

Rehabilitation Monograph 49

**HORTICULTURE
AS A THERAPEUTIC AID**

by
**Howard D. Brooks
and
Charles J. Oppenheim**

With a Foreword by
**Howard A. Rusk, M.D.
Director, Institute of Rehabilitation Medicine**



Institute of Rehabilitation Medicine
New York University Medical Center - 1973

HORTICULTURE
AS A THERAPEUTIC AID

by
Howard D. Brooks
and
Charles J. Oppenheim

With a Foreword by
Howard A. Rusk, M.D.
Director, Institute of Rehabilitation Medicine

1975 - \$2

Preface

Although what is now known as horticultural therapy, or garden therapy by some, has been used for over a hundred years in an experimental, even casual way, there has been very little published about it. This is an attempt to bring together information and comments from various sources, as well as to describe some of the methods used in the program developed at the Institute of Rehabilitation Medicine, New York University Medical Center in New York City.

There are so many variables that each project must grow to fit into its own particular situation. We do not give a definitive blueprint, therefore; we do outline certain guides which help establish a functional program. Routines that have been successful, procedures that are useful in structuring activities, and some benefits that derive from this work have been set down. Professional jargon has been avoided. We hope anyone wishing to start a program of horticultural therapy, no matter how limited in scope, will find some helpful suggestions.

Our thanks to Joan L. Bardach, Ph.D., Sophie K. Chiotelis, M.A., O.T.R., and W. Saunders Davis, M.D. for reading our manuscript and making useful suggestions and wise criticisms. The books, pamphlets and sources listed will give more specific information than is possible or desirable to include in this short work.

Howard D. Brooks
Charles J. Oppenheim

Foreword

The Therapeutic Greenhouse at the Institute was born at a party at the home of General and Mrs. Julius Ochs Adler in 1959. Two of the guests were Mr. and Mrs. Ira Haupt. Mrs. Haupt was then the dynamic, imaginative editor of "Seventeen" magazine. This gave me an opportunity to chat with her.

She told me that she had a foundation and helped many causes, but this gave her no satisfaction nor sense of accomplishment. She said, "If you know of a project in which I can get really interested and give of myself as well as my substance, let me know." I knew that she was tremendously interested in flowers and growing things and understood the therapy that comes with digging in the ground and planting seeds that create beauty. (And, incidentally, I share both her interest and her understanding.) I thought long and hard about this challenge during dinner, and at coffee I told her I felt I had the answer.

The Institute had just been built and we were already crowded with severely disabled and distressed human beings. I told her that I felt the creation of a therapeutic greenhouse would be of incalculable inspiration to those courageous people who were actually fighting for their lives. To work in it would be to help them live with dignity and independence. She liked the idea and the Therapeutic Greenhouse was born. It included a beautiful reflection pool that could be used by the children for wading;

wide aisles so that wheelchairs could go between benches; planters with bright flowers, and also birds and fish.

There was a special room where the patients could come and work, water and cultivate their own plants and thus create their own beauty. This new, unique place of healing was dedicated on May 13, 1959. All of Mrs. Haupt's family and friends came, along with many notables including Bernard Baruch. We had talked at length about a name. We talked about the "children's garden" and many other ideas, but the day before the dedication, while we were discussing it, one of the therapists suddenly exclaimed, "I have the name. It's the only name. It is THE GARDEN OF ENID."

Hundreds of patients through the years have not only found joy and solace in the program but many have gone on to follow careers in horticulture or as florists. Distressed families have found peace in this atmosphere.

During all this time, Mrs. Haupt has continued her generous support of this unique activity. The idea has been copied throughout the entire country and has spread like wild flower seeds scattered by kindly winds. It is proper and heartening that there now is this monograph on horticultural therapy so that all can share in this great experience.

Howard A. Rusk, M.D., Director
Institute of Rehabilitation Medicine



THE DEVELOPMENT OF HORTICULTURAL THERAPY

A dictionary definition of **Therapeutic** (adj. & noun) is: (1) One who waits on another, an attendant, servant; wait on, attend, serve, cure. (2) Curative, pertaining to the healing art; concerned in discovering and applying remedies for disease.

Occupational Therapy, by official definition adopted by the Delegate Assembly of the American Therapy Association, is “the art and science of directing man’s response to selected activity, to promote and maintain health, to prevent disability, to evaluate behavior and to treat or train patients with physical or psychological dysfunction.” (American Journal of Occupational Therapy - July-August, 1970.)

And, specifically, a **Horticultural Therapist**, according to Rhea McCandliss, who serves in that capacity at the Menninger Foundation is “one who uses the knowledge of plants and gardening, greenhouse and floristry skills as a tool to develop a relationship with a patient for the dual purpose of helping that patient with the problem of adjustment, and encouraging the patient to develop a broader interest in his surroundings as a result of increased knowledge of the plant world.”

Alice W. Burlingame, co-author of the book, “Therapy Through Horticulture,” adds: “What do you do in Horticultural Therapy? You develop a program of working with flowers and plants with the primary objective to

raise the level of motivation for the patient - whether his problem be mental or physical. Response will come from the patient in a renewed confidence, a warm feeling of achievement, and a greater interest in tomorrow than yesterday.” (3)

Over the years, gardening gradually has emerged as an aid in the rehabilitation of the mentally and/or physically handicapped person. For him, there is magic in working with plants. Instinctively he knows his plant “needs” him and will react to love and attention by remaining healthy, by growing larger and by becoming more beautiful.

The first professional indication of the size and the importance of the field of Horticultural Therapy was reflected in the April, 1968 Survey by Miss McCandliss. She mailed 500 questionnaires to hospitals through the nation. Out of the 216 replies, 140 of these (64%) reported that they had some kind of garden or greenhouse therapy program. Thus the urgent need for trained personnel was established immediately.

The Menninger Foundation, itself, was looking for a graduate student to work with and help their patients in the greenhouses and on the grounds. They turned to Kansas State University for assistance. Out of this mutual need, grew a cooperative training program by both institutions specifically designed to train - and produce - Horticultural Therapists. The curriculum: three and one-half years of work at Kansas State to be followed by six months of supervised training at the Menninger Foundation, the latter

giving fifteen credit hours towards the student's degree.

The program, which Dr. Ronald Campbell, Head of the Department of Horticulture at Kansas State, says "is the first undergraduate program in the nation as far as we know," offers great emphasis on horticultural sciences, supported by a background of psychology, sociology and related areas, and actual field work. Student work at the Foundation during the six-month stay there includes activities in the greenhouse, gardens, arboretum and grounds. There are no stipends paid. Students attend departmental and hospital staff meetings and also observe section conferences. As of this date, there are 20 undergraduate students enrolled in the new curriculum (1).

The Menninger Foundation has used gardening therapy since it opened its doors and over one-half of the patients at this hospital participate in this part of the rehabilitation program during the course of their treatment. Dr. Will Menninger cited the case in which the vegetables from the Menninger gardens supplied food for several youth homes in Topeka - as well as for victims of emergency and disaster in the state of Kansas. "As they share the product of their work with people less fortunate economically, patients picture themselves, often for the first time, as productive members of society." (The Therapy of Gardening - Wm. Menninger, M.D. and J. F. Pratt. Popular Gardening Magazine. Vol. 8, 1957)

Demands for skilled workers in the field of horticultural therapy will make a formal educational approach both necessary and desirable, and certainly this undergraduate degree from Kansas State will be the first of many. But it is important not to lose sight of what is perhaps the basic attribute for a horticultural therapist: gardening must be the dominant interest of his life. The broader his knowledge of horticulture and botany, the greater his enthusiasm for the field and its benefits - the more compelling and helpful it will be to the person (disabled or not) who is entering this wonderful world for the first time.

For years, there have been many experiments and programs all over the world. Most of these were independently conducted, unknown to one another, and were not necessarily labeled "therapy" although they clearly fell within this category. Some interesting examples follow: In an article entitled "A Rational Analysis of Ultra-Violet as a Vital Part of the Light Spectrum Influencing Photobiological Responses" by John Ott, Sc.D. (Optometric Weekly, September 5, 1968), we find this unexpected quote: "Former Warden Ragen of Statesville Penitentiary in Illinois has reported that he has been able to rehabilitate some of the toughest psychological criminals only by means of horticultural therapy."

. Early in 1920, the U. S. Federal Board for Vocational Education offered courses in gardening for disabled soldiers and suggested that continuation of their garden work would help maintain health. The Red Cross, using the same reasoning, established truck gardens near the

hospitals for wounded soldiers. One of the psychological reasons for the therapeutic value of this work was the emphasis on creation rather than destruction - a more recent association of most soldiers. (1)

..... An annual flower contest, supervised by the New York City Housing Authority, resulted in a marked reduction in vandalism of trees and shrubs planted by the city. More surprising, vandalism inside the buildings was substantially reduced. Charles A. Lewis, Horticulturist at Morton Arboretum in Lisle, Illinois, and for nine years judge and advisor to the New York City Housing Authority Flower Contest says: "We do not usually associate agriculture with the depressed central city areas, and yet it is here that a new role has emerged for a specific agricultural discipline: horticulture. In public housing where clusters of multi-storied buildings dwarf the individual residence, participation in gardening has led to self-realization and a fuller appreciation of life's potential. Growing flowers has become a means of communicating deeper values in living to people whose environment is hostile to such values . . . The city gardener discovers in his work new life-enhancing values. Growing plants suggests to him the possibility of beauty and order in his own life, and it is a bridge to a new basis of communication with fellow residents. In the ecology of the human spirit, the microclimate of a flower box or a flower bed can contain a tremendous healing force." (6)

..... In 1963, funded by Mrs. Arthur Hays Sulzberger, the New York Botanical Garden began a trainee-gardener program for potential high-

school drop-outs which combined an abbreviated scholastic program with actual gardening field work and instruction at the Botanical Gardens. Students received a small monthly income. Out of a pilot group of sixty boys only one failed to complete his high-school course. In addition to his regular diploma, he also received a certificate in gardening from the New York Botanical Gardens. This project was so successful that it was taken over by New York City and paid for, for a time, by the Human Resources Administration. In a letter dated December 10, 1968, Renee S. Sherline, Acting Director, Cooperative Education, Board of Education of the City of New York, said: "those boys in particular who were potential drop-outs have been motivated to remain in school as a result of this opportunity. Our records indicate that a large number of these boys have remained in the field of horticulture after graduation and have found a life-time vocation which was the direct result of their involvement in this cooperative work-experience program."

. In England, where gardening is not only a national pastime, but where interest in the care of the disabled and elderly is extremely high, the Chelsea Flower Show in London in 1967 had a Gardening Exhibit for the Disabled for the first time. The objectives were to provide valuable information "in the training of a small number of disabled for a livelihood in gardening; in helping aging and professional gardeners to stay in their calling; and to help the permanently disabled and the elderly to enjoy a relaxing and profitable leisure occupation which does not demand great mobility." (2)

..... A Youth Garden Program is conducted for severely handicapped children at the C. Melvin Sharpe Health School in Washington, D.C.'s inner city. The project started with 25 youngsters. Each made his own window box, planting it and caring for it. At the end of the school year, he took it with him - an old 'friend' to add color and interest to his home. In a booklet, "Youth Gardens - A Unique Opportunity for Your Community" (American Association of Nurserymen), this comment was added: "Some children are multiple handicapped but are among the most enthusiastic gardeners in the program. Some are spastics, and in addition to the joy they get from gardening, their sense of coordination is greatly improved. They also produced a small outdoor vegetable garden. They cultivated and planted it themselves - quite an accomplishment for handicapped children... Ever since the gardening program began at Sharpe School, it has been a great source of pride for the youngsters... The number of participants and the scope of the program have grown steadily."

..... In Upper Marlboro, Maryland, The Prince George's County Association for Retarded Children, Inc., has established the Melwood Agricultural Training Center. It is coeducational, has no fixed course of study and no graduation. It does have an active and successful placement bureau. To the level of his or her ability each student is taught to transplant, fertilize, use and maintain cultivators, grinders, sprayers, etc. Reporting the success of this project in The New York Times, August 3, 1969, Barbara Dubivsky wrote: "This facility uses an intensified form of

garden therapy to achieve employability for young adults previously considered untrainable for positions in a work-a-day world . . . They are accepted whenever openings exist and leave as soon as they achieve competence in elementary horticultural skills and are judged to have developed satisfactory job responsibility." 'Graduates' now work at the Department of Agriculture Research Center, The National Arboretum and on the grounds at the Goddard Space Center.

Thus we can readily see working with plants has a beneficial effect upon the handicapped. Why? The answers are many and complicated. A simple explanation is offered by Prof. H. B. Tukey, Head of the Department of Horticulture, Michigan State University: "The housewife who has propagated a begonia or an African violet from a single leaf, who has painstakingly watched the plant take hold, and delighted in the opening of each new petal, may be unaware of the enrichment to her daily life. The man who grows a shapely apple tree in the backyard, who watches the buds break in the Spring, smells the flowers, and feels and enjoys the fruit is richer than his neighbor . . . And the unfortunate individual who has become dependent upon others and unwilling to help himself may not realize that it was the interest demanded by a rapidly growing plant at his bedside that stimulated his hold on life. Yet, the value of a plant in each of these situations is significant."

THE GREENHOUSE AT THE INSTITUTE OF REHABILITATION MEDICINE

In December, 1972, Howard D. Brooks, Horticulturist at the Institute of Rehabilitation Medicine, received two letters. Both were from former patients. The first read, in part: "I have been home two weeks and I seem to have made the transition with no difficulty. 'My garden' which you so generously provided is a source of fun and satisfaction. Every afternoon I spend some time with it." The writer was a hemiplegic. The second letter reminded Mr. Brooks that "I was a stroke patient and you helped me make a terrarium . . . I was quite proud of it since it was the first and only thing I have done with the use of one arm only. By the way, I would like to try one more. Do you know of a seed or plant supplier that has a catalog I can write for?" No Horticultural Therapist could have received two merrier Christmas messages.

In the shadow of a Con Edison smoke stack, lies one of the loveliest spots in Manhattan. At the corner of 34th Street and First Avenue is a glass enclosed garden and greenhouse and it is here that the Institute of Rehabilitation Medicine's horticultural therapy program under the direction of Mr. Brooks takes place. It was officially dedicated in May, 1959, and named after its donor, Mrs. Enid Haupt. Mrs. Haupt gave the greenhouse complete with plants, equipment and funds for its operation and maintenance. A three year-old patient, Evan D'Arcy, cut the opening day ribbon while Bernard M. Baruch, Dr. Howard A. Rusk and Mrs.

Haupt joined in the ceremonies. Since that day, "The Garden of Enid" has brought hope and help to the patients of the Institute, and pleasure to the staff and visitors from the surrounding community. It is a peaceful sanctuary from the noise of the city, and from the routine and atmosphere of a hospital.

A solarium, a growing house, tropical bird cages, and an aquarium are included in the garden which measures seventy-one feet long by twenty-six feet wide. The occupational therapy section is located in a separate room to the left of the "growing house". Everything has been designed for the patient's use and comfort: benches of graduated heights, hydraulic tables easily adapted to wheelchair or standing positions, smooth floors to make movement easier and safer, and water sources at sitting level.

The Garden Journal of the New York Botanical Garden (February, 1971) said, "Although patients know the program is an authorized part of their treatment, they look forward to it eagerly as time off from their regular medical routine of clinical treatment and exercises." The article continues with a quote from Sophie Chiotelis, Director of Occupational Therapy for the Institute: "It is a non-medical therapeutic method conducted in a natural environment. For many disabilities, it offers exercises in a disguised fashion and utilizes the patient's improvement in physical gains in a normal activity. Children in a hospital are taken away from their normal growth opportunities. They do not have the experience of

learning. The gardening work gives them that exercise. The patients enjoy it. It raises their spirits and helps them adjust to living with their handicaps.”

The author of the Garden Journal article, Barbara Black, former Garden Editor of the New York World Telegram & Sun, concludes: “Mixing soil can be a major achievement for a badly crippled hand. The coordination involved in transplanting a small geranium may be an absorbing challenge - and success a great thrill.”

The Horticultural Therapy program at the Institute of Rehabilitation Medicine is one aspect of the total rehabilitation of the patient. Activities are based on the goals established for the individual by an occupational or physical therapist. The program also may provide assessment of vocational potential and/or performance evaluation reports. Patients may work alone or in small groups, once a week or more often - depending upon assignment, degree of interest, physical or mental limitations, age, and need for supervision. For some, the program is an opportunity to resume a hobby thereby re-establishing a link with life outside the hospital. For others, it may be a new and exciting experience. Where feasible, programs are planned to be carried on at home after the patient's discharge.

In very basic terms, the horticultural practices used in the greenhouse are related to the patient's own personal life and physical restrictions. The simplest instruments are used: those that are readily available in the home.

The objective, of course, is to prove that to be successful in growing plants it is not necessary to have sophisticated and expensive equipment. The stress is put upon the simple requirements needed to grow the majority of plants suitable for the average home gardener.

Basic Materials and Equipment

Greenhouse size will be dictated by the site available for it, and, needless to say, by the budget. The variation in greenhouses is endless and one can be designed to fit any specific need. The categories of patients, physically handicapped, mentally ill, etc., also will influence the ultimate form of the installation. If the setting is urban, with little or no land available for a greenhouse, it may be possible to use a rooftop. In terms of light requirements, this could be an ideal solution. (It will not be the showcase a ground-level installation would be, of course.)

If neither the greenhouse nor the rooftop are available, a window area with natural light source, or even an artificially lighted area may be quite satisfactory if utilized in a knowledgeable way. In such situations, however, it will be difficult to maintain a structured program. It will be less therapeutic in a physical sense, and may prove to be primarily a diversionary function. It may seem more like a home-situation and thus help the patient transfer the activities of the program to his residence

when he leaves the hospital.

Whatever the work area, planning for greatest mobility and multi-use fixtures will make it more functional and adaptable to a varied-patient population. A work area designed for the physically handicapped is no less useable for the mentally ill. Whatever the basic design, there will be some individual specifications dictated by particular needs. Individual program activities will require the construction as well as the design of special planting beds, raised growing benches, etc. Designs that are too specialized may prove to be restrictive.

If the greenhouse is for the disabled, work tables must be the proper height or adjustable. This is of great importance. Hydraulic lift bases from dental chairs serve extremely well. They also may be rotated in a complete circle - which is necessary for stretcher patients. Aisles must be wide throughout. Floors of textured concrete are safer and more desirable than other surfaces, such as tiles, even if the latter are of the unglazed type. Large corner areas will eliminate the need for complicated maneuvering of stretchers, wheelchairs, or even crutches. Overhead supportive slings may be needed for those patients who have weakness in their upper extremities. Materials, supplies and tools can be simple or elaborate depending upon the situation. It should be emphasized once more that success in indoor gardening is not a question of equipment and accessories alone. In the final analysis, success will depend upon light, water, proper planting procedures and continuity of care and attention.

Pots will be of comparable shape but, of course, in different sizes and will be made of both plastic and clay. They vary in weight and in number of drainage holes. Plastic is lighter and thus less stable for the patients who have difficulties such as incoordination and loss of dexterity. The pots are available in many colors, even a terra cotta imitating the clay pot, and they will have multiple drainage holes in contrast to the usual one in a clay pot. Plastic has a distinct advantage in ease of cleaning and sterilizing. However, some growers still prefer clay pots for such categories of plants as cacti, succulents and others with varying moisture needs within the growing year.

We recommend duplicating equipment in both metal and plastic. This is necessary in choosing watering cans, bowls, pots etc. Some patients, because of their physical limitations, cannot support or handle heavier accessories. For others, the use of heavier equipment may help to strengthen the weak arm or hand and to improve work tolerance.

Spoons of various sizes are used for transporting planting media, or other materials (perlite, vermiculite) from one container to another. If plastic, they are apt to be awkward in design but will have the asset of almost weightlessness. Metal spoons can be bent to help overcome 'grasp and support' deficiencies.

Bowls must be of various diameters and heights. Elevation is a problem for many patients and an extra inch may be an insurmountable obstacle. All

utensils should be colorful. Bowls of unusual or imaginative shapes also help to add variety and fun to what could become, to some, a monotonous routine.

A roll of heavy-gauge clear plastic is a great help. It should be cut into work-surface lengths and placed in front of the patients. This helps in cleaning up at the end of the work session, and also protects from water spillage. In addition, construction paper of different colors may be slipped between the clear plastic sheet and the table surface when working with patients with visual impairments. A paper towel, placed on top of the plastic, helps in the return of spilled planting media, etc. (A patient feels less embarrassed about spilling on a protected surface.)

Growing media of the soil-less type are supplanting regular soil mixtures for many reasons. With increasing urbanization, sources of soil are vanishing. There are fewer variables involved in the compounding and mixing of the soil-less product. At present, there is no shortage of the basic components: peat moss, vermiculite, perlite, limestone, etc. One of the advantages of this mixture is its freedom from disease, organisms and insects. The latter are eradicated from soil mixtures only by persistent (and partially effective!) fumigation. The lack of weight is another important advantage.

The choice, and sources, of plant material are unlimited and are ultimately decided by growing needs. With less than desirable natural light

conditions, and little supplemental lighting practical, plants tolerating low light levels (or which grow normally in such situations) must be used. Plants needing higher light intensity can be added for varying lengths of time knowing they will not survive indefinitely. These must be considered expendable and, of course, must be replaced. Whether all propagating material, a portion of it, or none of it is raised in the greenhouse will be determined by the individual situation. In any event, there are many gardening organizations, both professional and amateur, eager to be of help.

Will the program activities be conducted entirely indoors? This may be the case in a city, and possibly in the suburbs or country as well. Much will depend upon the weather, the time of year, the conditions of the patients. It may be advantageous to work indoors at the start and move outside later, or to begin a garden experiment outdoors and then come inside.

Success for the patient does not depend upon an imposing greenhouse. The most important element is motivation. The horticultural therapist must impart enthusiasm and imagination; he must be able to inspire his patients. He must have a solid foundation in horticulture, and the more complex the installation and/or the project, the greater must be his expertise. These qualities bring confidence to the patients and once encouraged, they will enjoy the challenge and the reward of "growing things".

An Analysis of a Basic Planting Routine

Potting a rooted cutting, or seedling, seems, to the experienced gardener, a simple matter. When analysed in terms of progressive steps and elements of judgment, organization and deftness, however, it will be recognized as a structured routine with one step based firmly on the preceding one.

Covering the drainage holes in a pot will be a problem calling for accuracy and coordination involving a sense of numbers, size and space relationships. Some patients will not be able to handle the problem of choosing a shard of proper size to cover the drainage hole, or to choose the correct number, or to be deft enough to perform the task. This will be true especially of a number of hemiplegics and some traumatic brain damaged patients. Conversely, at times, it will be the only step a patient will be able to initiate. Those unable to cope with this initial task may be allowed to use an entire layer of pebbles or shards. For those with erratic coordination or a visual problem, this will give greater stability to the pot because of the added weight. It will be less apt to tip over. The index finger usually is used for placing these shards, but a dowel, or pencil with an eraser tip, will help to position them.

After this is completed, an appropriate amount of planting medium is put into the pot. Depending upon the root system of the cutting or seedling being transplanted, the pot will be partially filled to a designated level. This can be accomplished by instructing the patient to place two

spoonfuls of medium in the pot, or to fill it half full, or up to a mark made on the inside wall of the pot. Here, again, judgment is involved and there will be infinite variations as to the amount that two spoonfuls or a pot half full represent. Making the mark on the wall of the pot may be helpful. Some patients, of course, will be unable to follow even such a simple direction and will have to be stopped from over-filling.

After the placement of the proper amount of the medium, the cutting or seedling is set so that the root system and the main stem are in the center of the pot. If the patient has sufficient coordination, he may now stabilize the cutting or seedling in an upright position at the proper depth with one hand, while adding the remainder of the planting medium to the pot - and filling it entirely - with the other. Some, especially hemiplegics, will not be able to do this due to the loss of functional use of one arm. Brain damaged patients will often crush the plant by grasping it too firmly or bruising it beyond use by pushing it into the medium too roughly, or striking it (either intentionally or not) with whatever utensil is at hand. With the hemiplegic patient, this procedure can be accomplished with the use of one arm. The plant is centered and allowed to rest against one wall of the pot. The side of the pot opposite the wall against which the plant is resting is then filled with planting medium - as full as possible without overflowing. The pot is then turned 180 degrees, and the plant is raised to the vertical, using the base of the plant as a fulcrum. In most cases, the planting medium will then stabilize the plant sufficiently so that the remainder of the medium can be used to fill the pot to the proper level.

Then the pot is tapped gently to settle the medium a bit, and the plant is checked to be sure it is well placed. If it is at the correct level and centered, it is then permanently positioned by using the index and middle fingers astride the stem, without touching it, and pressing the medium firmly. The pot is turned half-way around and the operation is repeated. This should anchor it well. The pot is then tapped sharply on the surface of the work table to settle the medium finally. Its level should be from one-eighth to one-half inch below the rim of the pot to allow for watering without overflowing.

The final step will be to water the plants. If the soil-less media are not moistened before use, they will tend to repel water. If this is the case, fill the pot to the brim with water, allow it to be absorbed, and then add additional water until it drains out of the holes at the bottom of the pot. If the planting medium is slightly dampened, potted plants may be set in a shallow pan with water added to it. The water will enter the drainage holes and rise by capillary action until the top surface of the medium is thoroughly moistened. The time it takes to accomplish this will be shortened if the water level in the pan and the medium level in the pot are the same. Then remove the pots to drain.

This planting routine is basic and adaptable to any size potting container or plant material normally used. Because of its progressive character, this procedure offers an evaluation of the patient's ability to recall from one session to the next. What particular step, or steps, are recalled, and

whether initiated without prompting or support, will make evaluation of this portion of the program a simple matter.

Vegetative Propagation

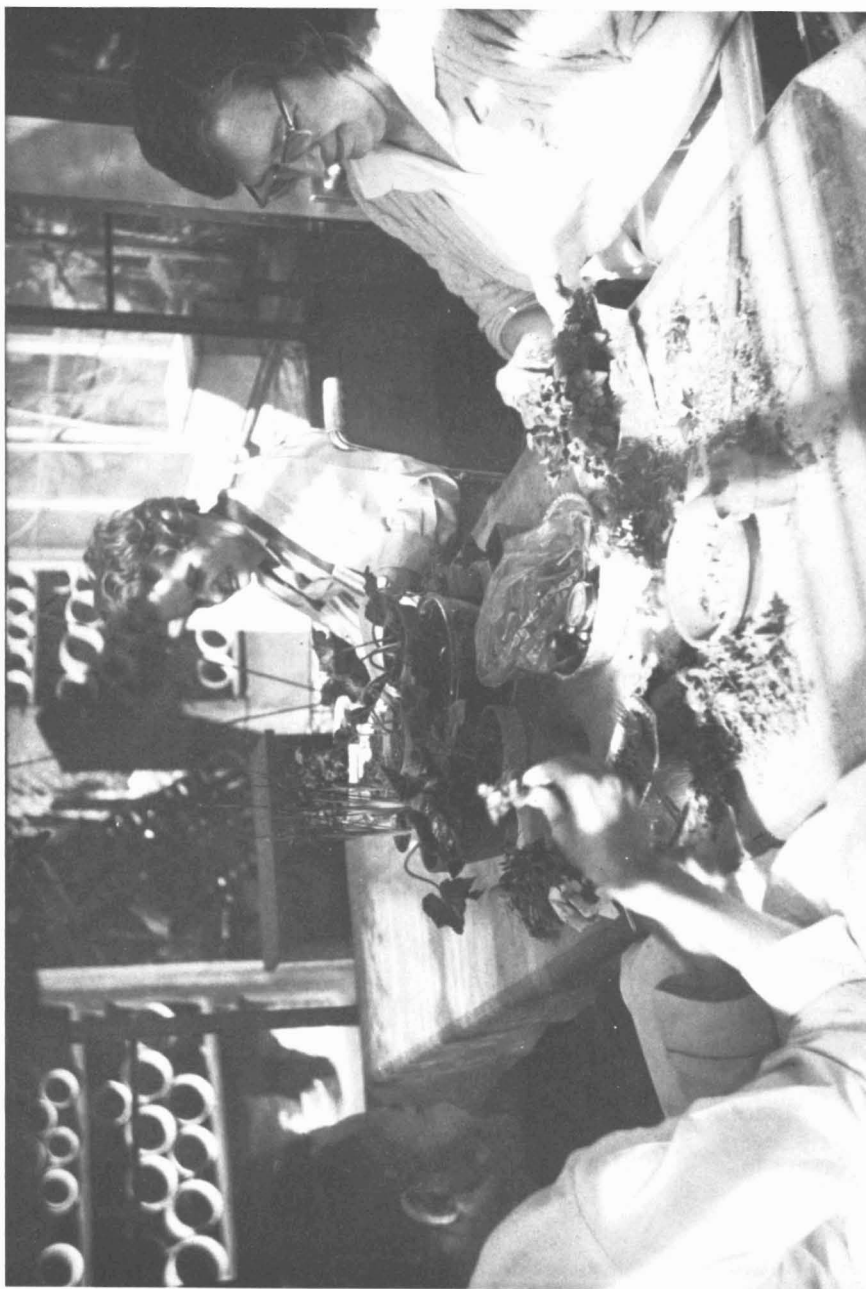
Propagating plants by vegetative means (asexual) rather than from seeds (sexual) is one of the basic routines of horticultural therapy. It is the only dependable way to reproduce a plant accurately. When propagated by cuttings, the new plant, in most cases, will duplicate its parent exactly. This may or may not be true when growing from seed. (There are too many variables to guarantee it.)

The procedure of plant cuttings usually associated with a therapy program is rather simple. However, as one wise man said, "Simple things are simple when you know how to do them."

Proper materials should be assembled, and the plant to be propagated chosen. Material should not be cut too far ahead of time; a long wait can be damaging.

After putting the shards in place over the drainage holes, the patient should fill the container chosen to hold the cuttings (until they are rooted) with the propagating medium - usually half vermiculite, half





perlite. Then it should be leveled with a straight edge (usually the insertion stick if it is long enough to exceed the diameter of the container), and, using a small watering can, watered in a lateral motion describing a grid pattern on the surface. The container should then be rotated and the watering process repeated, watching for the sudden exit of the water from the drainage holes. It would be best to place the container in a saucer tray large enough to hold excess water until it can be emptied. The pot should then be set aside to absorb the moisture.

Plant material should be prepared in the following way. The cutting should be held lightly but firmly in one hand, and the lower leaves removed from that portion of the stem to be inserted in the propagating medium. (In most cases, select terminal growths with a minimum of three groups of leaves and sufficient growth to allow one to two inches of cleaned stem. Hemiplegic patients may hold the cutting with the heel of the usable hand and, at the same time, strip the leaves away with the free fingers of the same hand.)

All cuttings should be prepared in this fashion, one at a time, leaving the unprepared material in one pile, the prepared cuttings in another, and the removed leaves and other growth in a third. Neatness will help eliminate confusion. After all cuttings have been processed, they should be dipped, again one at a time, in hormone powder, and set aside in still another pile. The dipped end of the cutting should never be handled.

Then, with stick or dowel, the first hole for inserting the first cutting should be made approximately one-half inch to one inch from the rim of the pot. The stick should be inserted vertically and then twisted as removed to prevent bringing some of the propagating material with it. The cutting should be inserted so that the lowest leaves rest on the surface of the material, which should then be pressed gently around the stem. This routine should be repeated until there is a straight row across the entire pot - each cutting a half-inch to an inch (depending on size) apart from the next one. They must be firmly anchored.

After the first row is completed, the pot should be turned and another row of cuttings inserted in front of the first row - the same distance the first is from the side of the container. This operation should be continued until the supply is exhausted or the container filled. Another watering may be necessary to settle the propagating material more firmly around the stems. Cuttings with a rather large leaf area and thin texture may have wilted to some extent and the added water will help freshen them.

Sometimes, a "close" atmosphere must be established to prevent wilting. A plastic bag (heavy enough in gauge to remain open), or an unused fish tank, etc. may be used. A temporary Wardian case can be made from a seed flat or box, using proper-sized panes of glass, or a structure of wire covered with removable plastic. After a few days in a location with strong light (but not direct sun), cuttings should be turgid and beginning their rooting period. During this time, fogging caused by excess moisture should

be prevented by allowing air into the “box” as needed. There will be no such problem if the heavy plastic bag has been used.

Many cuttings, especially in the Spring, will root in a week to fifteen days. Roots should not be allowed to grow too long; they will be injured later when separated. Roots need be no more than an inch in length at most. (Choose one of the cuttings that is crisp and showing signs of expanding top growth and give it a gentle tug. If there is a slight resistance, rooting usually has begun.)

After transplanting into individual pots, several days of “close” conditions may be needed once more to help plants become re-established, and to reduce the loss of turgor resulting from the rapid evaporation of moisture through the leaf cells.

THERAPEUTIC USES OF HORTICULTURE

Writing in the *Journal of Rehabilitation* (Jan.-Feb., 1973) Paula Diane Hefley said: "The specific goals toward which a horticultural therapy program is directed may differ distinctly from one institution to another and from one population of handicapped individuals to another. However, the ultimate goals of these programs is the improved physical and mental health of the individual. The benefits may be seen in four areas: intellectual, social, emotional and physical development."

In planning the activities of the horticultural program at the Institute of Rehabilitation Medicine, emphasis is placed on reinforcing physical gains being made in the other therapy areas. Equally important, however, are the intellectual, social and psychological benefits. They cannot be stressed enough. Conferences are held with the Occupational Therapist or therapists associated in other areas of treatment. Often, the doctor in charge of the patient is consulted to determine the specific goals to be established. Then, if possible, a normal horticultural routine is adapted to fit the actual needs of the patient. Among other physical advantages, this helps in developing hand function, such as improving grasp, pinch and/or dexterity.

The following are various therapeutic uses of horticulture as planned and practiced in the Greenhouse at the Institute of Rehabilitation Medicine:

Counting or Numbers Sense

The initial step of putting shards in place over the drainage holes in pots can be used in several ways. To begin, the patient is asked to select four. He may or may not be able to do this. He should be asked to count aloud as he makes his selection, or as he puts them into place. Because some pots have a different number of holes than others, this can be accurately checked by substituting, in random order, pots with different holes as the planting routine is repeated. (When working with a brain-damaged male patient, after several weeks of potting sessions, he began to count spontaneously when initiating the first step of placing the shard. This was the first evidence that a numbers concept was at least partially intact. He had not shown this ability when working with a therapist in other areas.)

A numbers sense also may be checked when: planting seeds large enough to place individually; potting several rooted cuttings or seedlings into one pot; counting potted plants at the close of a session.

Color Sense

The use of variously colored pots, utensils and plants can be used to test color sense, either color-blindness, or an inability to distinguish color and

to classify it properly. Colored construction paper sheets may be inserted between the transparent plastic work sheet and the table surface. This will be useful when working with some patients with a color visualization impairment. The colored work surface may be more readily perceived through the drainage holes and aid in the placement of the shards.

Coordination

The placement of shard over drainage hole will be, in part, a test of coordination. Stabilizing the pot with one hand while putting the shard in place may be a problem. Sometimes a patient will use two shards where one would have been ample. Transporting the growing medium from container to pot will present problems of excess spillage (too much or too little in the utensil used for transferring it, etc.) When the rooted cuttings, seedlings or plants to be transplanted have been placed, supporting them with one hand without displacing them may be difficult while bringing additional planting medium to the pot. Finally, stabilizing the plant, and the last step of tapping the pot to settle the soil may be impossible for the patient to do. This is especially true of hemiplegics and it is difficult to find a satisfactory explanation for this.

Alignment

Deficits in alignment or visual scanning will be noticed when a patient is transplanting seedlings in a flat or box with straight sides or regular shape. This deficit also will become apparent when inserting cuttings into a container of rooting medium. It may not be accomplished even after making a terminal point at the end of a projected row. The following assignments will be revealing: centering a single plant in a pot, placing three plants equidistant in a triangular pattern, or four plants in a square, or five in a square with one in the center.

Space Concepts

The physical act of covering drainage holes will clearly indicate the presence or the absence of space concept. If absent, the patient will be unable to cover each of the holes with a shard of the right size. Trying to use several small pieces instead of the correct large one is evidence of this also, as is an attempt to use four pieces in a pot with three holes. (Often, if the pot used just before had three holes, this 'imprinting' gets carried over and superimposed on the new pattern.) Loss of a numbers sense, visual deficit, and other impairments may be involved, too.

Psychological Aspects and Other Benefits

There will be some patients who will be difficult to reach and motivate. Working with plants may provide an impetus and initiate a response. Something as simple as the growth of roots on a cutting suspended in a glass of water, or a bud preparing to open, may provide the key. One of the great advantages of gardening is that it is not a static activity. There is always something happening - a new sprout, shoot or leaf is forming, a flower is opening or fading and has to be removed. Then the cycle begins all over again. Most importantly, for so many patients who are totally dependent on others for assistance in even the smallest tasks - a living thing depending on **them** for care and sustenance gives them the will to go on and an interest in the future. A plant must be watered, transplanted, given more or less light, cultivated, fed, groomed, etc. (These are the basic routines of life that the patients themselves understand.) It also gives them the knowledge of success or failure based on their ability to meet the needs of the plant in their care. All this helps them make a greater effort on their own behalf, something to which they can relate in a very personal way.

All age groups benefit from working with growing plants. The youngest child, on the threshold of so many new experiences, is intrigued by the diversity of seeds' shapes, colors and textures - as he is with the living plant material itself. For many children this is a whole new world filled with beauty and pleasure. One of its few disadvantages is the inescapable

fact that a plant's cycle can be speeded up just so much - which is slow by any child's standards. However, there are seeds which sprout relatively quickly - beans, sunflowers, etc. There is the magic, too, of the 'sensitive' plant and the Venus Flytrap which respond to tactile stimuli. Terrariums can become doubly exciting if they also serve as homes for chameleons, newts or other likely inhabitants.

The relationship of animal and plant life is truly fascinating, and often the child is eager to make this a shared experience. Children many times 'talk' to their plants; a response may not be audible to an adult ear but there are no such limitations in a child's world where nothing is inarticulate.

Adults, at first, must overcome the trauma of whatever misfortune has befallen them. Then, they welcome horticultural therapy as either an escape from the present, or a return to the security of prior familiarity. Those who have gardened before may welcome it as an opportunity to lose themselves and their awareness of their handicaps for a brief time. This, of course, will depend upon the degree of physical damage. Some may reject it if their ability to do the vigorous tasks associated with outdoor gardening has been compromised. If they have had indoor gardening experience, acceptance will be more likely because gross activity demands will be fewer. If they are familiar with growing plants under artificial lights and micro-climate conditions, acceptance will be even quicker. Here, brains not brawn are the key requirements.

The most difficult group will be the males from the early teens to the middle twenties. In most instances, they will reject this form of therapy particularly if they are unfamiliar with gardening. This is true, principally, of the paraplegic whose masculinity is threatened, he feels, by the sudden reversal of roles in which he finds himself - dependent, to an agonizing degree, upon others. He is seldom capable of participating in what, to him, seems a feminine activity.

The relation between a patient and the plant he has brought into being by sowing seeds, propagating and finally potting is truly meaningful. Curiosity, concern and, hopefully, hope itself will be aroused in the person who has accepted the responsibility for giving a plant the essentials of life. This can be a very rewarding, and, in truth, a health-giving experience.

New Vocabulary New Interests

The language used in the world of plants also is fascinating to explore for it is based on a Graeco-Latin vocabulary. It is a direct link with scientific communication in all fields even though it has its own roots and derivations.

With the awakening of a greater interest in the relation of man to his

environment, plants provide a vital key to understanding biology - the science of life. Gardening offers an opportunity to become involved in this biological world on whatever level desired. Working with the soil, and following the cycles of the plant world upon which man is so dependent, brings an involvement and an awareness of everything around us. With this comes appreciation and reaction to the impact we make upon our environment whether it be good or bad.

The world of plants and the exploration and colonization of the globe are inextricably entwined. From the earliest voyages into uncharted seas, man has returned home with new plants for food, medicine, seasoning. This bounty has influenced the whole course of territorial conquest and the settlement of the ancient and modern worlds.

This provided, along with the search for gold, the greatest impetus for men to travel into the unknown to find new sources of wealth and power. The understanding of the part plant-exploration played in these adventures and discoveries is another link that binds man to his world and his environment. History, geography, biography, travel, all are the fascinating by-products of an interest in and a love for plants.

HORTICULTURAL THERAPY AT HOME

For the shut-in patient, a window garden has unlimited possibilities, restricted only by his level of interest and imagination. In the beginning, success in growing any plant will seem quite a victory. Then with added knowledge and experience, he will try the more difficult ones and will know the feeling of pride and exhilaration that comes with being able to meet the requirements of a plant 'prima donna' and see it flourish.

For the family, growing things at home can become a compelling group activity. Each season brings its own attraction - and project. No one is more conscious of the passing seasons, and the beauties of each, than the gardener - whether he has an acre of ground or a small sunny window. The satisfaction of having clipped the chives or basil for a salad from a pot growing in a window garden is something to treasure.

What is Needed?

First, of course, a place to work. A table, reasonably rigid, folding or fixed, of the proper height is usually the best working surface. Depending upon physical conditions, a lap board, or some variation of it, may be more desirable. With this, should be a U-shaped wooden barrier several inches high which can be attached when needed. This will prevent

equipment and materials from falling to the floor. A sheet of plastic covering the work surface will make clean-up easier. Newspaper will give added protection, if placed under the plastic.

Soil: If storage space is at a premium, small packages of soil can be purchased one at a time - even though it is less economical that way. The soil-less mixtures most readily available have been discussed in the section on planting routines.

Pots: Pots of various sizes will be needed - and, once again, the number will be determined by the amount of storage space available. There are many plastic food containers that will serve as satisfactory pots. Restraint and discrimination, however, are called for! Uniformity and arrangement are much more pleasing than mere quantity. A geranium planted in an old tomato can may give a bit of "local color" but it will not add much to the attractiveness of the window garden. It is important to remember that drainage holes must be made in the bottom of those containers which were not designed as flower pots to begin with. Without them, most plants will not flourish.

Tools: There are only a few tools needed for indoor gardening. Which ones will depend upon physical limitations. A few large soup spoons, a dessert spoon, and a teaspoon will do. Also: a sharp knife to make cuttings, a dowel sharpened at one end, a pencil with a good eraser, a light pair of pruning shears, a trowel, a plastic watering can, various foil

containers (such as those used for frozen food packaging), and perhaps one or two plastic containers. A plastic storage box (sweater size) can be converted into a small "Wardian" case to create that humid atmosphere needed to keep cuttings or newly transplanted seedlings fresh and crisp. A shallow roasting pan, and a serving tray will be of great help when watering or when carrying plants or soil from one area to another.

Food: Many people are surprised to learn that plants need food on a more or less regular schedule just as we do - but not as often! All plant food (fertilizers) that is chemically based and non-organic will have the analysis of its essential elements on the label, which is required by law. These figures written as 5-10-5 or 10-10-10 on the label probably will mean nothing at first sight. They represent three basic elements needed in varying amounts for satisfactory growth by all plants. The first number represents nitrogen, the second number phosphate, and the third number potash. There will be two basic kinds compounded for the two general groups of houseplants. One, the largest group, requires a more or less neutral soil (that is rather evenly balanced between acid and alkaline elements) and the other which requires acid soil. The first is used for most houseplants and the second for gardenias, citrus, azaleas, etc. The frequency of feeding will vary, of course, but this subject is explained at great length in many books dealing with the growth and care of houseplants. (A list of suggested books follows.)

Rooting Compounds: These can be purchased in various strengths. They are used when making cuttings, and in many cases encourage earlier and more uniform root growth, especially of plants that are difficult to propagate. They may not be of concern to the part time hobbyist at home, but to a nursery, propagating plants by the thousands, to have them root rather uniformly is commercially important. The rooting compounds are inexpensive, and because such a small amount is used, they last a very long time. Again a houseplant book will give full details.

Project: Before deciding what to grow, it must be determined what can be grown. Many factors are involved, but one of the most important is the available light. Lack of light, or insufficient light, means artificial light will have to be used, either entirely or as a supplement. The amount of light varies greatly particularly in the midst of a city, and the direction a window faces will not necessarily have much bearing because of large buildings nearby. Without supplemental light, only those few plants which accept deep shade as a natural environment can be grown.

Dish Gardens: These should be thought of as temporary arrangements of plants which contrast texture, forms of leaves and stems and color. Eventually, all dish gardens outgrow their boundaries even when assembled thoughtfully. There will always be at least one plant that thrives, sprawls or elongates, exceeding the limits of growth originally planned and spoiling the proportion and the overall effect.

Terrariums: Where difficult growth conditions exist, the only satisfactory solution, sometimes, is to plant a terrarium. This is a special container, often an unused aquarium, holding a group of plants that are more or less tolerant of a rather high level of humidity and, occasionally, a low level of light intensity. There are also desert terrariums which use plants that only thrive in an arid climate. These take knowledgeable management to be successful. Keeping plants in their individual pots (buried in the terrarium soil) makes maintenance less of a problem, particularly when replacing a plant that has died or one that has exceeded its boundaries. This is one area of gardening where imagination and an artistic sense of composition mean a great deal. Some lovely effects may be obtained if the person making the terrarium has "a feel for it". Terrariums can be maintained for a very long time if managed properly.

Propagation: Propagation is the means of increasing one's supply of plants, or sometimes saving a plant from oblivion. It is always one of the most fascinating parts of gardening. Often times, seeds will be used; some may be very difficult to germinate or grow to a state of maturity. Some are so tricky and capricious, that only great expertise assures propagation. However, it is always a challenge and to enthusiastic gardeners that is enough! Seeds will be used in most cases for new varieties - especially of annual plants. Other methods of propagation are by leaf, stem, a growing tip of a rhizome, or a cutting from a sprout of a tuber. All of these demand attention and some skill and it is important to acquire them.

Re-potting: To know when a plant needs to be moved from one pot to another, to choose the proper size pot and to mix the proper soil to suit the plant's needs - are arts in themselves. Too often a plant is re-potted as a matter of course, without it being necessary. Some plants are maintained in a more vigorous condition by allowing them to remain in the container in which they are planted. Some seem to need confinement in order to bloom their best, or to restrain excessive or aberrant growth. Some plants need to be potted more firmly than others, but at all times extreme care must be taken not to injure roots or the plant will decline and die. Some of the epiphytic ferns or orchids need special mixes. One should know how these plants grow and thrive, where they come from, what their natural environment is, their place in the different growth levels, their normal light conditions, etc. (Do they grow on the floor of a jungle on fallen moss-covered logs or high in the branches climbing the trunk of a tall tree; are they rarely exposed to direct sunlight, or a moving pattern of light and shade constantly dappling them, or are they desert plants exposed to the full, burning rays of the sun; do they have daily showers or long rainy spells alternating with periods of rest and drought; do they grow with most of their roots exposed to the air or are they buried under a loose covering on the ground?) All of these elements help determine whether a plant's root system will be sparse or heavily fibrous and these, in turn, will be the deciding factors in potting and re-potting. If a plant has a small root system, use a small pot - no matter how large its leaf surface (rex begonia). If it has large, vigorous, fleshy roots (spider plant), use a larger pot.

“Kitchen” Gardening: It’s fun to grow plants from the seeds of the orange, grapefruit, or lemon just used in the kitchen. Avocado and mango seeds may be planted, too, making interesting tree experiments until they gradually succumb to the effects of an unnatural environment. They are intriguing, indeed, but there is little hope that they will ever flower or produce fruits. Dates may be grown if they haven’t been treated with heat to pasturize them. The tops of carrots, pineapples and beets fascinate children as they root and take on new growth. Many years ago, sweet potatoes were quite popular as a vine. If they are not “kiln-dried”, they will sprout, and, for a short time in the depths of winter, they will garland a window with fresh, green tendrils. For the most part, all of these should be considered short-term projects.

Care: Most amateur gardeners kill their plants with kindness and ignorance. They water too frequently, misestimate the plant’s light requirements, or the light that is available, and completely overlook the need for nourishment. And if the latter is not forgotten altogether it is remembered too frequently. Plants are apt to be overfed or starved! The happy medium is rare.

There are a few plants (Spathyphyllum, Sansevieria, Philodendron, Aglaonema) that will grow where light intensities are low. The first is one of the few that will flower under such conditions. Eventually, the others will lose vigor, have many foliage problems, and gradually decline. Even if they do not die, they will be so unattractive that they should be

discarded. Plants should be regarded as expendable as cut flowers. Flowering plants can brighten up a dark apartment but it should be accepted they will not thrive indefinitely nor continue to bloom profusely.

Next in importance, after light conditions, is proper watering. Plants will need varying amounts of moisture, but usually - in the average city apartment - they should be allowed to dry out a bit on top with some moisture remaining in the lower part of the pot. Then they should be watered thoroughly until the water flows out through the drainage holes. (Twice a week for a plastic pot about 4" in diameter is about average.) A plant with heavy leaves of fleshy character will need considerably less watering than a plant with large, thin leaves. No sun, heavy humidity, temperature - all affect the watering schedule. It is better to err on the side of dryness. If a plant has wilted badly, the pot should be plunged into a large amount of water and allowed to remain for several hours - or even overnight - to regain its full vigor. It then should be removed from the water and set aside away from draughts and direct sun. (This applies to coleus, cinerraria and hydrangeas.)

Plants that have wilted badly several times may be damaged permanently. Plants should be kept "in shape". If they get "leggy" or out of proportion, they should be pruned. Dead flowers, leaves or branches should be removed promptly.

Insects: A great deal of damage can be avoided by being alert and

observant when working with plants. Syringing and spraying foliage and stems with water can discourage insect invasion. (Red spider mites, aphids) If caught early, scale insects can be eliminated by washing foliage with a soft brush dipped into room-temperature water to which a few drops of dishwashing detergent has been added. Mealy bugs always are attracted to those plants which have many crevices, bracts or axils where they can hide. (Dieffenbachia, Aglaonema) However, the alert window gardener can rid his plants of these - before they are too numerous - by using a cotton swab dipped in alcohol. Avoid household sprays for ordinary house pests for often they are compounded with an oil base and can injure plants more than the insects. A plant insect spray should be used with caution. Stand the proper distance from the plant, for as the propellant reaches the air it expands rapidly and is quite low in temperature. If used too closely it gives the same effect as frost bite. If the plant is too heavily infested, the only solution is to discard it. Too many insects are impossible to control under home conditions with insecticides that truly can be termed safe. In this area, prevention is more desirable than cure.

* * * *

Gardening, in ancient Egypt and 18th century England - everywhere, in fact, from Biblical times to the present - has been a rewarding hobby, an honored profession and a source of national pride.

Man has grown plants for food, for medicine, for beauty. He has explored the four corners of the globe to find them. He even has worshipped them. Yet only recently have we started to think about, let alone understand, the relationship of man and plant; and more specifically about gardening and man's health.

One thing is certain, interest in plants has reached a new high. There is literally, a houseplant boom, with a proliferation of shops selling plants from all over the world. In the big cities, plant-sitters are now available to take over when owners are on vacation! There has been a serious debate about the benefits of talking to your plants.

In a speech (5) Patrick Horsbrough of the Department of Architecture of Notre Dame made the following comments: "It has been long recognized that, apart from the dependency on food, there exists an identifiable affinity between person and plant Many individuals possess some obvious facility which encourages plant growth, but such aptitudes remain seemingly ignored as a vital attribute to which certain vegetation responds. Further, you are aware of the beginnings of other scientific explorations respecting the reactions of individual plants to controlled lighting conditions, to the playing of different kinds of music and at varied volumes, to the use of vegetation for therapeutic treatment"

Hundreds of years ago, it was understood that somehow gardening helped people both mentally and physically. Today, the urge to get out in the

open, to work with one's hands, to grow things - is greater than ever. It is preventive medicine whether recommended by a doctor or self-prescribed.

Why does horticulture reduce tensions? Why does working with plant materials help the handicapped? Writing in *The Cornell Plantations* (1958), Audrey H. O'Connor put it this way: "First of all, it gives the patients an opportunity to work in a living medium, and to feel the stability of a return to the most basic and primitive of materials - the soil. Secondly, gardening offers an opportunity to create without putting great demands or a sense of competition upon the worker. As anyone who gardens knows, the sense of accomplishment does not depend upon the size of the task performed. Skill can be gained but it is not essential." (4)

For those in good health, gardening is a pleasure, a hobby, a career. For the disabled, gardening can mean new hope, literally a new life. Horticulture helps to heal!



Sources

Listed alphabetically and by number. Other sources have been credited fully within the text itself.

- | | |
|---|--|
| 1) <i>A Career in Horticultural Therapy</i>
Rhea McCandliss | Menninger Perspective
June - July 1972
Menninger Foundation
Topeka, Kansas 66610 |
| 2) <i>Gardening For The Disabled</i>
The Disabled Living Activities Group
Central Council for the Disabled - 1967 | 39 Victoria Street
London, S.W. 1
England |
| 3) <i>Gardening Offered As A Therapy</i>
Alice W. Burlingame | The Cornell Plantations, 1960
Ithaca, New York 14850 |
| 4) <i>Horticulture As A Curative</i>
Audrey H. O'Connor | The Cornell Plantations, 1958
Ithaca, New York 14850 |
| 5) Human Plant Proximities:
<i>A Psychological Imperative</i>
Patrick Horsbrough | Nursery News: Vol. 33 No. 4
Apr. 1972 Indiana Assoc. of
Nurserymen - Lafayette, Ind. |
| 6) Public Housing Gardens:
<i>Landscapes For The Soul</i>
Charles A. Lewis | U.S. Dep't. of Agriculture
Yearbook - 1972
Sup't. of Documents
Washington, D.C. 20402 |
| 7) <i>Therapy Through Horticulture</i>
Donald P. Watson &
Alice W. Burlingame | MacMillan & Co.
New York, 1960 |

List of Indoor Gardening and House Plant Books

Ballard	Garden In Your House	Harper & Row 1971
Eaton	Gardening Under Glass	The MacMillan Co. 1973
Faust	Book of House Plants	Quadrangle Books New York Times, 1973
Fitch	The Complete Book of House Plants	Hawthorn 1972
McDonald	World Book of House Plants	Popular Library 1963 (Paperback)
Nicolaisen	Pocket Encyclopedia of Plants in Color	The MacMillan Co. 1972

Publications of Related Interest

1972 Yearbook of Agriculture U.S. Department of Agriculture	Sup't. of Documents Washington, D.C. 20402
The Avant Gardener Vol. 2 No. 2 Vol. 4 No. 18 Vol. 4 No. 19	Horticultural Data Processors Box 489, N.Y. N.Y. 10028

HOWARD D. BROOKS has been the Horticultural Therapist at the Institute of Rehabilitation Medicine since he joined the staff in February, 1964. He has had wide horticultural experience including greenhouse, institutional, landscape, maintenance and research laboratory work. He is on the Board of Directors of the Horticultural Society of New York and is a fellow of the Royal Horticultural Society. He has lectured on the subject of Horticultural Therapy on many occasions, and the photographs in this monograph were taken from slides used to illustrate his talks.

CHARLES J. OPPENHEIM is a graduate of Cornell University (B.A. 1937). Botany and Horticulture have been his avocations since his school days. He holds a Certificate of Gardening from the New York Botanical Gardens. Retired, he is a full-time volunteer at the Institute of Rehabilitation Medicine.

