Everyday Living

Horticultural activities offer one the chance "to improve upon his life situation aesthetically, nutritionally and financially."[65] Although he was speaking to the issue of the effect of machines on the life of man, McClary described the utility of horticulture in everyday living with these words: "We may laugh at the thought of

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[65]Lynda A. Walker, "Using Horticultural Resources in Washington, D.C.," The Agricultural Education Magazine, Volume 47, No. 12, June 1975, p. 279.

returning to a handicraft technology, but hobbies, gardening, even the do-it-yourself movement, bespeak a widespread urge to recapture a personal participation in the creation of material things..."[66] Plant culture activities offer a range of benefits primarily dependent upon the perception of those activities held by the user.

It may be that Schwab has the soundest approach to blending practical action with theoretical knowledge. His answer to this evolved from a consideration of the ways that science teaching could meld the discipline of science to practical processes which would better enable persons to make the critical decisions facing man. He suggests that,

> "...it is they (schools) who must begin to teach the young what a seriously formulated practical problem looks like, and give them a beginning idea of what a good solution entails. The heart of every well-formulated practical problem and the guts of every good solution is the practical union of materials borrowed from the specialized sciences and altered-returned from the state of being knowledge about the subject-matter of enquiry to partial knowledge of the <u>real</u> world, of the field of potential study."[67]

The proposal to offer avocational horticulture as part of the general education curriculum represents one attempt to provide an appropriate balance between theoretical knowledge and the activities of life.

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[66]Andrew McClary, 1975, p. 282.

[67]Schwab, p. 314.

Summary and Overview

Elements of the Rationale

If a rationale is to provide an adequate base for curriculum decisions it must take into consideration the needs of the learner, the needs of society and the role of schools.

Needs of Learners Man has an extensive history of interactions with plants thus suggesting possible evidence that plant culture answers an inner need of man. Through direct experiences with plants an individual may be drawn into contact with his biological heritage while developing his social and environmental sensitivity.

Needs of Society Current societal conditions, such as technological change, urbanization, and inflation have increased the distance between man and his natural environment. In this way a need for additional plant-man-interactions has been fostered.

Role of Schools Both by mandate and precedent, schools have the responsibility to provide education for real life activities, to provide education for leisure, and to provide education for sound environmental behavior.

Avocational horticulture has much to offer the individual. Its utility is both immediate and long-range. Plants provide aesthetic reward and personal satisfaction to persons of all ages.

The Rationale

Sociologic, technologic, and economic change create an increased need for enhancing people-plant interactions. Although not educated to the task, people have increased their uses of horticultural materials. As an agency empowered to educate for effective living, schools have a role in meeting the needs of society and the needs of the individual within that society. For our present and future students, it is increasingly important to blend the theoretical and the practical, the aesthetic, and the cognitive in the curriculum. Horticultural experiences, when provided for general education purposes, can provide a vehicle for this blending and therefore can enrich the lives of individuals.

Overview of Chapter Five

Data gathered through the use of the horticulture task inventory will be summarized in Chapter five. The ratings of task items by jurors will be provided. In addition, clustering of task items will be set out for later comparison. The question whether jurors responded uniformly across subjuries will be explored through the application of the Spearman Rank Correlation Coefficient. Comments and additions to the horticulture task inventory will be set forth to allow later discussion regarding the strengths and weaknesses of the inventory as a content selection tool.

In Chapter five data is gathered to be considered as possible content for avocational horticulture as it might be offered within the general education curriculum.

CHAPTER V

PRESENTATION OF DATA

This chapter contains a summarization of data gathered through application of a content determination model patterned after those used in identifying content for vocational education. One objective of this study was to identify plant culture tasks which could be suggested as content, when attempting to provide general education in avocational horticulture.

Fundamentally, an assumption was made that common practical horticultural tasks were carried out in everyday life. The premise was that those horticultural practices had value in establishing a content base for practical education experiences. Additionally, it was assumed that everyday life practices were an appropriate source for practical content.

One significance of this study is in providing the trial of a content determination model in developing curriculum for general education. As noted in Chapter two, general education experiences in horticulture are very limited. To date, no study has been carried out to systematically identify content for avocational horticulture.

An additional value of this study is in the adaptation of a vocational content determination model to the search for avocational content. The majority of studies using a task analysis procedure have been vocationally oriented.

Study Processes

Curriculum Identification Model

An analysis-of-activities approach was the model used in this study. Through the analysis-of-activities approach, jobs or tasks are reduced to component activities. The purpose is to use a systematic method to identify the steps needed to complete a task. This process, though new to avocational studies, has been used extensively in the development of industrial arts curriculum. In this application the analysis-of-activities approach was used to develop a practical horticulture tasks inventory.

Inventory Development

In applying the model the initial task was to identify several wide scope horticultural functions commonly carried out by home owners and hobbyists. These wide scope horticulture functions were called task areas. A literature search revealed the areas to be lawns, trees and shrubs, indoor gardens, gardening (fruits, vegetables and flowers) and miscellaneous.

Once the task areas were established, a pool of practical horticultural tasks was gathered. Tasks were defined as those component manipulative activities which enable one to carry out practical horticulture functions. For example, if the task area is trees and shrubs, then a task would be to prune a tree.

Screening criteria were used to define acceptable tasks. A preliminary task inventory of 90 items was prepared for circulation to a local panel of experts for rating.

The group of local horticulture experts, composed of three garden center managers, a landscaper, and a garden club president were asked to rate the preliminary inventory. Their responses were used to eliminate items, to improve wording and to add items. Mean values were calculated for each of the 90 items. Those items with a mean value of less than 1.0 were deleted from the preliminary inventory.

Changes in the Inventory

In the task area of lawns, one item, 12 (Roll the seeded ground), was deleted. Comments by the experts indicated that they considered rolling the ground unnecessary and possibly harmful.

Only one change was necessary in the task area trees and shrubs and that was to delete item 12 (Propagate shrubs and trees through cuttings). Jurors felt that this item was only suitable for the advanced hobbyist.

In the task area indoor gardening, three items ranked low enough to be eliminated. Item 2 (Dry flowers), item 6 (Sterilize soil prior to use as potting or seed media) and item 18 (Make cuttings of house grown plants). Comments by the experts explained their low ratings of these items. Drying flowers was considered a small craft activity and thus was not important. Sterilizing soil was judged to be unnecessary work considering the availability of commercial

soil mixes. The item on making cuttings was viewed as a duplicate of item 10 (Propagate house plants).

In the fourth task area, gardening (flowers, fruits and vegetables) two items were judged unacceptable. Item 12 (Plant herbs) was thought to be covered by other items. Item 21 (Graft fruit trees) was rated poorly because it was considered a task for advanced hobbyists.

In the final task area miscellaneous, only one item, 9 (Construct a cold frame), was rejected. Ratings by panel members caused a total of eight items to be deleted from the preliminary inventory.

Items suggested by the local experts were added to the research form of the inventory if they met the original screening criteria. In total, three items were added. Two items, "identify lawn weeds," and "apply chemicals for weed, insect, and disease control" were added to the task area of lawns. The third task item, "locate plants according to their need for light," was added to the task area of indoor gardening.

As the result of deletions and additions, the preliminary inventory of 90 items was reduced to the research form of the inventory consisting of 85 items. The research form of the inventory can be found in the appendix.

Research Inventory

In order to determine the relative value of the practical horticulture tasks to the development of avocational

curriculum, the research form of the inventory was circulated to an expert jury for rating. The thirteen-person jury was composed of two sub groups. Eight jurors were members of the Pennsylvania Cooperative Extension Service, and five jurors were horticulture educators.

As previously mentioned, the assumption was that cooperative extension jurors would provide a practical reference frame, and the horticulture educators would provide a strong discipline reference frame.

Results of jury ratings are provided in Table 5.1. For convenient comparison frequency of importance ratings have been reported by subjury. Except in the task areas of lawns and miscellaneous, the total number of jurors responding was thirteen. One hort-educator did not respond to the tasks listed under lawns because he felt that lawns were not his speciality. Another hort-educator failed to rate task items under the task area of miscellaneous. Therefore the jury numbers twelve in the task area of lawns and miscellaneous.

Data Analysis

Content by Criterion

Potential content for avocational horticulture was proposed to come from juror evaluation of the 85 item horticulture task inventory. Because of the limited number of jurors the criterion of acceptance was set at 75 per cent of the jurors rating a task as very important or important.

Table 5.11

Frequency of Importance Ratings and Comments on Practical Tasks Involved in the Care and Maintainence of Lawns by Cooperative Extension Agents (Ext.), and Horticulture Educators (H.Ed.) Jury Groups

HORTICULTURAL TASK	Sub	Importance Rating					
Lawns	Jury	3	2	1	0	U	Comments
1. Plant a new lawn from seed	H.Ed.	1	1	1	1	0	1
	Ext.	4	4	0	0	0	0
	Total	5	5	1	1	0	1
2. Plant a new lawn from sod	H.Ed.	0	1	2	1	0	1
	Ext.	2	0	3	2	1	1
	Total	2	1	5	3	1	2
3. Prepare the seed bed for a new lawn	H.Ed.	1	1	1	1	0	2
	Ext.	3	5	0	0	0	0
	Total	4	6	1	1	0	2
4. Repair and reseed a lawn	H.Ed.	2	1	1	0	0	1
	Ext.	3	2	3	0	0	0
	Total	5	3	4	0	0	1
5. Mow and trim a lawn	H.Ed.	4	0	0	0	0	0
	Ext.	2	2	3	1	0	0
	Total	6	2	3	1	0	0
6. Fertilize and lime a lawn	H.Ed.	4	0	0	0	0	0
	Ext.	6	2	0	0	0	0
	Total	10	2	0	0	0	0

Legend:
3=Very Important, 2=Important, 1=Some Importance, 0=Not Important, U=Not Acceptable for Rating

Table 5.11 (Cont'd.)

HORTICULTURAL TASK Lawns	Sub Jury	Importance Rating 3	2	1	0	U	Comments
7. Remove weeds from a lawn	H.Ed.	4	0	0	0	0	1
	Ext.	3	5	0	0	0	0
	Total	7	5	0	0	0	1
8. Water a newly seeded or sod lawn	H. Ed.	3	1	0	0	0	0
	Ext.	2	1	5	0	0	0
	Total	5	2	5	0	0	0
9. Treat insect and disease problems of the lawn	H. Ed.	1	2	1	0	0	0
	Ext.	2	6	0	0	0	1
	Total	3	8	1	0	0	1
10. Broadcast grass seed and fertilizer with a spreader	H. Ed.	2	2	0	0	0	0
	Ext.	4	1	3	0	0	1
	Total	6	3	3	0	0	1
11. Clean and sharpen mower blades	H. Ed.	0	1	1	2	0	1
	Ext.	1	3	2	1	1	3
	Total	1	4	3	3	1	4
12. Spread and level top soil	H. Ed.	0	2	1	1	0	0
	Ext.	1	1	3	3	0	0
	Total	1	3	4	4	0	0
13. Till soil for lawn seedbed	H. Ed.	0	1	2	1	0	0
	Ext.	3	1	4	0	0	1
	Total	3	2	6	1	0	1
14. Plant ground covers	H. Ed.	2	1	1	0	0	0
	Ext.	1	4	2	0	1	2
	Total	3	5	3	0	1	2

Table 5.11 (Cont'd.)

HORTICULTURAL TASK	Sub	Importance Rating					
Lawns	Jury	3	2	1	0	U	Comments
15. Identify lawn weeds	H.Ed.	1	3	0	0	0	0
	Ext.	4	3	1	0	0	0
	Total	5	6	1	0	0	0
16. Apply chemicals for weed, insect and disease control	H.Ed.	1	3	0	0	0	1
	Ext.	4	4	0	0	0	1
	Total	5	7	0	0	0	2

Table 5.12

Frequency of Importance Ratings and Comments on Practical Tasks Involved in the Care and Maintainence of Trees and Shrubs by Cooperative Extension Agents (Ext.) and Horticulture Educators (H.Ed.) Jury Groups

HORTICULTURAL TASK	Sub	Importance Rating					
Trees and Shrubs	Jury	3	2	1	0	U	Comments
1. Plant trees	H.Ed.	4	1	0	0	0	1
	Ext.	5	2	1	0	0	1
	Total	9	3	1	0	0	2
2. Trim (Prune shrubs and trees)	H.Ed.	5	0	0	0	0	2
	Ext.	6	2	0	0	0	0
	Total	11	2	0	0	0	2
3. Fertilize trees and shrubs	H.Ed.	4	1	0	0	0	0
	Ext.	3	2	3	0	0	0
	Total	7	3	3	0	0	0

Table 5.12 (Cont'd.)

	HORTICULTURAL TASK Trees and Shrubs	Sub Jury	Importance Rating 3	2	1	0	U	Comments
4.	Water new plantings of trees and shrubs	H. Ed.	5	0	0	0	0	0
		Ext.	2	3	1	2	0	1
		Total	7	3	1	2	0	1
5.	Support newly planted woody plants by staking or guying	H. Ed.	1	3	1	0	0	0
		Ext.	1	3	3	1	0	1
		Total	2	6	4	1	0	1
6.	Wrap young trees	H. Ed.	0	4	1	0	0	0
		Ext.	1	2	5	0	0	1
		Total	1	6	6	0	0	1
7.	Remove damaged, diseased, or unwanted limbs	H. Ed.	4	0	1	0	0	0
		Ext.	5	2	1	0	0	0
		Total	9	2	2	0	0	0
8.	Repair minor tree wounds	H. Ed.	2	1	2	0	0	0
		Ext.	2	3	3	0	0	0
		Total	4	4	5	0	0	0
9.	Move and replant a shrub or small tree	H. Ed.	2	3	0	0	0	0
		Ext.	4	4	0	0	0	0
		Total	6	7	0	0	0	0
10.	Select and purchase nursery stock	H. Ed.	4	1	0	0	0	0
		Ext.	5	1	2	0	0	0
		Total	9	2	2	0	0	0
11.	Shear hedges and shrubs	H. Ed.	4	1	0	0	0	1
		Ext.	4	3	0	1	0	1
		Total	8	4	0	1	0	2

Table 5.12 (Cont'd.)

HORTICULTURAL TASK	Sub	Importance Rating					
Trees and Shrubs	Jury	3	2	1	0	U	Comments
12. Provide winter protection for shrubs	H.Ed.	2	1	2	0	0	0
	Ext.	3	2	2	1	0	0
	Total	5	3	4	1	0	0
13. Add compost or peat moss at time of tree planting	H.Ed.	0	4	1	0	0	0
	Ext.	3	1	3	1	0	1
	Total	3	5	4	1	0	1
14. Spray trees and shrubs for pests and disease	H.Ed.	2	3	0	0	0	0
	Ext.	6	1	1	0	0	1
	Total	8	4	1	0	0	1
15. Dig holes for tree setting	H.Ed.	1	4	0	0	0	0
	Ext.	3	2	2	1	0	1
	Total	4	6	2	1	0	1
16. Plant a hedge	H.Ed.	0	4	1	0	0	1
	Ext.	0	1	6	1	0	0
	Total	0	5	7	1	0	1

Table 5.13

Frequency of Importance Ratings and Comments on Practical Tasks Involved in Indoor Gardening by Cooperative Extension Agents (Ext.) and Horticulture Educators (H.Ed.) Jury Groups

HORTICULTURAL TASK	Sub	Importance Rating					
Indoor Gardening	Jury	3	2	1	0	U	Comments
1. Arrange fresh or dried flowers	H.Ed.	3	2	0	0	0	1
	Ext.	2	4	1	1	0	0
	Total	5	6	1	1	0	1
2. Prepare soil mix for potting	H.Ed.	4	1	0	0	0	0
	Ext.	3	3	2	0	0	0
	Total	7	4	2	0	0	0
3. Force spring bulbs for indoor bloom	H.Ed.	2	1	2	0	0	0
	Ext.	1	1	4	2	0	0
	Total	3	2	6	2	0	0
4. Pot and re-pot house plants	H.Ed.	4	1	0	0	0	0
	Ext.	7	1	0	0	0	0
	Total	11	2	0	0	0	0
5. Prepare bottle gardens (Terraria)	H.Ed.	1	1	3	0	0	0
	Ext.	2	2	3	1	0	0
	Total	3	3	6	1	0	0
6. Prepare hanging baskets of plants	H.Ed.	1	2	2	0	0	0
	Ext.	2	0	6	0	0	0
	Total	3	2	8	0	0	0

Table 5.13 (Cont'd.)

HORTICULTURAL TASK Indoor Gardening	Sub Jury	Importance Rating 3	2	1	0	U	Comments
7. Water house plants	H. Ed.	5	0	0	0	0	0
	Ext.	4	3	1	0	0	0
	Total	9	3	1	0	0	0
8. Propagate house plants	H. Ed.	2	3	0	0	0	0
	Ext.	4	4	0	0	0	0
	Total	6	7	0	0	0	0
9. Fertilize house plants	H. Ed.	3	2	0	0	0	0
	Ext.	5	2	1	0	0	0
	Total	8	4	1	0	0	0
10. Prepare seed flats or containers for planting	H. Ed.	2	3	0	0	0	2
	Ext.	2	3	3	0	0	0
	Total	4	6	3	0	0	2
11. Regulate humidity in the area of house plants	H. Ed.	1	1	3	0	0	1
	Ext.	2	4	1	1	0	0
	Total	3	5	4	1	0	1
12. Treat insect and disease problems of house plants	H. Ed.	2	2	1	0	0	0
	Ext.	3	3	2	0	0	0
	Total	5	5	3	0	0	0
13. Raise plants with artificial light	H. Ed.	1	2	2	0	0	0
	Ext.	2	0	6	0	0	0
	Total	3	2	8	0	0	0
14. Transplant seedlings to pots	H. Ed.	3	2	0	0	0	0
	Ext.	3	3	2	0	0	0
	Total	6	5	2	0	0	0

Table 5.13 (Cont'd.)

HORTICULTURAL TASK	Sub	Importance Rating					
Indoor Gardening	Jury	3	2	1	0	U	Comments
15. Determine soil mix for specific plant requirements	H.Ed.	3	1	1	0	0	1
	Ext.	3	2	2	1	0	1
	Total	6	3	3	1	0	2
16. Pinch back potted plants	H.Ed.	3	0	2	0	0	0
	Ext.	3	3	2	0	0	0
	Total	6	3	4	0	0	0
17. Locate plants according to their need for light	H.Ed.	5	0	0	0	0	1
	Ext.	4	3	1	0	0	0
	Total	9	3	1	0	0	1

Table 5.14

Frequency of Importance Ratings and Comments on Practical Tasks Involved in Gardening (Flowers, Fruits, and Vegetables) by Cooperative Extension Agents (Ext.) and Horticulture Educators (H.Ed.) Jury Groups

HORTICULTURAL TASK	Sub	Importance Rating					
Gardening	Jury	3	2	1	0	U	Comments
1. Plant bulbs	H.Ed.	2	2	1	0	0	0
	Ext.	3	4	0	0	0	0
	Total	5	6	1	0	0	0
2. Transplant seedlings	H.Ed.	4	1	0	0	0	0
	Ext.	3	4	1	0	0	0
	Total	7	5	1	0	0	0

Table 5.14 (Cont'd.)

HORTICULTURAL TASK Gardening	Sub Jury	Importance Rating 3	2	1	0	U	Comments
3. Pinch back plants	H. Ed.	2	3	0	0	0	0
	Ext.	1	6	1	0	0	0
	Total	3	9	1	0	0	0
4. Start plants from seed	H. Ed.	4	1	0	0	0	0
	Ext.	4	3	1	0	0	0
	Total	8	4	1	0	0	0
5. Cut and care for cut flowers	H. Ed.	1	2	2	0	0	0
	Ext.	2	2	3	1	0	0
	Total	3	4	5	1	0	0
6. Prepare garden plots	H. Ed.	2	3	0	0	0	0
	Ext.	6	0	2	0	0	0
	Total	8	3	2	0	0	0
7. Plant rose bushes	H. Ed.	2	1	2	0	0	0
	Ext.	2	1	5	0	0	2
	Total	4	2	7	0	0	2
8. Prune roses	H. Ed.	2	2	1	0	0	0
	Ext.	3	1	4	0	0	0
	Total	5	3	5	0	0	0
9. Plant annual flowers	H. Ed.	3	2	0	0	0	0
	Ext.	4	2	2	0	0	0
	Total	7	4	2	0	0	0
10. Plant a vegetable garden	H. Ed.	4	1	0	0	0	0
	Ext.	5	2	1	0	0	0
	Total	9	3	1	0	0	0

Table 5.14 (Cont'd.)

HORTICULTURAL TASK Gardening	Sub Jury	Importance Rating 3	2	1	0	U	Comments
11. Plant perennial and biennial flowers	H. Ed.	2	1	2	0	0	0
	Ext.	3	4	1	0	0	0
	Total	5	5	3	0	0	0
12. Thin seed plants	H. Ed.	2	1	2	0	0	0
	Ext.	5	2	1	0	0	0
	Total	7	3	3	0	0	0
13. Treat pest and disease problems	H. Ed.	3	2	0	0	0	0
	Ext.	7	1	0	0	0	1
	Total	10	3	0	0	0	1
14. Fertilize vegetable plants	H. Ed.	3	2	0	0	0	1
	Ext.	6	2	0	0	0	0
	Total	9	4	0	0	0	1
15. Fertilize plants grown specific for their flowers	H. Ed.	3	1	1	0	0	1
	Ext.	1	5	1	1	0	0
	Total	4	6	2	1	0	1
16. Water seedlings	H. Ed.	5	0	0	0	0	0
	Ext.	4	2	2	0	0	0
	Total	9	2	2	0	0	0
17. Spray fruit trees	H. Ed.	3	1	1	0	0	1
	Ext.	4	2	2	0	0	0
	Total	7	3	3	0	0	1
18. Prune fruit trees	H. Ed.	2	2	1	0	0	1
	Ext.	4	3	1	0	0	0
	Total	6	5	2	0	0	1

Table 5.14 (Cont'd.)

HORTICULTURAL TASK	Sub	Importance Rating					
Gardening	Jury	3	2	1	0	U	Comments
19. Plant small fruits and berries	H.Ed.	2	2	1	0	0	1
	Ext.	1	5	2	0	0	0
	Total	3	7	3	0	0	1
20. Weed garden plantings	H.Ed.	4	1	0	0	0	1
	Ext.	5	3	0	0	0	0
	Total	9	4	0	0	0	1

Table 5.15

Frequency of Importance Ratings and Comments on Miscellaneous Practical Horticulture Tasks by Cooperative Extension Agents (Ext.) and Horticulture Educators (H.Ed.) Jury Groups

HORTICULTURAL TASK	Sub	Importance Rating					
Miscellaneous	Jury	3	2	1	0	U	Comments
1. Add mulch to protect plants	H.Ed.	2	2	0	0	0	1
	Ext.	4	3	1	0	0	0
	Total	6	5	1	0	0	1
2. Provide winter protection for sensitive plants	H.Ed.	1	3	0	0	0	0
	Ext.	4	1	2	0	1	1
	Total	5	4	2	0	1	1
3. Plan a home landscape	H.Ed.	2	1	1	0	0	1
	Ext.	4	2	2	0	0	0
	Total	6	3	3	0	0	1

Table 5.15 (Cont'd.)

HORTICULTURAL TASK Miscellaneous	Sub Jury	Importance Rating 3	2	1	0	U	Comments
4. Cultivate plants	H. Ed.	1	1	1	0	1	2
	Ext.	1	3	3	0	0	0
	Total	2	4	4	0	1	2
5. Select plants with regard to hardiness, growth requirements, and desired effects	H. Ed.	3	1	0	0	0	0
	Ext.	6	0	1	1	0	1
	Total	9	1	1	1	0	1
6. Sharpen hand tools (Hoes, trowel, and so forth)	H. Ed.	0	2	2	0	0	0
	Ext.	0	3	1	4	0	1
	Total	0	5	3	4	0	1
7. Prepare power tools for winter storage	H. Ed.	0	3	1	0	0	0
	Ext.	2	2	3	1	0	0
	Total	2	5	4	1	0	0
8. Build a compost pile	H. Ed.	0	1	3	0	0	0
	Ext.	3	1	4	0	0	0
	Total	3	2	7	0	0	0
9. Apply lime and fertilizer according to soil test	H. Ed.	1	3	0	0	0	0
	Ext.	8	0	0	0	0	0
	Total	9	3	0	0	0	0
10. Treat nutrient deficiencies in plants	H. Ed.	0	3	1	0	0	0
	Ext.	5	1	2	0	0	1
	Total	5	4	3	0	0	1
11. Recognize horticultural plants	H. Ed.	4	0	0	0	0	0
	Ext.	4	2	2	0	0	0
	Total	8	2	2	0	0	0

Table 5.15 (Cont'd.)

HORTICULTURAL TASK	Sub	Importance Rating					
Miscellaneous	Jury	3	2	1	0	U	Comments
12. Use sprayers to dispense pesticide, herbicide and fungicides	H.Ed.	2	2	0	0	0	0
	Ext.	6	1	1	0	0	1
	Total	8	3	1	0	0	1
13. Take a soil sample to be analyzed by State Agricultural lab	H.Ed.	0	2	2	0	0	0
	Ext.	6	2	0	0	0	1
	Total	6	4	2	0	0	1
14. Modify soils through the addition of humus, lime, gypsum and other addatives as required	H.Ed.	1	3	0	0	0	0
	Ext.	5	3	0	0	0	2
	Total	6	6	0	0	0	2
15. Till the soil and seed beds with power equipment	H.Ed.	0	1	2	1	0	0
	Ext.	1	2	5	0	0	0
	Total	1	3	7	1	0	0
16. Identify and remove poisonous plants	H.Ed.	1	2	0	1	0	0
	Ext.	2	3	3	0	0	0
	Total	3	5	3	1	0	0

Table 5.2

Horticultural Tasks Rated Very Important to Important by 75 Percent of the Jurors

Item	Horticultural Task
	Task Area: Lawns
1	Plant a new lawn from seed
3	Prepare the seed bed for a new lawn
6	Fertilize and lime a lawn
7	Remove weeds from a lawn
9	Treat insect and disease problems of the lawn
10	Broadcast grass seed and fertilizer with a spreader
15	Identify lawn weeds
16	Apply chemicals for weed, insect and disease control
	Task Area: Trees and Shrubs
1	Plant trees
2	Trim (Prune shrubs and trees)
3	Fertilize trees and shrubs
4	Water new plantings of trees and shrubs
7	Remove damaged, diseased, or unwanted limbs
9	Move and replant a shrub or small tree
10	Select and purchase nursery stock
11	Shear hedges and shrubs
14	Spray trees and shrubs for pests and disease
15	Dig holes for tree setting

Table 5.2 (Cont'd.)

Task Area: Indoor Gardening

Item	Horticultural Task
1	Arrange fresh or dried flowers
2	Prepare soil mix for potting
4	Pot and re-pot house plants
7	Water house plants
8	Propagate house plants
9	Fertilize house plants
10	Prepare seed flats or containers for planting
12	Treat insect and disease problems of house plants
14	Transplant seedlings to pots
17	Locate plants according to their need for light
	Task Area: Gardening
1	Plant bulbs
2	Transplant seedlings
3	Pinch back plants
4	Start plants from seed
6	Prepare garden plots
9	Plant annual flowers
10	Plant a vegetable garden
11	Plant perennial and biennial flowers
12	Thin seed plants
13	Treat pest and disease problems
14	Fertilize vegetable plants

Table 5.2 (Cont'd.)

Gardening

Item	Horticultural Task
15	Fertilize plants grown specific for their flowers
16	Water seedlings
17	Spray fruit trees
18	Prune fruit trees
19	Plant small fruits and berries
20	Weed garden plantings
	Task Area: Miscellaneous
1	Add mulch to protect plants
2	Provide winter protection for sensitive plants
3	Plan a home landscape
5	Select plants with regard to hardiness, growth requirements, and desired effects
9	Apply lime and fertilizer according to soil test
10	Treat nutrient deficiences in plants
11	Recognize horticultural plants
12	Use sprayers to dispense pesticide, herbicide, and fungicide
13	Take a soil sample to be analyzed by State Agricultural lab
14	Modify soils through the addition of humus, lime, gypsum and other addatives as required

In all but the task areas of lawns and miscellaneous the 75 per cent criterion represented ten or more jurors rating the tasks in the top two categories. Twelve jurors responded to the task areas of lawns and miscellaneous. Therefore the 75 per cent criterion represented nine or more jurors.

Those items meeting the 75 per cent criterion have been reported in Table 5.2. Data for this table were derived out of an examination of the data in Table 5.1. The use of this criterion reduced the 85 task items to 55. These are offered as possible content in avocational horticulture, particularly if learning experiences using the five main task areas are going to be designed.

Table 5.3 has been included to show the distribution of acceptable tasks by task area. It should be noted that the range of acceptable tasks varies from 50 per cent acceptance to 85 per cent acceptance, with the highest per cent falling in the task area of gardening.

Table 5.3

Tasks Rated Very Important to Important by 75 Per Cent of the Jurors-Summarized by Task Areas

Task Area	Number of Items	Number Selected	Percent Accepted
Lawns	16	8	.50
Trees and Shrubs	16	10	.63
Indoor Gardening	17	10	.59
Gardening	20	17	.85
Miscellaneous	16	10	.63
Totals	85	55	

Rank Ordering of Tasks

The full jury response was used to calculate a weighted mean. In that way the deliberate weighting of eight extension jurors to five hort-educators was maintained. Items have been listed in Table 7.1 of the appendix. They are reported in order of descending values of the weighted mean. Ranks were assigned to the weighted means in such a way that ties were given the average rank.[1]

A second, but possibly less desirable method to identify content, would be to consider a weighted mean of 2.0 or greater as the cut-off point for essential content. To illustrate this an asterisk has been used in Table 7.1 to indicate the cut-off point in each task list. With a weighted mean of 2.0 as the criterion, 59 items would be acceptable. In many cases they are the same as those listed in Table 5.2.

Hypothesis Testing

It was assumed that extension agents would rate practical horticulture task items differently than hort-educators.

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[1]Hubert M. Blalock, Social Statistics, New York: McGraw-Hill Inc., 1972, p. 259.

To test the assumption that the responses of cooperative extension agents would be different from those of hort-educators Spearman's Rho-test statistic was applied to the rankings of items by sub-juries. The comparison was made on the basis of item means which were ranked within each of the five task areas. Ties within the sub-jury rankings were handled as before, by assigning average ranks.

In the task area of lawns there were 16 task items. Rating of those items by extension jurors produced 16 mean responses, one for each item. Ratings by hort-educators produced a second response pattern on the same 16 items. Once the responses were tallied, ranks were assigned. Then a comparison of the rankings was made through application of Spearman's Rho-test statistic.

The Spearman Rank Correlation Statistic, sometimes called rho, serves as a measure of association between variables ranked in two ordered series. In this case one ordered series was the ranked mean responses of cooperative extension jurors and the other was the ranked mean responses of hort-education jurors. Through this statistic it was possible to determine the significance of the observed association. The larger the disparity between two sets of rankings, the less perfect the association between the two variables.[2]

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[2]Sidney Siegel, Nonparametric Statistics for the Behavioral Sciences, New York: McGraw-Hill Inc., 1956, p. 202.

Two different sub juries were selected so that the rating of the horticulture task inventory would represent different perspectives. It was assumed that hort-educators would be discipline-oriented and that cooperative extension agents would provide a practical orientation. In order to test the assumption that the sub juries were different, Spearman's Rho test statistic was applied to rankings paired by sub jury within task areas.

Although each section of the inventory should be represented by two hypotheses, a null hypothesis and an alternative hypothesis, in order to avoid redundancy only one general pair will be reported. The procedure of hypothesis testing is meant to be a question of a study process rather than a main element.

Hypotheses

Null hypothesis There is no association between the ranking of practical tasks by cooperative extension persons and hort-educators in the task area of lawns, trees and shrubs, indoor gardening, gardening, and miscellaneous.

Alternative hypothesis There is a positive association between the ratings of cooperative extension persons and hort-educators.

The rejection region consists of all values of rho (r_s) which are so extreme that the probability associated with their occurrence under the null hypotheses is equal to or less than alpha (.05).

Results showing the measure of association between sub jury rankings in the five task areas have been provided in Table 5.4. It should be noted that jurors were not randomly selected from the population of hort-educators or cooperative extension personnel, but instead were chosen because they represented a highly skilled sample. Selection was based upon their knowledge of horticulture as a discipline and as a field of practice particularly as it related to home owners and hobbyists. Therefore, tabled results cannot be generalized to the universe of cooperative extension personnel or hort-educators. Table 5.4 is descriptive of the particular sample chosen.

Table 5.4

Spearman's Rho of Item Ranking by Task Areas

Task Area	Number of Items	Rho	Table Value Alpha .05
Lawns	16	0.1960	0.4265
Trees and Shrubs	16	0.5001*	0.4265
Indoor Gardening	17	0.4897*	0.4118
Gardening	20	-0.0091	0.3789
Miscellaneous	16	0.3773	0.4265

*Reject H_0: at .05

Application of the test statistic produced mixed results. According to the data in Table 5.4 hypothesis number one in the task area of lawns fails to be rejected. A value for rho of 0.1960 shows small correlation between sub jury ranking.

Null hypotheses two, concerning the task area of trees and shrubs is rejected at an alpha level of .05. As recorded in Table 5.4 a rho value of 0.5001 tends to show substantial correlation. Therefore, the alternate hypothesis that there is a positive association between the ratings of cooperative extension persons and hort-educators is accepted.

Null hypothesis three, concerning the task area of indoor gardening is rejected at an alpha level of .05. Table 5.4 shows the calculated value of rho to be 0.4897. Only five times in one hundred would a ranked correlation value be this large. Again the alternative hypothesis of a positive association between ranked ratings of cooperation extension persons and hort-educators is accepted.

Null hypothesis four, concerning the task area of gardening fails to be rejected. The reported value of rho in Table 5.4 was 0.0091 indicating lack of correlation.

Null hypothesis five, concerning the task area of miscellaneous, fails to be rejected at the .05 value of significance. The reported value of rho (Table 5.4) was 0.3773. According to Froehlich and Hoyt values between

0.30 and 0.49 indicate "some correlation."[3] It should be noted that since the correlation coefficients ranged between .01 and .50 the predictive accuracy is marginal. At best they account for 25 per cent of the variance.[4]

Clustering for Comparison

In a further effort to look for differences between sub jury responses, those items showing strong disparity have been grouped in Table 5.5. Strong disparity was said to exist when there was a difference in ranking of five or more units. Items have been listed in order of diminishing values of disparity. In total, significant disparity was found in the ranking of 26 of the 85 inventory items. For analysis purposes Table 5.5 reflects the jury sub group which favored the item with a higher ranking.

For the purpose of considering whether the sub juries were different, it is useful to look at specific items. In the task area lawns, hort-educators out-ranked the extension jurors on several practical items. The word practical is used in the sense that they were commonly practiced tasks. Hort-educators gave high rankings to:

5. Mow and trim a lawn.
8. Water a newly seeded or sod lawn.

The items favored by the extension jurors appeared to be items of a problem nature. Perhaps these were most

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[3] Guidance Testing, 1959, p. 59.

[4] Paul Games, and George Klare, Elementary Statistics, New York: McGraw-Hill Book Company, 1967, pp. 395-397.

often directed to them as questions and therefore received priority. In the task area of lawns the items were:

1. Plant a new lawn from seed.
3. Prepare the seed bed for a new lawn.
16. Apply chemicals for weed, insect and disease control.

In replying to the second task area trees and shrubs, the same response set applied. Hort-educators considered (4) Water new plantings of trees and shrubs to be important. The extension jurors, however, favored (14) Spray trees and shrubs for pests and disease. Again the task of spraying appears to fall within the problem arena identified by extension personnel. It should be noted that the statistical test of rank ordering by sub jury suggested that items in the task area trees and shrubs were rated similarly.

Although statistically sub groups appeared to answer similarly in the third task area indoor gardening, there were three items which showed a significant disparity. Hort-educators placed a high priority on (1) Arrange fresh or dried flowers. This choice may reflect a tie-in of hort-educators with the vocational field of florist or perhaps it indicates an appreciation of this as a creative endeavor. The two items favored by extension jurors seemed practical. Those items were: (8) Propagate house plants and (11) Regulate humidity in the area of house plants.

Sub groups were balanced in their rank ordering of items in the task area of gardening. As reported in Table 5.5, significant disparity was found in the rank ordering

of 13 tasks. Seven of the 13 items were preferred by extension jurors and 6 were favored by the hort-educators. The response pattern apparent in the three previous task areas was not obvious. By regrouping the responses in Table 5.5 some sub group consistency is visible. Hort-educators favored the following task items:

4. Start plants from seed.
9. Plant annual flowers.
16. Water seedlings.
2. Transplant seedlings.
7. Plant rose bushes.
15. Fertilize plants grown specific for their flowers.

Cooperative extension jurors placed greater priority on these tasks:

6. Prepare garden plots.
12. Thin seed plants.
14. Fertilize vegetable plants.
1. Plant bulbs.
11. Plant perennial and biennial flowers.
18. Prune fruit trees.
13. Treat pest and disease problems.

Although task area four gardening was the task area of greatest disagreement on rank ordering, it was also the task area of highest item acceptance. Referring back to Table 5.3, 17 of 20 items were rated very important or important by 75 per cent of the jurors.

Jurors responded to the final task area miscellaneous in a predictable manner. One of the major services of the cooperative extension service is that of soil testing. As one might expect, extension jurors preferred item (13) Take a soil sample to be analyzed by state agricultural lab and item (9) Apply lime and fertilizer according to soil test.

The discipline base of hort-educators was visible in their favoring of item (11) Recognize horticultural plants.

To summarize the sub jury responses, cooperative extension personnel rated tasks highly if they were consistently in their problem sphere. In doing this they tended to down-grade some of the common horticultural tasks carried out by home owners and hobbyists. Unexpectedly, hort-educators tended to take a practical posture on items.

Table 5.1, which includes the frequency of responses by sub jury, provides a useful source for looking at the response patterns by sub groups and item. Further comparisons are possible in Table 7.1 where items with a high rank (one through six) represent strong agreement.

Another and perhaps the most meaningful way to identify differences between sub jurors would be to look at those items which have been excluded by one group and not the other. An item was judged to be excluded when it was not rated very important or important by 75 per cent of the sub jury responding.

The following tasks were excluded by Horticulture Education jurors but not by Cooperative Extension jurors.

Task Area Lawns

1. Plant a new lawn from seed.
2. Prepare the seed bed for a new lawn.

Task Area Trees and Shrubs

None.

Task Area Indoor Gardening

11. Regulate humidity in the area of house plants.

Task Area Gardening

None.

Task Area Miscellaneous

4. Cultivate plants.

13. Take a soil sample to be analyzed by the state agricultural lab.

These tasks were excluded by Cooperation Extension jurors but not by Horticulture Educators.

Task Area Lawns

5. Mow and trim a lawn.

8. Water a newly seeded or sod lawn.

Task Area Trees and Shrubs

5. Support newly planted woody plants by staking or guying.

6. Wrap young trees.

13. Add compost or peat moss at time of tree planting.

16. Plant a hedge.

Task Area Indoor Gardening

3. Force spring bulbs for indoor bloom.

6. Prepare hanging baskets of plants.

13. Raise plants with artificial light.

Task Area Gardening

5. Cut and care for cut flowers.

7. Plant rose bushes.

8. Prune roses.

Task Area Miscellaneous

7. Prepare power tools for winter storage.

In summary, five tasks were excluded by Horticulture Educators which were not excluded by Cooperative Extension jurors and thirteen tasks were excluded by Cooperative Extension jurors which were not excluded by Horticulture Educators. The fact that each sub jury excluded a few different items implies that the jurors may represent two different perspectives.

Contributions for Inventory Improvement and Evaluation

The nature of questionnaires can be such that they frustrate respondents. Many times the wording of a questionnaire is so restrictive that the target subjects rebel at completing the evaluation. To cope with this problem the horticulture task inventory was deliberately structured in open-ended form. Because of the difficulty in designing an inventory which is concisely worded, it was decided to provide for jurors' comments on each item. Respondents were specifically asked to comment on those items which they checked as not acceptable for rating.

Comments by Jurors Since the reference frame of the reader is rarely the same as that of the writer, comments by jurors have been looked upon as a mechanism for clarification.

Table 5.5

Task Items Showing Strong Disparity Between Subjury Rankings

Index of Disparity		Horticultural Task	Subjury Favoring
		Task Area: Lawns	
100	5.	Mow and trim a lawn	H.Ed.
81	1.	Plant a new lawn from seed	Ext.
64	8.	Water a newly seeded or sod lawn	H.Ed.
42.25	3.	Prepare the seed bed for a new lawn	Ext.
25	16.	Apply chemicals for weed, insect and disease control	Ext.
		Task Area: Trees and Shrubs	
132.25	4.	Water new plantings of trees and shrubs	H.Ed.
42.25	14.	Spray trees and shrubs for pests and disease	Ext.
		Task Area: Indoor Gardening	
100	1.	Arrange fresh or dried flowers	H.Ed.
42.25	8.	Propagate house plants	Ext.
30.25	11.	Regulate humidity in the area of house plants	Ext.
		Task Area: Gardening (Vegetables, Flowers, Fruits)	
156.25	12.	Thin seed plants	Ext.
121	16.	Water seedlings	H.Ed.
72.25	2.	Transplant seedlings	H.Ed.

Table 5.5 (Cont'd.)

Index of Disparity		Horticultural Task	Subjury Favoring
72.25	7.	Plant rose bushes	H.Ed.
64	1.	Plant bulbs	Ext.
49	15.	Fertilize plants grown specific for their flowers	H.Ed.
42.25	18.	Prune fruit trees	Ext.
36	6.	Prepare garden plots	Ext.
36	13.	Treat pest and disease problems	Ext.
30.25	11.	Plant perennial and biennial flowers	Ext.
25	4.	Start plants from seed	H.Ed.
25	9.	Plant annual flowers	H.Ed.
25	14.	Fertilize vegetable plants	Ext.
		Task Area: Miscellaneous	
121	13.	Take a soil sample to be analyzed by state agricultural lab	Ext.
56.25	11.	Recognize horticultural plants	H.Ed.
30.25	9.	Apply lime and fertilizer according to soil test	Ext.

The unedited comments of jurors have been reported in Table 5.6. Although the horticulture educators were outnumbered eight to five, they were responsible for 36 of the 65 comments made.

Juror comments indicated that in many cases task statements were not discrete. A problem of communication was evident. In several instances task statements did not communicate all the information the respondent considered necessary. Some felt the task statements included more than was intended.

Judging from the number of comments, it was essential to have included the provision for respondent comments. The most common of these revealed that respondents viewed certain task statements as including several steps or operations. For example, in the task area of lawns item (1), Plant a new lawn from seed, was seen to include item (10), Broadcast grass seed and fertilizer with a spreader, and item (13), Till soil for lawn seed bed.

Because of the discrepancy among respondents' views toward particular items, a different approach to inventory development might be more suitable. An alternative approach to an analysis-of-activities method for content selection would be that of setting forth specific tasks. Then experts could be asked to describe the individual sub-steps in carrying out the task.

Suggested Additions Items chosen for the horticulture task inventory were in theory selected from a universe of

items in the specific task areas. It is not physically possible, however, to tap a universe of items. Because criteria and resources restricted the development of the inventory, it was deemed important to allow jurors to add task items. In this way it was hoped to make use of the jurors wide experience and thus develop a more comprehensive task list.

For comparison purposes, suggested task items have been reported by sub jury in Table 5.7. In most cases jurors have also rated the importance of the task statement. It is interesting to note that although an item was suggested, it may not have been given a high rating by its proponent.

When examining the proposed additions, which can be found in Table 5.7, one should be reminded that the cooperative extension jury numbered eight persons while the hort-educator jury numbered five. As with the earlier research form of the inventory, the respondents were unaware of the original screening criteria. Therefore, juror suggestions have been included regardless of their fit to the criteria.

Fifty-four additional task statements were proposed by jurors. When these suggestions (as reported in Table 5.7) were considered, it was apparent that respondents were operating with a wide range of criteria. Thirty-one of the suggestions were provided by extension jurors and

Table 5.61

Jury Comments on Task Statements
Task Area: Lawns

Task Statement	Respondent	Comment
1. Plant a new lawn from seed	H. Ed.	More important for small areas.
2. Plant a new lawn from sod	Ext.	Very few people do this.
	H. Ed.	More important for small areas.
	H. Ed.	Most people don't do this.
3. Prepare and seed bed for a new lawn	H. Ed.	Include leveling.
	H. Ed.	More important for small areas.
4. Repair and reseed a lawn	H. Ed.	More important for small areas.
7. Remove weeds from a lawn	H. Ed.	Using physical and/or chemical means.
9. Treat insect and disease problems of the lawn	Ext.	After properly identified.
	H. Ed.	Proper lawn care should minimize some of these problems.
10. Broadcast grass seed and fertilizer with a spreader	Ext.	This is included in item #1 and item #6 (fertilizer and lime a lawn).
11. Clean and sharpen mower blades	Ext.	Not acceptable for rating - instead recognize dull and unbalanced mower blades.
	H. Ed.	Clean blades - very important, sharpen mower blades - some importance.
	Ext.	Rotaries only.
	Ext.	Job for service organization.
13. Till soil for lawn seed bed	Ext.	This is included in item #1.
	H. Ed.	This is included in items #1, #2, and #3.

Table 5.61 (Cont'd.)

Task Statement	Respondent	Comment
14. Plant ground covers	Ext.	More important to know where they can be identified.
	Ext.	Not considered "lawns."
16. Apply chemicals for weed, insect and disease control	Ext.	After properly identified.
	H. Ed.	How is this different from item #9?

Table 5.62

Jury Comments on Task Statements
Task Area: Trees and Shrubs

Task Statement	Respondent	Comment
1. Plant trees	H. Ed.	Should be two items - Plant container grown balled and burlaped plants - plant bare-root plants.
	Ext.	Is this a duplication of item #9 (move and replant a shrub or small tree.)
2. Trim (Prune shrubs and trees)	H. Ed.	Prune is more inclusive than trim.
	H. Ed.	This includes item #7 (Remove damaged, diseased, or unwanted limbs) and item #8 (repair minor tree wounds).
5. Support newly-planted woody plants by staking or guying	Ext.	What size?
6. Wrap young trees	Ext.	What size?

Table 5.62 (Cont'd.)

Task Statement	Respondent	Comment
11. Shear hedges and shrubs	H. Ed. Ext.	This is part of item #2. This is a duplicate of item #2.
12. Provide winter protection for shrubs.	H. Ed.	Selection is the answer.
13. Add compost or peat moss at time of tree planting	Ext.	This is included in task item #1.
14. Spray trees and shrubs for pests and disease	Ext.	After proper identification.
15. Dig holes for tree setting	Ext. H. Ed.	This is included in task item #1. This is a part of task item #1.
16. Plant a hedge	H. Ed.	This is a part of task item #1.

Table 5.63

Jury Comments on Task Statements
Task Area: Indoor Gardening

Task Statement	Respondent	Comment
1. Arrange fresh or dried flowers	H. Ed.	Include Christmas decorations.
10. Prepare seed flats or containers for planting	H. Ed. H. Ed.	This should be a part of starting vegetable and flower transplants. This is the same as item #2 (prepare soil mix for potting).

Table 5.63 (Cont'd.)

Task Statement	Respondent	Comment
11. Regulate humidity in the area of house plants	H. Ed.	Important but difficult to effect.
15. Determine soil mix for specific plant requirements	H. Ed.	This is part of item #2 (prepare soil mix for potting).
	Ext.	How is this different from item #2?
17. Locate plants according to their need for light	H. Ed.	Replace the word locate with the word place.

Table 5.64

Jury Comments on Task Statements
Task Area: Gardening (Flowers, Fruits and Vegetables)

Task Statement	Respondent	Comment
7. Plant rose bushes	Ext.	Why "single out" roses?
	Ext.	Roses have a lot of problems.
13. Treat pest and disease problems	Ext.	After proper identification.
14. Fertilize vegetable plants	H. Ed.	See item #12 (thin seed plants)
15. Fertilize plants grown specific for their flowers	H. Ed.	See item #12 (thin seed plants)
17. Spray fruit trees	H. Ed.	Important to those who grow them! -
18. Prune fruit trees	H. Ed.	but overall must be checked in the
19. Plant small fruits and berries	H. Ed.	category of "some importance".

Table 5.64 (Cont'd.)

Task Statement	Respondent	Comment
20. Weed garden plantings	H. Ed.	Also includes use of herbicides.

Table 5.65

Jury Comments on Task Statements
Task Area: Miscellaneous

Task Statement	Respondent	Comment
1. Add mulch to protect plants	H. Ed.	Mulch used for several reasons other than protection - usually on such plants as roses, strawberries and some perennials.
2. Provide winter protection for sensitive plants	Ext.	Too vague - not acceptable for rating.
3. Plan a home landscape	H. Ed.	Or be able to interpret plan of a professional.
	H. Ed.	Everyone should know something about this.
4. Cultivate plants	H. Ed.	Cultivate soil?, or plant culture?
	H. Ed.	If to loosen soil this should be rated very important.
5. Select plants with regard to hardiness, growth requirements, and desired effects.	Ext.	Should be the responsibility of the nurseryman or plant store operator.

Table 5.65 (Cont'd.)

Task Statement	Respondent	Comment
6. Sharpen hand tools (hoes, trowels, etc.)	Ext.	Not too important in introductory stage.
10. Treat nutrient deficiencies in plants	Ext.	Not acceptable for rating because of item #9 (apply lime and fertilizer according to soil test) and item #13 (take a soil sample to be analyzed by State Agricultural lab).
12. Use sprayers to dispense pesticide, herbicide and fungicide	Ext.	After proper identification.
13. Take a soil sample to be analyzed by State Agricultural lab	Ext.	Teach the "sampling technique".
14. Modify soils through the addition of humus, lime, gypsum and other addatives as required	Ext. Ext.	We don't recommend gypsum. Not acceptable for rating because of item #9 and 13. Item #9 was to apply lime and fertilizer according to soil test and item #13 is stated above.
16. Identify and remove poisonous plants	H. Ed.	Weeds.

23 were provided by hort-educators. It must be pointed out that in suggesting the additions jurors were not informed of the original selection criteria.

Hort-educators tended to provide action-worded tasks which were in keeping with the original criteria. A few of the task additions provided by extension jurors were too broad. In particular, "greenhouses," "hydroponics," and "organic gardening" are broad enough to be considered task areas. Rather than a criticism of their input, this points up a limitation which was arbitrarily set when the original five task areas were chosen. Additions by all jurors emphasized the wide range of practical horticulture tasks available.

The 54 additional items contributed by the expert jurors represent their perceptions of essential content which had been overlooked when the task inventory was developed. When the contents of Table 5.71-5.75 are combined with highly ranked inventory items it forms a nucleus of practical horticulture content which can then be used as a foundation for curriculum development.

General Comments by Jurors During the course of completing the horticultural task inventory, three of the jurors were moved to make comments which were not directly related to specific items. They appear to have value in evaluating the inventory and the process which was used. The comments were as follows:

"I assumed the age level of high school when replying to your questionnaire."[5]

"All subjects mentioned are very important to teaching. The question of course, is to organize them in a logical and meaningful way."[6]

"Note: I found all of your tasks extremely difficult to rate on the basis of "it's potential for avocational applicability" and suitability to stimulate interest." I believe that separate ratings for each characteristic would have been much better."[7]

Summary of Data

Data presented in this chapter were derived from the application of an analysis-of-activities model for content identification. It was intended for use in developing general education curriculum in horticulture.

An expert jury composed of five horticulture educators and eight cooperative extension agents was asked to rate the research inventory of 85 practical horticulture tasks. Fifty-five of the practical tasks were rated as either very important or important by more than 75 per cent of the jurors.

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[5]Robert Powers, Cooperative Extension Agent, West Chester, Pennsylvania.*

[6]William Carlson, Horticulturalist - Michigan State University, East Lansing, Michigan.*

[7]John Shearer, Cooperative Extension Agent, Chambersburg, Pennsylvania.* *(comments provided when the inventory was returned.)

Table 5.71

Additional Horticultural Tasks Suggested by Jurors

Task Area I: Lawns

	Extension Service Subjury	Rating		Hort-Educators Subjury	Rating
1.	Understanding fertilizers	3	1.	Recognize commonly used lawn grasses	3
2.	Removing thatch	1	2.	Dethatch a lawn	1
3.	Selection of grass species (Best grasses for uses and conditions)	2	3.	Renovate a lawn	1
4.	Choose adapted species and varieties for new seeding	3			
5.	Grasses for speciality areas (slopes, athletic fields, etc.)	3			
6.	Recognize dull and unbalanced mower blades	3			
7.	Understand pesticide labels	3			
8.	Become familiar with the best times for carrying out the operations	3			

Table 5.72

Additional Horticultural Task Suggested by Jurors

Task Area II: Trees and Shrubs

	Extension Service Subjury	Rating		Hort-Educators Subjury	Rating
1.	Tree and shrub identification	3	1.	Identify commonly used trees and shrubs	3
2.	Basic landscape design	2	2.	Propagate trees and shrubs	2
3.	Mulching shrub beds	3	3.	Plant container grown or balled and burlaped plants	3
4.	Street tree requirements	3	4.	Plant bare-root plants	3
5.	Become familiar with timing schedule for all horticultural activities	3	5.	Identify insect or disease problems	3
6.	Variety of trees	2	6.	Select proper insect and disease treatment	*
7.	Become familiar with cultural requirements of different species	3	7.	Recognize need for preventive treatment such as cabling and bracing	2

Note: (*) This suggestion was not rated by the respondent.

Table 5.73

Additional Horticultural Tasks Suggested by Jurors

Task Area III: Indoor Gardening

	Extension Service Subjury	Rating		Hort-Educators Subjury	Rating
1.	Greenhouses	1	1.	Construct simple corsage	3
2.	Hydroponics	1	2.	Recognize insect and disease problems of house plants	3
3.	Study of light effects	3	3.	Start vegetable and flower transplants	3
4.	Containers	3	4.	Identify commonly used indoor plants	3
5.	Summer care of house plants	3			
6.	Locate plants according to their need for temperature (heat)	3			

Table 5.74

Additional Horticultural Tasks Suggested by Jurors

Task Area IV: Gardening (Flowers, Fruits and Vegetables)

	Extension Service Subjury	Rating		Hort-Educators Subjury	Rating
1.	Soil testing	3	1.	Fertilize flowers, fruits and vegetables	3
2.	Organic gardening	2	2.	Water flowers, fruits and vegetables	3
3.	Selection of vegetable varieties	3	3.	Identify commonly grown flowers, vegetables and fruits	3
4.	Herbicides vs. mulches	3	4.	Select and plan a vegetable garden	3
5.	Variety differences	3			
6.	Identify varieties adapted to area	3			
7.	Planning the vegetable garden (Choice of crops to grow)	3			

Table 5.75

Additional Horticultural Tasks Suggested by Jurors

Task Area V: Miscellaneous

	Extension Service Subjury	Rating		Hort-Educators Subjury	Rating
1.	Basic soil physiology	3	1.	Till the soil and prepare seed beds without power equipment	2
2.	Pesticide safety	3	2.	Safety practices	3
3.	A brief basic introduction and explanation of what landscape architecture and landscape consist (The esthetics of horticulture)	3	3.	Be able to interpret a landscape plan provided by a professional	3
			4.	Add mulch for weed control, moisture conservation, appearance, and so forth	2
			5.	Know where to obtain answers to horticultural problems and questions	3

Jurors responses were used to calculate a weighted mean for each item. Using the weighted mean as an index of relative importance, the items were ranked within the five task areas. These data have been reported in ranked form in Table 7.1 of the appendix. The rankings could be used as an alternative method of content selection by employing a weighted mean of 2.0 or greater as the criterion of acceptance.

Jurors were picked to represent two points of view. Hort-educators were assumed to be theory-oriented while the cooperative extension jurors were assumed to be of a practical orientation. These assumptions were tested by comparing the ranking of items by sub jury. The null hypothesis of no association between ranking was tested for each of the five main task areas. The test statistic used was Spearman's Rank Correlation.

In the task areas of lawns, gardening, and miscellaneous, the null hypothesis failed to be rejected. Conversely, the null hypothesis of no association was rejected in the task areas of indoor gardening and trees and shrubs. In these two areas it appears as though both sub juries rated the inventory in the same general manner.

In addition to their ratings, jurors contributed 54 additional task items, which because of the jurors specific expertise, is valuable in contributing to the search for a practical content base. While rating task items jurors made 65 comments. Secondarily, both the comments and the

additional task items can be used in evaluating the research inventory.

Evaluation of the Research Inventory

The research inventory was mailed as a questionnaire to thirteen jurors. Every questionnaire was returned. The jurors' willingness to add tasks and make comments attested to their sincerity.

As a format to identify practical content through jury rating, the inventory seemed effective. The greatest weakness appeared in the individual tasks. Many tasks were found to include different meanings or sub-parts. Some of this was due to the variations in respondent reference frames. Among other things, it points up the problem which would likely occur if the jury were broadened to include homeowners and students.

Task additions by jurors suggested that the inventory may have been too limiting. It appears that both more task areas as well as additional tasks should have been added. The inventory format, however, was useful in stimulating respondents to contribute items.

In summary, the analysis-of-activities approach provided an acceptable framework for looking at horticulture activities carried out by homeowners and hobbyists. It served as an organized way to search for content. Additionally, it acted as a stimulus to gather more content from the expert jury. The failure to provide inventory

tasks which were discrete was not a failing in the analysis-of-activities process but rather a failing in proper application of the process.

Summary of Findings

Data gathered in the search for content provided the basis for the following findings:

1. Of the 85 horticultural tasks, 55 were rated very important to important by 75 per cent or more of the jurors.

2. When a weighted mean of 2.0 or greater was used as an index of acceptability, 59 items qualified as acceptable.

3. The response of hort-educators and cooperative extension jurors in the rating of the following task areas, lawns, gardening, and miscellaneous, were not associated. In these areas rank ordering of items by sub juries did not correlate significantly.

4. In the task areas of trees and shrubs and indoor gardening the ratings given by hort-educators and extension jurors were positively associated. When responses of sub juries were paired, high rankings of task statements by hort-educators tended to match with high rankings given by cooperative extension jurors.

5. Five task items were excluded by hort-educators which were not excluded by cooperative extension jurors.

6. Thirteen task items were excluded by cooperative extension jurors which were not excluded by hort-educators.

7. Fifty-four additional task statements were proposed by jurors. Thirty-one of the suggestions were provided by cooperative extension jurors and 23 were provided by horticulture educators.

8. Three task statements suggested by the local experts when they rated the preliminary inventory were subsequently ranked 2.5, 3, and 4, in the research inventory.

9. Several task statements, as presented, were not mutually exclusive.

10. Juror additions suggested that a broader scope of practical tasks should have been provided in the inventory.

11. Juror comments such as, "Sodding a lawn is not commonly done," indicate that the criterion of tasks commonly carried out by home owners and hobbyists was being applied.

Overview of Chapter Six

In the final chapter both purposes of the study will be summarized. Conclusions will be made based on the data presented. A section entitled "reflections" has been included to allow for discussion of ideas and questions which developed while carrying out the original study. Types of curriculum responses will be offered as possible methods to include avocational horticulture in the general education program of schools.

CHAPTER VI

SUMMARIES, CONCLUSIONS, REFLECTIONS, IMPLICATIONS

This chapter contains summaries and conclusions of the two elements studied. The first is a rationale for offering avocational horticulture in the general education curriculum of schools, and the second is the report of a search for a practical content base for avocational horticulture. While not a specific goal of the study, the process of developing a rationale and seeking content represents one model for curriculum development in general education.

Of all the areas of the curriculum, those portions considered general education should represent a balance between cognitive, affective and practical skill learning. General education can serve as a vehicle to bring theoretical subject matter into practice. Present day criticisms of education indicate that experts feel schools could do more to translate the disciplines into such real uses as problem solving and decision making.

Functions of a Rationale

Given the social system of schools it is not possible to make effective changes without careful design. Curriculum development is the key process to changes in schools. Within that process, rationale building serves a critical

early role. Sources reviewed cite the following criteria as functions to be served by the rationale.

1. It sets forth assumptions about the goals of education with respect to the individual and society.
2. It sets forth assumptions about the nature of society and man's relationship to society.
3. It sets forth the way in which the curriculum contributes to the goals for the individual and for society.
4. It should indicate the internal consistency between the goals and assumptions.
5. It sets forth the framework for decisions on the choice of subject matter and objectives.
6. It substantiates the value of the objectives and indicates the source from which they will be derived.
7. It supports the basis for content and describes the selection of organizing elements.

Elements of a Rationale

In developing a rationale for avocational horticulture as a part of the general education curriculum the following major elements are considered. Evidence is presented which indicates a history of man-plant interactions. Information is given to support a need for increased plant culture by

man as a result of current societal conditions. An attempt is made to show how plant culture activities meet the needs of man. Particular attention is given to the ways in which plant culture activities might serve as enabling mechanisms for broader learning. Finally an exploration is made of the expectancies for schools to see if there is a role for avocational horticulture in the general education curriculum.

Evidence of Man's Interaction with Plants

In their leisure humans often seek out plant-rich areas. It is common to find ornamental plants deliberately planted in close proximity to places frequented by man. People are practicing all forms of gardening in greater numbers than ever before. Scientists such as Dubos,[1] Illtis,[2] and Morris[3] would suggest that this is an example of man the animal seeking to maintain contact with his earlier natural environment.

Social Conditions Foster a Need for Increased People-Plant Interaction

Contemporary society is the fabric of human produced technologies. Through his abilities and decisions man

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[1]Dubos, So Human an Animal, New York:, Charles Scribner's Sons, 1968.

[2]Illtis, "Can One Love a Plastic Tree", Bulletin of the Ecological Society of America, December 1973, Vol. 54, No. 4, p. 7.

[3]Morris, The Naked Ape, New York:, McGraw-Hill, 1967.

continually changes his natural world. Many of these changes are beneficial although the impact depends upon an individual's perspective. Some of the impacts of technology are urbanism, change, artificial cycles, increased leisure and inflation. Plant-people interactions represent a chance for humans to turn from objects of their technologies to objects which are part of the natural world.

Evidence that Plant Culture Activities Meet the Needs of Man

Horticultural activities have a long history of application in the leisure of humans. The field of horticulture-therapy has capitalized on the process of nurturing plants as a mechanism to induce caring and belonging into the lives of the socially and mentally disturbed. Plants as esthetic material represent just one attribute which can serve to link plant culture with a vast range of hobby potentials.

Changing Expectancies for General Education

The changing nature of society and all its related factors such as technology, environment and the need for better decisions has given cause to question and perhaps change some of the objectives of schools. Particularly in the realm of general education, schools are being challenged to provide a more balanced blend of curriculum elements. New mechanisms are needed which can increase the functional value of knowledge areas in the lives of individuals.

One such mechanism to achieve this end has been proposed by Schwab. He suggests "that the natural sciences, the social studies and the humanities in every school give serious thought to curtailing their time and coverage of their own subject-matters by one-third; that the time thus made accessible, be used to convey the disciplines of treatment of practical problems."[4] Through cooperation and compromises of this nature a more suitable mix of theoretical, practical, aesthetic and cognitive elements may be found in the general education curriculum of schools.

Possible Contributions of Avocational Horticulture

Through plant culture an individual may learn of the inter-relationships of biological systems. Plant culture activities can serve as a tool to emphasize basic ecological relationships while in turn serving as enabling mechanisms to meet the basic inner needs of learners. As a consumer, or in moments of leisure, avocational horticulture provides for man one opportunity to blend theoretical knowledge with practical activities useful in many phases of life.

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[4]Joseph J. Schwab, "Decision and Choice the Coming Duty of Science Teaching," Journal of Research in Science Teaching, Vol. II, No. 4, 1974, p. 317.

The Rationale

Sociologic, technologic, and economic change create an increased need for enhancing people-plant interactions. Although not educated to the task, people have increased their uses of horticultural materials. As an agency empowered to educate for effective living, schools have a role in meeting the needs of society and the needs of the individual within that society. For our present and future students, it is increasingly important to blend the theoretical and the practical, the aesthetic, and the cognitive in the curriculum. Horticultural experiences, when provided for general education purposes, can provide a vehicle for this blending and therefore can enrich the lives of individuals.

The Content Study

If one accepts the need for avocational horticulture in general education then another question to consider is one of content. Because avocational horticulture is not commonly offered in schools, the question of content determination is important. Several studies have been carried out for the purpose of establishing vocational horticulture content, however, no study was found which sought avocational content in horticulture.

Summary of Content Study Processes

The second purpose of this study was the identification of practical horticulture tasks which might be useful as a basis for curriculum development in avocational horticulture. Methods used to identify practical tasks as a prelude to the identification of content in horticulture were patterned after an analysis-of-activities approach. Usually this approach is used to establish vocational content. Practical horticulture tasks were identified through analysis of the plant culture activities practiced by home owners and hobbyists. An inventory was fashioned out of the list of task statements.

Two levels of screening were given to the horticulture task inventory. Local experts in horticulture reviewed the preliminary inventory. Their input was used to develop the revised inventory.

Final screening of practical horticulture task statements was given by two groups of jurors. Five horticulture educators made up one sub jury. The other sub jury of eight persons was selected from the cooperative extension service of Pennsylvania.

Responses of the jurors were used to identify acceptable content. Because of their special knowledge jurors were encouraged to add additional task statements and thus broaden the content base. Additionally their comments were used to evaluate the inventory. Ratings and comments have

been used to evaluate the effectiveness of the analysis-of-activities approach in the search for avocational content.

Findings of the Content Study

To determine the question, which of the 85 practical horticulture task items might be acceptable as content for avocational horticulture, the importance ratings given by jurors were considered (see Table 5.1). Those tasks which were rated as important to very important by 75 per cent of the combined juries would seem to be the most suitable practical tasks around which avocational horticulture curriculum could be developed.

Using the criterion of 75 per cent acceptance by jurors per item, 55 of the 85 items were judged acceptable as content. The actual breakdown is reported in Table 5.2. Some task areas contained a greater number of acceptable items. In the task area of gardening 17 out of 20 items were acceptable under the 75 per cent criterion.

When a weighted mean of 2.0 or greater was used as an index of acceptability, 59 items qualified. Those items can be found in Table 7.1. With a weighted mean of 2.0 or greater as the standard, 69 per cent of the task statements were found to be acceptable as content for avocational horticulture.

Because of the small number of jurors (13) the more conservative selection factor would be the most appropriate. Therefore, the standard of acceptance based on 75 per cent

of the jurors rating an item very important or important is the criterion of choice. The difference between application of the two criteria is 4 items, 55 items for the 75 per cent criteria and 59 for the weighted mean of 2.0 or greater.

Beside the ranking of 85 practical horticulture tasks, the jurors contributed 54 additional task items. Cooperative extension jurors provided 31 tasks and horticulture educators added 23. These data, recorded in Tables 5.71-5.75, contribute to a broadened content base.

Conclusions

It appears that greater use could be made of jurors in the initial stages of inventory development. Those items suggested for inclusion by local experts received high rating by the final jurors. This suggests a compatibility between the local experts and the final jurors.

The format of the practical horticulture task inventory provided a uniform approach to the search for content. An analysis-of-activities method appears to provide a useful technique for analyzing life activities with the purpose of identifying practical content for general education in horticulture.

Horticulture-educators seemed to approach the rating of practical horticulture tasks from a perspective different than that of cooperative extension agents. Both groups were useful in the identification of content. Their total

participation in rating, adding, and commenting on the inventory suggested an endorsement of avocational horticulture as a valid educational experience.

Tables 5.2 and 5.71 through 5.75 represent jurors "high rankings" and jurors "additions". As such they represent a constellation of practical content which may serve as the content base for an avocational horticulture curriculum. In this form it represents the attempt to achieve the second major goal of the study, that of establishing a practical content base for avocational horticulture.

Reflections

In the process of conducting the study, an observation was made which suggested questions beyond those guiding this study. Through the literature search for Chapter two and in gathering supportive material for a rationale, it became apparent that there were numerous and varied sources for learning the practical techniques of plant culture. Yet few of these sources have been articulated with public education.

Some questions are generated from this observation. Should schools draw upon the resources of community groups and agencies, particularly in those areas where the academic staff might be lacking in expertise? The answer to this question is obvious, and perhaps best stated by the following quote.

> "Learning occurs at all times and in all places, namely in three settings: home, community, and school. Failure to analyze and utilize effectively the unique characteristics of each of these places is one reason education in schools is not as effective as it might be."[5]

If schools are to draw upon community resources, then what should be the mechanism to effect the use of community?

Articulation of the questions raised in reflection upon the study will be dealt with further under the next section entitled Possible Curriculum Responses.

Possible Curriculum Responses

The range of expectations for schools has become so broad that it would be foolish to expect avocational horticulture to fit as an add-on program. Instead, several school and school-related alternatives will be considered, ranging from a single elective course to a parent-community learning experience.

One option would be to structure avocational horticulture as a course package to be offered either on an elective basis or as an exposure course. This might be suitable for grades four through to the retired citizens group. Depending on the age of the target audience, it should be possible to tailor a course to the specific interests of learners.

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[5]J. Lloyd Trump, A School for Everyone, The National Association of Secondary School Principals, Virginia, 1977, p. 96.

A second option would be to modify existing programs to incorporate basic plant culture techniques. This could be done through revision of life-science courses. Provisions could be made to include plant culture as a practical extension of plant study. If this were done through several grade levels of general science or biology, it would be possible to provide exposure to a wide range of horticultural practices.

Currently most schools consider these courses as part of their general education curriculum. By adding practical horticulture schools might begin to answer the criticism that school programs do not relate to life. It would seem that closer articulation of course work to real-life would have several advantages.

Supplemental School Programs

School farms and school gardens are two areas which lend themselves naturally to programs in avocational horticulture. In speaking of school farms Smith suggested that, "the lasting and most successful ventures (school farming) are those that serve the purposes of both vocational agriculture and general education."[6] The majority of successes in outdoor education programs are probably found in those programs where students are involved in doing meaningful real-life activities.

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[6]Julian Smith and others, Outdoor Education, Prentice-Hall, Inc., New Jersey, 1963, p. 75.

The values to be obtained through school farms and gardens have been discussed thoroughly in a paper by Miller. According to her the success of outdoor education in general and school gardening and farming in particular is that "learning occurs through direct instead of indirect experiences and through working with concretes instead of abstractions."[7]

School gardening is one example of the way in which horticulture can be used as a vehicle to blend theoretical learning with practical learning. Although it would not include the full range of plant culture experience that might be considered necessary to achieve a general education in avocational horticulture, school gardening does illustrate one mechanism to acquaint students with plant culture.

Extended School Programs

Avocational horticulture may also have a place in summer school programs and evening schools. Handled this way, the crowded curriculum of the regular school year could thus be eliminated as a constraint. In those schools fortunate to have moderate to extensive grounds, there is a wealth of natural learning resources for plant culture. Programs which provided a combination of plant culture and

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[7]Peggy L. Miller, School Gardens and Farms-Aspects of Outdoor Education, ERIC, December, 1970, Las Cruces, New Mexico, pp. 15-17.

school beautification could provide dual benefits. In addition to learning valuable practical skills, students could maintain and improve the school grounds. Those who have tried this found that the act of planting and caring for plants brought a sense of pride which carried over to a reduction in vandalism.[8]

In situations where the natural resources of the immediate environment are lacking, summer programs could make use of public parks, nature centers, vacant lands or possibly the property of a willing senior citizen whose home grounds could use the work of energetic hands. For those limited to traditional classrooms it would be possible to cover many aspects of plant culture with houseplants.

Evening or night school programs provide another format for avocational horticulture. Though not as popular with school-age people, it is an accepted winter format for adults. Depending on the nature of the population to be served, a variety of programs could be offered. They might range from something as broad as horticulture for home-owners to something as narrow as orchids. This is the ideal time to tap community experts who may not have the time to contribute during the day.

Ancillary Efforts

Demands for schools to offer more programs in the face of diminishing funds may bring educators around to

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[8]Richard L. Tracy, "An Unexpected Harvest," Horticulture, July, 1977, Vol. 55, No. 7, pp. 48.

greater utilization of community resources. Community education is looked upon by many as a successful way to extend the curriculum. The rationale for this was clearly stated in a Pennsylvania Department of Education publication.

> "Formal educational facilities do not have a monopoly on housing educational activities. In fact as widely maintained by many experts today the majority of learning resonant with the world as it really is takes place outside and away from these expensive facilities and neither these facilities nor the staff are able or equipped to assume a great portion of educational responsibility."[9]

There are many opportunities to provide general education experiences in horticulture through the use of community resources. If a program of neighborhood gardening were started, schools or other community agencies might be in a position to supply the land and perhaps the coordination. Resource persons could be obtained from any or all of the following: the cooperative extension service, educational institutions, garden center personnel, landscapers, garden club members, or avid hobbyists. The essential ingredient would be a dedicated nucleus of interested persons. Some person or agency must take a coordinating role.

Programs of this sort have been successful in several places and in a variety of partnerships. As was pointed out in Chapter two, there have been programs between communities

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[9]"Learning Outside the Classroom" (The Role of Field Experiences in the School Program), Pennsylvania Department of Education, August, 1973, p. 2.

and schools such as the Hill Top Program in Indiana. Garden clubs have supported vest pocket gardening and community gardening. Sometimes the efforts of a single individual will provide enough spark to educate others to the joys of plant culture.

There is no shortage of agencies which deal totally or in part with general education in horticulture. Junior garden clubs, facets of the 4-H program, and scouting represent just a few of these organizations. If some exposure to avocational horticulture is valid for all, then the critical question is that of who shall have the responsibility? The rationale argues that schools have part of this role.

Schools have a natural opportunity to provide for early plant culture experiences. Raising plants from seed is a valid learning experience in real life, no matter whether it falls under the heading of science or outdoor education. What matters most, is that schools should seek more opportunities to provide learning experiences which have immediate carry-over to life. These transfers should not be assumed, but deliberately planned.

Since general education in avocational horticulture could be handled through a variety of school and school-related responses, it should be less difficult for those who accept the rationale to find a way to implement it.

This is not to say, however, that implementation of a new curriculum depends solely on a sound rationale.

Many factors enter into the implementation process. These include the nature of existing programs, consideration of the resources available, sense of need and receptivity on the part of the staff, perception and acceptance of the program by the learners and finally the needs of the community which the school serves.

Preparation of a rationale and the identification of possible practical content still leaves several important questions to be answered before a program is teachable.

Suggestions for Further Study

Once one decides that certain practical horticulture tasks would make suitable content for general education experiences, then the next logical question is what knowledge components are necessary. It is true that one can physically show a person how to prune a shrub and be certain that they can duplicate the operation; however, without the knowledge of how this benefits the plant, or when it should be done, or how the plant will respond, one has failed to provide education which is "general."

Therefore these are some things which could be done when starting from a practical content base such as the 55 highly ranked tasks and the 54 juror contributed tasks. From the current knowledge in the discipline of horticulture one must determine what knowledge components are necessary

to carry out the tasks with understanding. Thought should be given to those horticulture knowledges and concepts which might have carry over to several practical applications. Consideration should also be given to the ways in which horticulture knowledge components might link or build.

Another aspect to be considered with practical content and knowledge is that of sequencing. How does one arrange the content of avocational horticulture in order to present the learning experiences most effectively. Does horticulture as a discipline have a natural structure? Which skills and concepts should be taught first? Are there some areas of avocational horticulture which have greater appeal and utility to specific age groups?

Writers in the field of outdoor education, environmental education, nature study, conservation, ecology, and horticulture often speak of the bond between man and nature. Science in its search to understand the natural world has yet to explain this bond. Despite the lack of empirical evidence it is the thesis of this study that man benefits greatly from his interactions with plants and because of this, efforts should be made to increase people-plant interactions. As educators we need to do some research on the effects of instruction in increasing people-plant interactions. For example, are there motivational benefits to be derived by students who are involved in growing plants?

How can activities with plant materials be used to aid in concept formation and to improve process skills?

Yet another concern of critical importance is how one implements a new program in an already overloaded curriculum. In what ways can teachers be encouraged to try a new curriculum, particularly one for which they have had little previous background. This is the key question in the adoption process of all new materials and programs. These are some of the major issues and questions which must be resolved before avocational horticulture can be effectively incorporated in the curriculum of schools.

It is the general education curriculum of schools which contacts the majority of students. Therefore research and discussion on striking a balance between all the elements of the curriculum is a necessary step if we are to continue to improve the programs of schools. If we were to do all of these things there is a chance that schools could increase their effectiveness in dealing with contemporary problems and thereby improve the quality of life of our students.

APPENDICES

APPENDIX A-1

List of Pennsylvania Cooperative Extension Jurors

Mr. E. V. Chadwick
Court House Annex
5 Water Street
Wilkes-Barre, Pa. 18702

Mr. John Shearer
Extension Service
191 Franklin Farms Lane
Chambersburg, Pa. 17201

Mr. James Janowsky
Home Horticulturalist
850 East Gore Road
Erie, Pa. 16509

Mr. William White
Extension Office
Broad and Grange Streets
Philadelphia, Pa. 19141

Mr. Allan Michaels
Allegheny County Extension Office
315 Jones Law Building Annex
311 Ross Street
Pittsburgh, Pa. 15219

Mr. Robert Powers
Penn State Extension Service
235 West Market Street
3rd Floor
West Chester, Pa. 19380

Mr. Paul Reber
Extension Service
400 Markley Street
Norristown, Pa. 19401

Mr. Arthur Rusknak
Cooperative Extension Service
P. O. Box 250
Greensburg, Pa. 15601

APPENDIX A-2

List of Horticulture Education Jurors

Dr. William H. Carlson
Horticulture Building
Michigan State University
East Lansing, Mi. 48823

Dr. Kenneth W. Reisch
Dean's Office - College of Agriculture
2120 Fyffe Road
Ohio State University
Columbus, Ohio 43210

Dr. Richard Stinson
102 Armsby Building
Pennsylvania State University
State College, Pa. 16802

Dr. Harold B. Tukey, Jr.
Department of Floriculture
Cornell University
Ithaca, New York 14850

Mr. Peter Wotowiec
Director of Horticulture Education
Cleveland Board of Education
1380 East 6th Street
Cleveland, Ohio 44114

APPENDIX A-3

Dear

Thank you for agreeing to participate in a study relating to the inclusion of horticulture in the general education curriculum of schools. In doing this you will be serving as one of several professional jurors whose task it will be to indicate those critical learnings that a person ought to have if he is to be stimulated to pursue horticulture avocationally.

It has been common practice to probe various horticulture industries to determine content for vocational education programs; however, this study is unique in that it represents an effort to systematically search for appropriate avocational content.

Please rate each task according to its potential for avocational applicability or its suitability to stimulate interest when offered as a learning experience. It is hoped that the inventory will then serve as a mechanism to identify the essential tasks one should consider when attempting to provide for avocational horticulture in schools.

The horticultural task inventory has purposely been designed as open-ended. Please feel free to add task statements. A "Not Acceptable for Rating" column has been included to avoid forcing you to respond to items about which you have uncertainties regarding wording or intent. When items are checked in this category, it would be helpful if you would comment on the task statement.

By placing a check mark in the column of choice, you are indicating the importance of that specific task as a learning experience when attempting to provide for general education in horticulture.

Your opinions are critical to this study. It is hoped that you will complete the inventory and return it to me at your earliest convenience.

Thank you,

David Tompkins

DT:lt
Enclosures

PRACTICAL HORTICULTURE TASK INVENTORY

HORTICULTURAL TASK	VERY IMPORTANT	IMPORTANT	SOME IMPORTANCE	NOT IMPORTANT	NOT ACCEPTABLE FOR RATING	COMMENTS
LAWNS						
1. Plant a new lawn from seed						
2. Plant a new lawn from sod						
3. Prepare the seed bed for a new lawn						
4. Repair and reseed a lawn						
5. Mow and trim a lawn						
6. Fertilize and lime a lawn						
7. Remove weeds from a lawn						
8. Water a newly seeded or sod lawn						
9. Treat insect and disease problems of the lawn						
10. Broadcast grass seed and fertilizer with a spreader						
11. Clean and sharpen mower blades						
12. Spread and level top soil						
13. Till soil for lawn seedbed						
14. Plant ground covers						
15. Identify lawn weeds						
16. Apply chemicals for weed, insect and disease control						
17.*						
18.*						

HORTICULTURAL TASK	VERY IMPORTANT	IMPORTANT	SOME IMPORTANCE	NOT IMPORTANT	NOT ACCEPTABLE FOR RATING	COMMENTS
TREES and SHRUBS						
1. Plant trees						
2. Trim (Prune shrubs and trees)						
3. Fertilize trees and shrubs						
4. Water new plantings of trees and shrubs						
5. Support newly planted woody plants by staking or guying						
6. Wrap young trees						
7. Remove damaged, diseased, or unwanted limbs						
8. Repair minor tree wounds						
9. Move and replant a shrub or small tree						
10. Select and purchase nursery stock						
11. Shear hedges and shrubs						
12. Provide winter protection for shrubs						
13. Add compost or peat moss at time of tree planting						
14. Spray trees and shrubs for pests and disease						
15. Dig holes for tree setting						
16. Plant a hedge						
17. *						
18. *						
19. *						
20. *						

HORTICULTURAL TASK	VERY IMPORTANT	IMPORTANT	SOME IMPORTANCE	NOT IMPORTANT	NOT ACCEPTABLE FOR RATING	COMMENTS
INDOOR GARDENING						
1. Arrange fresh or dried flowers						
2. Prepare soil mix for potting						
3. Force spring bulbs for indoor bloom						
4. Pot and re-pot house plants						
5. Prepare bottle gardens (Terraria)						
6. Prepare hanging baskets of plants						
7. Water house plants						
8. Propagate house plants						
9. Fertilize house plants						
10. Prepare seed flats or containers for planting						
11. Regulate humidity in the area of house plants						
12. Treat insect and disease problems of house plants						
13. Raise plants with artificial light						
14. Transplant seedlings to pots						
15. Determine soil mix for specific plant requirements						
16. Pinch back potted plants						
17. Locate plants according to their need for light.						
18.*						
19.*						

HORTICULTURAL TASK	VERY IMPORTANT	IMPORTANT	SOME IMPORTANCE	NOT IMPORTANT	NOT ACCEPTABLE FOR RATING	COMMENTS
GARDENING (Flowers, Fruits and Vegetables)						
1. Plant bulbs						
2. Transplant seedlings						
3. Pinch back plants						
4. Start plants from seed						
5. Cut and care for cut flowers						
6. Prepare garden plots						
7. Plant rose bushes						
8. Prune roses						
9. Plant annual flowers						
10. Plant a vegetable garden						
11. Plant perennial and biennial flowers						
12. Thin seed plants						
13. Treat pest and disease problems						
14. Fertilize vegetable plants						
15. Fertilize plants grown specific for their flowers						
16. Water seedlings						
17. Spray fruit trees						
18. Prune fruit trees						
19. Plant small fruits and berries						
20. Weed garden plantings						

HORTICULTURAL TASK	VERY IMPORTANT	IMPORTANT	SOME IMPORTANCE	NOT IMPORTANT	NOT ACCEPTABLE FOR RATING	COMMENTS
MISCELLANEOUS						
1. Add mulch to protect plants						
2. Provide winter protection for sensitive plants						
3. Plan a home landscape						
4. Cultivate plants						
5. Select plants with regard to hardiness, growth requirements, and desired effects						
6. Sharpen hand tools (hoes, trowels, etc.)						
7. Prepare power tools for winter storage						
8. Build a compost pile						
9. Apply lime and fertilizer according to soil test						
10. Treat nutrient deficiencies in plants						
11. Recognize horticultural plants						
12. Use sprayers to dispense pesticide, herbicide and fungicides						
13. Take a soil sample to be analyzed by State Agricultural lab						
14. Modify soils through the addition of humus lime, gypsum and other addatives as required						
15. Till the soil and seed beds with power equipment						
16. Identify and remove poisonous plants						
17.*						

APPENDIX B-1

Table 7.1

Rank Order of Horticultural Tasks
by Weighted Mean - Task Area: Lawns

Rank	Horticultural Task	Item	Weighted Mean
1	Fertilize and lime a lawn	6	2.83
2	Remove weeds from a lawn	7	2.59
3	Apply chemicals for weed, insect and disease control	16	2.42
4	Identify lawn weeds	15	2.34
5	Broadcast grass seed and fertilizer with a spreader	10	2.25
6.5	Treat insect and disease problems of the lawn	9	2.17
6.5	Plant a new lawn from seed	1	2.17
8.5	Prepare the seed bed for a new lawn	3	2.09
8.5	Mow and trim a lawn	5	2.09
10	Repair and reseed a lawn	4	2.08
11	Water a newly seeded or sod	8	2.00 *
12	Plant ground covers	14	1.84
13	Till soil for lawn seedbed	13	1.59
14	Clean and sharpen mower blades	11	1.17
15	Plant a new lawn from sod	2	1.09
16	Spread and level top soil	12	1.00

* Items with a weighted mean of 2.00 or greater have been considered acceptable content.

Table 7.12

Rank Order of Horticultural Tasks by Weighted Mean - Task Area: Trees and Shrubs

Rank	Horticultural Task	Item	Weighted Mean
1	Trim (Prune shrubs and trees)	2	2.85
2	Plant trees	1	2.62
4	Select and purchase nursery stock	10	2.54
4	Spray trees and shrubs for pests and disease	14	2.54
4	Remove damaged, diseased, or unwanted limbs	7	2.54
6.5	Move and replant a shrub or small tree	9	2.46
6.5	Shear hedges and shrubs	11	2.46
8	Fertilize trees and shrubs	3	2.31
9	Water new plantings of trees and shrubs	4	2.16
10	Dig holes for tree setting	15	2.00 *
11.5	Provide winter protection for shrubs	12	1.93
11.5	Repair minor tree wounds	8	1.93
13	Add compost or peat moss at time of tree planting	13	1.77
14	Support newly planted woody plants by staking or guying	5	1.69
15	Wrap young trees	6	1.62
16	Plant a hedge	16	1.31

Table 7.13

Rank Order of Horticultural Tasks by Weighted Mean - Task Area: Indoor Gardening

Rank	Horticultural Task	Item	Weighted Mean	
1	Pot and re-pot house plants	4	2.85	
2.5	Water house plants	7	2.62	
2.5	Locate plants according to their need for light	17	2.62	
4	Fertilize house plants	9	2.54	
5	Propagate house plants	8	2.46	
6	Prepare soil mix for potting	2	2.39	
7	Transplant seedlings to pots	14	2.31	
8.5	Pinch back potted plants	16	2.16	
8.5	Treat insect and disease problems of house plants	12	2.16	
10.5	Determine soil mix for specific plant requirements	15	2.08	
10.5	Prepare seed flats or containers for planting	10	2.08	*
12	Arrange fresh or dried flowers	1	1.85	
13	Regulate humidity in the area of house plants	11	1.77	
15	Raise plants with artificial light	13	1.62	
15	Prepare hanging baskets of plants	6	1.62	
15	Prepare bottle gardens (Terraria)	5	1.62	
17	Force spring bulbs for indoor bloom	3	1.46	

Table 7.14

Rank Order of Horticultural Tasks by Weighted Mean
Task Area: Gardening (Flowers, Fruits and Vegetables)

Rank	Horticultural Task	Item	Weighted Mean	
1	Treat pest and disease problems	13	2.77	
2	Water garden plantings	20	2.70	
3	Fertilize vegetable plants	14	2.69	
4	Plant a vegetable garden	10	2.62	
5.5	Start plants from seed	4	2.54	
5.5	Water seedlings	16	2.54	
7.5	Transplant seedlings	2	2.46	
7.5	Prepare garden plots	6	2.46	
9	Plant annual flowers	9	2.38	
11	Thin seed plants	12	2.31	
11	Spray fruit trees	17	2.31	
11	Prune fruit trees	18	2.31	
14	Plant bulbs	1	2.15	
14	Plant perennial and biennial flowers	11	2.15	
14	Pinch back plants	3	2.15	
16.5	Prune roses	8	2.00	
16.5	Fertilize plants grown specific for their flowers	15	2.00	*
18	Plant rose bushes	7	1.93	
19	Plant small fruits and berries	19	1.85	
20	Cut and care for cut flowers	5	1.70	

Table 7.15

Rank Order of Horticultural Tasks by Weighted Mean
Task Area: Miscellaneous

Rank	Horticultural Task	Item	Weighted Mean
1	Apply lime and fertilizer according to soil test	9	2.75
2	Use sprayers to dispense pesticide, herbicide and fungicides	12	2.59
4	Recognize horticultural plants	11	2.50
4	Select plants with regard to hardiness, growth requirements and desired effects	5	2.50
4	Modify soils through the addition of humus, lime, gypsum and other addatives as required	14	2.50
6	Add mulch to protect plants	1	2.42
7	Take a soil sample to be analyzed by State Agricultural lab	13	2.33
8	Plan a home landscape	3	2.25
9	Treat nutrient deficiencies in plants	10	2.17
10	Provide winter protection for sensitive plants	2	2.08 *
11	Identify and remove poisonous plants	16	1.84
12.5	Build a compost pile	8	1.67
12.5	Prepare power tools for winter storage	7	1.67

Table 7.15 (Cont'd.)

Rank	Horticultural Task	Item	Weighted Mean
14	Cultivate plants	4	1.63
15	Till the soil and seed beds with power equipment	15	1.33
16	Sharpen hand tools (hoes, trowel, etc.)	6	1.09

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