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About the Institute
The Hunt Institute for Botanical Documentation, a research division of Carnegie Mellon University, specializes in the history of botany and all aspects of plant science and serves the international scientific community through research and documentation. To this end, the Institute acquires and maintains authoritative collections of books, plant images, manuscripts, portraits and data files, and provides publications and other modes of information service. The Institute meets the reference needs of botanists, biologists, historians, conservationists, librarians, bibliographers and the public at large, especially those concerned with any aspect of the North American flora.

Hunt Institute was dedicated in 1961 as the Rachel McMasters Miller Hunt Botanical Library, an international center for bibliographical research and service in the interests of botany and horticulture, as well as a center for the study of all aspects of the history of the plant sciences. By 1971 the Library's activities had so diversified that the name was changed to Hunt Institute for Botanical Documentation. Growth in collections and research projects led to the establishment of four programmatic departments: Archives, Art, Bibliography and the Library.

Taximetrics Lab. November 21, 1969

Dr. R.A. Howard, Director
The Arnold Arboretum
The Arborway
Jamaica Plain, Mass. 02130

Dear Dick:

I am sorry, but I will not be able to attend the meeting of the PRC committee because of teaching committments.

My only comment with respect to the grant proposal for ten years continuation of the PRC is that I do not see enough details of planning and budgetting to determine how the work will be done.

But more important than consideration of the grant proposal, it would be tragic if the committee did not consider some cost-effectiveness comparisons between the system presently employed and some other systems in the country. Before AHS embarks upon a long-range endeavor, some disinterested consultant should be given a chance to compare various systems.

Sincerely,

David J. Rogers
Professor of Biology

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THE ARNOLD ARBORETUM of HARVARD UNIVERSITY
THE ARBORWAY · JAMAICA PLAIN · MASSACHUSETTS 02130 · U.S.A.

OFFICE OF THE DIRECTOR

Nov. 14, 1969

Members of the Plant Records Center Committee

Greetings:

Robert MacDonald has sent me a copy of a third draft of a grant proposal which I have read. I have just asked him to send copies to each of you. I request you read it over and send your comments to me as soon as possible. These will be collated and distributed.

I suggest then that we plan to meet in Washington on Friday December 5th. A meeting of the AHS Board is scheduled for that evening at 7:30 PM at the Old Colony Motor Lodge, which I am told is 3 minutes drive from the National Airport. Can we meet at the same Motel for lunch at 12 and a committee meeting at 1:30. I believe we can complete our discussions in the afternoon so any who need to could leave that evening. I would plan to present the results of our discussions, recommendations one way or another, to the Board before their meeting ends on Sunday.

Please note that the draft again alters the kind of equipment to be leased or bought. I hope those of you wiser than I am in computer processing will comment on the equipment and procedures. Note too that MacDonald has budgeted (p.32) for a major medical hospitalization policy plus a life insurance policy without cost to the employee. This is directly in opposition to the discussion and vote of this committee at Philadelphia and to the policy of the AHS.

Mrs. Glenn Eastburn has a block of rooms reserved for the AHS at the Old Colony. If any of you wish to arrive for the night on the 4th. Please let her know as you must if you plan to stay over on the 5th. or later.

Sincerely,

Richard A. Howard

Richard A. Howard
Director of the Arnold Arboretum

LIN/em

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THE AMERICAN HORTICULTURAL SOCIETY, INC.

PLANT RECORDS CENTER

GRANT PROPOSAL

THIRD DRAFT

7 November 1969

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PROPOSAL

Submitted to:	Longwood Foundation, Inc. Wilmington, Delaware
Objective:	Expanded development to the functional level of The American Horticultural Society, Inc. Plant Records Center
Proposed starting date:	1 April 1970
Proposed duration:	Ten years
Amount requested:	$1,835,600
Grant to be made to:	The American Horticultural Society, Inc. 2401 Calvert Street, N. W. Washington, D. C. 20008

Respectfully submitted,

Fred C. Galle
President
The American Horticultural Society, Inc.

David G. Leach
First Vice President
Chairman, Fund Development Committee
The American Horticultural Society, Inc.

Date submitted:	1 December 1969
Prepared by:	Robert D. MacDonald Director A.H.S. Plant Records Center

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PLANT RECORDS CENTER PROPOSAL

This proposal is a request for fiscal support for a ten-year period to record and bring together in a central location, through the use of electronic data processing methods and techniques, horticultural information concerning the living plant collections of all important research and study collections contained in arboreta, botanical gardens and similar institutions in North America. The feasibility and usefulness of this project has been demonstrated through the work done to date with the support of a two-year Longwood Foundation grant.

The more than 125 major arboreta, botanical gardens, and similar institutions in North America contain collections which average some 3,800 taxa. It is anyone's guess as to how many accession records which contain useful information about these taxa are extant -- on the basis of observations made by PRC staff, it would appear to approximate 1,000,000. The value of these records and the data they contain is inestimable.

It is doubtful if more than a half-dozen institutions in North America presently have the economic resources to enable them to convert their accession record files to the PRC system. A number of gardens have indicated their desire to undertake the necessary file conversion, but are unable to justify the expenditures of funds because of budget and income considerations.

It is therefore proposed that the PRC undertake to:

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1. Record existing record files, which meet minimum criteria for significance of data, maintained by North American arboreta, botanical gardens, and similar instituions and organizations; and to record this information without cost to the institution provided that the institution or organization:

A. is either government, university, or college supported and/or is a tax-exempt or non-profit organization established for either educational, research, scientific, or charitable purposes.

B. agrees that such recording of information by the PRC be confined to records presently on file.

C. agrees to commit themselves to supply future accession data and changes to the PRC.

D. requested PRC materials and services will be paid for according to appropriate cost schedules.

2. Record the information, kept by certain private and commercial organizations and institutions, as to sources of plants to the extent deemed feasible by the PRC, but with the processing of this information for these organizations or institutions to be at their expense.

3. In cooperation with national and international plant registration authorities, maintain and produce registration and check lists of important plant genera.

4. Set up a schedule of services and related costs in order to proceed as rapidly as possible towards operating the PRC on a self-sustaining basis.

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PROJECTED YEARLY FUNDING SCHEDULE

	1	2	3	4	5*	6	7	8	9	10
1. Salaries	43,820	69,600	73,200	76,800	80,400	84,000	87,600	91,200	94,800	98,400
2. Travel and Consultation	8,000	12,000	12,000	12,000	8,000					
3. Printing, Copying, etc.	5,500	6,000	7,700	7,000	6,000					
4. General Operation	8,500	9,000	11,000	11,000	11,000					
5. E.D.P. Services	28,760	45,000	62,400	62,400	50,000	103,170				
6. Social Security, etc.	6,500	7,710	7,850	8,200	8,500					
Sub-total --	101,080	149,310	174,150	177,400	163,900					
7. A.H.S. Overhead	12,130	17,920	20,900	21,290	19,670					
First Year Sub-total --	113,210	162,230	195,050	198,690	183,570	187,170	190,770	194,370	197,970	201,570
						Yearly Totals				
One Time Costs:										
Microfilm Equipment	6,000									
Office Equipment	5,000									
First Year Total --	124,210**									

Grant Total -- $1,835,600

* The amount required for fiscal year operations will be reviewed, on the basis of operating costs and income, during the fifth fiscal year.

** Figures reflect less than full operation cost, based on equipment delivery schedule and office facility availability.

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APPENDIX A

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PROJECT CONCEPT

Horticulture in North America, and, indeed, throughout the world, suffers from an inadequate source and flow of information. The Plant Records Center is envisioned to improve this communication. North America contains a significant number of the world's outstanding horticultural institutions; but, unfortunately, at present, information regarding the composition and performance of the resources contained in these institutions is at best fragmented or outdated. If a botanic garden or arboretum were to make available listings of plants in its collection by historical methods (and fewer than a half-dozen out of more than 125 have done this), the publication would be hopelessly out of date by the time it reached its audience. Using present methods, the preparation of summaries of pertinent horticulture information is beyond the economic capability of most horticultural institutions.

The value of the information regarding living plant collections maintained by horticultural institutions is inestimable. The ready availability of this information would be a great boon to horticulture, and other plant sciences, the world over. The basic knowledge of just where to locate quickly specified plants for a variety of research, breeding, propagation, or information purposes is vastly important. If this knowledge, such as general plant performance, summer or winter hardiness, flowering as related to environmental conditions, resistance to insects, disease, fire, or air pollution, and many other valuable details, were readily accessible, it would increase significantly the progress of national and international horticulture. This is particularly

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important when it pertains to the search for plants to fill specific needs predicated by our changing society and its environment.

The PRC offers an opportunity to assist and coordinate the plant record keeping activities of all the botanical gardens, arboreta, and similar horticultural institutions of North America, thereby making a wealth of horticultural information easily available to the scientific, professional, and amateur communities who seek information about and materials from plants.

The PRC proposes to act as a clearinghouse for horticultural information regarding the living plant resources maintained by North American horticultural institutions, while at the same time aiding these institutions to keep detailed records for their own research and management purposes.

The PRC utilizes electronic data processing methods and equipment -- a modern, logical way to handle, economically and efficiently, large volumes of horticultural information so that it may be accurately arranged, sorted, and made available for use.

This project is focused on arboreta and botanical gardens primarily and collectively since they perpetuate the preponderance of the world's ornamental horticultural resources and the data pertaining to these resources. The involvement and participation of all botanical gardens and arboreta in Canada, Mexico, and the United States is anticipated.

During the first five-year period of operation, emphasis of the project will be directed toward:

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1. The securing of cooperation from botanic gardens and similar institutions or organizations.
2. The recording of their accession files and related materials.
3. The training of their personnel in the use of the PRC record-keeping system and its utilization in the future.

Work carried out during the second five-year period will be focused on:

1. The development of specific research data banks and programs for the extraction of specific information pertaining to plant hardiness, air pollution resistance, phenology, etc.
2. Continued recording of information obtained from garden accession files.
3. Production of registration and check lists of horticulturally important plant genera.
4. Preparation and production of source directories for rare or special horticultural plants.

The Plant Records Center is located at the John J. Tyler Arboretum, Lima, Pennsylvania. The Tyler Arboretum furnishes office facilities without charge and has made available one-half of the Arboretum Director's time to direct the PRC. The Tyler Arboretum Board has agreed to continue this relationship if this grant proposal is accepted.

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INTRODUCTION

The arboreta and botanical gardens of the world contain collections of plants of almost every sort. The average number of taxa for botanical gardens is around 3,800, while the total number of taxa in any one garden may range from 60 to 25,000. Botanic gardens may be as small as ¼-acre or as large as 44 square miles -- they may have been in existence for over 200 years or as short a period as one year. At present, we can only assume that specimens of many cultivated plants, as well as a great number of wild taxa, might be found in some botanic garden or arboretum.

The importance of these collections was pointed out by a resolution passed during the final plenary session of the Tenth International Botanical Congress (1964) which stated:

> "The Tenth Botanical Congress, recognizing the increasing role of Botanic Gardens and Arboreta in supplying materials and information for research in all botanical disciplines, recommends the expansion of such activities and the development of documented collections of authenticated taxa in Botanic Gardens throughout the world."

Arboreta and botanic gardens are not restricted to aiding research in the botanical disciplines alone. Medical research workers, in particular, draw heavily on the resources of gardens for information and plant materials.

The combined factors of expanding human population pressures (with the resultant loss of irreplaceable plant populations) and the increasing use being made of plant materials for research in all fields, makes it very evident

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that the major function of arboreta and botanical gardens is (and will continue to be) to provide protected pools of genetic materials.

There are vast amounts of data on file concerning the living plant collections in arboreta and botanical gardens. These files of data are kept in individual and ponderous systems, few of which are alike. The only apparent logical method for handling the information contained in these files is through the use of electronic data processing methods and equipment.

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DATA PROCESSING AND THE NATURAL SCIENCES

There are over 40 current projects in biological systematics and related areas in the natural sciences which deal with the problems of information retrieval through the use of some form of automatic or electronic data processing. Most of these projects deal with investigations of a taxonomic nature or are involved with indexing and/or inventory of herbaria, museums, or biological literature. Several floristic studies utilizing data processing techniques have been initiated.

Major results have been produced by the Biological Records Centre (England) in the publication of the Atlas of the British Flora (1962, 432 pp.) and the Hunt Botanical Library with the publication of Botanico-Periodicum-Huntianum (1968, 1063 pp.), a bibliographic account of the world's important botanical periodicals and serials (1666-1966). Sidney Gould has made contributions with his volumes Family Names of the Plant Kingdom (1962, 111 pp.) and Authors of Plant Genera (1965, 336 pp.).

Several international, national, and local data centers of various types have been proposed or are in operation. The Biological Records Centre, mentioned above, has as its objective the production of maps showing the distribution of individual plant and animal taxa of the British Isles. The World Plant Germ Plasm Records System, being developed at Washington State University under the auspices of the Food and Agricultural Organization of the United Nations, has as its primary purpose the establishment of an international agronomical crop data center. The system is in operation for the genera Triticum

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THE A.H.S. PLANT RECORDS CENTER

The American Horticultural Society Plant Records Center (PRC) is a unique project. It has as a goal:

1. The development of a central data bank containing information about living plant collections growing in arboreta, botanic gardens and similar institutions.
2. The providing of a means to manipulate, analyze, and evaluate statistical data about these collections.
3. The dessemination of information to the scientific, professional, and amateur communities which draw on the botanical disciplines for information and materials.

The PRC had its beginning in research carried out at the University of Tennessee Arboretum. In August, 1966, a Plant Records Center Pilot Project was begun in Tennessee under the auspices of the International Association of Botanical Gardens and Arboreta through contributions from member institutions. With the receipt of a Longwood Foundation grant by the American Horticultural Society for its establishment, the PRC became an operating reality as a project of this society in July, 1968.

The Longwood Foundation grant made in April, 1968 was to cover a two year period of operation beginning April 1, 1968. The objectives to be carried out under the provisions of this grant included:

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1. The development of the organization and methods to be employed in establishing and continuing the PRC on an operational basis.
2. The documentation of the horticultural records at Longwood Gardens to test the methods and procedures developed for the processing of this and similar information.

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PLANT RECORDS CENTER PROGRESS

Progress on the objectives to be carried out during the two year grant period is well ahead of schedule. The basic plant accession records of the living plant collection at Longwood Gardens have been recorded. A master computer program for the manipulation of this information has been developed. This program will generate all or any combination of 18 different reports which may be desired as research or management aids by the institution whose data are listed or by other institutions or individuals. Various supporting programs have been developed for data verification and file maintenance. Peripheral programs for the extraction of specific research data are now being developed.

A standard accession card has been developed and made available for use by arboreta and botanic gardens. An accession manual indicating how the accession card is to be used is also available.

More than ten institutions have begun using the PRC standard accession card for their collections. Included are the Missouri Botanical Garden, Scott Horticultural Foundation (Swarthmore College), Dawes Arboretum, and the Chicago Botanic Garden. It is anticipated that the U.S.D.A. North Central Regional Plant Introduction Station will be cooperating with the PRC in furnishing woody plant trials data.

The Plant Records Center is now an established, functioning reality.

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APPENDIX B

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OUTLINE OF PROJECTED BASE COSTS

1. SALARIES (see Yearly Salary Schedule

* Director	$ 8,500	
Assistant Director	11,000	
Administrative Assistant	7,000	
Technical Assistant	6,500	
* Secretary	4,000	
Clerk-Equipment Operator	5,800	
Clerk-Equipment Operator	5,800	
Clerk-Equipment Operator	5,800	
Data Translator	5,800	
Data Translator	5,800	
		$ 66,000

* position shared with The Tyler Arboretum

2. TRAVEL AND CONSULTATION

Vehicle Rental 1 headquarters vehicle 1 field vehicle	3,500	
Vehicle Maintenance, gas, etc.	3,000	
Travel connected with recording of garden records, professional meetings, etc. per diem base of $25/day for ordinary travel within the continental U. S.	5,500	
		12,000

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3. PRINTING, COPYING AND FORMS

Copier Rental and Supplies	$ 1,200	
Printing of PRC forms, manuals, and associated materials	1,500	
Assembly and distribution of PRC publications	5,000	
		$ 7,700

4. GENERAL OPERATION

Leasing of office space	4,800	
Telephone	1,000	
Maintenance contracts and repair of equipment	500	
Insurance for equipment, etc.	500	
Fuel and electricity	1,200	
Janitorial services	1,500	
Miscellaneous supplies and services (postage, freight, paper, envelopes, office supplies, etc.)	1,500	
		11,000

5. E.D.P. SERVICES

Programming and systems analysis	12,000	
Computer utilization	36,000	
Keypunch rental	4,000	
Accounting machine rental-IBM 407 (includes maintenance)	4,800	
Card sorter rental (includes maintenance)	660	
Leasing of various peripheral equipment such as type composers for the production of upper and lower case copy for publication purposes, etc.	5,000	
		62,460

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6. SOCIAL SECURITY, ETC.

Social security	$ 3,500	
Hospitalization and life insurance	4,500	
		$ 8,000
		$167,160

7. A.H.S. OVERHEAD

12% of Projected yearly funding	20,060	
		$187,220

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PLANT RECORDS CENTER

Projected Yearly Salary Schedule

	1	2	3	4	5	6	7	8	9	10
Director (Shared Position)	8,500	9,000	9,500	10,000	10,500	11,000	11,500	12,000	12,500	13,000
Assistant Director	11,000	11,500	12,000	12,500	13,000	13,500	14,000	14,500	15,000	15,500
Administrative Assistant	7,000	7,400	7,800	8,200	8,600	9,000	9,400	9,800	10,200	10,600
Technical Assistant	6,500	6,900	7,300	7,700	8,100	8,500	8,900	9,300	9,700	10,100
Secretary (Shared Position)	4,000	4,300	4,600	4,900	5,200	5,500	5,800	6,100	6,400	6,700
Data Processing Clerks, Keypunch Operators, Data Translators, Machine Operators	(5,800)	(6,100)	(6,400)	(6,700)	(7,000)	(7,300)	(7,600)	(7,900)	(8,200)	(8,500)
(Total-Five)	29,000	30,500	32,000	33,500	35,000	36,500	38,000	39,500	41,000	42,500
Full Staff - 10 Years	66,000	69,600	73,200	76,800	80,400	84,000	87,600	91,200	94,800	98,400

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PRC PERSONNEL STRUCTURE

Staff Responsibilities

Director — Direction of entire PRC operation
(a position shared on an equal basis with The Tyler Arboretum)

Assistant Director

- Will be responsible for the on-site microfilming of present records at arboreta and botanic gardens. He will carry out the microfilming of these records himself, traveling as required to cooperating institutions.

- While engaged in microfilming records, he will note and list file and/or record items which might be questioned during the keypunching phase of operation.

- While working at the cooperating institution, he will instruct the appropriate staff in the utilization of the PRC standard accession card and associated material.

- Will supervise the technical assistant, as necessary, in the interpretation of information contained in the records of cooperating institutions.

- Will develop and expand the research applications of data obtained by the PRC.

Administrative Assistant

- Will be responsible for office management and bookkeeping.

- Will be responsible for personnel relations and personnel files.

- Will be responsible for the editing of all material prepared by the PRC, including:

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- card-image printouts of keypunched records.

- computer prepared data listings.

- registration and/or check lists

- data prepared for publication

- Will be responsible for the processing of requests for information and/or data listings and preparation of appropriate billing for PRC materials and services.

- Will be responsible for maintaining a continuing flow of communication (new data, changes, corrections, etc.) to and from cooperating institutions.

Technical Assistant

- Will be responsible for the immediate supervision and activities of the clerical and keypunch staff, data translators, etc.

- Will act as liaison with the service bureau and other data processing agencies utilized.

- Will be responsible for the maintenance of the data files and related materials.

Clerical Staff

- The basic function of these staff will be to convert the information made available to the PRC into a form which may be processed by automatic data processing methods and equipment.

Secretary

- Will perform usual secretarial responsibilities. A position shared with The Tyler Arboretum.

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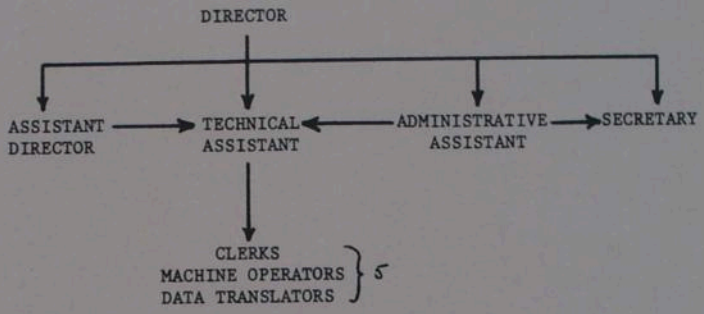
PRC PERSONNEL STRUCTURE DIAGRAM



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ACQUISITION OF INFORMATION

The acquisition of information by the PRC from arboreta and botanic gardens will be accomplished by two general methods. The first method is concerned with information presently on file which is not recorded in the standard format used by the PRC (the PRC Standard Accession Card). The second method is used when the information is recorded in the standard PRC format.

METHOD 1:

Present information maintained by cooperating gardens which is not in the PRC standard format will be microfilmed at the garden. Two portable microfilm units (each about the size of a typewriter case) will be used. One microfilm unit will be used for loose accession cards, sheets, etc. This unit is very efficient and will film various sized documents as rapidly as they are placed in the unit's feed mechanism. The second microfilm unit will be used for the filming of bound documents, such as accession books.

After the microfilming of the documents of a particular garden, the film will be processed and returned to PRC headquarters. There, keypunch operators will keypunch the appropriate data from the microfilmed records with the aid of a microfilm reader mounted close to the keypunch.

The product of this operation is a set of four punch-cards containing the desired information.

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METHOD 2:

This (or a similar*) method is the one which will be utilized on a continuing, long-term basis and assumes the receipt of the PRC portion of the PRC Standard Accession Card (carbon copy) from the cooperating institution. Since the data are in the standard format, all that is necessary to be done by the PRC upon receipt is editing to insure that all specifications and conditions for the entry of data have been met, plus the entry of appropriate Phase II Director and other codes.

The PRC Standard Accession Card is then given to a keypunch operator.

The product of this operation is a set of four punch-cards containing the desired information.

PROCESSING OF INFORMATION

The processing of accession once the four-card set has been punched is outlined below:

1. Because of greater efficiencies involved, the four cards containing the desired data have been punched separately. This results in all the Card 1's being together, Card 2's together, etc. Consequently, the first step after punching the cards is

---

* Keytape may be substituted for keypunch when this is shown to be more efficient and economic for this operation.

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to process them through a card sorter so that the appropriate cards for each record are together in proper order.

2. After the cards have been sorted, they are placed on an IBM 407 accounting machine for the printing of card-image listings. These listings are then edited using the original information made available to the PRC. Errors found are noted on the listing. This listing is then given back to a keypunch operator who then prepares corrected cards from it.

3. The decks of punch-cards which have been corrected are then processed by a computer and the information transferred to magnetic tape. Once the transfer has been accomplished, the punch-cards are discarded. The data are stored permanently on the magnetic tape reels. Several duplicate reels are prepared to guard against loss of data.

4. At the point when data are requested, the magnetic tape files are used for computer processing.

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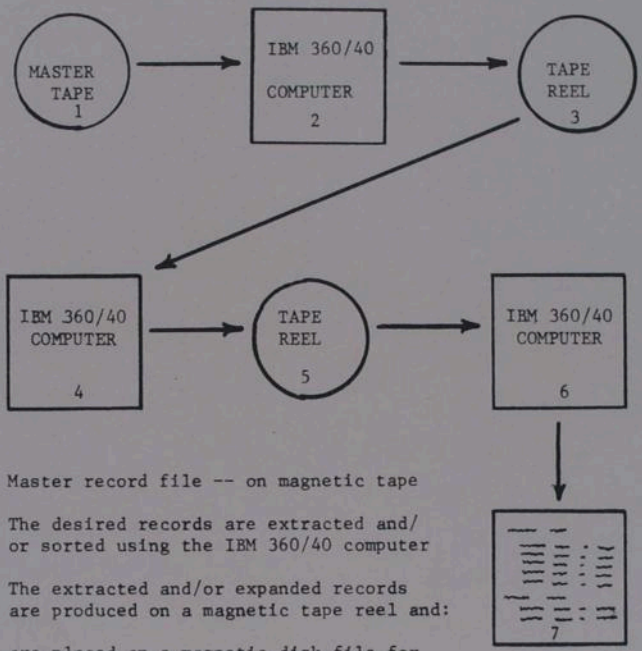
COMPUTER PROCESSING

The diagram below shows the steps taken when the MASTER program is used to prepare data listings.



1. Master record file -- on magnetic tape
2. The desired records are extracted and/or sorted using the IBM 360/40 computer
3. The extracted and/or expanded records are produced on a magnetic tape reel and:
4. are placed on a magnetic disk file for sorting by desired criteria.
5. The sorted, extracted records are placed on a magnetic tape reel for input to:
6. the IBM 360/40 printer which then produces:
7. the desired reports, listings, etc.

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FILE MAINTENANCE

A system for updating or correcting the information contained in the magnetic tape file has been developed. Cooperating institutions may utilize the PRC Plant Record Change Sheet to change data.

After editing for proper format, this sheet is given to a Keypunch operator for keypunching of appropriate data. Batches of these punch-cards are then processed by a computer for updating of the file. Based on experience to date, the computer processing of file updates costs the PRC $0.047 per record change. Additional costs are dependent on the nature of the change or update and the amount of data involved.

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A.H.S. PLANT RECORDS CENTER

Plant Record Change Sheet

Garden _____ Date _____

Addition	Change	Deletion	Accession No.	F	New or Correct Information (if applicable, old data are given also)

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SERVICES TO COOPERATORS

It is proposed that institutions which supply information to the PRC on a continuing basis be provided certain listings (No. 1 or No. 2, and No. 3) of this information without charge. This proposal would supercede in part the Schedule of User Services and Costs (next page).

Cooperating institutions will have the option of obtaining computer printed PRC Standard Accession Cards prepared from the current data recorded by the PRC. This will enable institutions not presently utilizing a 5" x 8" - card system to easily merge their current files with the new PRC system for purposes of uniformity.

Cooperating institutions, on their request, may be furnished (at a cost) punch-cards or tape files of their data.

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THE AMERICAN HORTICULTURAL SOCIETY

PLANT RECORDS CENTER

Schedule of User Services and Costs

The following schedule is set up for those botanic gardens, arboreta, and similar institutions which utilize the services of the PRC on a continuing basis.

PRC Accession Manual	$ 35.00 each (one time cost)
PRC Standard Accession Cards	$ 5.00 per 100 (4,000 or less cards/order)
	$ 4.00 per 100 (4,500 or more cards/order)
Initial Processing of Accession Records*	$100.00 per 100 to $80.00 per 100, depending on quantity processed

* This includes:

- Editing by PRC staff and insertion of Phase II Director codes.
- Keypunching of data.
- Preparation of computer-generated card image listings for editing purposes by PRC staff and/or garden involved.
- Error correction.
- Preparation of two data listings for the garden involved:

  Listing 1. Plant listing by family name with totals of accessions and taxa.

  OR Listing 2. Plant listing by plant name with totals of accessions and taxa.

  AND Listing 3. Plant listing by accession number with totals of accessions by year received.

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APPENDIX C

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FIRST YEAR SALARY BREAKDOWN

Director	100%	$ 8,500
Assistant Director	75%	8,250
Administrative Assistant	100%	7,000
Technical Assistant	100%	6,500
Secretary	100%	4,000
Clerks, etc.	33%	9,570
Total - First Year		$43,820

TRAVEL EXPENSES

Reimbursement for travel expenses is in line with House Bill HR 337 as amended by the Senate for government employees traveling on official business. The amounts are: $25 per diem, $40 per day for actual expenses, and $18 over the established per diem rate for foreign travel. (Reference AIBS Newsletter Vol. 3, No. 10, October, 1969.)

COMPUTER UTILIZATION COSTS

Budget figures for computer utilization are scaled somewhat low on the basis of full operation. However, these figures are projected to cover in-house operation only -- requested computer services to be paid for by those requesting such services. The amount projected for the leasing of peripheral equipment, etc. is intended to act as a contingency account to cover leasing costs of additional or modified equipment or costs of short term use or utilization of equipment located at service bureaus or other data processing agencies or concerns.

HOSPITALIZATION AND LIFE INSURANCE

The budget item for hospitalization and life insurance is to cover the cost of premiums for employee insurance. Each employee would be provided, without cost to the employee, a major medical hospitalization policy, plus a life insurance policy ($10,000 for professional staff, $4,000 for other staff).

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OFFICE EQUIPMENT REQUIRED

Office equipment required for expanded operation includes:

File cabinets

Office desks and work tables

Office chairs

Typewriter

Desk Calculator

Tab-card file cases

Desk and floor lamps

Dictating equipment

Waste baskets

Storage shelves

Air conditioning equipment

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IBM 407 ACCOUNTING MACHINE

The IBM 407 Accounting Machine prepares printed reports from IBM cards. The machine prints information from 120 printwheels, which form a solid bank 12 inches wide. Each printwheel has 47 different characters; namely, all the letters of the alphabet, all the numbers, and 11 special characters.

The 407 can print 18,000 characters a minute. IBM cards are read at the rate of 150 per minute. The same rate of speed is maintained for detail printing and group printing.

As a punched card is being read, it remains stationary at one of two stations and can be re-read as often as desired, which permits multiple line printing from a single card.

Amounts can be added or subtracted in 112 counter positions, which are arranged in 20 groups of 3, 4, 6 and 8 positions each. Numeric or alphabetic information may be stored in four storage units ready for use.

Various forms can be positioned in the machine automatically by the use of the carriage, which is set up for operation by inserting a prepunched tape in the tape control mechanism.

The IBM 407 will be used by the PRC primarily for the printing of listings used in the editing of data. However, with the use of the IBM 082 Card Sorter (see following page), punch cards may be sorted and various listings obtained from them for a number of purposes. (See figure next page.)

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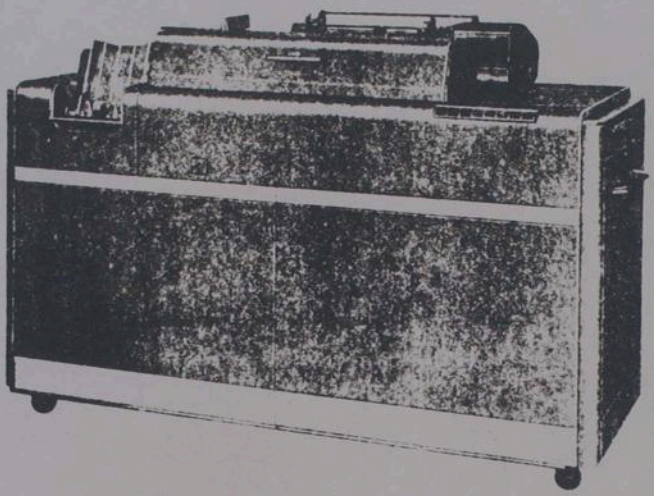

IBM 407 Accounting Machine

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IBM 082 CARD SORTER

Manual sorting of punched cards into sets or by numerical or alphabetical sequence is a time-consuming and tedious operation. The use of the high-speed IBM sorter eliminates delay and errors. The IBM Card Sorter operates at a rated speed of 650 cards per minute. (See figure next page.)

IBM 1050 SYSTEM

Because of various reasons, the IBM 1050 system is no longer being considered. The primary reason is slowness of operation. This system prints at the rate of about 8 lines per minute versus 50 lines per minute for the IBM 407. The 1052 Printer reads and prints one character at a time. The IBM 407 reads and prints an entire card (line) at a time.

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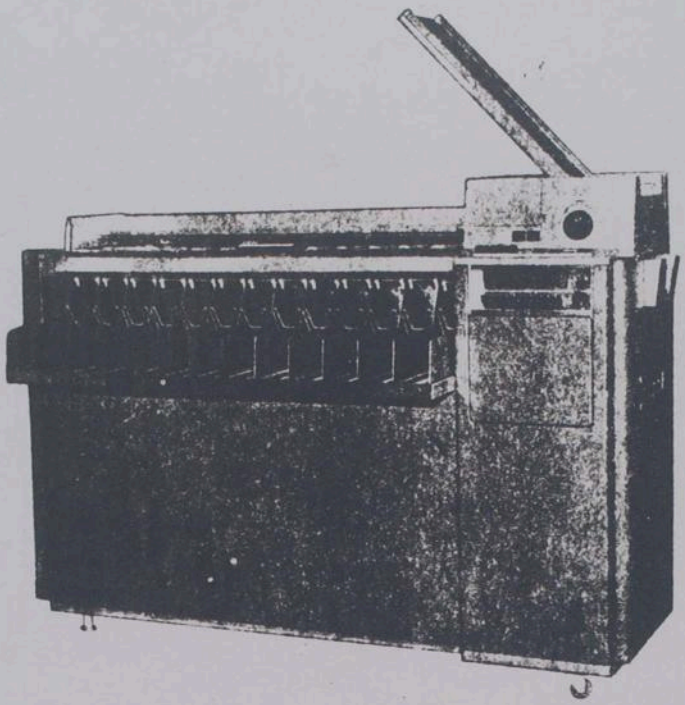

Figure 2. IBM 84 Sorter

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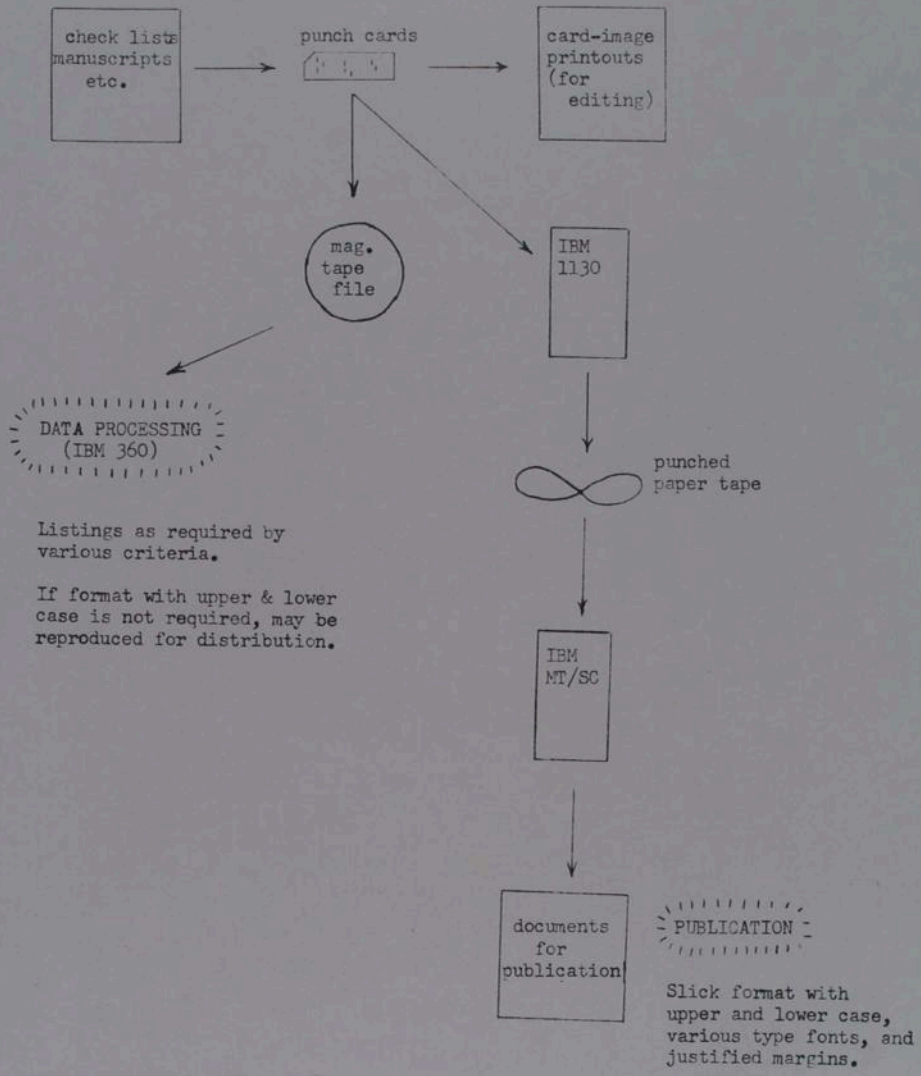
FLOW CHART -- REGISTRATION AND CHECK LIST DATA



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ARBORETUM AND BOTANIC GARDEN RECORD FILE STATISTICS

		Total Record Images *
One master accession card (data on front only)	72% **	154,800
One master accession card (data on front & back)	20%	86,000
Two master accession cards (data on front only)	4%	17,200
Two master accession cards (data on front & back)	2%	17,200
Master accession cards not acceptable	2%	
Gardens having 1 major sub-file	48%	55,728
Gardens having 2 major sub-files	4%	9,288
Gardens having 3 major sub-files	2%	6,966
		347,182

* Based on 91 gardens listing a total of 215,000 taxa

** Based on 50 gardens

Using an expansion factor of 3 to estimate total records from total taxa, a total of 1,041,546 record images is obtained.

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YEARLY RECORD RATES

42,000 records per year

per keypunch operator from prepared green sheets ** or PRC accession cards

75 cards/hour = 25 records/hour
7 hours/day = 175 records/day
5 days/week = 875 records/week
48 weeks/year* = 42,000 records/year

* makes provision for two weeks annual leave, holidays, and possible sick leave

** green sheet preparation rates approximate 10,000 records/year/clerk

67,200 records per year

if the card rate/hour goes up to 100

For keypunching from raw, unformatted records, production rates/operator may vary from 10,000 to 30,000 records per year depending on the complexity, arrangement, and legibility of information AND the number of sub-files to be integrated with each master accession record.

Operator years needed for file conversion of 1,000,000 records (counting sub-files):

Records/year	Operator years
67,200	14.8
42,000	23.8
30,000	33.4
23,000	43.4
20,000	50.0
10,000	100.0

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COST OF ACCESSION RECORD PROCESSING BY PRC

Number of Records	Cost per Record	Total Cost
500	$0.5563	$ 278.15
1,000	0.4963	496.30
1,500	0.4763	714.45
2,000	0.4663	932.60
5,000	0.4499	2,249.50
10,000	0.4423	4,423.00

Above cost includes:

1.	Editing by PRC Clerk for:	a. format correctness b. insertion of Phase I codes, if necessary c. insertion of Phase II Director codes		$0.0380
2.	Keypunching of: (includes card costs)	a. Phase I b. Phase II Director Codes		0.2246
3.	Card to tape and file update			0.0150
4.	Generation of alphabetic card image listing**			
5.	Editing of card image listing against original records			0.0714
6.	Keypunching of corrections		0.0200	
7.	File correction (update) - $65.00 per 1,500 records		0.0433	0.0633
		subtotal		$0.4123

8. Preparation of listings Number 1 or 2 and 3

No. Records	Cost per Record	No. Records	Cost per Record
500	$0.114	2,000	$0.054
1,000	0.084	5,000	0.0376
1,500	0.064	10,000	0.030

**On a straight generation of an alphabetic card-image listing based on 10,000 records, it will take 3/4 of an hour at $125 per hour--a total of $93.75 or $0.009375 per record.

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ESTIMATED PRC COMPUTER COST FOR PRODUCING LISTINGS

Listing No.(s)	Number of Records 500	1,000	1,500	2,000	5,000	10,000
1	$ 38.40	$ 44.29	$ 49.92	$ 56.32	$ 96.00	$160.00
2	38.40	44.29	49.92	56.32	96.00	160.00
3	38.40	44.29	49.92	56.32	96.00	160.00
5	36.58	42.19	47.90	53.54	87.36	143.72
6	41.36	47.73	54.08	60.45	98.63	162.26
7	21.00	22.00	23.00	24.00	30.00	40.00
8	21.00	22.00	23.00	24.00	30.00	40.00
10	34.22	40.32	46.70	52.86	90.16	152.32
11	34.22	40.32	46.70	52.86	90.16	152.32
14	42.00	44.00	46.00	48.00	60.00	80.00
15	42.00	44.00	46.00	48.00	60.00	80.00
17	135.91	156.81	177.74	198.63	219.54	533.14
1-3-5	51.00		89.00		222.00	412.00
2-8	39.40		54.20		106.00	180.00
2-8-14-5	47.60		78.60		188.00	344.00
2-10-14-8-5	53.20		95.60		244.00	456.00
1-3	44.80		70.40		160.00	288.00
2-3	44.80		70.40		160.00	288.00
1-2-3	51.20		89.60		224.00	416.00
2-8-10-5	51.20		89.60		224.00	416.00

12 Sept. 1969

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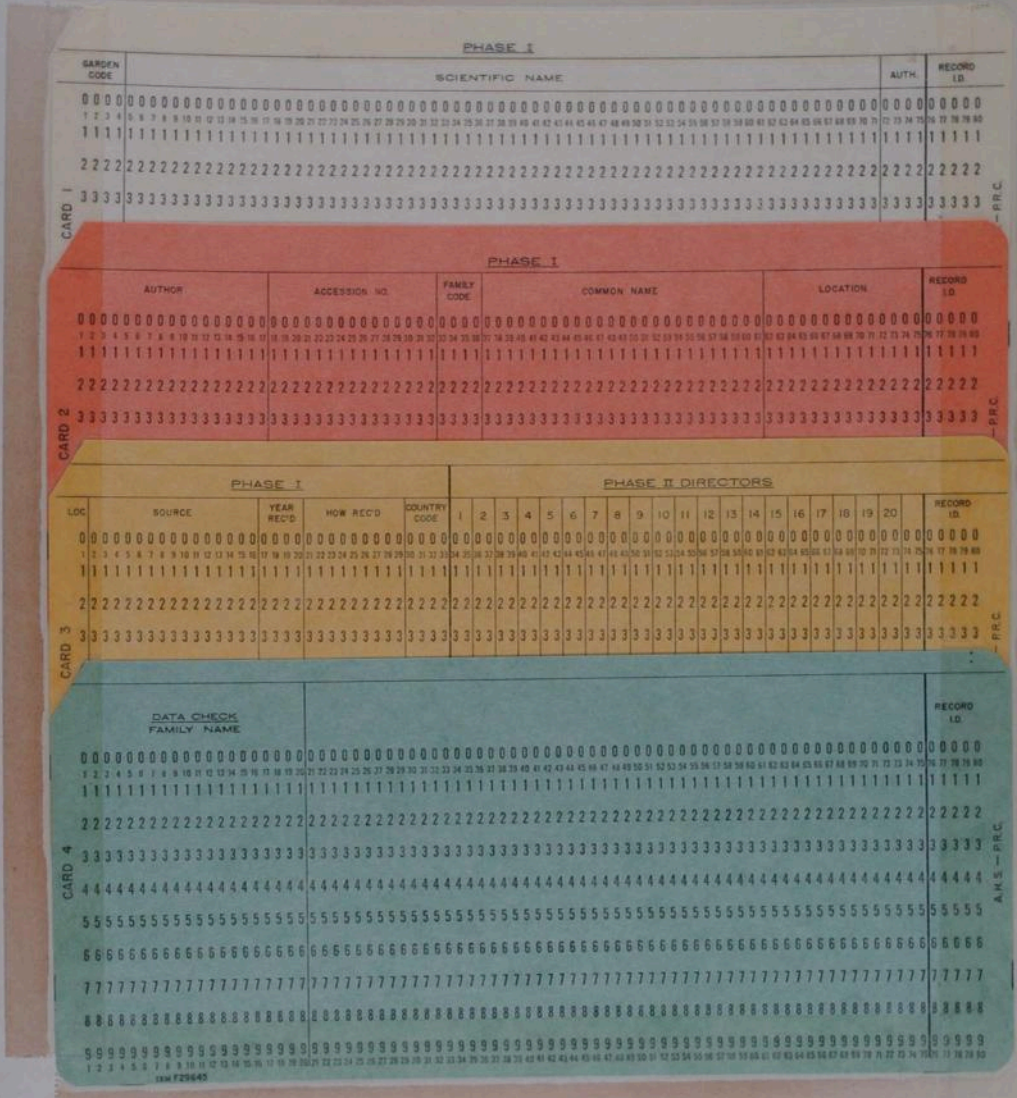

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THE ARNOLD ARBORETUM of HARVARD UNIVERSITY
THE ARBORWAY · JAMAICA PLAIN · MASSACHUSETTS 02130 · U.S.A.

OFFICE OF THE DIRECTOR

November 24, 1969

Dr. David J. Rogers
Taximetrics Lab.
University of Colorado
Boulder, Colorado 80302

Dear Dave:

Many thanks for your letter and comments on the "3rd draft." Gil Daniels read it over with similar comments and others on the overabundance of antiquated equipment and ideas. Sorry you can't be at the meeting but I'll let you know the results.

Sincerely,

Dick

Richard A. Howard
Director

RAH:vb

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THE ARNOLD ARBORETUM of HARVARD UNIVERSITY
THE ARBORWAY · JAMAICA PLAIN · MASSACHUSETTS 02130 · U.S.A.

OFFICE OF THE DIRECTOR

September 12, 1969

Members of the Plant Records Center Committee:

We have not approved a budget for the operation of the PRC during the fiscal year of the grant---April 1, 1969 to March 31, 1970. This must be done at a meeting of the Committee members during the AABGA or AHS meeting in Wilmington or Philadelphia and reported to the AHS executive committee and board.

The attached sheet is a financial statement of the PRC as of July 31, 1969. Several comments are in order.

The proposed budget, in item as submitted by Robert MacDonald, is given in the second column indicating a proposed expenditure in the several categories amounting to $57,120.66. This is equalled by the proposed income of $19,120.66, or unexpended funds from the first half of the Longwood Foundation grant and $38,000 being the second and final payment of the grant received on May 20, 1969.

The first column represents the disbursements for the four month period of this fiscal year of the grant---April 1 to July 31, 1969. The rate of expenditure, therefore, is slightly in excess of the amount available for the remaining eight months of the grant. It is to be noted that No. 9 computer services during a four month period nearly equals the budgeted amount for the full year. Expenses run at approximately $5,000 monthly. Note also some "income" as receipts from the Dawes Arboretum and Mt. Cuba Botanical Park is not reported as income but is used to reduce recorded expenses.

I can only recommend that this committee request that expenditures be reduced. The Memorandum of Understanding for the employment of Robert MacDonald is for a period ending July 14, 1970. This is a period of 3 1/2 months beyond the proposed budget year. The rock bottom in committed expenditures for personnel, vehicles, office equipment, social security, etc., not including overhead, is approximately $2,900 a month. We must assume that a sum of $9,100 will be available to finance the PRC beyond the March 31 budget year or until July 14, 1970 for minimum operation. Mrs. Eastburn assures me that the overhead paid the AHS "covers" but not in an excessive manner, the actual cost of handling the business affairs of the PRC. We cannot assume that the AHS will carry this operation, anticipating future grants. We must have this contingency fund within the PRC or complete a new grant proposal so swiftly that we can have financing for it before the end of March 1970.

Richard A. Howard

Richard A. Howard
Chairman

September 12, 1969
RAH/mp

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THE AMERICAN HORTICULTURAL SOCIETY, INC. 2401 CALVERT STREET, N.W. • WASHINGTON, D.C. 20008 • 202-387-3100

AMERICAN HORTICULTURAL SOCIETY-Plant Records Center

Financial Report as of July 31, 1969
Four Months - April 1, 1969 to July 31, 1969

Four Months April 1 to July 31	Disbursements	12 Month Budget	Budget Balance
Salaries			
Director (half time)	$ 1,903.86	$ 5,500.00	
Administrative Asst.	2,128.17	6,300.00	
Clerical	2,712.15	11,900.00	
Total Salaries	$ 6,744.18	$ 23,700.00	$ 16,955.62
Unremitted Withholding	- 258.39		+ 258.39
Payments Made	$ 6,485.79		$ 17,214.21
#9 - Computer Service	6,441.50	6,500.00	58.50
#10 - Travel	1,071.64	3,100.00	2,038.36
#11 - Printing	1,359.92	3,850.00	2,490.08
#12 - Office Operation	581.53	1,200.00	618.47
#13 - Procurement	950.50	5,600.00	4,649.50
#14 - Tyler Refund	500.00	500.00	
#15 - AHS Administration	1,500.00	6,000.00	4,500.00
Social Security Tax	359.41	1,000.00	640.59
Contingency Withholding (March)	408.68	5,670.66	5,261.98
TOTALS	$ 19,658.97	$ 57,120.66	$ 37,461.69

Funds Available 4/1/69 (Bal. from 1st Period	$ 19,120.66
Longwood Foundation (2nd Payment)	$ 38,000.00
Disbursements - 4 Months	$ 19,658.97
Balance on Hand 7/31/69	$ 37,461.69

Identification of Cash Resources:	
AHS - PRC - General Account	$ 5,361.66
AHS - PRC - Budget Account	2,000.03
American Security and Trust, Certificates of Deposit	30,000.00
Petty Cash, Lima	100.00
Total	$ 37,461.69

Payments Received by the Plant Records Center for Printouts and/or Consultation.

Previously reported	$ 711.35
July 23 - Dawes Arboretum	235.00
July 25 - Mt. Cuba Botanical Park	135.00
Total Outside Income	$ 1,081.35

All credited to "Printing Account" - except $59.00

The outside receipts for service do not appear in this statement as "Income" but as reduction of expenditures.

Glenn B. Eastburn
Finance Officer

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THE ARNOLD ARBORETUM of HARVARD UNIVERSITY
THE ARBORWAY · JAMAICA PLAIN · MASSACHUSETTS 02130 · U.S.A.

OFFICE OF THE DIRECTOR
September 12, 1969

Report of the Chairman, Plant Records Center Committee:

I have received no official report from the Director of the Plant Records Center regarding the activities or progress of the PRC on the files of the Longwood Garden. I assume the staff continues its work. The work on the living files was completed this spring and work began on the dead files and miscellaneous records.

The Director has completed a revision of the User's Manual and fifty copies are available. The first seven pages of this have been reproduced and assembled for distribution to arboreta and botanical gardens along with a letter of explanation to determine their interest in participating in the program.

In June, Mr. MacDonald met with Dr. Moore and Dr. Bates of the Bailey Hortorium in Ithaca, New York to inspect the plant source records maintained there and consider the feasibility and means of handling such records by the PRC. A similar visit of consultation was made to Columbus, Ohio in reference to the records of the American Rose Society.

Inquiries on the operations of the PRC have been received from a number of botanical gardens and arboreta in the United States and Canada.

Mr. MacDonald attended the New York meeting of the American Association of Nurserymen and had specific discussions for information on the commercial computer locator operations of the Northwest Nursery Distributors, Inc.

During the International Botanical Congress in Seattle, Washington Mr. MacDonald described the operation of the PRC to assembled members of the International Association of Botanical Gardens.

An exhibit of the operations of the PRC was prepared by a commercial firm and is to be on display at the AABGA and the AHS meetings in Wilmington and Philadelphia.

A memorandum dated May 29, 1969 from Dr. Russell Seibert concerned the future development of the AHS Plant Records Center and suggested that a long range proposal be drawn up and submitted to the Longwood Foundation for their consideration and, hopefully, support. I canvassed the members of the PRC committee and received a majority approval to request Mr. MacDonald draw up such a proposal which would be discussed by the PRC committee and with their approval be submitted to the Executive Committee of the AHS and by the AHS president to the full board. Any application to Longwood Foundation or other foundations will be made by the AHS or its officers.

A "First Draft" of a grant proposal was distributed by Mr. MacDonald directly to the members of the PRC committee. I have received carbons of replies of three members to Mr. MacDonald. My own initial suggestions are being considered by MacDonald prior to forming a second draft. A meeting of the PRC committee members attending the AABGA meeting should permit discussion of the proposal. I fully expect a final draft proposal can be available for the November-December meeting of the Board.

Financial reports of expenditure of the PRC are prepared regularly by Mr. Eastburn. A budget for the next year of operation of the PRC as attached is recommended, having received the approval of the PRC committee. We are aware that the present rate of expenditures must be reduced to continue the PRC operation through the term of the Memorandum of Understanding with the director and/or additional funding must be available by March 31, 1970.

Richard A. Howard, Chairman

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Plant Records Center Budget

April 1, 1969 - March 31, 1970

Expenditures:

Salaries		
Director (half time)	5,500	
Administrative Asst.	6,300	
Clerical	11,900	
9 Computer Services	6,500	
10 Travel	3,100	
11 Printing	3,850	
12 Office Operation	1,200	
13 Procurement	5,600	
14 Tyler Refund Services	500	
15 AHS Administration	6,000	
Social Security Tax	1,000	
Contingency Withholding	5,670.66	
Total	57,120.66	

Resources:

Funds Available 4/1/69	19,120.66	(balance from first period)
Longwood Foundation	38,000.00	(second anf final payment)
Total	57,120.66	

Approved,

Richard A. Howard

Richard A. Howard
Chairman, Plant Records Center
Committee

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THE AMERICAN HORTICULTURAL SOCIETY, INC. 2401 CALVERT STREET, N.W. • WASHINGTON, D.C. 20008 • 202-387-3100

April 1, 1969

The Longwood Foundation
2024 Du Pont Bldg.
Wilmington, Delaware 19898

Gentlemen:

We are pleased to enclose complete progress and financial reports covering the twelve month period (April 1, 1968 - March 31, 1969) since the Longwood grant of $90,000. to this Society on March 16, 1968.

The AHS Plant Records Center became operative on July 15, 1968, four months after the grant, three and one-half months after receipt of the Foundation's first check ($52,000.). For this reason, the financial statements attached cover eight and one-half months of operation and twelve months of record.

The firm of Matthews, Carter and Boyce, certified public accountants, has examined the financial records of the American Horticultural Society and its administration of the Longwood Foundation grant as of December 31, 1968. A copy of its findings is enclosed.

The reports here presented for your review are:

1) Reports of Dr. Richard A. Howard, director of Arnold Arboretum of Harvard University and chairman of our AHS Plant Records Center Committee, which reports have been approved by the Board of Directors of the American Horticultural Society.

2) The AHS Plant Records Center's financial statement for the year, April 1, 1968 - March 31, 1969, by Glenn B. Eastburn, finance officer of the Society.

3) Marked copies of the Society's newsletter, News and Views, (Volume II, No. 1 - Spring, No. 2 - Summer, No. 3 - Fall, and No. 4 - Winter 1968) containing news stories on the AHS Plant Records Center, these mailed to AHS members in the United States and 53 other countries around the world.

The AHS Plant Records Center budget for the ensuing twelve months (April 1, 1969 - March 31, 1970) is in process of compilation and will be forwarded for your information when approved by the AHS Plant Records Center Committee and the AHS Board of Directors.

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April 1, 1969

Subject to your approval, we shall present quarterly financial reports in the year ahead, and progress reports following the regularly scheduled (but not quarterly) meetings of our Board of Directors. These occur in the months of December, March and September (or October) of each year.

We are understandably proud of the opportunity the Foundation has given us to search out and demonstrate the best methods of electronic data processing for the horticultural field. It is our hope that the results of this work will be substantive and readily adaptable by all segments of horticulture.

Sincerely,

For the Board of Directors of the Society

Fred C. Galle
President

cc: Board of Directors
AHS Plant Record Center Committee
AHS Plant Record Center Director
Dr. Russell J. Seibert
The American Security & Trust Company, Washington, D.C.

Enclosures

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THE AMERICAN HORTICULTURAL SOCIETY

PLANT RECORDS CENTER

Schedule of User Services and Costs

The following schedule is set up for those botanic gardens, arboreta, and similar institutions which utilize the services of the PRC on a continuing basis.

PRC Accession Manual	$ 35.00 each (one time cost)
PRC Standard Accession Cards	$ 5.00 per 100 (4,000 or less cards/order)
	$ 4.00 per 100 (4,500 or more cards/order)
Initial Processing of Accession Records*	$100.00 per 100 to $80.00 per 100, depending on quantity processed

* This includes:

- Editing by PRC staff and insertion of Phase II Director codes.
- Keypunching of data.
- Preparation of computer-generated card image listings for editing purposes by PRC staff and/or garden involved.
- Error correction.
- Preparation of two data listings for the garden involved:

Listing 1. Plant listing by family name with totals of accessions and taxa.

OR Listing 2. Plant listing by plant name with totals of accessions and taxa.

AND Listing 3. Plant listing by accession number with totals of accessions by year received.

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COST OF ACCESSION RECORD PROCESSING BY PRC

Number of Records	Cost per Record	Total Cost
500	$0.5563	$ 278.15
1,000	0.4963	496.30
1,500	0.4763	714.45
2,000	0.4663	932.60
5,000	0.4499	2,249.50
10,000	0.4423	4,423.00

Above cost includes:

1.	Editing by PRC Clerk for:	a. format correctness b. insertion of Phase I codes, if necessary c. insertion of Phase II Director codes		$0.0380
2.	Keypunching of: (includes card costs)	a. Phase I b. Phase II Director Codes		0.2246
3.	Card to tape and file update			0.0150
4.	Generation of alphabetic card image listing**			
5.	Editing of card image listing against original records			0.0714
6.	Keypunching of corrections		0.0200	
7.	File correction (update) - $65.00 per 1,500 records		0.0433	0.0633
		subtotal		$0.4123

8. Preparation of listings Number 1 or 2 and 3

No. Records	Cost per Record	No. Records	Cost per Record
500	$0.144	2,000	$0.054
1,000	0.084	5,000	0.0376
1,500	0.064	10,000	0.030

**On a straight generation of an alphabetic card-image listing based on 10,000 records, it will take 3/4 of an hour at $125 per hour--a total of $93.75 or $0.009375 per record.

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THE ARNOLD ARBORETUM of HARVARD UNIVERSITY
THE ARBORWAY · JAMAICA PLAIN · MASSACHUSETTS 02130 · U.S.A.

OFFICE OF THE DIRECTOR

September 24, 1969

Messrs. K. Evans, W. Knierim, D. Rogers, T. Throckmorton, R. Dennis
and copies to the full Committee.

Gentlemen:

We missed you at the AABGA and AHS meetings, so may I bring you up to date. An informal session of the Plant Records Center Committee was held at the Hotel DuPont in Wilmington, Sunday evening, September 14th, with Mrs. Hill, W. Crowley, J. Oppe and R. Howard of the Committee present; Fred Galle of the AHS; Bob MacDonald and three members of his staff including a secretary and "cost analysis" specialist. This did not constitute a quorum so no business was officially transacted except to record the approval of the budget for the PRC for the present year (enclosed). Data has been sent to each of you and with no objections reported by mail the budget was considered and recorded as approved for action by the AHS Board.

The discussion first concerned the report to be made to the AHS Board in Wilmington. Bob MacDonald produced a second draft of a proposal to be submitted to Longwood Foundation for continuation of the activities of the Plant Records Center which so drastically altered the procedures and plans of the first draft that any comments received or prepared were non-applicable. The result was a long disussion of many aspects of the "second draft" while PRC personnel were present. In essence the idea of mobile units to record data at individual botanical gardens was abandoned in favor of microfilm reproduction of such records. The microfilm would be returned to the PRC headquarters and recorded directly by keypunch machine operators. Proposed positions as budgeted were discussed as were costs to Tyler; construction of a building or renovation of Tyler space; overhead to AHS; benefits to employees, etc.

Before the meeting adjourned near midnight the subject of the PRC brochure which MacDonald had prepared and printed was discussed. No member of the PRC committee, including your chairman, had seen the brochure in the process of preparation and the AHS board had not approved the use of its name and seal on this "publication". The illustrations as cartoons did not receive favorable comment and the consensus was that the text was not truly representative of our present state of operation.

During the remaining days of the AABGA meeting and the opening of the AHS Congress I held individual discussions with Bob MacDonald and two members of his staff (Mrs. Miller and Mr. Brown), with Mrs. Hill and Messrs. Seibert, Oppe and Crowley of this committee; and with the Eastburns, Fred Galle and Mr. Pullman of the AHS Board.

On Tuesday evening, September 16th, I met with the AHS Board and presented a report (enclosed) which approved the budget for the PRC and indicated our progress with the Longwood Garden Records. Since many members of the AHS Board are aware of the termination of the first Longwood Foundation grant it was pointed out that we are prepared to fulfill our obligations to Longwood Garden by the end of October (see attached handwritten report from MacDonald) and those of the "Memorandum of Understanding" within the money on hand by judicious spending. We also propose to submit a new proposal to the AHS Board by their meeting at the end of November for their approval and submission to the Longwood Foundation. I reported that we had considered two drafts

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On Wednesday, September 17th, after continuing individual discussions, we held a meeting of the PRC Committee at the Hotel Benjamin Franklin in Philadelphia. Those present included: Crowley, Hutton, Leach, Seibert, Mrs. Hill, Oppe, Philip Livingston (a new member of our committee), Mr. and Mrs. Eastburn, Fred Galle and R. Howard. A quorum was declared.

The subjects of discussion were primarily items associated with the second draft and corrections needed for the third draft of the proposal. I list our thoughts and conclusions.

1. The Eastburns were asked to review methods of getting checks to the PRC personnel at Tyler following complaints on delays in mail service keeping in mind the difficulties encountered when staff cash checks before the calender date of the check.

2. A benefit system is in effect for MacDonald according to the Memorandum of Understanding. The other employees because of shifts are not currently eligible for any group plan. The committee voted that we would recommend only a plan which required participation (contributions) from the employees involved.

3. The third draft should be submitted to the Chairman PRC for comment and/or revision before being circulated to the full committee. Upon completion of a seemingly acceptable proposal, it will be distributed to all members of the PRC committee with the request that comments and corrections be returned to the Chairman for collation.

4. A meeting of this Committee should be held in early November to discuss the near-final draft of the proposal. Mrs. Eastburn suggested we meet at the AHS headquarters in Washington since only one member of the committee had seen these offices.

5. The final proposal when approved by the majority of this committee will be submitted to the AHS executive committee; by them to the AHS Board, and by the President to the Longwood Foundation if approval is indicated in each step.

6. When an acceptable proposal seems near, Russell Seibert may feel free to discuss the proposal informally with whomever he choses of his staff or advisors.

7. Changes in the second draft should include consideration of the following items.

   a. A short proposal and budget might be acceptable to the Longwood Foundation. However, a series of appendices should be available for support or documentation and for the records of the PRC committee and the AHS. These include job descriptions and justification for every position and budgetary item.

   b. The position of administrative assistant seems unnecessary.

   c. The number of clerk-operators may be reduced with alternate suggestions involving aiding botanic gardens in preparing their own records.

   d. An item for "office facilities" involving renovation or building should be considered as "renting of facilities" either on or near the Tyler Arboretum.

   e. Reexamination of costs of insurance and service contracts for equipment.

   f. A reexamination of the desirability of purchase of data processing systems in contrast to renting such items.

   g. The AHS overhead should be 12% of the budgeted items.

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h. The relationships with the Tyler Arboretum involving the sharing of personnel and the use of facilities should be discussed with the President and/or the Board of the Tyler Arboretum. The Chairman will make the necessary offer. A full understanding by the Tyler Board of a 10 year grant proposal should be verified in writing.

i. Mr. Pullman and David Leach had felt that each botanical garden and arboretum whose records would be processed without cost to the garden should be asked to contribute annually to the AHS on a basis to be decided. It was suggested that large gardens, medium sized gardens and small gardens be rated at some figure such as $250.00, $150.00, and $75.00, respectively. These amounts seemed excessive to those of us having restrictions on society memberships enforced by our governing bodies. It was indicated that some gardens might not participate in making their records available under the circumstances. Since the goal of the proposal will be to create a data bank of available plant resources it is most desirable to obtain as much information as possible. We recognize that many gardens will be forced to do much basic work in preparing their records to be photographed. Although the garden must agree to continue to submit accession records and changes of status of their collections to the PRC we felt these should be processed by the PRC without charge. However, if the garden wished print-outs or data on the forms possible under the computer program established, the garden should expect to pay full price for these. For comparative purposes it was indicated that about 50 gardens held institutional memberships in the AABGA at an annual fee of $25.00. The committee indicated that botanical gardens and arboreta should be encouraged to join the AHS as institutional members. The present institutional membership fee is $35.00 but it is hoped this will be considered the minimum contribution and that gardens which can will contribute larger sums voluntarily.

8. The question of the "brochure" was raised again and after discussion it was voted that this committee does not approve the brochure and requests no further distribution of the item.

9. The question of expenses of travel of members of this committee was raised and the consensus is that no committee member should expect to be reimbursed for his travel or subsistence costs during the remainder of the first Longwood grant. An expression of opinion of committee members is desired whether some support should not be considered in relation to the grant proposal.

10. The committee instructed the chairman to convey to Bob MacDonald an expression of their appreciation of his devotion and effort in the work to the present. Accordingly, I wrote to Bob that the Committee did "Vote to express appreciation to you and your staff for the work you have done and the program you have formulated in the development to the present of the Plant Records Center and for the program you have completed for the Longwood Gardens".

At the banquet sponsored by the Pennsylvania Horticultural Society held Wednesday evening, the Society presented an award to Fred Galle for the AHS commending the AHS for the development of the Plant Records Center. Fred, in accepting the citation, paid compliments to the committee and to Bob MacDonald and his staff. I hope to have a copy of the citation soon for each of you, in text at least.

Sincerely,

Richard A. Howard

Richard A. Howard
Director

RAH/mp
Enc.

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9/11/69

Progress re Longwood

1. 10,700± records on file
2. Changes + additional information
3. Remainder) 1969 revisions
4. Dead file

To be completed by Oct 30, 1969

Records recorded
From "scratch", through all reformatted stages, have
been completed within time allotted.

The file is continually changing which requires
revision from time to time to keep file up to date.

AFTER CONFIRMATION OF ITEMS 1-4 AND PREPARATION
OF REQUESTED LISTINGS, LONGWOOD WILL BE
BILLED FOR FILE CHANGES.

RDM

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THE AMERICAN HORTICULTURAL SOCIETY, INC. PLANT RECORDS CENTER John J. Tyler Arboretum 515 Painter Road Lima, Pennsylvania 19060
215-566-1782/215-566-5431

AMERICAN HORTICULTURAL SOCIETY-Plant Records Center
Financial Report as of June 30, 1969
Three Months - April 1, 1969 to June 30, 1969

Three Months April 1 to June 30	Disbursements	12 Month Budget	Budget Balance
Salaries			
Director (¼ time)	$ 1480.78	$ 5500.00	
Administrative Asst.	1643.55	6300.00	
Clerical	2214.44	11900.00	
Total Salaries	5338.77	23700.00	$ 18361.23
Unremitted Withholding	-246.36		+ 246.36
Payments Made	$ 5092.41		$ 18607.59
#9 - Computer Service	6441.50	6500.00	58.50
#10 - Travel	699.44	3100.00	2400.56
#11 - Printing	1631.42	3850.00	2218.58
#12 - Office Operation	476.88	1200.00	723.12
#13 - Procurement	950.50	5600.00	4649.50
#14 - Tyler Refund	500.00	500.00	-----
#15 - AHS Administration	1500.00	6000.00	4500.00
Social Security Tax	294.65	1000.00	705.35
Contingency Withholding (March)	408.68	5670.66	5261.98
TOTALS	$ 17,995.48	$ 57120.66	$ 39125.18

Funds Available 4/1/69 (Bal. from 1st Period)	$ 19,120.66
Longwood Foundation (2nd payment)	$ 38,000.00
Disbursements - 3 Months	$ 17,995.48
Balance on Hand 6/30/69	$ 39,125.18

Identification of Cash Resources:	
AHS-PRC - General Account	$ 7080.04
AHS-PRC - Budget Account	1945.14
American Security and Trust, Certificates of Deposit	30000.00
Petty Cash, Lima	100.00
Total	$ 39125.18

Glenn B. Eastburn
Finance Officer

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THE AMERICAN HORTICULTURAL SOCIETY, INC. 2401 CALVERT ST., N.W. • WASHINGTON, D.C. 20008 • 202-387-3100

July 1, 1969

To: AHS Executive Committee
AHS Plant Records Center Committee

Notes regarding Financial Report of June 30, 1969:

Payments received by Plant Records Center for printouts and/or consultation:

As reported in the statement of May 31, 1969	$ 403.85
June 11 - Scott Foundation of Swarthmore College	75.00
June 20 - Scott Foundation of Swarthmore College	162.50
June 20 - Longwood Gardens	70.00
Total Received	$ 711.35

At the Director's designation, these have been deposited in the AHS-PRC Budget Account, credited to:

#11 - Printing	$ 652.35	
#10 - Travel and Consultation	59.00	711.35

Thereby reducing the reported disbursement by the amount so credited.

The first 8 1/2 months of PRC operation are reported in the statement of March 31, 1969.

All requisitions so far received have been paid.

Glenn B. Eastburn
Finance Officer

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4048 ROSELEA PLACE ■ COLUMBUS, OHIO 43214 ■ 614/268-7577
THE AMERICAN ROSE SOCIETY
O. KEISTER EVANS, JR.
Executive Secretary

June 16, 1969

Dr. Richard A. Howard, Director
The Arnold Arboretum of Harvard University
The Arborway
Jamaica Plain, Mass. 02130

Dear Dr. Howard:

Dr. Seibert's letter is very inspiring. I certainly share his enthusiasm over the importance of the Plant Records Center and the contributions it can make to horticulture and botany.

You may consider this letter my whole-hearted endorsement of Dr. Seibert's proposal to approach the Longwood Foundation for sustained support.

I plan to attend the AHS Congress in Philadelphia, and hope the PRC Committee can meet at that time. By then, Mr. MacDonald and I should have a suggested format for programming the rose registration records.

Sincerely,

O. Keister Evans, Jr.
Executive Secretary

OKE:sb

cc: Plan Records Center Committee

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Star Roses ★ *West Grove, Pa. 19390*

THE CONARD-PYLE COMPANY

June 13, 1969

Mr. Richard A. Howard, Director
The Arnold Arboretum of Harvard University
The Arborway
Jamaica Plain, Mass. 02130

PLANT RECORDS CENTER COMMITTEE

Dear Mr. Howard:

Dr. Seibert's confidence in the work of the Plant Records Center and its future possibilities are wonderful words to read. By all means, I recommend acceptance of his proposal and also your planned procedure.

I do plan to be present at the AHS Congress in Philadelphia in September.

Sincerely,

S.B. Hutton, Jr.
Member of PRC Committee

SBHj/mf

CC: PRC Members

Star IS THE REGISTERED TRADE MARK OF THE CONARD-PYLE CO.

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JUN 9 1969

THE AMERICAN HORTICULTURAL SOCIETY, INC. PLANT RECORDS CENTER John J. Tyler Arboretum 515 Painter Road Lima, Pennsylvania 19060
215-566-1782/215-566-5431

AMERICAN HORTICULTURAL SOCIETY - Plant Records Center
Financial Report as of May 31, 1969
Second Budget Period - Beginning April 1, 1969

Two Months April 1 to May 31	Disbursements	12 Month Budget	Budget Balance
Salaries			
Director	$ 1057.70	$ 5500.00	
Administrative Asst.	1204.62	6300.00	
Clerical	1699.98	11900.00	
Total Salaries	$ 3962.30	$ 23700.00	$ 19737.70
Unremitted-Withholding	-419.43		+419.43
Payments Made	$ 3542.87		$ 20157.13
#9 - Computer Service	3960.50	6500.00	2539.50
#10 - Travel	207.50	3100.00	2892.50
#11 - Printing	1670.22	3850.00	2179.78
#12 - Office Operation	116.24	1200.00	1083.76
#13 - Procurement	2159.50	5600.00	3440.50
#14 - Tyler Refund	500.00	500.00	----
Social Security Tax	187.92	1000.00	812.08
Contingency(March Withhold)	408.68	5670.66	5261.98
AHS Overhead		6000.00	6000.00
TOTALS	$ 12753.43	$ 57120.66	$ 44367.23

Funds Available 4-1-69	$ 19120.66
Longwood Foundation (2nd payment)	$ 38000.00
Total	$ 57120.66
Disbursements - 2 Months	12753.43
Balance on Hand 5-31-69	$ 44367.23

Identification of Funds:	
AHS-PRC General Account	$ 12361.76
AHS-PRC Budget Account	1905.47
American Security and Trust - Certificates of Deposit	30000.00
Petty Cash	100.00
Total	$ 44367.23

Glenn B. Eastburn
Finance Officer

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THE AMERICAN HORTICULTURAL SOCIETY, INC. PLANT RECORDS CENTER John J. Tyler Arboretum 515 Painter Road Lima, Pennsylvania 19060
215-566-1782/215-566-5431

June 4, 1969

To: AHS Executive Committee
AHS Plant Records Center Committee

Notes regarding Financial Report of May 31, 1969:

1) The revised budget period - April 1, 1969 to March 31, 1970 was proposed by the Plant Records Center Director and approved by the Plant Records Center Committee at their meeting May 13, 1969.

2) The statement of March 31, 1969 covers the first year of the appropriation by the Longwood Foundation and the first 8½ months of PRC operation.

3) The statement of May 31, 1969 reports the first two months of the current and second phase of the PRC work.

4) There is no significant change in the first budget which is cut off as of March 31, 1969 and the second budget beginning April 1, 1969.

5) As the statement indicates there was a carry-over of $19,120.66, to which The Longwood Foundation has added their second payment of $38,000.00.

6) Several small payments to PRC for printouts and/or consultation have been received and credited to the several budget divisions and do not appear in the statement as separate income:

a)	April 2	Mary Louise Hill	$35.00
b)	April 2	University of Pennsylvania	$59.00
c)	April 16	Longwood Foundation	$200.00
d)	April 30	Swarthmore College	$47.50
e)	May 12	Missouri Botanical Garden	$62.35
	TOTALS		$403.85

Glenn B. Eastburn
Finance Officer

Attachment

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THE AMERICAN HORTICULTURAL SOCIETY, INC. 2401 CALVERT ST., N.W. • WASHINGTON, D.C. 20008 • 202-387-3100

AHS PLANT RECORDS CENTER
FINANCIAL REPORT
April 1, 1968 --------- March 31, 1969

Longwood Foundation Grant $52,000.00

	DISBURSEMENTS	BUDGET	BUDGET BALANCE
Director	$ 3,807.72		
Administrative Assistant	4,038.47		
Clerical Staff	9,264.94		
TOTAL SALARIES	$ 17,111.13	$21,625.00	$ 4,513.87
Unremitted Deductions	-408.68		+ 408.68
Paid Out to 3/31/69	16,702.45	$21,625.00	4,922.55
Computer Service	2,229.50	6,000.00	3,770.50
Travel & Consultation	2,995.61	4,000.00	1,004.39
Printing	822.47	2,000.00	1,177.53
Office Operation	3,178.42	3,000.00	(178.42)
Procurement	1,589.00	5,000.00	3,411.00
AHS Administration	4,687.47	6,250.00	1,562.53
Social Security Tax	674.42	2,125.00	1,450.58
Contingency	----	2,000.00	2,000.00
TOTALS	$ 32,879.34	$52,000.00	$19,120.66
Grant, Less Disbursements	$19,120.66		

IDENTIFICATION OF AHS/PRC FUNDS:

American Security & Trust Company, Washington, D.C.:

General Account	$ 7,020.66
Budget Account	2,000.00
Certificates of Deposit	10,000.00
Petty Cash (AHS/PRC, Lima, Pa.)	100.00
TOTAL	$19,120.66

April 1, 1969

Glenn B. Eastburn, Finance Officer

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THE ARNOLD ARBORETUM of HARVARD UNIVERSITY
THE ARBORWAY · JAMAICA PLAIN · MASSACHUSETTS 02130 · U.S.A.

OFFICE OF THE DIRECTOR

May 23, 1969

Dr. David Rogers
Taximetrics Laboratory
Armory 101
University of Colorado
Boulder, Colorado 80302

Dear Dave:

I guess I have no choice but to accept your resignation from the PRC committee. I could do this more willingly if I felt it would do any good at all. The committee is possibly prejudiced or ignorant or prejudiced from ignorance and I recognize all too well the ignorance label falls on me. Without you on the committee, there will be no valid inspection or criticism since I, for one, am not fully cognisant of what should be questioned. You could continue to play a role and I still hope you will, on the committee or off. There is one technical point, however. The president of the American Horticultural Society appointed the committee and it is he who should receive your formal resignation. Would you write what you wish to be recorded to him, Fred Galle, Ida Cason Callaway Gardens, Pine Mountain, Georgia, 31822?

I am also at a loss of what to say about the bill and the receipts you submitted. The meeting was scheduled to take advantage of the fact that you were to be in Washington. I recognized you would have a bit of additional travel and some board and room expenses and only these came to mind when you suggested in your letter of April 25 "I do hope that some assistance with travel can be forthcoming because as you know NSF budgets are drying up all over the place, ours included". I was prepared to ask the AHS to handle these local expenses for you. Now if I read the receipts correctly, you made a special trip for the purpose. Will you please confirm this and let me have the other half of the airline receipt or a statement of your travel dates in case you didn't save it? I want to avoid any more ruckus than necessary in asking that this bill be paid.

round trip Den - Phila $126.

Sincerely,

Dick

Richard A. Howard
Director

RAH/ny

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3 June 1969

Dr. Richard A. Howard
The Arnold Arboretum
The Arborway
Jamaica Plain, Mass. 02130

Dear Dick:

In thinking over the various activities ao far with regard to the PRC, I still think that resignation from that committee is the only route to go. However, I do not wish to let you and the American Horticulture Society down, and since this is the case would like to recommend that my position be as a consultant on information systems for AHS. This might be a more useful relationship. I frankly do not see that the committee as presently consituted has much of a chance to be objective about MacDonald's operations. Very clearly, MacDonald has sold Russ Siebert and, very clearly, Russ Siebert wields a big stick with all the money he has available. Since money speaks so loudly the members of the committee have little choice but to accept what Russ Siebert wants. I do not think, however, that the American Horticulture Society is quite so much under Russ's thumb and that the AHS needs an independent look at the various types of retrieval systems. Therefore I believe that if I could serve in the role of consultant to AHS, something better could be achieved. If you agree to this type of relationship, then I will write to Fred Galle with this suggestion.

I did indeed have to make a special trip to Philadelphia for this meeting. I had been in Washington the week before, and had originally planned to spend the weekend in Washington and then go to Philadelphia. However, since the meeting was on Tuesday I simply could not stay away the long weekend because of obvious academic committments here. Therefore I must submit a bill for a special trip. I am sending the bill from the travel agency which handled my ticket but am requesting only the Denver-Philadelphia round trip fare inasmuch as I did return via Ithaca. I am sorry to have to add this burden but feel that I have to.

I look forward to your response to my idea.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

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Expenses for Visit to Plant Records Center Committee
Meeting, Longwood Gardens, May 13, 1969

Air Fare - Denver to Philadelphia and return	@235.00 — 849 side Trip
Car rental - Round trip, Boulder to Denver	18.90
" " , Phila. to Media	18.13
Per diem	25.00
	$297.03
	-49
	#248.03

David J. Rogers
Department of Biology
Taximetrics Laboratory
Armory 101
University of Colorado
Boulder, Colorado 80302

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19 May 1969

Dr. Richard A. Howard
The Arnold Arboretum
The Arborway
Jamaica Plain, Mass. 02130

Dear Dick:

Here is a list of my expenses, and the receipts, for the trip to the PRC meeting.

I trust that you will take my announcement of resignation from the PRC to represent some way to "clear the air" for the committee. There did not seem at the time any way to get MacDonald off the AHS back. Very clearly I am ddeply interested in AHS getting a good system for their important records. It is obvious to me that the present method of operations will not provide such a system. Therefore, while my resignation still stands, it does not indicate my loss of interest. I learned nothing new from MacDonald this past Tuesday. He is still proceding as we discovered in March.

I hope that my public announcement will cause some second thoughts on the part of the PRC. I will continue to work with you should you so desire, but I refuse any further contact with MacDonald.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

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4048 ROSELEA PLACE ■ COLUMBUS, OHIO 43214 ■ 614/268-7577
THE AMERICAN ROSE SOCIETY
O. KEISTER EVANS, JR.
Executive Secretary

May 23, 1969

Robert D. MacDonald, Director
John J. Tyler Arboretum
515 Painter Road
Lima, Pennsylvania 19060

Dear Bob:

The PRC meeting last week was informative and enlightening. We were, of course, very interested in the progress of the Center, and your presentations were quite valuable.

In the risk of creating some confusion, I am enclosing a copy of the complete computer program that was developed for the rose registration records. This is solely for your information, and not intended as an indication of what should be done through the AHS Plant Records Center.

As I mentioned at the meeting, the program was developed by a graduate student at Ohio State University who needed a rather complex "guinea pig" program. You will see that the information required is much more detailed than we would need for a basic registration file. You will also note that the program was developed in the Scatran language for use with the IBM 7094Digital Computer. As I understand it, the Scatran language is only used with the Ohio State equipment.

My calendar is reasonably flexible in June and early July. Can we get together soon, hopefully to develope an outlined plan that might be discussed in connection with the AHS Conference in Philadelphia?

Hang on to the enclosed program outline; it's my only copy.

Incidentally, the outline includes cost estimates on key punching and computer use in the Columbus area. This information was developed in 1966.

Sincerely,

Keister

O. Keister Evans, Jr.
Executive Secretary

cc: Dr. Howard Peter, Executive Director, AHS

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4048 ROSELEA PLACE ■ COLUMBUS, OHIO 43214 ■ 614/268-7577
THE AMERICAN ROSE SOCIETY
O. KEISTER EVANS, JR.
Executive Secretary

May 19, 1969

Dr. Richard A. Howard
The Arnold Arboretum
The Arborway
Jamaica Plain, Massachusetts 02130

Dear Dr. Howard:

The meeting of the Plant Records Center Committee last Tuesday was, in my opinion, enlightening and productive. I believe the project will in time represent a major contribution to the plant world.

We are assembling some basic information on the rose records for Bob McDonald's consideration. I hope we will be able to develop a practical approach to programming the rose data that will be acceptable to the Committee. Bob and I plan to have a session on this in a few weeks.

Sincerely,

O. Keister Evans, Jr.
Executive Secretary

OKE:sb

cc: Plant Records Center Committee

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THE ARNOLD ARBORETUM of HARVARD UNIVERSITY
THE ARBORWAY · JAMAICA PLAIN · MASSACHUSETTS 02130 · U.S.A.

OFFICE OF THE DIRECTOR

April 23, 1969

To Members of the Plant Records Center Committee:

I have had favorable replies from a majority of you on the PRCC and suggest we go ahead with plans to meet at the Longwood Gardens on May 13 at 10 AM. The following topics should comprise an agenda for our meeting.

1. A review of the organization, method of operation and accomplishments of the Plant Records Center during the first year. I'll count on the director, Robert MacDonald, to handle the demonstration of this topic. Our location at the Longwood Gardens will permit an examination and demonstration of the records of the Gardens, the procedures of recording the data, and the types of information recovered by the processing procedures used.

2. The nature of the present relationship of the PRCC to the PRC with discussion of the future role. Basic to our discussion here is the question that has been raised of a "conflict of interest" between the activities of the PRC and the interests, holdings or abilities of individual members of the committee and the gardens they represent.

3. The program of activity of the PRC during year no. 2 of operation under the Longwood Foundation grant. Mr. MacDonald will have to indicate how his staff plans to spend year no. 2. I suggest this program should be discussed by the PRCC and approved or suggestions made for alternate activities which the PRC staff must consider and carry out or reject. Specifically should the PRC extend its operations during year no. 2 to work on recording and processing the records of other gardens? Should the PRC be directed to experimental work of other types during the duration of the Longwood Grant to demonstrate for the AHS its capabilities or problems? An alternate type of activity might be to record and reproduce a kind of "plant buyers' guide" for the benefit of the AHS. Other suggestions would be welcome.

4. A discussion of future activities of the PRC after the Longwood Foundation grant has been expended. Here we will need to know the basic costs of maintaining the PRC staff in status capable of operating. The costs of processing the records of other gardens or doing other projects for a subsidy are essential and I hope Mr. MacDonald can supply us with a proposed budget for subsequent years. Mr. Leach as representative of the "financial planning committee" of the AHS might report on the prospect for financial subsidy by the AHS or the nature of grant requests that might be implemented for the benefit and operation of the PRC.

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5. Any other items which members of the committee wish to raise for comment or discussion.

If you can not attend this meeting of the committee I'll see you receive a summary of the discussions. However, your written comments on topics as suggested above will be welcome.

Sincerely,

Richard A. Howard

Richard A. Howard
Plant Records Center Committee Chairman

RAH/IW

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Subject: Project Outline for A.H.S. Plant Records Center

1. To develop organization and methodology for an A.H.S. Plant Records Center.

2. To employ necessary personnel and make arrangements with cooperating organizations within budget limitations.

3. To use for the organization and development of the A.H.S. Plant Records Center the horticultural records at Longwood Garden within the provisions of the Longwood Foundation grant.

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MAY 1 3 1969

THE AMERICAN HORTICULTURAL SOCIETY, INC. PLANT RECORDS CENTER John J. Tyler Arboretum 515 Painter Road Lima, Pennsylvania 19060
215-566-1782/215-566-5431

Receipts & Disbursements- AHS PLANT RECORDS CENTER
FINANCIAL REPORT
Appropriation Period April 1, 1968 to April 30, 1969
Operating Period July 15, 1968 to April 30, 1969

Longwood Foundation Grant $52,000.00 of $90,000.00

	DISBURSEMENTS	BUDGET	BUDGET BALANCE
Salaries:			
Director	$ 4,230.80		
Administrative Assistant	4,516.16		
Clerical	10,102.63		
TOTAL SALARIES	$ 18,849.59	$ 21,625.00	$ 2,775.41
Unremitted Deductions	- 322.64		+ 322.64
Salaries Paid Out	18,526.95	21,625.00	3,098.05
Computer Service	3,997.50	6,000.00	2,002.50
Travel and Consultation	3,069.86	4,000.00	930.14
Printing	958.95	2,000.00	1,041.05
Office Operation	3,188.42	3,000.00	(188.42)
Procurement	1,981.50	5,000.00	3,018.50
AHS Administration	4,687.47	6,250.00	1,562.53
Social Security Tax	778.90	2,125.00	1,346.10
Contingency	----	2,000.00	2,000.00
TOTAL PAID OUT	$ 37,189.55	$ 52,000.00	$ 14,810.45
Balance Available	14,810.45		

IDENTIFICATION OF PRC FUNDS ON HAND:

American Security & Trust Company, Washington, D.C.:	
General Fund	$ 2,378.94
Budget Account	2,331.51
Certificates of Deposit	10,000.00
Petty Cash (AHS/PRC, Lima, Pa.)	100.00
TOTAL FUNDS ON HAND	$ 14,810.45

The following amounts have been received for service performed by the PRC:

April 7 - Mary Louise B. Hill - Printing	35.00
April 7 - University of Pennsylvania - Consulting	59.00
April 16 - Longwood Foundation - Printing	200.00
April 30 - Swarthmore College - Printing	47.50
TOTAL	$ 341.50

These amounts have been credited to budget allowances.

May 1, 1969

Glenn B. Eastburn, Finance Officer

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AMERICAN HORTICULTURAL SOCIETY

TO: Dr. Richard A. Howard

FROM: Betty Eastburn

RE: Members of Plant Records Center Committee

DATE: April 26, 1968

Webster R. Crowley, Jr.
Head of Applied Research
Morton Arboretum
Lisle, Illinois 60532

Keister Evans
Executive Secretary-Editor
American Rose Society
4048 Roselea Place
Columbus, Ohio 43214

S. B. Hutton, Jr.
President
Conard-Pyle Company
West Grove, Pennsylvania 19390

Wells Knierim
1968 Convention Chairman
American Daffodil Society
31090 Providence Road
Cleveland, Ohio 44124

David B. Leach
First Vice President
The American Horticultural Society
15 Caldwell Street
Brookeville, Pennsylvania 15825

Dr. Russell J. Seibert
Director, Longwood Gardens
Kennett Square, Pennsylvania 19348

Mr. John M. Patek
434 Mount Airy Drive
Rochester, New York 14617

Dr. David S. Rogers
Department of Taximetrics
University of Colorado
Boulder, Colorado 80302

Dr. Joseph Oppe, Director
Dawes Arboretum
Mail Route 5
Newark, Ohio 43055

Mrs. Julian Hill
1106 Greenhill Avenue
Wilmington, Delaware

Dr. Tom D. Throckmorton
c/o Iowa Methodist Hospital
Des Moines, Iowa 50312

Mr. Reid Dennis
Thistle Hill
9221 Georgetown Pike
Great Falls, Virginia 22066

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Report to Dr. R. A. Howard, A.H.S. Chairman of the Plant Records Committee

From: David J. Rogers

Date: March 10, 1969

I. Our understanding of the objectives of the AHS.

We believe that the objectives of the AHS with respect to some retrieval system are:

(a) To discover the feasibility of a computer-assisted information retrieval system for the records of arboreta and botanic gardens.

(b) To employ some person to develop a pilot project to study the problem, devise systems, and determine the costs of such a system.

Robert MacDonald was engaged to fulfill the above objectives, using the records and resources of Longwood Gardens as a test case to develop the system.

II. The nature of information retrieval systems.

Our understanding of the involvements which would allow the development of these objectives are:

(a) Pre-computer activities - the preparation of data for machine manipulation.

(b) Computer program design - the program instructions, the flow-charts, the documentation of the programs which will (i) store the information in the computer, (ii) produce certain desired results, such as the ability to ask questions about the stored data, and produce printed lists, or cards, in any of several desired formats.

(c) Cost/effectiveness studies - analysis of each step of the project to determine what personnel involvement, machine involvement, and dissemination procedures cost in time and money. Effectiveness of the project should also be measured against other information systems to determine whether one design or another is the most effective system for the AHS.

III. Analysis of the present operations at the Tyler Arboretum and Longwood Garden.

From an interview with Mr. MacDonald on March 5 and 6, 1969, we believe that the Plant Records Center has embarked upon an operational scheme, and has not investigated the various potential systems available to them in other organizations. As best we can determine, the present activities at Longwood

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Garden and at the Tyler Arboretum have been involved largely with II(a) above; to a lesser extent some work has been done on part II(b) by contract with EDS (Electronic Data Systems), and none has been done on II(c).

The work in II(a) described to us by Mr. MacDonald is something as follows (in steps):

i. Transfer file information to standardized card (PRC form).

ii. Transfer card information to coding sheet.

iii. Transfer coding sheet information to IBM punch card.

iv. Print information from IBM punch cards to be proof-read.

v. Correct errors, and repunch cards.

Two procedures develop with the above, depending on whether the work is done on the Longwood files or is to be done from collaborating institutions not at Longwood. In the first case, the file records at Longwood are transferred directly to coding sheets (step iii) and thence on through iv and v. In the second case, information is taken from the present files, transferred to the standardized card by workers at the separate institutions, and thence into step iii, etc. by the staff of PRC.

The work done in II(b) for MacDonald by the EDS so far is approximately as follows (we did not, however, actually see the programs):

(1) take coding sheets from step iii above and put onto IBM cards, and prepare a printed list of the card information (step iv).

(2) take corrected cards from step v and prepare ordered lists, arranged in one of 18 different orders, of all (or some parts of) the information in the cards. We didn't see these lists, but they were promised on the day we left.

IV. Critique of the present operating procedures.

The most impressive point about the present operating schemes designed by Mr. MacDonald is the failure to take advantage of the modern computing facilities available in several locations in the country. The best example is the use in his system of pre-coded numbers for names of plant families, for country, etc., a complete disregard for the facility of the computing machine to provide the coding internally in the machine, allowing the individual worker in an arboretum the freedom to write down the exact words he chooses for the most meaning to him.

This further indicates the failure to see all the way through a system, from the point of data gathering to final output. We are convinced that

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Mr. MacDonald does not understand the complexities of computer programming, and this is most evident in the very small budgeting for "computer programming." Were he realistic, he would have budgeted much more money for this aspect. Either that, or he would have called upon the expertise in the country from whom he might have derived at much lower cost the needed computer programs.

Mr. MacDonald has chosen to prepare his data "in vacuo" hoping that someone could take his procedures and go forward with some useful information retrieval program after he had completed his work. Such operations are, of course, doomed to failure, as has been demonstrated many times over in this country. It is absolutely essential to involve all of the people, horticulturists, mathematicians, programmers, and cost-effectiveness experts at the very beginning, and develop the systems in advance of actually preparing data. The fixed-field format used by Mr. MacDonald is extremely limited in application, and causes much of the difficulty which has already been encountered.

Even in those parts of the development where there has been considerable effort, part II(a), there has been disregard for good operational procedures. For example, the five steps now involved could be telescoped into two, and a computer program developed to proof-read the input cards with much greater speed and accuracy. There seems to be little effort to employ individuals in the various arboreta to their maximum efficiency, cutting overhead costs by a very appreciable amount. The types of input devices also seem to be very poorly employed. For example, a key-tape device is presently available which cuts out the need for first punching data, and then having these data "read" into the machine, because the key-tape machine prepares data in the exact manner read by the machine. Were the key-tape machine employed, a clerical assistant in each arboretum, already charged with making present file records, could prepare machine-readable data, circumventing all needs for standardized code cards, transferance to coding sheets, key-punching, and proof reading as now done. Furthermore, to charge some $30 - $35.00 for the "user's manual" is completely beyond reason.

Finally, to be in keeping with the objectives of the AHS, a cost-effectiveness study is absolutely essential to provide the AHS with some realistic figures on the costs which can be expected from such an endeavor. Without these no effective means is given for decisions to accept or reject the

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findings of the pilot project. No such technique is employed by Mr. MacDonald, and his costs so far stated do not take into account many actual costs. Rather, costs for data encoding have been figured on a haphazard basis, and are more guesses than derivation from actual work.

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GFF 3/10/69

An integrated information storage/retrieval system must encompass the entire flow of information from its inception through its storage to its final applications. There are many recent technological advances which have made this process more efficient and of more service. Perhaps some of the most dramatic of these recent technological advances is represented in machines and devices such as typewriters that write on computer tape, printing machines that print 1,000 lines per minute, and computers that perform thousands of calculations per second. These same machines, however, have cost the less wary among us much time and money for they cannot realize their potential usefulness unless coupled with the perhaps less dramatic advances in theory, concept and experience. As machines become more sophisticated, so the experience, training, and imagination of the people who control their use becomes more critical. In designing an integrated, computer-assisted information storage/retrieval system for horticultural information, it is necessary that the context of a complete information flow be maintained. The temptation to allow one aspect of the system (e.g. the computer) to place constraints on another aspect (e.g. data description) must be resisted until the depths of technology, human experience and imagination have been sounded. It should be clear that the only defensible approach to this problem is an inter-disciplinary one. The expertise involved should include

1. knowledge of the needs, desires, present practices, and facilities of horticulture, especially with respect to horticultural information;

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ii. knowledge of the capacities and limitations of various mechanical and electrical devices;

iii. theoretical (mathematical) skill requisite for efficient design and system concepts;

iv. linguistic (programming) skill and experience to implement the design effectively;

v. knowledge of the costs in time, money andother resources;

iv. an operations research capacity for making time, money, and resource cost projections, as well as contributing to work flow procedures for minimizing the cost/effectiveness ratio.

Not only to assemble such skill, experience and training, but to establish a meaningful interdisciplinary dialogue, would be a difficult and time-consuming thing to do, especially under the constraints of the traditional delimitations of academic fields as recognized by university departments. To fill this need for the biological community, however, the Taximetric Laboratory, University of Colorado, has assembled such skill and experience, established such dialogue, and with National Science Foundation support, has addressed itself to the problem of designing integrated computer-assisted information retrieval systems. Our staff includes the fields of botany, zoology, mathematics, computer science, economics, library science, and others. Our recent research results have been extremely informative. The studies which the American Horticultural Society wishes to make to discover the cost-effectiveness, and work flow nature of the best available integrated, computer-assisted information

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storage/retrieval systems for horticulture are studies which the Taximetrics Laboratory is especially well prepared to undertake.

Were the A. H. S. interested in taking advantage of the half million dollars of experience we have had in this field, we feel that it would be most appropriate to work under the following agreement:

I. Longwood Gardens

The following considerations are relevant.

1. It is desirable to effect computer-assisted retrieval of information attendant with the accessions of Longwood Gardens (Kennett Square, Pennsylvania).
2. The work done so far by R. MacDonald with this information is flagrantly nonrepresentative of the sort of integrated computer-assisted storage/retrieval program we would investigate.
3. A specially designed computer program would be written to translate the highly encoded data now extant on punched cards into the free format of the TAXIR system. This would obviate the need to further presume upon the generosity of the Longwood Gardens staff.
4. The design and writing of such a program would constitute a clear-cut digression from the mainstream of our own systems development, requiring an investment of our own design and programming staff time which would be irrelevant to our research pursuits. In the light of these considerations, it is proposed that such a digression by our own staff be made, such a conversion program be effected, and the extant data for Longwood Gardens be transformed. A detailed cost analysis (or any cost analysis, for

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that matter) of this operation, insofar as it would not be applicable by virtue of its singularity, nor possible in default of R. Macdonald's failure to have made any real effort along these lines, will not be made. A detailed cost analysis of the computer processing of these data by TAXIR is quite possible, very desirable, and forthcoming. The TAXIR system will demonstrate its processing facility on these data by generating the lists and files anticipated as a result of the previous work. It will also provide an accessioning facility not previously anticipated.

This work will be done for a flat contract fee of $10,000.

II. Complete Analysis of a Specific Application of an Integrated Computer-Assisted (TAXIR) Information Storage/Retrieval System

The following considerations are relevant.

1. A complete cost analysis of work flow programs through both human and computer aspects of the proposed system as determined by an actual field text is desirable.
2. Experience teaches us that by far the most expensive aspects of the program are those involving people and not machines.
3. This field test should be initiated at the beginning and carried through to its completion.

In the light of these considerations we propose that:

1. The remaining funds be invested in a field test with some cooperating arboretum, not the Longwood Gardens;

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2. the arboretum to be involved be selected on the basis of the following considerations.

   i. The institution should not be too atypical of institutions of its kind.

   ii. The staff and administration of the institution should be willing to cooperate with the Taximetrics Laboratory staff in this endeavor.

   iii. The size of the data bank represented by this institution should be such that the remaining funds be sufficient for the kind of thorough analysis that will be meahingful.

3. the Taximetrics staff be involved with this cooperation on a cost basis, such costs enbracing

   i. staff time

   ii. computer time

   iii. computer supplies

   iv. peripheral equipment rental and maintenance

   v. travel

   vi. hiring additional clerical staff if necessary (on location at cooperating institution)

   vii. publication and dissemination costs as appropriate

   viii. overhead for our own institution (University of Colorado), if necessary.

GFE;srh 3/10/69

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MEMO TO: Dr. David J. Rogers (Copy to Mr. Estabrook)
FROM: Gilbert N. Hersh
SUBJECT: Appraisal of reports from Plant Record Center (R. A. MacDonald)
DATE: 28 February 1969

As instructed I have examined the reports, correspondence and other documents concerning the Plant Record Center pilot project.

It is not clear from the reports that any standard systems analytic techniques were used to examine the problem of establishing a pilot project for the Plant Record Center. The only evidence of flow charts of any sort appear at the end of the latest report (March 1). This flow chart is not sufficient for analytic purposes.

There is no report in the folder of expenses during the first nine months of July 1968 through February 1969 and a budget is presented covering the period April 1969 to June 1970. The budget does not present sufficient information for analytic purposes; in fact there is no evidence of justification or explanation of any budget category.

By working from the flow chart the projected budget for the first year (written by Dr. Howard) in a letter to Plant Record Center committee members dated 26 April 1968, and through Dr. MacDonald's latest report, the following information can be gleaned.

1. $38,000 was expended for the first nine months of the project. Of this $38,000 approximately $10,000 was expended for clerical assistance. For the next 15 months $60,300 is to be spent of which $13,500 is for clerical assistance and $5,600 for key punching and service bureau encoding.

To date $11,000 records have been processed for Phase I as delimited by the Plant Record Center accession cards. Of these, 9,000 have been encoded by the service bureau. During the next 15 months an additional 9,000 records must be completely processed and the initial 11000 must be processed for Phase II.

This roughly means that the cost of producing 20,000 complete file records is a total cost of clerical time and the total cost of service bureau charges for encoding divided by the total number of plant records; to wit, is $1.52 per record.

This is extracted from the report previously mentioned and points out the need for a complete explanation of those reports and costs.

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Generally there is a standard set of procedures followed by a qualified systems analyst in setting up any pilot project for data storage, retrieval and maintenance. I appears that none of these have been followed as none have been reported. For an explanation of these procedures please see the Taximetrics Demonstration working papers, Systems Analysis: Cost/Effectiveness. Further references are included.

Simply stated, one states the goal which he desires, observes carefully the procedures currently being used, and carefully flowcharts these procedures as they are. Cost can be assigned to each subset of procedures by analysing time, movement and space constraints. This process is fairly well formalized.

By careful and continuous review of other current operating systems, the review of pertinent literature in the field of operations research and conversations with experts in the field, a competent systems analyst can eclectically and creatively devise a set of operating procedures to accomplish the stated goals.

The central concept of describing information systems of any type is that they should be viewed as an operating whole. All procedures are defined and determined by the make-up of the institution for which they are performed and the needs of that institution. Clearly the problem of data abstraction and preparation for machine readable format cannot be separated from the machine program to work on the data. It appears from Dr. MacDonald's evaluation of various systems in his report that he is concerned with choosing software packages to meet the constraints of his devised input systems. This violates certain concepts governing the design of information systems.

In conclusion, not enough information is presented to fully evaluate the techniques used by Dr. MacDonald and his staff. What information is presented would indicate misunderstanding of systems analysis with respect to designing information systems. Further the operating costs for mounting a pilot data bank given the number of items in the bank and the number of characters used to describe each item is excessively high by conventional norms.

Last it is a great mistake to search for a soft-ware system which will produce the desired listings after the designing of the data input system.

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memo 3 March 3

Below are some standard references which should be of interest.

Churchman, C. West, et. al., Introduction to Operations Research, John Wiley and Sons, 1957.

Hoengren, Charles T., Cost Accounting, Prentice Hall, 1965.

Minker, Jack and Jerome Sable, File organization and data management. In In: Carlos A. Cuadra (ed.) Annual review of information science and technology, Vol. 2 (New York, Interscience Publishers, 1967)

McCabe, John. On serial files with relocatable records. Operations Research.- 13.609-618, July-August 1965.

Olle, T. W. Generalized systems for storing structured variable-length data and retrieving information. Ppaer presented at IFIP/FID Conference, Rome, 14-17 June 1967. Cherry Hill, N. J. RCA, EDP Division.

RAND Corporation, Cost/Effectiveness Analysis, Council on Systems Analysis, Washington, D.C. 1967/

Walker, A. (ed.) Proceedings of the symposium on development and management of a computer-centered data base, Santa Monica, Calif., 6 January 1964. Santa Monica, Calif., System Development Corp. 1964.

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THE AMERICAN HORTICULTURAL SOCIETY, INC. 2401 CALVERT STREET, N.W. • WASHINGTON, D.C. 20008 • 202-387-3100

March 28, 1969

Dr. David J. Rogers
Professor of Biology
University of Colorado
Taximetrics Laboratory
Armory 101
Boulder, Colorado 80302

Dear Dr. Rogers:

Enclosed please find checks for expenses to the Plant Records Center for George Estabrook ($186.00) and David J. Rogers ($272.39), and at the suggestion of the Plant Records Center Committee, a Taximetric Laboratory fee of $150.00 for consulting services of George Estabrook.

The Board thanks you for your time and interest.

Yours truly,

Mr. Glenn B. Eastburn
Finance Officer

Enclosures

General:
Write memo to Stilson:
Deposit this in 1708-48,
Credit to our travel account.

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ARTHUR HOYT SCOTT HORTICULTURAL FOUNDATION
SWARTHMORE COLLEGE
SWARTHMORE, PENNSYLVANIA 19081

March 25, 1969

Dr. Richard A. Howard
The Arnold Arboretum
The Arborway
Jamaica Plain
Massachusetts. 02130.

Dear Dick:

I read with a great deal of interest your memorandum of March 17th addressed to the members of the Plant Records Committee.

It appears to me that there are several rather important questions regarding the PRC that should be resolved as quickly as possible. Therefore I would recommend that a full committee meeting be held during the first part of May on one of the dates that you have suggested. You indicate that you feel that Dr. Rogers should be present at any Committee meeting at which the PRC is discussed. I agree, but I feel it also would be valuable if Mr. Reid Dennis and Dr. T.D. Throckmorton could also attend, since they are the other committee members who have had a great deal of experience in computer technology.

Of course I realize that Dr. Throckmorton might find it difficult to travel such a long distance for a committee meeting, but Mr. Dennis of course who resides in the suburbs of Washington is close at hand and I would hope that he could find the time to attend.

I would appreciate it if you would let me know the exact date that the committee meeting is scheduled so that I can get it on my calendar.

The weather here in the Philadelphia area has been rather pleasant and spring-like the last week or so, to the degree that we have been able to begin some of the outside work. We are now beginning to receive some of the spring showers for which the area is noted I understand and this of course slows the work down considerably.

I hope you will stop in to visit us when you are in the neighborhood and I am still trying to schedule a visit to the Arnold Arboretum some time this spring. I will let you know if I can arrange this.

Yours sincerely,

Joseph W. Oppe
Director.

cc: All Members of
the Plant Records
Center Committee

JWO/eei

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APR 8 1969

THE ARNOLD ARBORETUM of HARVARD UNIVERSITY
The Arborway, Jamaica Plain, Massachusetts, 02130, U.S.A.

April 4, 1969

To Members of the Plant Records Center Committee:

Your responses to my circulated memorandum of March 17 indicate a wish to meet this spring if possible. Although May is a busy month in this area, I propose that we get together for a full day meeting on Tuesday, May 13. A Holiday Inn at Media, Pennsylvania has proven to be a convenient headquarters. Please make your own travel reservations. I suggest we meet at Longwood Gardens at 10 A.M. We can observe the activities associated with the PRC work on the Longwood records in situ and later in the day see the facilities supplied by the Tyler Arboretum. My own schedule is such that we must complete the meeting during the single day.

I hope that as many as possible will attend this meeting. Please let me know one way or the other. If we cannot have a majority of the members for this meeting, I will let you know as quickly as possible. The next convenient date may be September 12 preceding the AABGA meeting and the AHS convention in Philadelphia.

Sincerely,

Dick

Richard A. Howard
Director

RAH/mp

Dave: Russ was completely tied up the 12th. Hope you can manage that extra day. I've got to get back to Boston that night too.

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25 April 1969

Dr. Richard A. Howard
The Arnold Arboretum of Harvard University
The Arborway
Jamaica Plain, Mass. 02130

Dear Dick:

I will be at the meeting on Tuesday, but because of the fact that you had to put it back one day, I will not have Hersh with me. I feel so discouraged about this whole business that I am almost ready to say that I don't have any more to contribute.

However, I will attempt to give my understanding of the situation in some depth to the Record Committee. I do hope that some assistance with travel can be forthcoming because as you know NSF budgets are drying up all over the place, ours included.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

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'At the Park of Roses'

The American Rose Society

4048 ROSELEA PLACE ■ COLUMBUS, OHIO 43214 ■ PHONE 268-7577

O. KEISTER EVANS JR.
Executive Secretary-Editor

March 28, 1969

Doctor Richard Howard
Plant Records Committee
% Arnold Arboretum of Harvard University
The Arborway
Jamaica Plain, Massachusetts 02130

Dear Doctor Howard:

I have read with interest your March 17 letter to the P.R.C. Committee. In view of the complicated circumstances I think you handled the role of Committee Chairman exceptionallly well. I would certainly agree that with the majority vote overruling the recommendations in your letter of March 7, we should proceed with a committee meeting as soon as possible. The committee members are obviously interested and concerned in the progresss and potential of the Plant Record Center. As is often the case, communications seems to be our biggest obstacle. A meeting of the committee on the site would certainly serve a good advantage to all the members. From that point we would each be better qualified to make objective evaluations as various committee requirements arise.

A meeting the first week in May will be fine with me.

I hope that some point in the near future we can consider the possibility of including the Rose Registration Records, now housed by the American Rose Society, The International Registration Authority for Roses, in the plans of the Plant Records Center.

Sincerely,

O. Keister Evans, Jr.
Executive Secretary

OKE:lr

CC: P.R.C. Committee

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28 March 1969

Dr. Richard A. Howard
The Arnold Arboretum
The Arborway
Jamaica Plain, Mass. 02130

Dear Dick:

As far as the PRC committee meeting is concerned, I would hope that we could schedule it sometime during the week of May 12. I will have been in Washington the week before that in a meeting with Mason Hale on the 5th, and I understand that Russ Seibert will be out during the same week. I hope that the week of the 12th is satisfactory - any time during that week.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

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THE ARNOLD ARBORETUM of HARVARD UNIVERSITY
THE ARBORWAY · JAMAICA PLAIN · MASSACHUSETTS 02130 · U.S.A.

OFFICE OF THE DIRECTOR

March 28, 1969

Dr. David J. Rogers
Professor of Biology
Taximetrics Laboratory, Armory 101
University of Colorado
Boulder, Colorado 80302

Dear Dave:

Three replies to my letter so far, in addition to yours, indicating the desire for a meeting in May. I thought we might work one in around your trip to Washington to save you the cross-country trip. Do you have a date for that visit? As I indicated, Seibert didn't want it on May 7 or 8 and now I don't want it on the 6th. The alternate choice was NOT Labor Day but sometime after that. The Congress goes until September 2 anyway, as I recall.

You are quite right that this must be at the Tyler-Longwood area and we will have to face MacDonald. Since most of the committee is uninformed, a demonstration of the crudity of coding will permit some elucidation. MacDonald will reply--it only has to be coded going in, it will come out in English. As to the uninspired programming the answer will be "that is all Seibert asked for" and Seibert will say "that is all we want or need". Regarding their phase two, their retort will be--there is no uniform information to go into that phase yet. MacDonald told the committee that they were using "third generation equipment", etc., on which I could not comment. I think it can be handled between us. If necessary, I'll use the budget financial ignorance approach.

The meeting must hinge on your schedule. If you don't mind making a special trip, any time is possible. Sorry, Dave!

Sincerely,

Dick

Richard A. Howard
Director

RAH/mp

Ans. Sup. Please 5/3/69 Dear Mari Tex.

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25 March 1969

Dr. Richard A. Howard
The Arnold Arboretum
The Arborway
Jamaica Plain, Mass. 02130

Dear Dick:

Sorry you didn't receive my telegram any sooner than you did, but I doubt that it would have done any good anyhow. With respect to the next meeting of the PRC committee, it probably will have to be in May because I will be busy on Labor Day at the International Botanical Congress in Seattle.

I suppose the committee must meet at the Tyler Arboretum, and I suppose it must have MacDonald present. I do not look forward to another discussion with that gentleman.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

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THE ARNOLD ARBORETUM of HARVARD UNIVERSITY
THE ARBORWAY · JAMAICA PLAIN · MASSACHUSETTS 02130 · U.S.A.

OFFICE OF THE DIRECTOR

March 19, 1969

Dr. David Rogers
Department of Taximetrics
University of Colorado
Boulder, Colorado 80302

Dear Dave:

The enclosed report summarizes the situation that developed in Williamsburg. Seibert had switched direction completely and when asked why, said we talked so fast and pressured him by "twisting his arm" that he responded as he did until he had time to digest our presentation. What really irked him was my statement that the program was "uninspired", for MacDonald, whom he invited, produced a xerox of Seibert's requests for listings. He was the uninspired one. Further, he told the committee there would be no second part to the grant if I went ahead and presented my recommendation. In fact he has us, for the original gift from the Longwood Foundation calls for quarterly reports to be made to the Foundation of expenditures and progress. The Society has failed to do this but will make an annual report at the end of this month and then ask for the next check.

I have suggested a meeting of the full committee. I hope you will be willing to attend. Your points, through my recommendation, will have an impact as people think about them, even if they didn't initially. I have not made a request that you withdraw your proposal although I or we are in no position now to accept. Let it stand on the books if you will, for effect. However, the full committee meeting must have you present as a better spokesman than I am. MacDonald, for example, showed a picture of the key tape machine and said this is the kind of equipment available to the project. He did not say they used it. He did say they employed the latest "third generation" computer in the print out listing he had on display. There are other examples of inconsistency. Clearly he had the advance of my recommendation to the committee without my having committee approval to present the other side. I offered to resign but it was not accepted. The dates suggested for the committee meeting are either the week in May when you are at the Smithsonian (although Russ is not available May 7, 8) or probably better, right after Labor Day and before the September meeting of the Board. Let me know your wishes.

Seeing the way the meeting went I feel your organization is entitled to a consultation fee for Estabrook's services. I hope you will donate yours. The bills for your travel have been mailed so I will recommend a separate check for $150 for services. Hope you will approve of this amount.

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Many thanks for your contribution to this. I'm convinced the Taxir system should be tried before we are through. On the other hand we have made a point and there may be validity to giving the man sufficient rope.

Sincerely,

Dick

Richard A. Howard
Director

RAH/iw

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THE ARNOLD ARBORETUM of HARVARD UNIVERSITY
THE ARBORWAY · JAMAICA PLAIN · MASSACHUSETTS 02130 · U.S.A.

OFFICE OF THE DIRECTOR

March 17, 1969

To Members of the Plant Records Committee:

I appreciate your responses to my duplicated letter of March 7. One was marked personal, one was handwritten, two were indicated as "copies to members of the committee". I am willing to circulate either extracts of the replies or copies, if you should wish them. The opinions were strongly expressed on both sides and would be tabulated as 7 opposing the proposals I made, 3, plus the chairman's view, in favor and two not replying. During a luncheon meeting on Saturday, March 15, the proposal was discussed further with four members of the committee all of whom favored no discussion of the proposals before the full board at least until the PRC committee could meet and discuss them fully.

Accordingly I reported to the AHS board in the afternoon meeting on the "problems" of being the chairman under the present interpretation of the Memorandum of Understanding. It is evident that a committee as diverse as ours with strong and often contradictory opinions on methods, personnel and goals is difficult to chair and that majority opinions must be accepted. Therefore I proposed that the report which the director of the Plant Records Center submitted to us be accepted excluding the budget item.

The September 1968 report including personal employee benefits was mentioned as an example of a report submitted to the full committee by the director suggesting action on matters properly the responsibility of the AHS executive committee or its secretary and financial officer. The matter of vacation, insurance, health benefits, etc. for PRC personnel are being discussed by the director and the executive board of the AHS. Accordingly future reports will be sent to the chairman for distribution to the committee as appropriate.

The budget submitted by the director with his March 1 report covered more than a single fiscal year of 12 months; included income from contracts not approved by the AHS; included salary increases which the finance officer should approve etc. It was concluded at the Williamsburg meeting that the accounting year should be April 1, 1968 when the Longwood Foundation grant was received, to March 31, 1969 and an annual report of activities and expenditures of funds should be submitted to the Longwood Foundation at that time. The second fiscal year therefore would be April 1, 1969 to March 31, 1970, the duration of the Longwood Foundation Grant. The AHS is obligated to continue operation through July 14, 1970 if the Memorandum of Understanding is renewed for a similar second year. It is probable that the full amount of the Longwood Grant will not be spent by April 1, 1970 and a request for an extension of time to work on the grant funds can be made during the next year. A new budget will be submitted for a second fiscal year with an informal addendum

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indicating the anticipated expenses for the final contract months of April 1, 1970 through July 14, 1970. The AHS Development Committee which has the responsibility for the future financing of the Society is including the future financing of the PRC in its applications. The next year, therefore, is critical as the time to determine the actual costs of operation of the PRC, the nature of the basic organization of the PRC and its fundamental costs, the practicality of financing the PRC completely through its operations or the need for supplemental foundation support.

According to the Memorandum of Understanding, paragraph 3 on authority "...proposals can be made to other organizations for work to be performed at the Plant Records Center, such proposals are to have the prior approval of the Plant Records Committee". This committee will be called upon to consider a proposal the director wishes to make to the Dawes Arboretum.

Your replies in general suggested a full committee meeting was desirable. At least one member will not be available until the 1st of May. Do you wish a meeting in early May between the 1st and 10th (excluding the 7th and 8th)? Otherwise I suggest we meet immediately after Labor Day in September to precede the fall meeting of the AHS board. The meeting probably should be in the PRC operation area of the Tyler Arboretum and the Longwood Garden. We have found the Holiday Inn at Media, Pennsylvania to be convenient.

May I also report to you that subsequent to the mailing of my letter to you on March 7, I did receive a critique from Dr. Rogers relative to the visit of Rogers and Estabrook with me to the PRC. I also received from the Department of Taximetrics a proposal as suggested in numbered paragraph 4 of my letter. The critique and the proposal, although available, were not presented to the AHS board on the basis of your votes. In fact, a telegram from Rogers arrived at the Williamsburg Lodge before the meeting but was not called to my attention until I checked in the hotel in the evening. Rogers telegram reads: "I feel that the opposition to your proposals to withdraw support from McDonald is largely the result of the dual roles I play as a member of the PRC committee. One as potential contractor to AHS for the PRC. For this reason at your suggestion I will withdraw our proposal to AHS to pick up from McDonald and our proposal to begin a new investigation. My critique of McDonald stands. I wish AHS well." I did not and do not now suggest Rogers withdraw his proposal even though the majority does not accept the principle, and I consider it essential that he be present at any committee meeting when a discussion of the PRC is held. I will inform him directly as well as through this letter that as a committee the majority voted not to accept the proposal I put forth in the letter of March 7. As a chairman I do appreciate his concern that led to the serious discussions of the PRC and the recommendations of my letter. I am equally appreciative of the opinions of members of the majority who based their replies on equally sensitive points of concern.

Sincerely,

Richard A. Howard

Richard A. Howard
Chairman, Plant Records Committee

RAH/iw

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Star Roses ★ *West Grove, Pa. 19390*

THE CONARD-PYLE COMPANY

March 24, 1969

Mr. Richard A. Howard, Chairman
Plant Records Committee
c/o Arnold Arboretum of Harvard University
The Arborway
Jamaica Plain, Mass. 02130

PLANT RECORDS COMMITTEE

Dear Mr. Howard:

Thank you very much for the report contained in your letter of March 17. In the light of the Committee's expression of opinion, I believe the decision you have made to be a sound one.

Your suggestion of a meeting in early May is I think desirable and I will be available provided you set a specific date in the near future so I can get it scheduled. Wherever you suggest as a location will be fine with me.

Sincerely,

S.B. Hutton, Jr.
Member
Plant Records Committee - mf

CC: W.R. Crowley, Jr.
C. Keister Evans
Wells Knierim
D.G. Leach
Dr. H.J. Seibert
J.M. Patek
Dr. D.J. Rogers
Dr. J. Oppe
Mrs. Julian Hill
Dr. T.D. Throckmorton
Reid Dennis

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ARTHUR HOYT SCOTT HORTICULTURAL FOUNDATION
SWARTHMORE COLLEGE
SWARTHMORE, PENNSYLVANIA 19081

March 11, 1969

Dr. Richard A. Howard
The Arnold Arboretum
The Arborway
Jamaica Plain
Massachusetts. 02130

Dear Dick:

Received your memo of March 7, 1969 regarding the proposals which you favor for presentation to the AHS Board. I intend to telephone you regarding this matter but felt you might also like my thoughts in writing.

First of all I agree that progress to date of PRC is satisfactory. As a matter of fact I felt strongly enough regarding the progress of the PRC that I persuaded the Board of the Dawes Arboretum to allow that institution to take part in the PRC. I have also taken the initial steps here at the Scott Foundation to allow for the computerization of their records. This I feel is a reflection of my support for the PRC as envisioned and established under Bob McDonald's supervision.

Your basic premise as expressed in item one of the proposals is that progress to date has been satisfactory. It seems odd then that you should propose to recommend to the AHS Board that this program not be extended to other Gardens but instead to allow Dr. Roger's institution an opportunity to conduct a counter test based on the TAXIR system.

It was my understanding that Dr. Roger and Mr. Estabrook were brought to the PRC in an attempt to review its activities, to consult with Bob McDonald and to make proposals as to how the existing system might be improved. It was not my understanding that the PRC under Bob McDonald's supervision was to be dropped or disbanded as a result of Dr.Roger's analysis.

As I am sure you can see by the foregoing statements I am very much opposed to presenting such proposals to the AHS Board for their consideration. Up to this point I felt, and I am sure that other members of the Committee will concur, that progress on the PRC was satisfactory. I am very much concerned with what effects your proposals might have on the future of the PRC, particularly as regards the raising of additional funds to carry the program forward once the Longwood Foundation grant is exhausted. Since your proposals are rather drastic as I see it, it would appear to me that before they are presented to the AHS Board that the Committee should meet and discuss them.

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It was nice seeing you at the Tyler Arboretum the other day and I appreciate your invitation to visit the Arnold Arboretum this spring. Hopefully I will be able to do so. You, of course, have a standing invitation to visit us here at the Scott Foundation whenever you are able.

Sincerely,

Joseph W. Oppe

Joseph W. Oppe
Director.

cc: All Members of the
Plant Records Center
Committee.

JWO/eei

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R.A. Howard - Home - 617-973-7948

THE ARNOLD ARBORETUM of HARVARD UNIVERSITY
THE ARBORWAY · JAMAICA PLAIN · MASSACHUSETTS 02130 · U.S.A.
617-524-1715

OFFICE OF THE DIRECTOR

March 7, 1969

To members of the Plant Records Center Committee:

We have all received directly from Robert MacDonald a quarterly report of the activities of his group; a budget proposed for the next 15 months of operation which indicates the completion of the work on the Longwood Garden records and the extension of the activities of the PRC to other gardens and societies; and finally a copy of the User's Manual.

A meeting of the AHS Board is scheduled for Williamsburg on March 14th and I wish to represent your views in person. Due to my own hesitation on several points in the material received from Robert Macdonald, I asked Dr. David Rogers, a member of this committee and chairman of the Department of Taximetrics of the University of Colorado, to join me with a member of his staff, Mr. George Estabrook, a mathemetician and programmer for the TAXIR system, to review the PRC activities through consultation with MacDonald; to consult with Dr. Seibert (Director, Longwood Gardens) and to confer with Mr. Glenn Eastburn, finance officer of the AHS. We have completed that visit and I can report to you on it.

As a statement of progress Bob MacDonald and his staff have: 1. developed a standard record card (not yet available due to printer's errors) which will be the form on which he recommends data should be recorded for use in the system he has adopted; 2. a user's manual for the procedures to be followed if the PRC is to apply its talents and experience to the records of other gardens; 3. processed all the information available in card records of the living collections of the Longwood Gardens. This information, in the procedure adopted, has been copied by hand by PRC clerks on "green sheets" in letters or in code (family name, geographical locality only to the present) and then sent to a commercial firm where the information is key punched on cards, recorded on magnetic tape and, on request, printed out by machine. The print-outs of the records are being proofread and corrections are to be made. It is estimated that this will require another month. After that the records of the dead file (est. 7,000 items) will be processed and corrected (est. 3-5 months), completing all the work proposed by the PRC staff directly on the Longwood Garden records within the first full year of operation; 4. established contacts with gardens, societies or individuals where records may be processed cooperatively or on contract.

For the majority of the second year, then, MacDonald proposes to work with the records of other gardens, in part on a contract basis involving the PRC staff, and to process the cultivar check lists of the Magnolia Society and possibly the Holly Society, and to determine further areas of application within horticulture of the procedures adopted.

I feel that this committee must eventually express its opinion to the AHS board on the procedures which should be adopted. In the current review of the procedures we found the techniques of mounting the material to be awkward and obviously expensive and the procedure redundant when modern key-tape machines permit the clearer alpha-numeric entries and eliminate much hand work. The progress made toward coding procedures

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seems also to be an unnecessary step. The actual programming is uninspired and has not used the potential of the machines available. Therefore, I wish your reaction to the following proposals which I favor presenting to the AHS board for adoption.

1. We accept as a satisfactory first trial the procedures developed by MacDonald and exemplified by the records of the Longwood Gardens which he will have completed by July 1.

2. This procedure is not to be abandoned at the present time but should not be extended to other gardens by the AHS PRC.

3. The employment of Robert MacDonald and the staff he has hired on behalf of the AHS project be terminated on July 14th under the provision in paragraph 1 of the Memorandum of Understanding. (To begin as of July 15, 1968 and to terminate as of July 14, 1969, but to be renewable as of this date by mutual agreement for a further period of one year or through July 14, 1970, if at the end of the first year the progress of the Center is sufficient to assure completion of the approved Longwood project in accordance with the requirements of the Longwood grant.)

4. The Board should consider a proposal to be submitted by the Department of Taxi-metrics of the University of Colorado. This proposal will include: a. that they will obtain a tape or set of key punch cards of the data mounted from the Longwood Garden Records and write and conduct a program showing variations possible in the organization and retrival of the data. b. Select with the consultation and approval of your chairman the records of another garden willing to cooperate and mount, program and produce by print-outs a demonstration of the potential of the TAXIR system; c. Submit a detailed cost analysis of the two programs. d. Submit recommendations regarding the continuation of the PRC. It is understood the work proposed will be completed during the final year of the Longwood Grant. The proposal can be financed within the funds still available in the Longwood Foundation grant to the AHS.

5. This committee should assemble in late spring of 1970 to consider in detail the methods, costs and results of the two systems and submit a report to the AHS board of Directors with recommendations for the procedures to be adopted and for the future activities of the Plant Records Center.

Sincerely,

Richard A. Howard

Richard A. Howard, Chairman, P.R.C.

P. S. May I have your reaction by return card or letter to reach this office by Friday, March 14th. If you would like to discuss any part of this, feel free to call me collect between 9-12 A.M., Boston time, Wednesday, Thursday or Friday, March 12, 13 or 14 - 617-524-1718 or at home in the evening of March 13 or 14 between 7 and 11 P.M., Boston time - 617-973-7948. I plan to present this to the AHS board at Williamsburg on the 15th and I will arrive at the meeting area about 11 A.M. An informal discussion with any present can be held at lunch before the afternoon meeting.

R.A.H.

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Star Roses ★ *West Grove, Pa. 19390*

THE CONARD-PYLE COMPANY

March 11, 1969

TO: Dr. Richard A. Howard, Chairman
Members of Plant Records Center Committee

Thank you for your letter of March 7 with your progress report on the Plant Records Center and your recommendations on proposals to be presented to the American Horticultural Society Board at their March 14 meeting.

I am opposed to your proposals and do not believe they should be presented to the AHS Board. I would further state that if the Committee does adopt your proposals, that Robert MacDonald also be invited to appear at the AHS Board meeting. This would seem to me only reasonable.

At the outset I will plead almost total ignorance of anything that has transpired and if I'm in error my mind can change.

Reasons for my opposition are:

1) The old adage "don't change horses in mid-stream." With one year of the project left to go more progress can be made completing it with experienced personnel now employed than any change, no matter how competent or even superior is likely to achieve.

2) Sufficient reasons for making such a change are not in my opinion, contained in your letter. If some mistakes have been made - and I have no direct knowledge that they have - I'm sure they can be corrected with less drastic surgery than severing the root.

3) The evaluation team that met with MacDonald certainly could not be called unbiased with two of them from the University of Colorado which is interested in taking over the Plant Records Center work.

4) If conditions are such as to require such drastic action as the total withdrawal of this project from one group and assignment to another, then our Committee has been derelict in its supervisory responsibilities in not knowing of this sooner.

5) I took the liberty of phoning Dr. Sebert at Longwood Gardens for up-to-date information and he informs me that in his opinion the present PRC set-up is working well, efficiently, accurately and with good speed. He, too, appears to be at a loss in understanding any need for a change.

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THE CONARD-PYLE CO., WEST GROVE, PA.

Dr. Richard A. Howard, Chairman - March 11, 1969
Members of Plant Records Center Committee

I would be in favor of a Committee meeting to examine possibilities for any improvements that can be made in the work of the Plant Records Center within the framework of its present personnel and organization, but I cannot agree with its outright dismissal.

If you do make to the AHS Board your recommendations, I would appreciate your reading to them this letter of opposition.

Sincerely,

S.B. Hutton, Jr.
Member
Plant Records Center Committee

SBHj/mf

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Telegram

R A Howard - Personal
c/o AHS Governing Bd.

I feel that the opposition to your proposals to withdraw support from McDonald is largely the result of the dual roles I play - one as a member of the PRC Committee, one as ~~proposal to~~ potential contractor to AHS for the PRC. For this reason, ~~I withdraw~~ our proposal to AHS to pick up from McDonald, ~~or~~ ~~to~~ and our proposal to begin a new investigation.
My critique of McDonald stands.
I wish AHS well

at your suggestion I will withdraw

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10 March 1969

Dr. Richard A. Howard
The Arnold Arboretum
The arborway
Jamaica Plain, Mass. 02130

Dear Dick:

Enclosed is a list of our expenses for the trip to Philadelphia. We have not, of course, billed you for any consulting fee, although it would be nice if such were available.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

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TAXIMETRICS LABORATORY
DEPARTMENT OF BIOLOGY
ARMORY 101
UNIVERSITY OF COLORADO
BOULDER, COLORADO 80302

10 March 1969

EXPENSES: Trip to Philadelphia

For George Estabrook'	
Plane Fare	$186.00
For David J. Rogers	
Plane Fare	$186.00
Car Rental (Phila.)	36.20
(Denver)	9.00
Motel	41.19
	$272.39

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Report to Dr. R. A. Howard, A.H.S. chairman of the Plant Records Committee from D.J.R., Mar. 10, 1969

I. Our understanding of the objectives of the AHS

We believe that the objectives of the AHS with respect to some retrieval system ~~is~~ are:

(a) To discover the feasibility of a computer-~~oriented~~ assisted information retrieval system for the records of arboreta and botanic gardens.

(b) To employ some person to develop a pilot project to study the problem, devise systems, and determine the costs of such a system.

~~He~~ Robert McDonald was engaged to fulfill the above objectives, using the records and resources of Longwood Gardens as a test case to develop the systems.

II. The nature of information retrieval systems.

Our understanding of the involvements which would allow the development of these objectives are:

(a) Pre-computer activities--the preparation of data for machine manipulation.

(b) Computer program design--the program instructions, the flow-charts, the documentation of the programs which will (i) store the information in the computer (ii) produce certain desired results, such as the ability to ask questions about the stored data, and produce printed lists, or cards, in any of several desired formats.

(c) Cost/effectiveness studies--analysis of each step of the project to determine what personnel involvement, machine involvement, and dissemination procedures cost in time and money. Effectiveness of the project should also be measured against other information retrieval systems to determine whether one design or another is the most effective system for the AHS.

III. Analysis of the present operations at the Tyler Arboretum and Longwood Garden.

From an interview with Mr. McDonald on March 5 & 6th, 1969, we believe that the Plant Records Center has embarked upon an operational scheme, and

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has not investigated the various potential systems available to ~~him~~ them in other organizations. As best we can determine, the present activities at Longwood Garden and at the Tyler Arboretum have been involved largely with II(a) above; to a lesser extent some work has been done on part II(b) by contract with EDS (Electronic Data Systems), and none has been done on II (c).

The work in II (~~A~~ a) described to us by Mr. McDonald is something as follows (in steps):

(i) Transfer file information to standardized card (PRC form)
(ii) Transfer card information to coding sheet.
(iii) Transfer coding sheet information to IBM punch card.
(iv) Print information from IBM cards to be proof-read.
(v) Correct errors, and repunch cards.

Two procedures develop with the above, depending on whether the work is done on the Longwood files or is to be done from collaborating institutions not at Longwood. In the first case, the file records at Longwood are transferred directly to coding sheets (step iii) and thence on through iv and v. In the second case, information is taken from the present files, transferred to the standardized card by workers at the separate institutions, and thense into step ~~iv~~, iii, etc. by the staff of PRC.

The work done in II (b) for McDonald by the EDS so far is approximately as follows (we did not, however, actually see the programs):

(1) take coding sheets from step (iii) above and put onto IBM cards, and prepare a printed list of the card information (step iv).

(2) take corrected cards from step v and prepare ordered lists, arranged in one of 18 different orders, of all (or some parts of) the information in the cards. We didn't see these lists, but they were promised on the day we left.

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IV. Critique of the present operating procedures.

The most impressive point about the present operating schemes designed by Mr. McDonald is the failure to take advantage of the modern computing facilities available in several locations in the country. The best example is the use in his system of pre-coded numbers for names of plant families, for country, etc., a complete disregard for the facility of the computing machine to provide the coding internally in the machine, allowing the individual worker in an arboretum the freedom to write down the exact words he chooses for the most meaning to him.

This further indicates the failure to see all the way through a system, from the point of data gathering to final output. We are convinced that Mr. McDonald does not understand the complexities of computer programming, and this is most evident in the very small budgeting for "computer programming." Were he realistic, he would have budgeted much more money for this aspect. Either that, or he would have called upon the expertise in the country from whom he might have derived at much lower cost the needed computer programs.

Mr. McDonald has chosen to prepare his data "in vacuo" hoping that someone could take his procedures and go forward with some useful information retrieval program after he had completed his work. Such operations are, of course, doomed to failure, as has been demonstrated many times over in this country. It is absolutely essential to involve all, of the people, horticulturists, mathematicians, programmers, and cost-effectiveness experts at the very beginning, and develop the systems in advance of actually preparing data. The fixed-field format used by Mr. McDonald is extremely limited in application, and causes much of the difficulty which has already been encountered.

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Even in those parts of the development where there has been considerable effort, part II (a), there has been disregard for good operational procedures. For example, the five steps now involved, could be telescoped into two, and a computer program developed to proof-read the input cards with much greater speed and accuracy. There seems to be little effort to employ individuals in the various arboreta to their maximum efficiency, cutting overhead costs by a very appreciable amount. The types of input devices also seem to be very poorly employed. For example, a key-tape device is presently available which cuts out the need for first punching data, and then have these data "read" into the machine, because the key-tape machine prepared data in the exact manner read by the machine. Were the key-tape machine employed, a clerical assistant in each arboretum, already charged with making present file records, could prepare machine-readable data, circumventing all needs for standardized code cards, transferance to coding sheets, key-punching, and proof reading as now done. Furthermore, to charge some $30-$35.00 for the "user's manual" is completely beyond reason.

Finally, to be in keeping with the objectives of the AHS, a cost effectiveness study is absolutely essential to provide the AHS with some realistic figures on the costs which can be expected from such an endeavor. Without these no effective means is given for decisions to accept or reject the findings of the pilot project. No such technique is employed by Mr. McDonald, and his costs so far stated do not take into account many actual costs. Rather, costs for data encoding have been figured on a haphazard basis, and are more guesses than derivation from actual work.

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Report to Dr. R. A. Howard, A.H.S. Chairman of the Plant Records Committee

From: David J. Rogers

Date: March 10, 1969

I. Our understanding of the objectives of the AHS.

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Robert MacDonald was engaged to fulfill the above objectives, using the records and resources of Longwood Gardens as a test case to develop the system.

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(c) Cost/effectiveness studies - analysis of each step of the project to determine what personnel involvement, machine involvement, and dissemination procedures cost in time and money. Effectiveness of the project should also be measured against other information systems to determine whether one design or another is the most effective system for the AHS.

III. Analysis of the present operations at the Tyler Arboretum and Longwood Garden.

From an interview with Mr. MacDonald on March 5 and 6, 1969, we believe that the Plant Records Center has embarked upon an operational scheme, and has not investigated the various potential systems available to them in other organizations. As best we can determine, the present activities at Longwood

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Garden and at the Tyler Arboretum have been involved largely with II(a) above; to a lesser extent some work has been done on part II(b) by contract with EDS (Electronic Data Systems), and none has been done on II(c).

The work in II(a) described to us by Mr. MacDonald is something as follows (in steps):

i. Transfer file information to standardized card (PRC form).
ii. Transfer card information to coding sheet.
iii. Transfer coding sheet information to IBM punch card.
iv. Print information from IBM punch cards to be proof-read.
v. Correct errors, and repunch cards.

Two procedures develop with the above, depending on whether the work is done on the Longwood files or is to be done from collaborating institutions not at Longwood. In the first case, the file records at Longwood are transferred directly to coding sheets (step iii) and thence on through iv and v. In the second case, information is taken from the present files, transferred to the standardized card by workers at the separate institutions, and thence into step iii, etc. by the staff of PRC.

The work done in II(b) for MacDonald by the EDS so far is approximately as follows (we did not, however, actually see the programs):

(1) take coding sheets from step iii above and put onto IBM cards, and prepare a printed list of the card information (step iv).

(2) take corrected cards from step v and prepare ordered lists, arranged in one of 18 different orders, of all (or some parts of) the information in the cards. We didn't see these lists, but they were promised on the day we left.

IV. Critique of the present operating procedures.

The most impressive point about the present operating schemes designed by Mr. MacDonald is the failure to take advantage of the modern computing facilities available in several locations in the country. The best example is the use in his system of pre-coded numbers for names of plant families, for country, etc., a complete disregard for the facility of the computing machine to provide the coding internally in the machine, allowing the individual worker in an arboretum the freedom to write down the exact words he chooses for the most meaning to him.

This further indicates the failure to see all the way through a system, from the point of data gathering to final output. We are convinced that

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Mr. MacDonald does not understand the complexities of computer programming, and this is most evident in the very small budgeting for "computer programming." Were he realistic, he would have budgeted much more money for this aspect. Either that, or he would have called upon the expertise in the country from whom he might have derived at much lower cost the needed computer programs.

Mr. MacDonald has chosen to prepare his data "in vacuo" hoping that someone could take his procedures and go forward with some useful information retrieval program after he had completed his work. Such operations are, of course, doomed to failure, as has been demonstrated many times over in this country. It is absolutely essential to involve all of the people, horticulturists, mathematicians, programmers, and cost-effectiveness experts at the very beginning, and develop the systems in advance of actually preparing data. The fixed-field format used by Mr. MacDonald is extremely limited in application, and causes much of the difficulty which has already been encountered.

Even in those parts of the development where there has been considerable effort, part II(a), there has been disregard for good operational procedures. For example, the five steps now involved could be telescoped into two, and a computer program developed to proof-read the input cards with much greater speed and accuracy. There seems to be little effort to employ individuals in the various arboreta to their maximum efficiency, cutting overhead costs by a very appreciable amount. The types of input devices also seem to be very pporly employed. For example, a key-tape device is presently available which cuts out the need for first punching data, and then having these data "read" into the machine, because the key-tape machine prepares data in the exact manner read by the machine. Were the key-tape machine employed, a clerical assistant in each arboretum, already charged with making present file records, could prepare machine-readable data, circumventing all needs for standardized code cards, transferance to coding sheets, key-punching, and proof reading as now done. Furthermore, to charge some $30 - $35.00 for the "user's manual" is completely beyond reason.

Finally, to be in keeping with the objectives of the AHS, a cost-effectiveness study is absolutely essential to provide the AHS with some realistic figures on the costs which can be expected from such an endeavor. Without these no effective means is given for decisions to accept or reject the

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findings of the pilot project. No such technique is employed by Mr. MacDonald, and his costs so far stated do not take into account many actual costs. Rather, costs for data encoding have been figured on a haphazard basis, and are more guesses than derivation from actual work.

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FEB 20 1969

THE ARNOLD ARBORETUM of HARVARD UNIVERSITY
THE ARBORWAY · JAMAICA PLAIN · MASSACHUSETTS 02130 · U.S.A.

OFFICE OF THE DIRECTOR

February 17, 1969

Dr. David Rogers
Department of Biology
Armory 101
University of Colorado
Boulder, Colorado 80302

Dear Dave:

Through various absences including my own past two weeks change of scenery in Puerto Rico there have been delays in implementing our conversation over lunch in New York. Today (Washington's birthday in Mass.) I had a call from Russ Seibert who suggests the first week of March - March 3 through noon on March7 as open for him and/or MacDonald. Could you make a trip east in that period to visit Seibert-MacDonald and discuss the activities or progress of the Plant Records Center? I'll keep that time open in my schedule as long as possible and hope to meet with you. If you can come on such short notice, let me know with a copy to Russell Seibert or vice versa. The PRC project will reimburse your expenses and Russ can make a reservation for you. I'll react accordingly.

The AHS meeting is March 14th so I'd like to report then on your recommendations as a member of the PRC committee.

Sincerely,

Richard A. Howard
Director

RAH/iw

Harvard 617-868-7600 X 2363

25 Feb 9AM Phone call - March 5 & 6, call Brell come? Please notify Russ Siebert.

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AHS PLANT RECORDS CENTER
FINANCIAL REPORT
April 1, 1968 to February 28, 1969

Longwood Foundation Grant $52,000.00

DISBURSEMENTS		FIRST 12 MONTH BUDGET	BUDGET BALANCE
Payroll -			
Director	$ 3,384.64		
Administrative Asst.	3,576.93		
Clerical	7,972.62		
TOTAL	$14,934.19	$21,625.00	$ 6,690.81
Less Unremitted Deductions	-513.19		+513.19
Paid as of February 28,'69	14,421.03	21,625.00	7,203.97
Computer Services	2,229.50	6,000.00	3,770.50
Travel & Consultation	2,222.29	4,000.00	1,777.71
Printing, Etc.	717.51	2,000.00	1,282.49
Office Operation	3,093.59	3,000.00	(93.59)
Off-Line Procurement	1,589.00	5,000.00	3,411.00
AHS Administration	3,124.98	6,250.00	3,125.02
Social Security Tax	465.46	2,125.00	1,659.54
Contingency	----	2,000.00	2,000.00
TOTALS	$27,863.36	$52,000.00	$24,136.64

Identification of AHS-PRC Funds -

American Security & Trust-General Accounts	$12,526.23
American Security & Trust-Budget Account	1,510.41
American Security-Certificates of Deposit	10,000.00
Petty Cash (Lima)	100.00
TOTAL	$24,136.64

Glenn B. Eastburn, Finance Officer

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THE AMERICAN HORTICULTURAL SOCIETY, INC. PLANT RECORDS CENTER John J. Tyler Arboretum 515 Painter Road Lima, Pennsylvania 19060
215-566-1782/215-566-5431

January 30, 1969

Dr. David J. Rogers
Professor of Biology
Taximetrics Laboratory
Armory 101
University of Colorado
Boulder, Colorado 80302

Dear Dave:

Your letter of January 28 just received and noted. I acknowledge the fact that I have been remiss in getting some data to you. However, this was occasioned by the resignation of my Administrative Assistant during the early part of December, combined with the Christmas holidays and the fact that my wife presented me with a son in January.

My new Administrative Assistant, Mrs. Margaret Miller, has been reviewing the descriptor decks and bringing them up to date and has also prepared a deck of 100 sorted records for you. These should be in the mail to you within the next few days. Also, we will send to you copies of our User's Manual and our Master Manual so that you can see just what it is that we are doing.

I apoligize for the delay, but events have conspired against me.

With best wishes,

BOB

Robert D. MacDonald
Director

RDM/ac

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28 January 1969

Dr. Robert D. MacDonald
Plant Records Center
John Tyler Arboretum
Lima, Penna. 19060

Dear Bob:

For some time now I have had on my desk your various decks of coded descriptors and have meant to acknowledge them previously. Unfortunately (probably by oversight) there were not included any data decks. I wondered if you had intended to omit them or not.

We have been waiting to hear whether or not your wished to continue collaboratove efforts with us. In the absence of such word from you, there isn't much we can do. Perhaps by now you can tell me the score.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

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FEB 11 1969

THE ARNOLD ARBORETUM of HARVARD UNIVERSITY
THE ARBORWAY · JAMAICA PLAIN · MASSACHUSETTS 02130 · U.S.A.

OFFICE OF THE DIRECTOR

February 6, 1969

To members of the AHS Plant Records Center Committee:

Last November I requested a progress report from Robert MacDonald on the activities of the Plant Records Center which I had planned to paraphrase as might seem desirable and submit for the Board Meeting of the AHS in Chicago. As you know through a copy of his letter dated November 27, 1968, Bob reread the Memorandum of Understanding with the AHS and decided to report to ALL members of the AHS Plant Records Center Committee instead of just to the chairman for his (my) transmittal to you. This interpretation is possible but was slightly unexpected.

A report was submitted by me as your chairman to the Board for their Chicago meeting and copies were distributed to you from the AHS office. I have waited this length of time for your individual reaction to the material you received directly from MacDonald. Perhaps you too have replied directly to him in which case a chairman remains in the dark but perhaps has less to do.

MacDonald's report was certainly acceptable but his letter brought up administrative matters on salary increases, time, benefits, holidays and insurance plans. These were not matters of concern to the Plant Records Center Committee but should be dealt with by the AHS governing board. Accordingly President Galle has asked the Eastburns to examine MacDonald's proposals for board action at Williamsburg. If you wish to comment on this, feel free to do so to me or to officers of the Society directly.

The Williamsburg Board Meeting is scheduled for March 14. If any of you care to visit the Tyler Arboretum and examine the operation of the PRC there and at Longwood before that date and make any suggestions to me, I will see they are transmitted to the AHS Board in the next quarterly report which I plan to submit at that time. I hope it may be possible to arrange a special meeting for the EDP specialists at Longwood-Tyler during the interval.

I will be away from this office until February 16 but look forward to any communications you may wish to send after that date.

Sincerely,

Richard A. Howard iw.

Richard A. Howard
Director

RAH/iw

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FEB 18 1969

THE AMERICAN HORTICULTURAL SOCIETY, INC. PLANT RECORDS CENTER John J. Tyler Arboretum 515 Painter Road Lima, Pennsylvania 19060
215-566-1782/215-566-5431

February 14, 1969

Dr. David Rogers
Prof. of Biology
Taximetric Laboratory
Armory 101
University of Colorado
Boulder, Colorado.

Dear Dr. Rogers:

We are sending you, under separate cover, a Master manual covering the entry of data on the PRC standard accession card, a User's manual, 100 random records and also additional cards which will update the materials you have already received.

If you have any questions, please feel free to write, and we will be glad to help you in any way we can.

Sincerely,

Robert D. MacDonald

Robert D. MacDonald
Director.

RDM:mm

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THE AMERICAN HORTICULTURAL SOCIETY, INC. PLANT RECORDS CENTER

November 30, 1968

Dr. David J. Rogers
Professor of Biology
Department of Biology
University of Colorado
Boulder, Colorado 80302

Dear Dave:

Just a short note to let you know that you have not been forgotten. We had to make some changes in our data and bring our manual up to date to reflect these changes. Thanksgiving holidays and reports slowed us up a bit as well.

The information I said I would send should be in the mail by the sixth. This will include:

1. Manual
2. Deck of 100 random records
3. Country of origin code deck
4. Family name code deck
5. Source keyword deck

I will keep you posted on our developments here.

With best wishes,

Bob

ROBERT D. MacDONALD
Director

RDM:mm

encl.
cc: Dr. Howard

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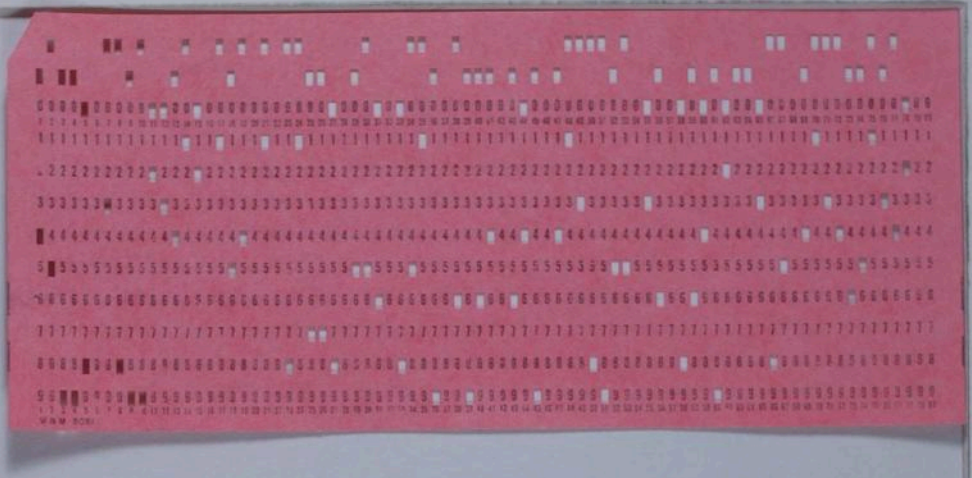

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THE ARNOLD ARBORETUM of HARVARD UNIVERSITY
THE ARBORWAY · JAMAICA PLAIN · MASSACHUSETTS 02130 · U.S.A.

OFFICE OF THE DIRECTOR

November 29, 1968

Dr. David Rogers
Department of Biology
Armory 101
University of Colorado
Boulder, Colorado 80302

Dear Dave:

I'm sorry to have the contents of your letter but I do need to know more and I'll do my best to get to the New York Botanical Garden on the afternoon of December 14. I'm committed to lectures at the University of Maine on the evening of the 12th and the 13th. I had planned to come back to Boston that night assuming the weather permitted the trip and I'll plan on continuing to the Garden in the morning, again assuming the weather will permit. I suspect now I'll fly down.

Sincerely,

Dick

Richard A. Howard
Director

RAH/iw

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demonstration. At present, TAXIR is proposed to consist of four modules (Accessioner, Display, Book, and Data Vet). Only Accessioner and Book are developed and developed only in prototype. Operation of TAXIR is presently done completely in core--their operation with the genus Manihot containing only some 2,000 records. The TAXIR program has not been developed to the stage where a determination of the efficiency and economics of its usage for our project may be accurately determined. A random sampling of 100 records plus a comprehensive package containing information about our record descriptors and descriptor states will be submitted to the University of Colorado Taximetrics Laboratory for trial. It is not yet clear, if TAXIR is found to be acceptable for the PRC, that the desired output may be generated by the termination of the initial grant period. This aspect is to be explored.

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OFFICE OF THE DIRECTOR

December 2, 1968

Dr. David Rogers
Department of Biology
Armory 101
University of Colorado
Boulder, Colorado 80302

Dear Dave:

I have asked Bob MacDonald for an interim report of activities of the Plant Record Center to pass on to the the board meeting of the A.H.S. I am enclosing a paragraph of his report that starts with the sentences "R.D. MacDonald attended the TAXIR demonstration held in Boulder, Colorado on October 7-8. Some 50 persons from the United States and Mexico attended this..." and continues with the xeroxed paragraph.

In line with our recent exchange of letters, does this statement have validity as far as his work is concerned? Although the Longwood grant was to establish a P.R.C. and to try its operation on the Longwood records, there is an obligation felt and expressed in conversation that the Longwood records MUST be completed in that two year period of the grant. Where financing will come from after that period is the big question right now.

I'm planning to be at the NYBG the afternoon of Saturday the 14th, weather permitting. I'll fly down and get out to the garden by a surface route, somehow.

Sincerely,

Richard A. Howard (by Irene Wylie)
Richard A. Howard
Director

RAH/iw
Encl.

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21 November 1968

Dr. Richard A. Howard
The Arnold Arboretum of Harvard University
Jamaica Plain, Mass. 02130

Dear Dick:

We have attempted on several occasions to establish working relations with McDonald on the development of the plant record system. Our experiences have been somewhat frustrating because when we think we have some sort of agreement we later discover that we do not. While I can appreciate his problems in getting started, I cannot see why we have so much difficulty in the continuation of what we thought to be agreed upon.

I would like to talk to you about the situation to see if perhaps you can shed some light on the activities. I cannot arrange a trip to Cambridge, but I have a suggestion which I hope you will be interested in. I have to be in New York on the weekend of December 14 and 15, and probably will be at the NYBG one or both of those days. Would it be convenient for you to meet me, say, on the afternoon of the 14th at the Garden where we may talk about our information retrieval system, the potential application of this system to the plant records, and try to discover some operating procedure whereby we can reduce the confusion with McDonald? Let me know if you can make it, or if not, can you think of any alternative?

Sincerely,

David J. Rogers
Professor of Biology

DJR:qm

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THE AMERICAN HORTICULTURAL SOCIETY, INC. 2401 CALVERT ST., N.W. • WASHINGTON, D.C. 20008 • 202-387-3100

September 12, 1968

To Members of the Plant Records Center Committee:

Greetings:

I was asked to submit a report of the development of the PRC and its progress for the meeting of the Board of the AHS at San Francisco. Although some of you will be there and will be aware of this report, I am taking the liberty of sending copies to all of you. The Six Month Chronology is in my opinion a record of significant progress. There will be less to report in the next six months when the long routine of preparing data for encoding continues. Nevertheless, we are underway and the first "mark" was made on September 9th. Bob MacDonald will have to keep close watch on the encoding procedure. Secretaries cannot be counted upon to know all the spelling errors, synonymy and technical mistakes that are bound to be daily occurrences when one takes botanical garden records and seeks uniformity of encoding. However, we expect him to learn the problems and I'll report to you at stages of progress.

The grant from the Longwood Foundation will support the activities of the PRC for two years. Before the first year is over, we will have to develop plans of financing and actual work to be done when the Longwood Garden records are complete. We can consider processing the records of other gardens for a price or we can seek financial support for "research projects" using the capabilities of the PRC. Within a year we should have a better idea of actual speed possible and realistic costs of operation.

Feel free to comment.

Sincerely,

Richard A. Howard
Chairman

AHS PLANT RECORDS CENTER John J. Tyler Arboretum, 515 Painter Rd., Lima, Pa. 19060
215-566-1782/215-566-5431

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A Six Month Chronology Of The Plant Records Center

The formation of a plant Records Center (PRC) of the AHS was approved at the board meeting, March 16, 1968 at Williamsburg, Virginia, with Richard Howard as the Chairman.

A grant from the Longwood Foundation was announced to fund the operation of the PRC for a two year period from April 1, 1968, during which time methods would be developed for recording and retrieval of information of horticultural value using electronic data processing techniques. The records of the Longwood Gardens would be available as material to be utilized in an initial project and the co-operation of the Gardens was promised.

A PRC committee was selected consisting of twelve members to aid the Chairman. Mrs. Hill and Messrs. Crowley, Dennis, Evans, Hutton, Knierim, Leach, Patek, Oppe, Rogers, Seibert and Throckmorton accepted such appointments.

The committee (PRCC) considered and recommended to the executive committee of the AHS that Robert MacDonald be employed as director of the AHS PRC and that a three point program and a one year budget be approved.

An agreement was developed and endorsed by the executive committee of the AHS and representatives of the Tyler Arboretum (Lima, Pennsylvania) to house the PRC and its staff in buildings at Lima and to permit its Director, Mr. MacDonald to devote one-half of his time to the project.

A memorandum of understanding was signed July 8-10 employing Mr. MacDonald for one year, July 15, 1968 to July 14, 1969, subject to renewal for another year upon mutual agreement.

Procedures for handling purchases, contracts, bills, salary checks, benefits, etc., were developed by Mr. and Mrs. Eastburn and were approved by Dr. Howard and Mr. MacDonald. A new budget granting the AHS additional funds to meet the administrative requirements of the PRC was agreed upon.

Mrs. Esther Quinn was employed as Administrative Assistant of the PRC starting July 15, 1968. Subsequently, Mrs. Quinn attended a three day instructional course given by the International Business Machine Company on keypunch operation and general data processing orientation, August 12-14.

Mrs. M. Miller was employed, jointly with the Tyler Arboretum, as secretary and key-punch operator, effective August 15.

AHS PLANT RECORDS CENTER John J. Tyler Arboretum, 515 Painter Rd., Lima, Pa. 19060
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Mrs. Ellen Pate, assistant to the Pilot Project at the University of Tennessee Arboretum developed under the sponsorship of the AABGA which preceded the PRC, was asked to spend a week at the Tyler Arboretum (August 24-September 2) as a consultant. She instructed Mrs. Quinn and Mrs. Miller in keypunch operation, preparation of accession cards and preparation of raw data for encoding. She also assisted in preparing the first draft of an accession manual.

During the period July 15-September 9, offices were established at the Tyler Arboretum and Longwood Gardens. Equipment, supplies, machines and services were bought or contracted. The Tyler Arboretum is supplying three offices which will have joint function but predominately will serve as headquarters for the operations of the PRC. A 029 Keypunch used by the PRC is located in one of these offices.

At Longwood Gardens two rooms, plus other facilities, have been made available in the main building. On September 9, "a red-letter day", Mrs. Pesce was employed as chief clerk and the first work towards encoding the Longwood Gardens records was begun. Two additional part time clerks will be employed, also, to assist in this work.

The information from the records of the Longwood Gardens is being prepared for direct transfer to magnetic tape for storage or retrieval. A contract for this operation has been agreed to with the Suburban Data Center, Haverford, Pennsylvania. Although this company is capable of programming and retrieving the recorded information as desired, it may be possible to complete an agreement for this ultimate phase of the program to be done at a much lower fee at the Computer Center of the University of Delaware.

Concurrently, the keypunch machine at the Tyler Arboretum is being used to prepare punch cards of the accessions of the Tyler Arboretum. This alternate procedure and program is a demonstration of a method which might be more practical for a smaller botanic garden or collection of horticultural materials. This is a part of the research in methods of the program of the PRC.

During this same period the standard accession card for recording information on the plant materials in a botanical garden which had been developed during the pilot program was again modified and a final form approved. A "User's Accession Manual" which is an instructional guide for the accession card is in early draft. During the current year a Longwood Garden Fellow, at no cost to the PRC, will develop the sub-codes and categories needed for recording accessory information on the accession cards. The cards will be printed in quantity and made available (sold) to botanical gardens, arboreta or institutions wishing to adopt or alter their records to this simplified standard form. The standard form will permit a more economical handling of the records when encoding for EDP is desired. The value of the standard accession card and the User's Accessional Manual cannot be over-emphasized. The completion of these two items, alone, will be a significant contribution of the PRC. The cards will be available in early December. The Manual will be completed during the year.

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Mr. MacDonald and Dr. Howard attended the American Institute of Biological Sciences meetings in Columbus, Ohio during which time there were many symposia, papers and individual discussions of methods and problems of electronic data processing and of data banks. One full day of conflicting, concurrent programs necessitated Dr. Howard to attend one group and Mr. MacDonald another. Certainly the goals of the PRC are more clear than those of the majority of projects and its operations further advanced.

From these meetings it was evident that additional coordination is desired with other organizations. Mr. MacDonald and possibly Mr. Leach will attend an October meeting and demonstration of methods being offered by Dr. David Rogers, a member of the PRCC, at the Department of Taximetrics at the University of Colorado. Further exploration of the programs of the IBP, AIBS, Flora North America, UN FAO and BIOSIS is desired. Mr. MacDonald plans to visit in Washington to consult with the staff members of these organizations and to confer with the NSF to determine means of future support. Mr. MacDonald, with the collaboration of Dr. Ted Corvello, University of Notre Dame, have, near completion, an Index to the EDP projects in Biological Systematics which will be published in TAXON.

Finally, a quarterly accounting of funds held by the AHS for the PRC has been prepared by Mr. Eastburn as requested by the terms of organization.

Respectfully submitted,

Richard A. Howard

Richard A. Howard
Chairman, Plant Records Center

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FOR YOUR INFO.
RDM

The John J. Tyler Arboretum

• THE PAINTER ARBORETUM •

Painter and Forge Roads, Lima, Delaware County, Pennsylvania

TELEPHONES 215-566-5431
215-566-1782

P. O. BOX 216, LIMA, PA. 19060

6 August 1968

MEMO

TO: Carl W. Fenninger

FROM: Robert D. MacDonald

SUBJECT: Arboretum Telephones

Because of the establishment of the American Horticultural Society Plant Records Center headquarters at the Arboretum (and related employment of additional personnel) certain changes have been made in the telephone system at the Arboretum.

Persons calling the Arboretum main office (located on the first floor of what used to be the apartment in Lachford Hall) may call using either LO 6-1782 or LO 6-5431. Provision has been made in the main office for phones for the secretary (Mrs. Freeman), administrative assistant (Mrs. Quinn), and the director. Provision has been made for a phone for the superintendent's office on the second floor (Mr. Finegan) and for the librarian (Mrs. Willis). However, the latter two persons may be reached only on LO 6-1782 and the call must first be answered by the secretary and then transferred to the appropriate person.

If calling the Arboretum on LO 6-1782, or after normal working hours (8:00 a.m. to 4:30 p.m.), there should be no answer, call again using LO 6-5431.

PHONE LOCATIONS and NUMBERS (LO 6-)

Administrative Assistant	--	1782, 5431
Director	--	1782, 5431
Director's Residence	--	5431
Library	--	1782
Secretary	--	1782, 5431
Superintendent	--	1782

After Sept. 1st, the director, administrative assistant, and other staff employed in connection with the Plant Records Center may be reached, when in the office at Longwood Gardens, at 388-6741 extension 61.

cc: Board of Trustees
Officers, American Horticultural Society
Officers, Friends of the Arboretum

OFFICERS: Carl W. Fenninger, *President* • John H. McWilliams, *Vice President* • Richard K. Stevens, *Secretary and Treasurer* • Harry S. Clark, *Assistant Treasurer* • Theodore W. Widing, *Assistant Secretary* • TRUSTEES: Dotlev W. Bronk, Mrs. George S. Cavendish, Carl W. Fenninger, Clarence L. Jordan, John H. McClatchy, John H. McWilliams, Richard K. Stevens, Theodore W. Widing, Mrs. John C. Wister, Minturn T. Wright, III • • Robert D. MacDonald, *Director* • Dr. John C. Wister, *Director Emeritus* • • Mrs. Robert D. MacDonald, *Botanist* • • Charles F. Finegan, *Superintendent*

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FOR YOUR INFO

RDM

UTAS

794 Bethel Valley Road Oak Ridge, Tennessee

EXPENSE STATEMENT

PLANT RECORDS CENTER PILOT PROJECT

For: Period of Sept., 1967 to 31 August 1968

Income: $1,200.00

Expenses:

Keypunch rental and freight charges:	$704.38
Computer utilization	63.24
Phone charges	84.25
Travel	156.97
Printing & office supplies	61.93
Miscellaneous	129.23
	$1,200.00

Itemized schedule of expenses attached.

ROBERT D. MacDONALD
Project Director

31 August 1968

This statement supercedes the statement of 10 Jan. 1968.

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UTAS

794 Bethel Valley Road Oak Ridge, Tennessee

STATEMENT

PLANT RECORDS CENTER PILOT PROJECT

Schedule of expenses -- Sept., 1967 to 31 Aug. 1968*

IBM 029 keypunch rental

Period	Amount	Check No.	Invoice No.
to 31 Oct	$31.10	36	B160824
1-30 Nov.	71.76	33	A107133
1-31 Dec.	71.76	35	A139169
1-31 Jan.	71.76	38	A107254
1-29 Feb.	71.76	11	A149014
1-31 Mar.	71.76	45	A113647
1-30 Apr.	71.76	48	A157080
1-31 May	71.76	49	A110149
1-30 Jun.	71.76	51	R109260
1-31 Jul.	71.76	52	S110224
Freight Charges			
029	14.66	34	0J21410
026	12.78	32	0A90691
Computer Utilization			
Mar. 68	63.24	18	dated 29 Apr. 68
Phone charges	84.25	15, 16, 19	
Travel (A.H.S. Board Meeting	52.16	19	
Printing & Office Supplies			
	11.36	12	
	35.00	9	
	3.25	25	
Postage	12.32	petty cash	

more --

*Includes in some cases reimbursement to the Arboretum Society general operating fund for expenses made prior to this period.

The University of Tennessee Arboretum Society

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Schedule of expenses — Sept., 1967 to 31 Aug. 1968 -- (2)

Miscellaneous

8.55	17	
.25		bank charge
2.96	6	(art work-rest of amount on Sept. 1967 Statement)
2.00	8	photographic supplies
55.00	5	registration fee - 1967 A.H.S. Congress

Travel

104.81		Expenses associated with the 1967 annual A.A.B.G.A. & A.H.S. meetings not previously reimbursed.

UTAS	17.97		Miscellaneous U. T. Arboretum Society expenses
Debit Item	42.50	21	Overpayment into Pilot Project fund from UTAS general operating fund

Total expenses: $1,200.00

Total Income: $1,200.00
Total Expenses: 1,200.00

Balance 31 Aug.: 0.00

Amounts outstanding: 0.00

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STATEMENT

PLANT RECORDS CENTER PILOT PROJECT

This is a facsimile of the expense statement prepared for the annual meeting of the American Association of Botanical Gardens and Arboreta held in September, 1967.

INCOME: $3,300.00

EXPENSE:	By Univ. of Tenn.	By U.T.A.S.	Total
Salaries and personal services	$1,121.89	500.00	$1,621.89
Miscellaneous materials, supplies, etc.	296.52	340.00	636.52
Computing center charges	492.19	---	492.19
Travel	89.40	460.00	549.40
	$2,000.00	1,300.00	$3,300.00

Robert D. MacDonald
Project Director

Support for this project from sources external to the A.A.B.G.A. have been considerable. A cautious estimate would be a figure in excess of $4,800 (as indicated below):

University of Tennessee Computing Center Programmer services and travel expense	$2,233.86
University of Tennessee Arboretum Computer utilization and estimated secretarial services	1,550.00
Miscellaneous donations and services (a minimum estimate)	1,000.00

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434 Mt. Airy Drive
Rochester, N. Y. 14617
May 6, 1968

Dr. Richard A. Howard
Arnold Arboretum
Jamaica Plain, Mass. 02130

Dear Dr. Howard,

I received a copy of your letter of April 26, 1968 to members of the Plant Records Center Committee. This regards the transfer of funds from the Longwood Foundation to the Tyler Arboretum via the American Horticultural Society in accordance with the recommendations of the director of the Tyler Arboretum. The director of the Tyler Arboretum is also to direct the plant records center function of the arboretum.

Your letter refers to a program for the formation of the plant record center for which the funds will be dedicated. I have not seen any program which deals with the fundamental elements or economics of such a center upon which the expenditure of funds could be based. Consequently, my vote is no to all of your items.

I would suggest that you recommend the employment of the services of an independent recognized management systems consulting firm to develop a program to be followed before consideration of the transfer of funds to the Tyler Arboretum.

Sincerely yours,

John M. Patek

JOHN M. PATEK

cc: AHS Directors
Plant Records Center Committee

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Star Roses ★ *West Grove, Pa. 19390*

Phone: (215) 869-2426 THE CONARD-PYLE COMPANY

May 3, 1968

Dr. Richard A. Howard
c/o Arnold Arboretum
Harvard University
Jamaica Plain, Massachusetts 02130

AHS PLANT RECORDS CENTER COMMITTEE

Dear Dr. Howard:

Referring to your letter of April 26 and the information contained therein, I cast my vote in the affirmative for Items 1, 2 and 3 as contained in your letter.

I do this with some reluctance because I haven't any direct knowledge whatsoever of what is transpiring. Therefore, I am not really competent to vote. Obviously, however, someone has spent a great deal of time, effort and thought on the matter and I have a feeling, though again no direct knowledge, that they merit my support.

Before further action by the committee is necessary, however, I would hope that through a meeting or correspondence I could be filled in on background information that I find sadly missing.

It will be a pleasure to work with you.

Sincerely,

S.B. Hutton, Jr.
President

SBHj/mf

CC: All members of the Committee

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THE ARNOLD ARBORETUM of HARVARD UNIVERSITY
22 DIVINITY AVENUE · CAMBRIDGE · MASSACHUSETTS 02138 · U.S.A.

July 16, 1968

Dr. David Rogers
Department of Taximetrics
University of Colorado
Boulder, Colorado 80302

Dear Dave:

As you may have learned the board of the AHS finally approved the plan for a plant records center with MacDonald as the director. The initial term is one year and a renewal is possible. The dissention is considerable and he has much to show to make converts.

The rules of the AHS say individuals cannot be members of committees without membership in the Society. I have contributed your dues for the first year and if you are not convinced of the value of the group I will do so again until this records center is either successful or voted out.

This is hasty for I am off to Europe all too soon. Back in three weeks and I do plan to be at the AIBS meetings in Columbus. Since Konzak and his group are having discussions of the world germ plasm records I think MacDonald and I should attend and perhaps you will be there too?

Sincerely,

Dick

Richard A. Howard
Director

RAH:ac

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3 May 1968

Dr. Richard A. Howard
Arnold Arboretum of Harvard University
Jamaica Plain, Mass. 02130

Dear Dick:

m As a member of the Plant Records Center Committee of the A.H.S. my vote on the proposals are as follows:

Item 1: Approved.
Item 2: Accepted
Item 3: Approved.

I am pleased that the American Horticultural Society has accepted this activity and I will be happy to assist wherever possible.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

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AMERICAN HORTICULTURAL SOCIETY

TO: Dr. Richard A. Howard

FROM: Betty Eastburn

RE: Members of Plant Records Center Committee

DATE: April 26, 1968

Webster R. Crowley, Jr.
Head of Applied Research
Morton Arboretum
Lisle, Illinois 60532

Keister Evans
Executive Secretary-Editor
American Rose Society
4048 Roselea Place
Columbus, Ohio 43214

S. B. Hutton, Jr.
President
Conard-Pyle Company
West Grove, Pennsylvania 19390

Wells Knierim
1968 Convention Chairman
American Daffodil Society
31090 Providence Road
Cleveland, Ohio 44124

David B. Leach
First Vice President
The American Horticultural Society
15 Caldwell Street
Brookeville, Pennsylvania 15825

Dr. Russell J. Seibert
Director, Longwood Gardens
Kennett Square, Pennsylvania 19348

Mr. John M. Patek
434 Mount Airy Drive
Rochester, New York 14617

Dr. David S. Rogers
Department of Taximetrics
University of Colorado
Boulder, Colorado 80302

Dr. Joseph Oppe, Director
Dawes Arboretum
Mail Route 5
Newark, Ohio 43055

Mrs. Julian Hill
1106 Greenhill Avenue
Wilmington, Delaware

Dr. Tom D. Throckmorton
c/o Iowa Methodist Hospital
Des Moines, Iowa 50312

Mr. Reid Dennis
Thistle Hill
9221 Georgetown Pike
Great Falls, Virginia 22066

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APPROVED BY THE BOARD OF DIRECTORS,
AMERICAN HORTICULTURAL SOCIETY, MARCH 17, 1968

_____ Executive Director

Dr. Richard A. Howard, Chairman, A.H.S. Plant Records Center Committee
March 16, 1968

1) The American Horticultural Society is to create an A.H.S. Plant Records Center and appoint a Plant Records Center Committee which will supervise the Center and report to the Board of Directors of the Society.

2) The chairman and the members of the A.H.S. Plant Records Center Committee are to be appointed annually by the president of the Society with the advice and consent of the Board of Directors. The Committee will consist of no less than five members, each of whom shall be eligible to succeed himself. The project director of the Center shall not be a member of the A.H.S. Plant Records Center Committee.

3) Funds received by A.H.S. for the Plant Records Center will be deposited in a separate bank account in the name of the Society. Such funds will be administered by the business office of the Society which will receive an appropriate reimbursement of its administrative cost.

4) The project director will be recommended by the Plant Records Center Committee for employment by the Board of Directors of the Society.

5) The project director will submit a program and a budget for approval by the Plant Records Center Committee and transmit them to the Board of Directors of the Society for its approval. The project director will make a report on activities quarterly or when requested by the chairman of the Plant Records Center Committee or by the president of A.H.S.

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A monthly report on expenditures will be on file at the business office of the Society and will be available on request to any member of the Plant Records Center Committee, to any member of the Board of Directors of the Society or to any other authorized person.

6) The accounts of the Plant Records Center will be audited by the accounting firm retained by the American Horticultural Society.

7) A memorandum of agreement will be drawn between the American Horticultural Society and any other organizations which may co-operate, from time to time, with the A.H.S. Plant Records Center. This agreement shall concern:

a) Use of space, facilities, equipment and supplies,

b) Use, payments and benefits of personnel,

c) Fidelity and such other insurance as may be deemed necessary

d) Duration of the agreement, with a release clause for either party, and

e) Consideration of an assessment for overhead and other charges.

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THE ARNOLD ARBORETUM of HARVARD UNIVERSITY
22 DIVINITY AVENUE · CAMBRIDGE · MASSACHUSETTS 02138 · U.S.A.

March 19, 1968

Dr. David Rogers
Department of Botany
Colorado State University
Fort Collins, Colorado 80521

Dear Dave:

First my thanks for the time you gave me last week in Boulder. I needed that briefing and profited from it.

I spent Thursday in the office and departed Friday for Williamsburg. Friday night and Saturday were spent in a discussion of the organization needed to create a Plant Records Center and to spend the $90,000 from Longwood and get the task done that he requires on the Longwood Records.

The program was presented to the Board of Directors of the American Horticultural Society and there was considerable reluctance to accepting it. I had to leave before they were through but since I am not a member of the Board I would not have been in on all of the meeting anyway.

The objections were based on the fact that other people had not examined and approved the budget submitted to the AHS for approval. I made it very clear that I did not feel MacDonald should proceed with the work on the Longwood Records until he had consulted with you. Needless to say you may be invited to join this committee since I indicated I knew you and had faith in what you were doing but I did not know (nor did anyone else) Reid Dennis who MacDonald has been calling his "computer specialist". It was Dennis who said MacDonald's budget was in order according to MacDonald. Of course they left out such items as social security and office costs etc.

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I would like to keep you informed of progress if there is any. Again my thanks for your kindnesses (including transportation) in Boulder.

Sincerely,

Dick

Richard A. Howard
Director

RAH:ac

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MAR 4 1968

DAVID GOHEEN LEACH
15 CALDWELL ST., BROOKVILLE PA. 15825

Feb. 29, 1968

Dr. David J. Rogers
Taximetrics Laboratory
Dept. of Biology
University of Colorado
Boulder, Colorado 80302

Dear Dr. Rogers:

I understand from Russ Seibert that you are continuing, and expanding, your application of data processing equipment to taxonomy.

I thought you might be interested in knowing that the American Horticultural Society is presently seeking grants to finance a five-year data processing program which will computerize a great range of information, beginning with institutional plant acquisition records, and ending with the production and revision of such indices as Index Kewensis, Index Filicum, Gray Herbarium Card Index, Index Londinensis and so on. In between are such projects as a comprehensive directory of the plant resources of North America as represented by the living collections in arboreta, botanical gardens and university collections; a directory of the seasonal offerings of the wholesale nursery industry; development and revision of major generic check lists for plants important to horticulture and forestry; maintenance and revision of international registration lists for important genera; sources where plants can be purchased; a catalog of horticultural and botanical books; services to member organizations which can be performed more efficiently by a computer.

This facility will be under the direction of Dr. Robert MacDonald, and we have already received a $90,000. grant to finance a sizeable pilot program.

I am writing merely to inform you of the plans, and to solicit any ideas you may have on the relationship of the A. H. S. Plant Records Center to your own program.

Sincerely,

David G. Leach

David G. Leach, Vice President
and Chairman, A. H. S. Fund
Development Committee

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7 March 1968

Mr. David G. Leach
15 Caldwell Street
Brookville, Penna. 15825

Dear Mr. Leach:

Thank you for your letter of February 29. Let me give you some background information concerning our activities, and this will perhaps lead to some suggestions about cooperation on some of the very important activities outlined in your letter.

Our major effort is to discover useful ways to employ computers for a variety of activities, mostly those which are part of taxonomy. We have to employ a variety of disciplines in order to carry out these aims, including botanists, zoologists, mathematicians and computer programmers. Some examples of work that we have already done are classification procedures which reflect the botanist's general methods of making classifications; procedures to test the value of characters for taxonomic purposes; procedures for ordering very large lists of objects; and now, our latest venture, procedures to put into computer programs the many items of information which describe plants and animals. In this last work, we have developed a very efficient set of procedures for storing information in the computer in such a way that we can ask a variety of questions about the stored information. We feel that our efforts in this endeavor are unique, in that our major interest is the development of a system for incorporating exactly the type of information which is most interesting in the A.H.S. That is, we are as much concerned about the primary data which exist on file cards or in file cabinets as we are in the information to be derived from published sources. This has not been the major push by most other workers in the field of information retrieval.

We also feel that our efforts are unique in that we put together, as a team, those who are involved with the primary data (such as myself and Henry Fleming), those who can develop the most efficient mathematical methods for the storage and retrieval, and those who are most knowledgeable about making the computer do the things we want done. Most frequently, information retrieval systems are designed by specialists in information retrieval, but who know very little about the desires and demands of those for whom they intend the systems. We do not feel that we should say anything about our system until we have actually tested the procedures on actual problems. This we have done, and while we have many more aspects of design and programming to do, we feel sufficiently confident in our programs that we are now willing to make "advertisements" to interested workers. Since our work is supported by the National Science Foundation for the development of the information retrieval system, we consider our programs to be in the public domain, not private nor patentable, and therefore free for the asking.

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Another aspect of our work which I feel is worth mentioning to you is the procedures we have for collaborating with other interested workers. First of all, we do not feel that all biologists should become experts in the computer field, since it is almost impossible to keep up even with the disciplines of biology. With this feeling, it becomes essential that someone who has built up the competence be willing to share that competence with working biologists. Since our group "speaks both languages" of biology and the computer field, we can most frequently be of service to the interested biologist, or suggest others who can give the needed service. We have an almost continuous stream of biologists visiting with us, determining how we may cooperate with them. Last week, for example, we had a USDA worker from Georgia visiting us to learn appropriate techniques for his study of sweet potato breeding. A number of botanists have already been supplied with information run through our programs. Zoologists as well are invited, and frequently do make use of our procedures. We can't help them all, but at least they know what can and can't be done. Frequently we will run the biologist's study on our computers here because it is much easier to use this equipment rather than go to the very great difficulty of transferring programs from one computer to another. However, if the biologist has computer facilities and good programmers available to him, we frequently hand him a "program deck" which he can use on his own hardware. I might say that very few biologists take this latter option.

With this background, let me make a few suggestions. First of all, as I mentioned in my letter to Russ Seibert, it would be well to have a well trained "roving ambassador" to the biologists (and you may note that my definition of biologists definitely includes horticulturists) who could keep the biologists abreast of the most modern methodologies for information retrieval, so that there would not have to be "reinvention of the wheel" for each different application. We do not at present have such an individual available, but would be willing to train him. (This is also part of our objectives.) Secondly, we would ourselves be pleased to aid A.H.S. in its efforts to mount an information retrieval system for the various endeavors you listed. I do not think that all the procedures for all of the listed ddeavors are worked out yet. That is, a slightly different procedure will be needed for such activities as a catalog of horticultural and botanical books than will be useful for institutional plant acquisition records. I think this can be seen. The problems will have to be worked out for each, to discover what procedures will actually be most useful, and the problems are in the area best defined as the use to which each information bank will be put. Thirdly, we will be pleased to consult on the most appropriate computer configurations for the various activities. In this area, knowledge of various computer characteristics will be an important operation. Clearly, some machines cannot be employed while others may be marginally useful, and still others adequate.

I should make it clear that we do not anticipate that Boulder, Colorado, become the place where the information retrieval system for A.H.S. be established. The is your choice, not mine. We may run test studies here, but - nothing permanently. Test studies would be charged for actual computer time and for necessary card-punching (or paper tape) and paper used. We feel it vital to keep our interests in the research necessary for new development,

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and would, therefore, not enter permanently into A.H.S. work. We merely wi wish to recover expenses for our work. This might include part-time salary, travel and perdiem expenses, and consultation fees. Note the conditional statement - we have no fixed fees.

I trust that this gives you some ideas for potential relationships between A.H.S. and this group here. As you may know, Dick Howard will be here in Boulder on March 11 and 12. He has indicated that he hopes to spend some time with us during his visit. Perhaps you can get some better ideas from him after he has actually been with us.

Once again, thank you for your letter. I hope we can be useful in your ambitious program.

Sincerely,

David J. Rogers
Professor of Biology

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MAR 8 1968

THE ARNOLD ARBORETUM of HARVARD UNIVERSITY
22 DIVINITY AVENUE · CAMBRIDGE · MASSACHUSETTS 02138 · U.S.A.

March 6, 1968

Dr. David Rogers
Department of Biology
Armory 101
University of Colorado
Boulder, Colorado 80302

Dear Dave:

I would appreciate the chance to talk with you on Tuesday morning March 12th. Your inquiry prompted a letter from Harold and I learned the schedule for the first time. They have made reservations for me at the Harvest House Hotel. I am normally an early riser and we could have breakfast together perhaps saving you some time that way. The 9:30 flight on Wednesday seems to be appropriate for me to take back but I can change if necessary.

Since writing to you I have received the first draft of a proposal the American Horticultural Society finance committee wishes to submit to the NSF for a "Plant Records Center". I will bring that along so you can understand the naïveté of the project.

Sincerely,

Dick

Richard A. Howard
Director

RAH:ac

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4 March 1968

Dr. Robert D. MacDonald
University of Tennessee Arboretum
Oak Ridge, Tenn. 37830

Dear Bob:

I very much appreciate receiving a copy of your enthusiastic letter to Russ Seibert. We look forward to seeing you in April. When you have firmed up your plans let me know and we will arrange to meet you in Denver and take care of housing.

Looking forward to seeing you

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

P.S. Dick Howard is going to be here either the 11th or 12th of this month.

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29 February 1968

Dr. Richard A. Howard
The Arnold Arboretum of Harvard University
22 Divinity Avenue
Cambridge, Mass. 02138

Dear Dick,

I've just checked with Dr. Baynton and discovered that he plans to keep you plenty busy on the morning of the 11th, but that he has no specific plans for Tuesday morning, the 12th. Your seminar at 3:00 is followed by a social endeavor in the evening.

It is possible to get to Boston leaving about 2:30 P.M. from Denver, but this is not a direct flight - you have to change planes in Chicago (waiting about an hour) - and arrives in Boston at 9:30 P.M. The only direct flight on Wednesday is in the morning.

This leaves you the opportunity then of meeting on Tuesday or Wednesday morning. I would have suggested Sunday, but we have a visitor who will be leaving about 6:00 P.M., and I will be rather tired out from what I expect to be a strenuous visit and would not recommend Sunday night. We can get most of the description and views across in a morning session and I will keep open both Tuesday and Wednesday mornings, the 12th and 13th. I hope you can make it during that time.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

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FEB 29 1968

February 27, 1968

37830

Dr. Russell J. Seibert
Longwood Gardens
Kennett Square, Pennsylvania 19348

Dear Russ:

This is in response to your query regarding David Rogers' 16 January 1968 letter to you.

Dave and I talked around and about the subject while in Mexico and agreed that it would be foolish for me to ignore the work he and his group have done. While there, I told Dave that I would avail myself of his work and apply it to our project as soon as our project became operative (and funds available!).

I talked with Dave yesterday, hoping that he might have a graduate student, suitably indoctrinated, ready to spring forth this June (to employ for our project)--but no such luck. We discussed the possibility of finding a bright young lad and sending him out to gather wisdom from Dave for a period of four months or so. This holds promise. A chap suitably trained in this manner would be invaluable to our project as an administrative (or technical) assistant. This certainly is the sort of utilization of basic work already accomplished that Dave is begging for. As I told him, "I'm on your bandwagon".

As regards his "roving adviser"--the idea suggested here would appear to be right up our (perhaps my) alley; this especially in light of the work Dr. Crovello (Notre Dame) and I are doing on indices on projects concerning information retrieval projects in the natural sciences (which I must admit I have been much too laggard in whipping into final shape!).

My opinion: Dave has sound ideas, direction, background, and basic data--much of which we can utilize to our advantage. Lets cooperate with him to the fullest! I plan to spend some time with him the first of April.

Sincerely,

OK?

BOB

Robert D. MacDonald
Arboretum Director
U. of Tenn
Oak Ridge, Tenn 37830

RDM/ep

bc: Theodore J. Crovello
David T. Rogers

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FEB 29 1968

THE ARNOLD ARBORETUM of HARVARD UNIVERSITY
22 DIVINITY AVENUE · CAMBRIDGE · MASSACHUSETTS 02138 · U.S.A.

February 27, 1968

Dr. David Rogers
Taximetrics Laboratory
Department of Biology
Armory 101
University of Colorado
Boulder, Colorado 80302

Dear Dave:

Russ Seibert has sent me a copy of your letter to him of January 16. I am the chairman of the committee to be of the American Horticultural Society which may establish a plant records center for the AHS. Russ is on the committee and the Longwood Foundation has just granted the AHS $90,000 as "venture" money to get the center into operation on behalf of American Horticulture. Bob MacDonald who was at Mexico City for the Symposium and who has sounded off on the subject in the past is the one who has spoken for the kind of work proposed. Bob is to be the new director of the Tyler Arboretum, some 12 miles from Longwood, and apparently the organization is counting on his getting part salary from some other project such as data processing. In other words the Longwood grant is to experiment with their records and MacDonald being on the spot is regarded as the man to do it.

I have just read the proposal of the Flora North America project submitted to the NSF for a major grant to put floristic records, bibliography etc on a retrieval system. It seemed to me that the information the American Horticultural Society wanted not only could but should be involved in that operation as a part of the distribution of taxa of plants anticipated within the study.

Now you raise still another point and that is the availability of your own team and its ability to evaluate and perhaps advise

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3 PM 15th Tues.
6147

on other proposals.

I plan to be in Boulder March 11 and 12 to present a seminar at NCAR on the work we have been doing in Puerto Rico cooperatively with Harold Baynton and his crew. I will come out on the 10th and go back on the 13th. I do not have traveling plans at present. Would it be possible to talk with you about this Plant Records Center of the AHS during that period? You might call Harold Baynton to learn what he has planned for me. I suggest this since I return to Boston and go immediately to Williamsburg for a committe meeting which will make some proposals which in turn will be acted upon by the AHS board in their committee meetings the following day.

I would appreciate your advice if you can spare the time.

Sincerely,

Dick

Richard A. Howard
Director

RAH:ac

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16 January 1968

Dr. Russell Seibert, Director
Longwood Garden
Kennett Square, Penna. 19348

Dear Russ:

I am writing for suggestions and advice about a problem which is becoming more and more pressing as time goes on. You are probably aware that I continue my interest in the use of various pieces of computing equipment for taxonomy both from the data processing angle as well as methods for aiding research workers. I now have a group of eight workers including myself investigating techniques for best application along various lines. I think we probably have the most balanced team to attack various complex problems such as information retrieval systems for museums and botanical gardens. We have recently received a $300,000 grant to put together a generalized complete computerized system for information retrieval.

At a recent meeting in Mexico City concerned with data processing systems which could be used to aid botanists (and horticulturalists) in keeping up with their data banks, we discovered that there is a tremendous amount of duplication of effort by biologists who have discovered the need for machines. I was struck with the inefficiency of most of these efforts because not enough money or knowledge is available to any one group to really do a thorough job of putting the machine to work.

Since we have done a considerable amount of work in this line, I feel we have something to offer biologists in need of programs, and wonder if it would not be useful to have a person familiar with the field and the techniques developed in it as a roving adviser who could put his hand in various techniques around the country which have been constructed and which could be used by a particular group or botanic garden or museum. This person would be able to suggest procedures in existence, give short demonstrations of certain techniques and tell biologists ways they could get the use of the most efficient machines to handle their problems.

It seems to me that such an individual could save a tremendous amount of labor and act as sort of an ambassador to the biological field from the computer field. I know that we have lots to tell people from our own experience and a knowledge of useful programs already available. It was evident at the meeting in Mexico that many people do not know of our programs although they have been published in the usual manner.

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I would like your advice and ideas on the usefulness of such an individual not only to you at Longwood, but to the many other gardens in the country where hugh files of information are crying for computerization. I would be glad to talk further about this in case I have struck a responsive chord.

Sincerely yours,

David J. Rogers
Professor of Biology

DJR:gm

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AAS

ADDITIONAL DIRECTORS NAMED TO THE BOARD

At its final meeting in Chicago on December 8, the Board elected four members of AHS to the Board of Directors as follows and welcomed them to service.

Mr. Brian O. Mulligan, director, The University of Washington Arboretum, Seattle, to 1971; Mrs. Ernesta D. Ballard, director, Pennsylvania Horticultural Society, to 1970; Dr. Joseph E. Howland, immediate past president of the Men's Garden Clubs of America, former assistant to the chairman, O. M. Scott & Sons, Marysville, Ohio, to 1969; Mrs. Julian W. Hill, advanced amateur horticulturist of Wilmington, Delaware, to 1969, completing the unexpired term of P. H. Brydon.

In announcing the resignation of Director Brydon, President Galle said, "Jock Brydon, host for the outstanding 23rd American Horticultural Congress in San Francisco in September, retired shortly before as director of Strybing Arboretum. He and Mrs. Brydon now reside in Salem, Oregon, where they are supervising their cherry orchards, and send warm regards to their AHS friends."

In selecting these additional members of the Board, AHS directors complied with that provision of the By-laws adopted by members the day before, which increased the size of the elected Board from fifteen to eighteen members; and also complied with members' wishes as expressed in the August 1968 balloting, these members having received the next highest number of votes.

Thus, of the fifteen names placed in nomination by the 1967-68 Nominating Committee, nine of the members' selections will serve the Society as Board members. Five were elected to fill regular vacancies and were announced at San Francisco. The four above were elected by the Board at Chicago to fill the newly created vacancies.

IN MEMORY
Mildred Barnes Bliss

Wife of the late Robert Woods Bliss of Washington, D.C.; philanthropist, patron of the arts, benefactress of many humanitarian causes; Honorary Chairman of the American Field Service; horticulturist, friend of the American Horticultural Society, a member of its Board of Directors for 33 years, its vice president for 16 years, a Life Member since 1955; at her home, Dumbarton Oaks, Washington, on January 17.

The sympathy of the Society goes to her family, friends and associates.

SOCIETY'S PLANT RECORDS CENTER ORGANIZED AND UNDERWAY

*—RICHARD A. HOWARD**

An inventory of plants under cultivation in the United States would be only a wild dream without the aid of modern computer techniques known as electronic data processing. However, *with* proper planning, the lists of plants grown in every botanic garden and the plants offered for sale as seed or plants by every nursery could be encoded and recorded, to be retrieved in any choice of combinations.

Do you want a list of red-flowered tetraploid Rhododendron cultivars which will root readily? Perhaps you need only those which are grown in Pennsylvania or are hardy in North Carolina, or which have been tested for alkaloids? The computer can select the information and print out what has been stored in it, for a nominal price. Thus, the possibility of a data bank for horticultural information which could serve amateur, professional, commercial, and scientific interests is within our abilities. The Plant Records Center of this Society is a first step in that direction.

The Board of the AHS approved in March the formation of a committee to establish and supervise the operation of a Plant Records Center. The Committee recommended the appointment of Robert D. MacDonald, Director of the Tyler Arboretum, as the director of the AHS/PRC in July. A grant from the Longwood Foundation will support the initial two years of organization and activity during which time the records of the Longwood Gardens will be used as test subjects. The chief clerk recorded the first data on September 9, 1968. The program is under way.

The PRC is based at the Tyler Arboretum with its generous cooperation. PRC activities will increase as financial support, experienced staff and worthy projects accummulate. For the first year the work of encoding botanical garden records will be slow. There is much to learn, errors to be made and corrected, but the final printouts will demonstrate *the many combinations of data which are now literally unobtainable.*

The possible additional uses of the PRC program are without limit. People must compile and encode but the machine can extract any combination of facts properly programmed. Such publications as *Hortus, Index Kewensis, Plant Buyers' Guide* and even a new edition of Rehder's *Manual* can be prepared more economically, kept up to date more easily, and reprinted more frequently at lower costs.

You will hear more of the Plant Records Center. These initials—PRC—are now associated importantly with AHS.

*Dr. Howard, director of the Arnold Arboretum of Harvard University, is chairman of the Society's Plant Records Center.

President Fred C. Galle (r) of Callaway Gardens, Pine Mountain, Georgia, accepts for the Society from Dr. Russell J. Seibert (l) of Longwood Gardens, Kennett Square, Pennsylvania, the Longwood Foundation's first $52,000 check of its $90,000 grant to assist the Society in establishing the Plant Records Center.

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UNIVERSITY OF COLORADO

The University of Colorado Taximetrics Laboratory (Dr. David Rogers) has been sent a range of materials for trial with the TAXIR program being developed there. Materials sent include:

- 100 random plant records ✓
- manuals for the preparation of PRC data ✓
- outline of 17 desired domestic data listings (for use by gardens)

UNIVERSITY OF DELAWARE

Several recent meetings have formalized some of the relationships between the PRC and the University. Their timetable for obtaining a third-generation computer has been moved up to sometime this year. A definite selection as to brand has not yet been made. The same range of materials that has been given the University of Colorado has been made available to the University of Delaware Computing Center for trial and cost-determination utilizing the program MANAGE. The PRC has the additional advantage at the University of Delaware of being able to utilize some of their off-line data processing equipment without cost.

ELECTRONIC DATA SERVICE

Charges for keypunching plant records at Electronic Data Service (the service bureau being utilized) are being made on a time and material basis. Costs have varied depending on the blocks of records being keypunched. A definite overall cost figure is not available at this time, however, a general cost estimate would appear to approximate $180 per thousand accession records. Some 17 domestic data listings have been programmed for us by this bureau. These initial listings serve primarily as data checking listings for the PRC, but have been arranged in accordance with

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the desires of the Director of Longwood Gardens. These listings may be used by participating gardens as an internal report system. While the data generated may be of use to other gardens and/or research workers, these listings are intended to be used primarily as management or research aids by the staff of the garden whose data are listed.

LONGWOOD GARDENS

As of March 1, some 11,000 accession records (the entire live file) will have been transcribed by the PRC clerical staff. Of this total some 9,000 records have been given to the service bureau for keypunching and listing.

A file maintenance--error correction routine has been developed. The next step in the work at Longwood will be to review the data listings for errors, correct these and then make the accumulated changes in the live-file data as have been indicated by Longwood staff. The third major operation will be the documentation of the records (some 7,000) in the dead file.

Mr. Richard Brown, Longwood Fellow, has been working on codification of information regarding mortality, display, and performance. He is working in particular on a system to record flower colors and flowering dates.

STAFF CHANGES

Mrs. Esther Quinn resigned her position as administrative assistant in December. Mrs. Margaret Miller was promoted to administrative assistant and Mrs. Ann Cody employed as secretary.

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PRC COOPERATORS

The Dawes Arboretum (Newark, Ohio) began using the PRC accession record system in mid-December. R. D. MacDonald visited the Dawes Arboretum for two days (at their expense) to orientate staff members in PRC operating procedures.

Mrs. Julian Hill(Barnards Inn Farm) has begun transferring her records to the PRC standard form. The Missouri Botanical Garden will begin utilization of the PRC form in March. The Morris Arboretum began a trial run of the system on February 25.

Dr. John Fogg of the Barnes Arboretum has been approached about using the PRC system. Dr. Fogg is now reviewing PRC materials in regard to this. A discussion was held with Mr. Gordon Tyrell of Winterthur with a somewhat negative answer resulting from present economic considerations. However, because of the detailed records kept on flower color, flowering dates, and other display and/or performance data, it is recommended that these data be included in the data bank. Mr. Tyrell is quite willing to cooperate with the PRC but cannot at the moment justify fiscal participation.

A proposed questionnaire to be sent out to arboreta and botanical gardens has not yet been prepared. It is hoped that this will be prepared before long.

CHECKLISTS

Work has begun on development of the Magnolia Checklist. Dr. John Fogg has made available the file cards he has worked on for the past seven years. Information as to format and progress of the Holly Checklist has been received from Mr. Gene Eisenbeiss (U. S. National Arboretum). Meetings have been held with representatives of several firms regarding

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the preparation of the checklist data, costs, and final mode of publication. These items are still being investigated.

MANUALS

The PRC User's Manual, containing the instructions for filling out and maintaining the PRC standard accession card, is now in a "final-type" form. A small number of manuals are now available. It is planned to let a small number of people use this manual and "de-bug" it before it is made available for wide distribution.

ACCESSION CARDS

The standard accession card is still not available for general distribution. A date of March 15 is hoped for. Delay in availability of this form is occasioned by poor work done by the vendor (Moore Business Forms Company). The first shipment of forms received by the PRC were damaged so badly in manufacturing that 85% were not usable. A second shipment of forms was received in good condition, but all forms received had sloppy design and graphic work along with many printing errors, so they were refused. The company has redrawn the form and is remanufacturing it.

COST SCHEDULE

A schedule has been prepared of what appear to be reasonable costs for PRC goods and services. A copy of this schedule is attached.

DATA FLOW CHART

A data flow chart outlining in general the operation of the PRC at present is enclosed.

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THE AMERICAN HORTICULTURAL SOCIETY, INC. PLANT RECORDS CENTER

February 14, 1969

Schedule of User Services and Costs

User's Accession Manual	$35.00	each
Standard Accession Cards	5.00	per 100 *
Initial Processing of Accession Records - includes first set of correct listings as requested -	1.00	per record *

* Subject to discount for large quantities

Consultant and Related Services

PRC Director	$100.00	per day
Technical Personnel	50.00	per day
Clerical Personnel	30.00	per day

All travel and related expenses to be paid by the cooperating institution.

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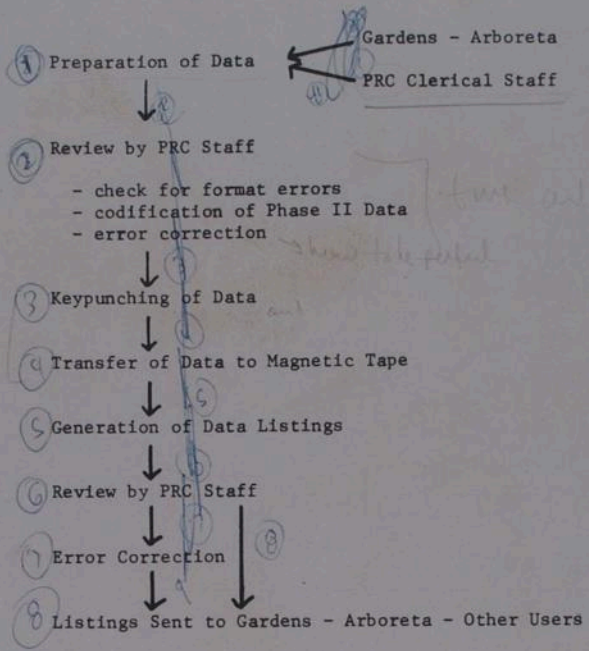
PRC DATA FLOW-CHART



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February 26, 1969

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To: Richard A. Howard, Chairman
AHS Plant Records Center Committee

From: Robert D: MacDonald
AHS Plant Records Center

Enclosed is the Progress Report for the PRC for the period ending 1 March 1969.

Also enclosed is the proposed budget for the period April 1, 1969 to July 1, 1970. The last financial report I have received from the Washington office covered the period to December 31, 1968 (only), so the amount of funds anticipated to be carried over from the current fiscal year is based on the records in the PRC office. The amount for AHS overhead is lower since I expect that a significant amount will be earned by the Certificates of Deposit and transferred to this account. The budget shows that one clerk will work for the PRC only through September, 1969. It is thought that this person might be employed by Longwood Gardens to aid in their record keeping section.

Depending on the type of equipment the University of Delaware will be obtaining to go with their new computer, we may drop the rental of the keypunch in six to eight months. It is felt that the continued rental of the vehicle is particularly important, especially in light of the fact that the Tyler Arboretum does not now have a vehicle that may be taken on public roads. Use of this vehicle by the Arboretum (at the cost of 10¢ per mile) will increase in the next six months. A separate statement regarding use of this vehicle by the Arboretum and purchases of gasoline, etc. from the Arboretum will be prepared and submitted shortly.

The proposed budget is set up for the period indicated because, while the initial portion of the grant was received in April, 1968, work did not begin until July, 1968. A working period of some two years was outlined in the grant proposal accepted by Longwood Foundation.

Enclosed for your files is a copy of the PRC User's Manual and a copy of the Domestic Data Listings which are available.

RDM

Distribution:

Plant Records Center Committee
Mrs. Elizabeth Eastburn
Mr. Fred Galle
Dr. R. C. Allen
Dr. Francis deVos (progress report only)
Mr. Theodore Widing

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Proposed Budget

April 1, 1969 to June 30, 1970

EXPENDITURES

Salaries

Director	$7,500	($500 raise to $6,000/year) original AHS proposal made provision for a $12,000/year salary.
Administrative Assistant	7,900	($300 raise to $6,300/year)
Secretary	3,000	($200 raise to $5,000/year)
Chief Clerk	5,750	($400 raise to $4,600/year)
Clerk #1	5,125	($200 raise to $4,100/year)
Clerk #2	2,560	($200 raise to $4,100/year)
		$31,835

Travel and Consultation

Rental of Vehicle	2,000	
Miscellaneous Travel	1,500	
		3,500

Printing, Copying and Forms

Rental of Copier	500	
Copy paper	500	
Printing of forms	2,000	
Miscellaneous	1,000	
		4,000

Office Operation

Telephone	600	
Miscellaneous	650	
		1,250

Off-line Equipment Services

Keypunch rental	1,050	
Keypunching of records (approximately 20,000)	4,600	
		5,650

Computing Center Services

Programming	2,500	
Computer Time	4,000	
		6,500

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Social Security, etc.	$ 2,000
A.H.S. Overhead	4,000
Contingency Fund	1,565
	$60,300

INCOME

Anticipated Income

Longwood Grant	$38,000	
Sale of Accession Cards	1,000	
Sale of Manuals	200	
Magnolia Society	100	
Dawes Arboretum	4,000	
		$43,300

Anticipated Carryover from First Fiscal Year

Salaries	5,500	
Computer Service	2,000	
Travel & Consultation	1,700	
Printing & Forms	1,100	
Outside Procurement	2,500	
Contingency	2,000	
AHS Overhead	1,500	
FICA and Tax	700	
		17,000
		$60,300

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AHS PLANT RECORDS CENTER
PROGRESS REPORT

25 November 1968

The Plant Records Center now has six (6) paid staff members (enclosure #1). Mr. Richard Brown, a Longwood Fellow, is working on this project as a Masters Degree problem.

Progress at Longwood Gardens is proceeding at a very encouraging pace. A breakdown of the number of accession records (made as a close estimate on 14 November 1968) is as follows:

12,000	-	Live file (Living collection)	See enclosure #2
7,000	-	Dead file	
1,500	-	Limbo file	
29,000	-	Total records 14 November 1968	

As of 22 November 1968 over 4,000 records in sections A to F (inclusive) in the live file have been transcribed onto source documents (AHS-PRC Data Sheets --enclosure #3).

As of 22 November, 1,500 records have been encoded by the Service Bureaus. The other 2,500 records will be encoded by 10 December. This means that as of the 10th of December we will have approximately one-third of the Longwood Gardens living plant records on magnetic tape in a form such that we may begin to produce and evaluate programs for the generation of data in desired formats by various criteria.

Transcription of the dead file records should proceed more rapidly than transcription of the live file records since fewer data will be recorded. Data recorded from the dead file records will include:

Botanical Name	Accession Number
Source	Presence of Herbarium Vouchers
How Received	Disposition

Limbo file records will not be transcribed until they are moved to either the live or dead files.

The Service Agreement entered into with Suburban Data Center as per their letter of 3 September 1968 has been terminated (see enclosure #4). In order to proceed without further delay, we have entered into an agreement with another Service Bureau (Electronic Data Service, Inc.) in Wilmington, Delaware. Our confidence in this company is very high. They offer a full range of services (enclosure #5), and their costs which were initially quoted higher (enclosure #6) would appear now to be lower. Their approximate cost for encoding 1000 records is $208 as against Suburban Data Center's cost of $223.

R. D. MacDonald attended the TAXIR demonstration held in Boulder, Colorado on October 7-8. Some 50 persons from the United States and Mexico attended this

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demonstration. At present, TAXIR is proposed to consist of four modules (Accessioner, Display, Book, and Data Vet). Only Accessioner and Book are developed and developed only in prototype. Operation of TAXIR is presently done completely in core--their operation with the genus Manihot containing only some 2,000 records. The TAXIR program has not been developed to the stage where a determination of the efficiency and economics of its usage for our project may be accurately determined. A random sampling of 100 records plus a comprehensive package containing information about our record descriptors and descriptor states will be submitted to the University of Colorado Taximetrics Laboratory for trial. It is not yet clear, if TAXIR is found to be acceptable for the PRC, that the desired output may be generated by the termination of the initial grant period. This aspect is to be explored.

A decision as to the extent of and/or utilization of University of Delaware Computing facilities is being deferred for the present. It appears that they will be changing their major on-line hardware in about 1-1/2 years. Their decision as to brand and models could effect major reprogramming expense for the PRC at the approximate end of our initial grant period (if their services are utilized).

Avenues for utilization of the programming services of Electronic Data Service, Inc. are being explored. It appears that several extant package programs could be made available without direct cost to the PRC.

The standard accession card is being manufactured by Moore Business Forms, Inc. Major changes in this form were made during late September and October upon further review by major users. The information entry format has not been changed (enclosure #7) but the original idea of a three-part card format with carbon inserted has been discarded. The present "card" is a two-part, full 5" x 8" card folded (attached) at the top. Maximum utilization of space has been achieved and user gardens will be able to retain the original copy for their files if desired. The carbon copy will be sent to the PRC. 100,000 forms have been ordered. Promised delivery date is 29 November 1968. These forms will be sold to users on a cost-plus basis. Our initial cost is some $1,500.

Permission has been received from Dr. A. J. Oakes to utilize the Country of Origin Code which is to be utilized by the U.S.D.A. New Crops Research Branch. Some modification of this code system is being made to meet PRC needs, but in general this is a simple, easily used system which meets our current needs.

Cooperative efforts with the Dawes Arboretum are being initiated. Work with this Arboretum will begin on 11th December with a two-day work session on the site.

The agreement with the Dawes Arboretum, which will serve as a guideline, is that the PRC Administrative Assistant would spend up to five (5) working days with the Arboretum staff for instructional and organizational purposes. It is anticipated that the actual time needed will be less. No charge will be made by the PRC for this service, but the institution will defray all associated travel and per diem costs.

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Direct informal communication with institutions regarding participation in the PRC have begun slowly. Contacts have been made with:

Mrs. Julian Hill, Barnards Inn Farm	-- Positive
Winterthur	-- Probable
Missouri Botanical Garden	-- Possible
Morris Arboretum	-- Positive
Dawes Arboretum	-- Possible
Cornell Plantations	-- Possible
Morton Arboretum	-- Possible
Arnold Arboretum	-- Possible
University of Mexico Botanic Garden	

A concerted effort (through the use of a questionnaire) will be made in December to determine the favor of the North American gardens.

Numerous contacts and meetings have been held with local data processing concerns, supply houses, and service bureaus. Mrs. Miller attended a free, three-day IBM orientation and keypunch operation session beginning 30th of September.

Recent talks with Dr. David Gates (who has received well over $400,000 in grants recently) at the Missouri Botanical Garden make it quite evident that Federal Funds for the PRC will be most difficult, if not impossible, to obtain in the near future. However, the various possible granting agencies will be approached informally soon.

ROBERT D. MacDONALD
Director

RDM/e
Enclosures

Distribution: Chairman, Plant Records Center Committee (full report with enclosures)

PRC Committee (body of report only)

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The American Horticultural Society, Inc.
A union of the American Horticultural Society and the American Horticultural Council
2401 CALVERT STREET N.W. • WASHINGTON, D. C. 20008
Telephone: 202-387-3100

April 26, 1968

To Members of the Plant Records Center Committee:

First, a greeting and welcome and a word of appreciation to each of you for your willingness to serve on the Plant Records Center Committee (hereafter, PRCC). This message will reach you in a duplicated form through the cooperation and hard work of Mrs. Glenn (Betty) Eastburn, for at present, I do not have the names and addresses for all of you.

The PRCC came into being officially on April 16 at the Williamsburg meeting of the AHS Board. A copy of the seven point memorandum approved by the Board is enclosed. This had evolved through considerable discussion at an informal meeting in the preceding 24 hours. The present memorandum replaces the resolution approved by the AHS board of directors on December 11, 1967.

Subsequently, the AHS received a grant from the Longwood Foundation to begin the activity of the plant records center and, specifically, to apply some of the methods previously considered to the resources of the Longwood Gardens. A check for $52,000 has been received and a second portion of the total grant of $90,000 will be paid within the year.

Our committee now has the task of selecting a project director. In order, then, we should receive a program of operation from him and a budget of the operation

I would like to recommend for your consideration and vote the appointment of Mr. Robert D. MacDonald as project director for the A.H.S. Plant Records Center for a period of two years, beginning May 1, 1968. Bob MacDonald is currently the director of the John J. Tyler Arboretum, having just moved there from the University of Tennessee Arboretum. MacDonald has been involved in electronic data processing and methods of coding and retrieving botanical and horticultural information, working in collaboration with computer specialists at the University of Tennessee and Oak Ridge. He has spoken and reported on the preliminary steps which have been taken, somewhat painfully, in the direction of a Plant Records Center. These reports have been to the AABGA and AHS meetings and in their publications. It has been his interest and willingness to process the records of the Longwood Gardens as a practical test of the procedures suggested that led to the current grant.

If you are willing to vote approval of this appointment, the following may be regarded as a general statement of the program to be developed. 1. To develop organization and methodology for an A.H.S. Plant Records Center. 2. To employ necessary personnel and make arrangements with cooperating organizations within budget limitations. 3. To use for the organization and development of the A.H.S. Plant Records Center, the horticultural records at Longwood Gardens within the provisions of the Longwood Foundation grant.

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Initially there is to be reviewed by Mr. MacDonald, if approved, and the qualified and interested members of this board the procedures which have been considered to the present. This is to involve conferences with a systems engineer for the DuPont Corporation and the head of the Computer Science Department of the University of Delaware. We will wish to recommend that MacDonald, and, if possible, David Leach, will consult with Dr. David Rogers of the Department of Taximetrics at the University of Colorado. Any further meetings or conferences they wish to suggest initially should be considered favorably, if at all possible.

A proposed budget for the first year of operation of the A.H.S. PRCC may be similar to the following:

Payments for a director	$ 5,500
Technical assistant	9,000
Secretarial help, part time	3,000
Clerical help, 1 to 3 persons	11,000
Programmer services and computer utilization	6,000
Social Security, etc.	2,070
Travel and consultation	4,000
Printing and forms	2,000
Office supplies, equipment, services	2,000
Off-line equipment procurement	5,000
A.H.S. overhead	2,478
TOTAL	$52,048

Since the work must be done at the Longwood Gardens and the Tyler Arboretum, it is clear we can avoid some "employment" complications by authorizing payments or grants from the A.H.S. fund on hand, to the John J. Tyler Arboretum rather than considering the personnel suggested in the proposed budget as employees of the A.H.S. The details of the actual transfer or payment of funds we must leave to the Executive Director of the A.H.S. and the representatives of the Tyler Arboretum.

May I have your vote by return mail authorizing or refusing our recommendation for the appointment of Mr. Robert MacDonald as Director of A.H.S. Plant Records Center. Item 1.

May I have your vote accepting the three point statement as a program outline to initiate the work of the Plant Records Center. Item 2.

May I have your vote approving the proposed budget as outlined subject to the procedures outlined in the seven point memorandum included. Item 3.

Your approval of a budget is essential since any operation, including duplicating correspondence, will involve expenses which are now justifiable charges against the grant on hand.

Sincerely,

Richard A. Howard

Richard A. Howard, Chairman
c/o Arnold Arboretum of Harvard University
Jamaica Plain, Massachusetts 02130

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THE AMERICAN HORTICULTURAL SOCIETY, INC. PLANT RECORDS CENTER John J. Tyler Arboretum 515 Painter Road Lima, Pennsylvania 19060
215 - 566-1782/215 - 566-5431

February 19, 1969

Dr. David J. Rogers
Professor of Biology
Taximetrics Laboratory
Armory 101
University of Colorado
Boulder, Colorado 80302

Dear Dave:

Enclosed are three revised pages to replace similar ones in the materials I just sent to you. The only change indicated is the inclusion of indicators of taxonomic rank (VAR., F., SSP., etc.) in the second field.

With best wishes,

BOB

Robert D. MacDonald
Director

RDM/ac

Enclosures

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AMERICAN HORTICULTURAL SOCIETY

PLANT RECORDS CENTER

USER'S MANUAL

2-6-69

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USER'S MANUAL INDEX

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PHASE II

FAMILY CODES

COUNTRY OF ORIGIN CODES

SOURCE KEYWORDS

SEE MASTER MANUAL

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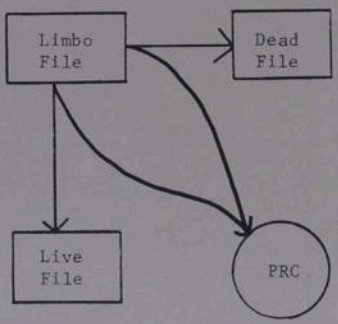
INTRODUCTION

The American Horticultural Society Plant Records Center (hereafter called the PRC) utilizes a standard accession card for use by arboreta, botanical gardens, and similar institutions. This accession card is to be used to record data concerning living plant collections in a standard manner so that these data may be handled through the use of automatic data processing.

The accession card has been designed so that when the data pertaining to a particular accession is sent to the PRC a copy may be retained by the sender. It is important to remember that data about an accession WILL NOT be accepted by the PRC until that accession has achieved a degree of relative permanence in the living collection. See Figure 1 for details concerning this point.



Limbo File: Records concerning accessions that have not reached a degree of relative permanence--plants present in a nursery, experimental greenhouse, or other holding, testing, or growing areas.

Dead File: Records concerning accessions that have died, failed to germinate, been discarded, given away, etc.

Live File: Records concerning accessions which have achieved a degree of relative permanence in the living collection.

Figure 1. File system suggested for PRC cooperators. Accession record copies are to be sent to PRC when records are transferred from the Limbo File.

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This Manual is a guide to the use of the PRC accession card. Because the PRC is in a developmental stage the guide lines, instructions, and other material contained in this Manual are subject to revision and/or additions. To facilitate these additions or revisions, this Manual has been prepared in loose-leaf notebook form. Please note that each page is dated as well as numbered.

The PRC accession card consists of three parts:

1. Phase I. This part of the card makes provision for entering the basic data usually recorded for each accession (Figure 2). All data are entered as either CODES or KEYWORDS (names).

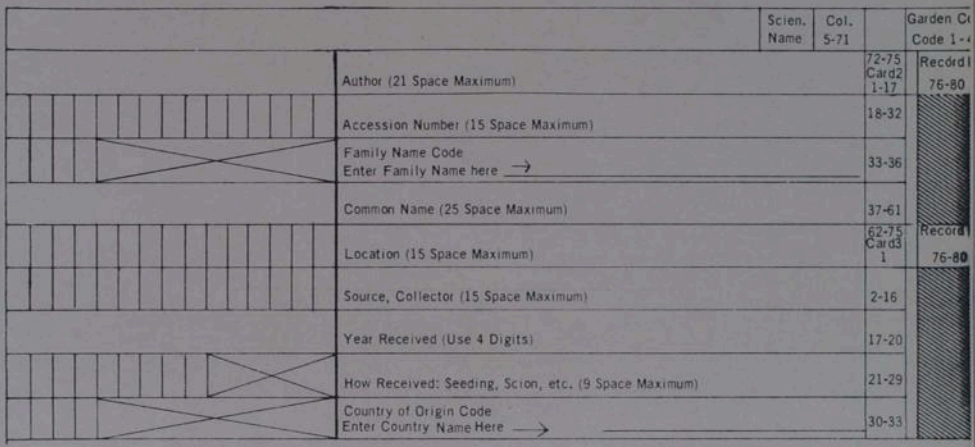

Figure 2 Phase I Format.

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2. Phase II Directors. Data are entered in this section only as CODES. These codes serve to indicate what information other than that entered in Phase I is available (Figure 3). Some 1,200 different codes may be assigned to each item (indicator) with the result that a possible 24,000 specific and/or general codes indicating information about an accession may be developed.

Additional information is available on:

Field-Column	Code	Item	Field-Column	Code	Item	Field-Column	Code	Item
1 – 34, 35		Nomenclature	8 – 48, 49		Herb Voucher	15 – 62, 63		Photographs
2 – 36, 37		Location	9 – 50, 51		Lit. Reference	16 – 64, 65		How Received
3 – 38, 39		Source	10 – 52, 53		Propagation	17 – 66, 67		Distribution
4 – 40, 41		Habitat	11 – 54, 55		Performance	18 – 68, 69		Other Info.
5 – 42, 43		Range	12 – 56, 57		Display	19 – 70, 71		Fruiting, Seed
6 – 44, 45		Number Red'd	13 – 58, 59		Genetic Data	20 – 72, 73		Mortality
7 – 46, 47		Planting Date	14 – 60, 61		Pathogens			Record ID 76-80

Figure 3. Phase II Directors Format.

3. Phase II. The area on the back of the card (Figure 4) is provided for the recording of any desired information about the accession. This information may be written out as desired and may concern cultural methods employed, distribution of plants, nomenclature, movement records, etc., etc. This information WILL NOT be recorded by the PRC at this time. However, CODES concerning this information will be entered in the Phase II Directors.

FIELD	LINE	ITEM

Figure 4. Phase II Format.

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The PRC Accession Card has been designed so that information should be entered using a typewriter with ELITE type (12 characters per inch). ALL information must be typed or printed legibly! The entry of all information in upper case letters is preferred.

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USERS MANUAL

INSTRUCTIONS

PHASE I:

The following three items MUST always be entered. If one of these items is not entered, the record WILL NOT be accepted by the PRC:

Garden Code
Scientific Name
Accession Number

When entering information in the Phase I section of the card, follow the directions carefully. Each Item has a certain number of spaces allocated to it. The term "space" means the space taken by each letter, period, comma, numeral, etc., as well as the break between words, characters, and numerals. For instance:

Acer palmatum dissectum cv Crimson Queen	=	40 spaces
(Marsh.) Borkh.	=	15 spaces
Kallays Compact Juniper	=	23 spaces

PHASE I ITEMS:

1. Garden Code. Your garden code is _____. Enter this code on each record.

2. Scientific Name. Enter only the words that make up the botanical name of the plant, plus abbreviations which are indicators of botanical taxonomic rank (var., forma, f., ssp., etc.). Do not enter authors of plant names. The taxon Styrax officinalis L. var. californica (Torr.) Rehd. must be entered as:

STYRAX OFFICINALIS VAR. CALIFORNICA	Scien. Name	Col. 5-71

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INSTRUCTIONS

PHASE I:

The following three items MUST always be entered. If one of these items is not entered the record WILL NOT be accepted by the PRC:

Garden Code
Scientific Name
Accession Number

When entering information in the Phase I section of the card, follow the directions carefully. Each Item has a certain number of spaces allocated to it. The term "space" means the space taken by each letter, period, comma, numeral, etc., as well as the break between words, characters, and numerals. For instance:

Acer palmatum dissectum cv Crimson Queen	= 40 spaces
(Marsh.) Borkh.	= 15 spaces
Kallays Compact Juniper	= 23 spaces

PHASE I ITEMS:

1. Garden Code. Your garden code is _____. Enter this code on each record.

2. Scientific Name. Enter only the words that make up the botanical name of the plant. Do not enter authors or abbreviations which are indicators of botanical taxonomic rank (var., forma, f., ssp., etc.). The taxon Styrax officinalis L. var. californica (Torr.) Rehd. must be entered as:

STYRAX OFFICINALIS CALIFORNICA	Scien. Name	Col. 5-71

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The abbreviations for grex and cultivars must be entered as:

X BRASSOLAELIOCATTLEYA G.ORANGE GLORY (grex)

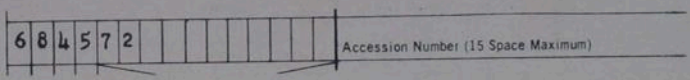
CALTHA PALUSTRIS CV PLENA (cultivar)

CATTLEYA G.COWANIAE CV ALBA (cultivar of a grex)

You will note that there is a period after the "G" (for grex) and no space between the "G." and the grex name. Also note that the abbreviation for cultivar used is "CV" without a period. When a "fancy" cultivar name such as 'Kallay's Compact' is entered it is preferred that the apostrophe be omitted (KALLAYS COMPACT).

3. Author. Enter only the author(s) for the last BOTANICAL name of the accession (no author is entered if the accession is a cultivar). The author for the taxon Styrax officinalis L. var. californica (Torr.) Rehd. must be entered as (TORR.) REHD. In the case of Prosopsis glandulosa Torr. var. torreyana (L. Benson) M. C. Johnst. the author should be entered as (L. BENSON) M. C. JOHNST. However this author entry exceeds the 21 space maximum requirement. In cases such as this compress the author name(s) by first omitting spaces between names and initials, etc. If the 21 space requirement is still not met, compress further by omitting periods. In the case above the author entry would be: (L.BENSON)M.C.JOHNST. This meets the 21 space requirement exactly.

4. Accession Number. Enter the accession number from left to right as indicated below--placing a letter or numeral in a square. The squares have been spaced so that if a character is centered in the first one the rest may be entered by spacing once, entering a character, spacing, etc.



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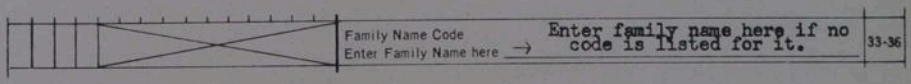
5. Family Name. Look up the appropriate code for the family name in the FAMILY CODES list in this Manual. Enter this code in the four spaces provided as indicated below. If a particular family (and its code) is not listed, print the family name in the space provided. A code will be assigned by the PRC.

If the family code is:	enter it as:
7	0007
29	0029
143	0143
2163	2163



6. Common Name. A relatively small space is provided for entering common names. No more than 25 characters and spaces in combination may be used. The entry of common names is limited to WHOLE words and the abbreviations listed below. If a logical word-string cannot be entered using the 25 spaces provided for, OMIT this entry and enter the common name on the reverse of the card.

Abbreviations (use no periods):

EUR - European, Europe, etc.
JAP - Japanese
CHI - Chinese
AME - American
RUS - Russian

Examples:

RUSSIAN OLIVE
RUS BLUE-STEMMED ALDER
DOUBLE MARSH-MARIGOLD
CARPATHIAN BELLFLOWER

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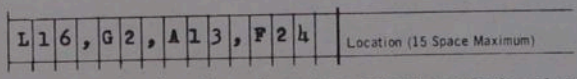
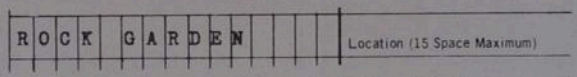
7. Location. Enter data on location from left to right placing one letter, numeral, or character in each square. If the location data are numeric or alphanumeric (based on a grid system or other precise reference point-system) enter these data. If more than one location is on record enter all that can be placed into the space available separating each location or coordinate by a comma. For example:



Always enter first the location where the majority of the plants of this accession are present. If all locations cannot be entered in Phase I, put the information about location of other plants of this accession on the reverse of the card (Phase II).

If the description of the location of the plant(s) is given in alphabetical terms and is lengthy enter the most logical keyword or string of WHOLE-WORD keywords. For example:

ROSE GARDEN	GREENHOUSE 23	STONE SPRING
SLOPE GARDEN	CONSERVATORY 4	ITALIAN WATER
HSE 24	HEATHER G	ROCK G



Some abbreviations such as HSE (for house) and G (for garden) may be used--but notify the PRC prior to their use to preclude duplication.

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8. Source. The data pertaining to the source of the accession should be the primary source if this is known. For PRC purposes the primary source is the first known place from which this accession was obtained. A Plant Introduction Number (PI 1234567) is ALWAYS to be treated as the primary source when this information is known. One exception to this is that a U. S. National Arboretum accession number may be used as a primary source if the accession was developed at the U. S. National Arboretum and it has been given a Plant Introduction Number as well.

The U. S. National Arboretum accession number may be used as the primary source except when more specific information is on record as to the primary source. For example, if the accession has a NA number but is known to have come from the National Botanic Garden, Glasnevin, Dublin, Ireland--the keyword entered would be GLASNEVIN. The NA number would then be entered on the reverse side of the card.

If no significant primary source data are available enter the immediate source of the accession. This immediate source would be the place or person from which the accession was directly received.

The use of KEYWORDS is to be utilized for entering information on source except as stated above. The keywords must be logical, whole words or word-strings. Only the abbreviations shown on the next pages may be used at this time. Other abbreviations may be added but notify the PRC prior to their use to preclude duplication. Examples of source keywords are contained in the rear of this Manual.

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PRC STANDARD ABBREVIATIONS

AES	AGRICULTURE EXPERIMENT STATION
AME	AMERICAN
ARB	ARBORETUM
B	BOTANY, BOTANIC, BOTANICAL
BG	BOTANIC OR BOTANICAL GARDEN
C	COLLEGE
DEPT	DEPARTMENT
ES	EXPERIMENT STATION
FES	FOREST EXPERIMENT STATION
FS	FOREST SERVICE
GC	GARDEN CLUB
GH	GREENHOUSE
H	HERBARIUM
HB	HORTUS BOTANICUS
HORT	HORTICULTURE
HSE	HOUSE
IN	INSTITUTE
INT	INTERNATIONAL
N	NURSERY
NP	NATIONAL PARK
ORC	ORCHIDS
ORCH	ORCHARD(S)
PG	PARK GARDEN
PI	PLANT INTRODUCTION
PIG	PLANT INTRODUCTION GARDEN
PIS	PLANT INTRODUCTION STATION
R BG	ROYAL BOTANIC GARDENS

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PRC Standard Abbreviations (continued)

RES	RESEARCH
SOC	SOCIETY
T	TROPICAL
U	UNIVERSITY
US	UNITED STATES
USDA	UNITED STATES DEPARTMENT OF AGRICULTURE

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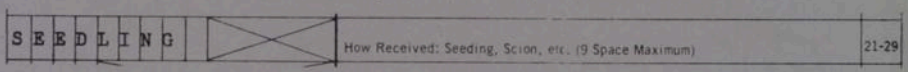
9. Year Received. Enter the year the accession was received as indicated below:

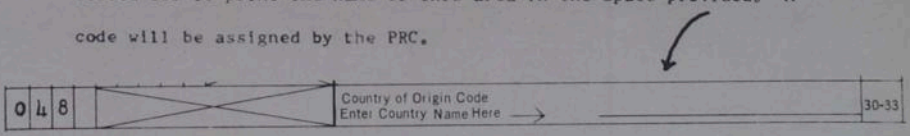
10. How Received. The information as to how the accession was received is entered in the form of KEYWORDS. These keywords are to be entered as indicated below. Any logical keyword which is appropriate may be used as long as the keyword(s) do not contain more than 9 characters and/or spaces. Please notify the PRC if any other than the following suggested keywords are used:

SEEDLING	BR PLANT - bare rooted plant
SCION	BB PLANT - balled & burlap
CONTAINER	CLUMP
SEED	ROOT
DIVISION	GRAFT
RHIZOME	LAYER
CORM	BUDDED
SPORLING	ROOTED - rooted cutting(s)
TUBER	PLANT
BULB	SPORE

The plural of these keywords, such as BULBS, may be used if desired.



11. Country of Origin. Look up the appropriate code for the country (or other similar areas--but NOT ranges) in the COUNTRY CODES list in this Manual. Enter this code in the four spaces provided as indicated below, leaving the right space vacant or void of numerals (see below). If a particular country or other specific area does not have a code listed for it print the name of this area in the space provided. A code will be assigned by the PRC.



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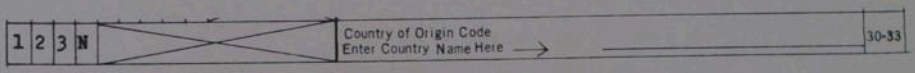
If you wish to indicate that the accession originated in a particular, but general, part of the country of origin this may be done by placing one of the following letters in the right-hand square:

N - North, northern
S - South, southern
W - West, western
E - East, eastern
C - Central



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INSTRUCTIONS

PHASE II DIRECTORS:

With the exceptions as noted below, the Phase II Director codes will be entered by the PRC on the basis of the information listed on the reverse of the card (Phase II).

1. Number of plants received. The exact number of plants received up to and including 98 may be entered in the code column for field 6 as indicated below. If more than 98 plants were received enter "99" in this space and record the exact number on the reverse of the card.

Field-Column	Code	Item
1 – 34, 35		Nomenclature
2 – 36, 37		Location
3 – 38, 39		Source
4 – 40, 41		Habitat
5 – 42, 43		Range
6 – 44, 45	25	Number Rec'd
7 – 46, 47		Planting Date

2. Herbarium vouchers. If herbarium vouchers have been prepared for this accession, the number prepared may be entered in the code column for field 8 in the same manner the number of plants received is entered.

Field-Column	Code	Item
8 – 48, 49	4	Herb Voucher
9 – 50, 51		Lit. Reference
10 – 52, 53		Propagation

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INSTRUCTIONS

PHASE II:

The reverse of the accession card (Phase II) is for the entry of any detailed or specific information regarding this accession. The information which is recorded must be entered under the heading "Item". The columns headed "Field" and "Line" are for PRC use only.

Each time an entry is made a separate line does not have to be used. However, the information regarding separate items such as location, source, range, pathogens, cultural practices, etc., MUST be kept on separate lines. The order that the information is entered in about different items does not make any difference. For instance, if a line on which information about propagation were filled up, the next available vacant line may be used.

All information entered should be as clear as possible. Use only easily understood abbreviations. The information SHOULD be printed or typed.

FIELD	LINE	ITEM
6		400 plants received Jan. 1956
2		200 plants put out by the old pasture near Rocky Run in 1956. The other
2		plants were planted near the lower pond.
20		In 1960 150 of the plants near RockyRun were alive--50 alive at the pond
15		There are color slides on file of the plants by the pond
2		In 1968 all of the plants near Rocky Run were moved to the pond (150)
12		Plants flowered for the first time in May 1968

↑ This will be entered by PRC.

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AUTHOR LISTING

This listing should provide the botanical authority (given in Field C) for each different plant name. Do not list any information if no authority is given.

However, there should be an option to list alphabetically those botanical plant names for which no authority has been entered. The botanical plant names always will consist of the first two words, but may have an additional third or fourth word also.

A botanical plant name will not be followed by a single "X" (Cornus X), by SP. (CEDRUS SP.), contain G.(CATTLEYA G.COWANIAE), or CV (CORNUS FLORIDA CV PENDULA).

The name may contain VAR. (CORNUS FLORIDA VAR. RUBRA), F. (CORNUS FLORIDA F. XANTHOCARPA), SSP., etc.

A botanical plant name may have an X immediately before or after the first word only. In the latter case there must be more than one word in the plant name and the other conditions (above) must be met.

GARDEN NAME

Plant name, author

ASIMINA TRILOBA, (L.)DUNAL.

BETULA ALBA, L.

CALOCEDRUS DECURRENS, (TORR.)FLORIN

CASTANEA DENTATA, (MARSH.)BORKH.

COLUTEA PERSICA, BOISS.

* * * * *

GARDEN NAME

PLANT NAME, AUTHOR NOT LISTED

BETULA LENTA

CASTANEA CRENATA

MAGNOLIA X THOMPSONIANA

X CUPRESSOCYPARIS LEYLANDII

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THE AMERICAN HORTICULTURAL SOCIETY

PLANT RECORDS CENTER

DESIRED

Outline of Domestic Data Listings

4 February 1969

Robert D. MacDonald
Director

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THE AMERICAN HORTICULTURAL SOCIETY

PLANT RECORDS CENTER

Outline of Domestic Data Listings

The following pages outline the types of reports, inventories, or data listings which will be available for gardens which have their records on file with the Plant Records Center. These listings have been developed primarily for use by participating gardens as an internal report system. While data generated by these listings may be of use to other gardens, they are intended to be used as management and research aids by the staff of the garden whose data are listed. Listing 15, for example, might be used as a basis for preparing plant labels.

A total of 17 listings are outlined in the following pages. Others may be added as the need arises. In order to request a particular report only the listing number need be given. Generation of certain reports on a regular schedule can be provided for.

As soon as enough experience has been gained in generating these listings, a cost schedule will be developed. No charges will be made for the first set of correct listings until this cost schedule is prepared.

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PRC INDEX OF DATA LISTINGS

NAME LISTING	1. Family name, plant name, number of accessions Total accessions Total taxa
	2. Plant name, number of accessions Total accessions Total taxa
ACCESSION LISTING	3. Accession number, plant name, family name, number of accessions/year
COMMON NAME LISTING	4. Common name, plant name, accession number if two different common names for same taxon Total number common names Total number taxa
LOCATION LISTING	5. Plant name, accession number, location
	6. Location, plant name, accession number Total taxa Total accessions
HERBARIUM LISTING	7. Family name, plant name, accession number, number of vouchers Total taxa Total accession numbers Total number of vouchers
	8. Plant name, accession number, number of vouchers Total taxa Total accession numbers Total number of vouchers
CULTIVAR LISTING	9. Lists plant names alphabetically by cultivar name, then alphabetically by plant name
SOURCE LISTING	10. Source name, plant name, accession number
	11. Plant name, accession number, source name
AUTHOR LISTING	12. Plant name, author
	13. Plant name, author not listed
COUNTRY OF ORIGIN LISTING	14. Country, plant names, accession number, location
	15. Plant name, common name, country, accession number
	16. Plant name, accession number, (no country of origin)
GENERAL INFORMATION LISTING	17. Phase I items plus indication of additional information available (Phase II Directors) with listed codes

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NAME LISTING

Provides an inventory of plants in the collection with the number of accessions per taxon. Two data formats are available.

Listing 1

GARDEN NAME

FAMILY NAME *

Plant name *	Number of accessions
Plant name	Number of accessions
Plant name	Number of accessions

FAMILY NAME

Plant name	Number of accessions
Plant name	Number of accessions

Total accessions
Total taxa

Listing 2

GARDEN NAME

Plant name *	Number of accessions
Plant name	Number of accessions
Plant name	Number of accessions

Total accessions
Total taxa

* In alphabetic sequence

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ACCESSION LISTING

Provides an inventory of plants in the collection in sequence by accession number.
At the end of the main listing, the total number of living accessions are summarized by the year of receipt.

Listing 3

GARDEN NAME

Accession number	Plant name	Family name
Accession number	Plant name	Family name
Accession number	Plant name	Family name
Accession number	Plant name	Family name

year	Number of accessions
year	Number of accessions
year	Number of accessions
year	Number of accessions

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COMMON NAME LISTING

Provides an alphabetic listing of common names (when on record). If more than one common name is on record for a taxon, it is listed.

Listing 4

GARDEN NAME

Common name	Plant name	Family name	
Common name	Plant name	Family name	Accession no. *
Common name	Plant name	Family name	Accession no. *
Common name	Plant name	Family name	
Common name	Plant name	Family name	

Total common names
Total plant names

* Accession numbers are listed when two or more common names are given for a particular taxon.

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LOCATION LISTING

Provides an inventory of plants in the collection according to location. Two options as to the arrangement of data are available.

Listing 5

GARDEN NAME

Plant name *	Accession number	Location
Plant name	Accession number	Location
Plant name	Accession number	Location
Plant name	Accession number	Location

* In alphabetic sequence

Listing 6

GARDEN NAME

Location *	Plant name	Accession number
	Plant name	Accession number
	Plant name	Accession number
	Total taxa	
	Total accessions	
Location	Plant name	Accession number
	Plant name	Accession number
	Plant name	Accession number
	Plant name	Accession number
	Total taxa	
	Total accessions	
Location	Plant name	Accession number
	Plant name	Accession number
	Plant name	Accession number
	Total taxa	
	Total accessions	

* In alphabetic (or alphanumeric) sequence

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HERBARIUM LISTING

Provides information only about those accessions for which herbarium vouchers have been prepared. Two options are available for the arrangement of the data.

Listing 7

A listing of taxa alphabetically by family, then scientific name:

GARDEN NAME

FAMILY NAME

Plant name	Accession number	Number vouchers
Plant name	Accession number	Number vouchers
Plant name	Accession number	Number vouchers

FAMILY NAME

Plant name	Accession number	Number vouchers
Plant name	Accession number	Number vouchers

Total Taxa:
Total accession numbers:
Total vouchers:

Listing 8

A listing of taxa alphabetically only by scientific name:

GARDEN NAME

Plant name	Accession number	Number vouchers
Plant name	Accession number	Number vouchers
Plant name	Accession number	Number vouchers
Plant name	Accession number	Number vouchers

Total taxa:
Total accession numbers:
Total vouchers:

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CULTIVAR LISTING

Provides an inventory of plants alphabetically by their cultivar name. When different plants have the same cultivar name, these plant names are listed alphabetically within the cultivar name.

Listing 9

GARDEN NAME

Plant name	Cultivar name
JUNIPERUS CHINENSIS	ARCTIC
JUNIPERUS CHINENSIS	BLAAUI
ABIES PROCERA	GLAUCA
JUNIPERUS CHINENSIS SARGENTII	GLAUCA
CORNUS FLORIDA	PYGMY
ILEX AQUIFOLIUM X CORNUTA	NELLIE R. STEVENS

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SOURCE LISTING

Provides information pertaining to the sources of the plant material in the collection. Two options as to data format are available.

Listing 10

GARDEN NAME

Source Name *

Plant name *	Accession number
Plant name	Accession number
Plant name	Accession number
Plant name	Accession number

Source Name

Plant name	Accession number
Plant name	Accession number
Plant name	Accession number

Listing 11

GARDEN NAME

Plant name *	Accession number	Source name
Plant name	Accession number	Source name
Plant name	Accession number	Source name
Plant name	Accession number	Source name

* in alphabetic sequence

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AUTHOR LISTING

Provides an alphabetic listing of all botanical taxa for which the authors are on record. Two options are available -- the second providing a listing of botanical taxa for which no authors are given.

Listing 12

GARDEN NAME

Scientific name *, author
Scientific name
Scientific name
Scientific name

Listing 13

GARDEN NAME

Scientific name *, author not listed
Scientific name
Scientific name
Scientific name
Scientific name

* In alphabetic sequence

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COUNTRY OF ORIGIN LISTING

Provides listings of taxa with the native country of origin or other specific geographical area (but not ranges). Three options are provided. Cultivars, horticultural hybrids, etc. are not included.

Listing 14

GARDEN NAME

Country of Origin *

Plant name *	Accession number	Location
Plant name	Accession number	Location
Plant name	Accession number	Location
Plant name	Accession number	Location

Total accessions
Total taxa

Country of Origin

Plant name	Accession number
Plant name	Accession number
Plant name	Accession number

Total accessions
Total taxa

* In alphabetic sequence

Listing 15

GARDEN NAME

Plant name *	Common Name **	Country of Origin	Accession number
Plant name	Common Name	Country of Origin	Accession number
Plant name	Common Name	Country of Origin	Accession number
Plant name	Common Name	Country of Origin	Accession number
Plant name	Common Name	Country of Origin	Accession number

* In alphabetic sequence
** If on record

Listing 16

GARDEN NAME

Plant name *	(No Country of Origin on Record)	Accession number
Plant name		Accession number
Plant name		Accession number
Plant name		Accession number
Plant name		Accession number
Plant name		Accession number

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GENERAL INFORMATION LISTING

Provides a listing of the basic information on record for each accession. The data is generated in a manner similar to the attached sample.

Listing 17

GARDEN NAME

Plant name

AUTHOR = ACC NO =
FAMILY = CN =
LOCATION = SOURCE =
DATE RECD = HOW RECEIVED =
COUNTRY =
** ADDITIONAL INFORMATION IS AVAILABLE ON
ITEM(CODE), ITEM(CODE), ITEM(CODE), ITEM(CODE)

or ** NO ADDITIONAL INFORMATION IS AVAILABLE

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FORMAT SAMPLE ONLY

580 LOS ANGELES STATE AND COUNTY ARBORETUM, ARCADIA, CALIF.

PROSTANTHERA NIVEA
AUTHOR =
FAMILY = LABIATAE
LOCATION = C4 C6 P14
DATE RECD = 1959 05 00
ACC NO = 59-S-1161
CN =
SOURCE = ~~C H SPALDING&74~~
HOW RECEIVED =
** ADDITIONAL INFORMATION IS AVAILABLE ON
NOMENCLATURE, RANGE, PLANTING DATES, PROPAGATION, DISPLAY

PROTEA SUSANNIAE
AUTHOR =
FAMILY = PROTEACEAE
LOCATION = M11 M12 N11 N12
DATE RECD = 1950 10 00
ACC NO = 50-S-1981
CN = SUSANNA PROTEA
SOURCE = ~~U.CAL.47.585~~
HOW RECEIVED =
** ADDITIONAL INFORMATION IS AVAILABLE ON
LOCATION, RANGE, NUMBER RECIEVED, PLANTING DATES, PROPAGATION,
DISPLAY

PRUNUS PERSICA CV BONITA
AUTHOR =
FAMILY = ROSACEAE
LOCATION = S13-NW S14-NE
DATE RECD = 1957 02 00
ACC NO = 57-P-52
CN =
SOURCE = ~~DR J W LESLEY~~
HOW RECEIVED =
** ADDITIONAL INFORMATION IS AVAILABLE ON
PLANTING DATES, PROPAGATION, PERFORMANCE

PSEUDOPANAX CRASSIFOLIUM
AUTHOR =
FAMILY = ARALIACEAE
LOCATION = O13-SW M13 M12
DATE RECD = 1955 09 00
ACC NO = 55-S-2209
CN =
SOURCE = ~~AYRES-DUNCVDAV~~
HOW RECEIVED =
** ADDITIONAL INFORMATION IS AVAILABLE ON
LOCATION, RANGE, PLANTING DATES, PROPAGATION

PSIDIUM CATTLEIANUM
AUTHOR =
FAMILY = MYRTACEAE
LOCATION = J7 J8 K7 N13
DATE RECD = 1956 01 00
ACC NO = 56-S-125
CN =
SOURCE = ~~MELBOURNE B-6~~
HOW RECEIVED =
** ADDITIONAL INFORMATION IS AVAILABLE ON
NOMENCLATURE, LOCATION, RANGE, PLANTING DATES, PROPAGATION,
DISPLAY

PSIDIUM CATTLEIANUM LUCIDUM
AUTHOR =
FAMILY = MYRTACEAE
LOCATION = R13-SE-F1
DATE RECD = 1958 04 00
ACC NO = 58-P-1075
CN =
SOURCE = ~~USDA MIAMI FLA~~
HOW RECEIVED =
** ADDITIONAL INFORMATION IS AVAILABLE ON
NOMENCLATURE, PLANTING DATES, PROPAGATION

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AMERICAN HORTICULTURAL SOCIETY

PLANT RECORDS CENTER

MASTER MANUAL

2-6-69

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MASTER MANUAL INDEX

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PHASE II

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COUNTRY OF ORIGIN CODES

GARDEN CODES

SOURCE KEYWORDS

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INSTRUCTIONS FOR FILLING OUT PHASE I

The following information must always be entered. If any one of the three items is not available, the record will not be accepted.

1. Garden Code - this is entered sequentially from right to left:

   garden code = 9, enter as 0009
   garden code = 29, enter as 0029

2. Scientific Name - the scientific name of the plant is entered from left to right starting in card column 7. If the plant is an intergeneric hybrid (X BRASSOLAELIOCATTLEYA) enter the "X" in column 5 (leaving 6 blank). Enter only the words that make up the scientific name of the plant, plus abbreviations which are indicators of botanical taxonomic rank (var., forma, f., ssp., etc.). Do not enter authors of plant names. The taxon Styrax officinalis L. var. californica (Torr.) Rehd. must be entered as: STYRAX OFFICINALIS VAR. CALIFORNICA

   The abbreviations for grex and cultivars must be entered as:

   X BRASSOLAELIOCATTLEYA G.ORANGE GLORY (grex)

   CALTHA PALUSTRIS CV PLENA (cultivar)

   CATTLEYA G.COWANIAE CV ALBA (cultivar of a grex)

   Note that there is a period after the "G" (for grex) and no space between the "G." and the grex name. Also note that the abbreviation used for a cultivar is "CV" without a period. When a "fancy" cultivar name such as 'Kallay's Compact' is entered it is preferred that the apostrophe be omitted (KALLAYS COMPACT).

3. Accession Number - the accession number is entered from left to right starting in column 18, card two.

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INSTRUCTIONS FOR FILLING OUT PHASE I

The following information must always be entered. If any one of the three items is not available, the record will not be accepted.

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3. Accession number - the accession number is entered from left to right starting in column 18, card two.

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The following information may not always be entered on the records received. When the data are available, enter as indicated below:

AUTHOR

These data are entered from left to right starting in column 72, card 1. When filling out data sheets, enter through column 75, stop, and continue in column 1, line 2. Not more than 21 characters and spaces can be entered. Sometimes more than one authority may be given for the scientific name of a taxon (variety, forma, etc.). In this case only the author for the last BOTANICAL name is given. If the taxon is a cultivar, grex, or other horticultural plant no author is to be entered.

EXAMPLE: For Prosopsis glandulosa Torr. var. torreyana (L. Benson) M. C. Johnst. enter: (L. BENSON) M. C. JOHNST. -- but this has 25 spaces and characters. In this case, compress the author name(s) by first omitting spaces: (L.BENSON)M.C.JOHNST. = 21 characters

If the taxon is a cultivar and an author is given for one of the botanical names, OMIT the author. Make sure records received are checked for this.

EXAMPLE: In the case of Acer platanoides L. 'Crimson King' do not enter the "L."

FAMILY NAME

Look up the appropriate code for the family name in the PLANT FAMILY CODES listing. Enter the code from right to left using columns 33-36, card 2.

EXAMPLES: 0007, 0029, 0376, 9425

If the family name on the record is not listed in the PLANT FAMILY CODES, inform the Director. A code will then be assigned.

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COMMON NAME

A relatively small space is provided for entering common names. No more than 25 characters and spaces in combination may be used. The entry of common names is limited to WHOLE words and the abbreviations listed below. If a logical word-string cannot be entered using the 25 spaces provided, OMIT the common name.

ABBREVIATIONS (use no periods):

EUR - European
JAP - Japanese
CHI - Chinese
AME - American
RUS - Russian

EXAMPLES:

RUSSIAN OLIVE
RUS BLUE-STEMMED ALDER
DOUBLE MARSH MARIGOLD
CARPATHIAN BELLFLOWER

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LOCATION

Enter data on the location of the plant in columns 62-75, line 2 and column 1, line 3 on the data sheets. Enter the data from left to right. A combination of 15 letters, numbers, spaces, etc. is the maximum which can be used. If the location data are numeric or alphanumeric (based on a grid system or other precise reference-point system) enter these data. If more than one location is on record enter all that can be placed into the space available, separating each location or coordinate by a comma. EXAMPLE: L16,G2,A13,F24

Always enter first the location where the majority of the plants of this accession are present. If the description of the location of the plant(s) is given in alphabetical terms and is lengthy, enter the most logical keyword or string of WHOLE-WORD keywords.

EXAMPLES:

ROSE GARDEN	GREENHOUSE 23	STONE SPRING
SLOPE GARDEN	CONSERVATORY 4	ITALIAN WATER G
HSE 24 (or HOUSE 24)	HEATHER G	ROCK GARDEN

Logical abbreviations such as HSE for house and G for garden may be used.

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SOURCE

The data pertaining to the source of the accession should be the primary source when known. The primary source is the first known source of the accession given on the record. A Plant Introduction (PI) Number is always to be treated as the primary source when it is given on the record.

EG: PI 236222

A U. S. National Arboretum number may be used as a primary source code except if a PI number is given or there is more specific information on the primary source on record. EG: If the accession has a NA number, but is known to have come from the National Botanic Garden, Glasnevin, Dublin, Ireland, the data entered would be GLASNEVIN. The use of keywords may be used for sources. However, these keywords must be logical, whole words or word-strings. Only the abbreviations shown on the next pages may be used at this time. Contact the Director if the use of other abbreviations is desired.

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PRC STANDARD ABBREVIATIONS

AES	AGRICULTURE EXPERIMENT STATION
AME	AMERICAN
ARB	ARBORETUM
B	BOTANY, BOTANIC, BOTANICAL
BG	BOTANIC OR BOTANICAL GARDEN
C	COLLEGE
DEPT	DEPARTMENT
ES	EXPERIMENT STATION
FES	FOREST EXPERIMENT STATION
FS	FOREST SERVICE
GC	GARDEN CLUB
GH	GREENHOUSE
H	HERBARIUM
HB	HORTUS BOTANICUS
HORT	HORTICULTURE
HSE	HOUSE
IN	INSTITUTE
INT	INTERNATIONAL
N	NURSERY
NP	NATIONAL PARK
ORC	ORCHIDS
ORCH	ORCHARD(S)
PG	PARK GARDEN
PI	PLANT INTRODUCTION
PIG	PLANT INTRODUCTION GARDEN
PIS	PLANT INTRODUCTION STATION
R BG	ROYAL BOTANIC GARDENS

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PRC Standard Abbreviations (continued)

RES	RESEARCH
SOC	SOCIETY
T	TROPICAL
U	UNIVERSITY
US	UNITED STATES
USDA	UNITED STATES DEPARTMENT OF AGRICULTURE

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If no valid primary source data are given enter the immediate source. The immediate source is the place or person the accession was directly received from. Enter in the same manner as the primary source.

If the primary source is different from the immediate source and both are known, enter the code "04" in field 3 in the Phase II Directors. EXCEPT in the case of the accession having a primary source different from the immediate source AND the immediate source is the U. S. National Arboretum. In this case enter the code "01" in field 18, Phase II Directors.

YEAR RECEIVED

Enter the year the accession was received using four (4) digits.

EG: received in 1964 -- enter 1964 in columns 17-20 (card three)

HOW RECEIVED

The information as to how the accession was received is entered in the form of KEYWORDS. These keywords are to be entered in columns 21-29 (card 3). Any logical keyword which is appropriate may be used as long as the keyword(s) do not contain more than 9 characters and/or spaces. Please notify the Director if any other than the following suggested keywords are used:

SEEDLING	BR PLANT - bare rooted plant
SCION	BB PLANT - balled and burlap
CONTAINER	CLUMP
SEED	ROOT
DIVISION	GRAFT
RHIZOME	LAYER
CORM	BUDDED
SPORLING	ROOTED - rooted cutting(s)
TUBER	PLANT
BULB	SPORE
CUTTING	FRUIT

The plural of these keywords, such as BULBS, may be used if desired.

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COUNTRY OF ORIGIN

Look up the appropriate code for the country of origin given in the accession record in the COUNTRY OF ORIGIN CODES. This code is to be entered from left to right in columns 30 - 32.

EG: Brazil = 036

If there is evidence that the accession originated in a particular, but general, part of the country of origin, this may be indicated by placing one of the following letters in column 33.

N - North, northern
S - South, southern
W - West, western
E - East, eastern
C - Central

If the country of origin is not listed in the country of origin codes, assign this country (or other specific area -- not range) a code may be assigned from the alphabetic groups of codes for such areas. Inform the Director when such a code is assigned.

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Instructions for Entering Phase II Director Codes (interim codes)

Except for codes listed below enter a "01" if any additional information is on record regarding the Phase II Director items.

Field 1 -- Nomenclature

01 -- Name of plant as given or determined at the source of the plant.

02 -- Name authenticated or determined by the responsible staff personnel. Name of person(s) is on file if known.

03 -- Name authenticated or determined by outside authority (name on record).

04 -- (do not use at present)

05 -- Name verified and changed from that received under.

06 -- Name in doubt.

07 -- Name as given by source of plant -- synonym is listed.

08 -- Name authenticated and changed from that received under--synonym listed.

Field 2 -- Location

01 -- Additional information on exact location (lengthy description).

02 -- Additional information on changes in "permanent" location.

03 -- Plants in more than one "permanent" location.

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Field 3 -- Source

01 -- General information on source is available (address, etc.)

02 -- Wild collected, name of collector, and where collected.

03 -- Seed source or provenance is on record.

04 -- The immediate (and/or intermediate) sources (or collector(s) are on record. THE PRIMARY SOURCE IS ENTERED IN PHASE I.

06 -- National Arboretum number is on record but is not primary source.

07 -- PI number is listed in Phase I, but National Arboretum is primary source.

Field 6 -- Number of Plants Received

-- Enter the exact number of plants received up to and including 98, If 99 or more plants were received, enter "99".

Field 8 -- Herbarium Vouchers

-- If herbarium vouchers have been prepared for this accession, the number prepared is to be entered in the same manner as the number of plants received.

Field 18 -- Other Information

01 --

02 -- Inventory data are on file.

03 -- Plant Patent number is on file.

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FAMILY CODES

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29	ACANTHACEAE
47	ACERACEAE
53	ACHARIACEAE
55	ACHATOCARPACEAE
118	ACTINIDIACEAE
169	ADOXACEAE
199	AEXTOXICACEAE
225	AGAVACEAE
269	AIZOACEAE
274	ALANGIACEAE
302	ALISMACEAE
303	ALISMATACEAE
359	AMARANTHACEAE
361	AMARYLLIDACEAE
428	ANACARDIACEAE
464	ANCISTROCLADACEAE
539	ANNONACEAE
650	APOCYNACEAE
654	APONOGETONACEAE
671	AQUIFOLIACEAE
674	ARACEAE
681	ARALIACEAE
686	ARAUCARIACEAE
739	ARISTOLOCHIACEAE
782	ASCLEPIADACEAE
951	BALANOPACEAE
952	BALANOPHORACEAE

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0967	BALSAMINACEAE
1012	BASELLACEAE
1023	BATACEAE
1056	BEGONIACEAE
1090	BERBERIDACEAE
1120	BETULACEAE
1136	BIGNONIACEAE
1162	BIXACEAE
1222	BOMBACACEAE
1239	BORAGINACEAE
1325	BRETSCHNEIDERACEAE
1341	BROMELIACEAE
1356	BRUNELLIACEAE
1358	BRUNIACEAE
1360	BRUNONIACEAE
1415	BURMANNIACEAE
1421	BURSERACEAE
1429	BUTOMACEAE
1431	BUXACEAE
1435	BYBLIDACEAE
1449	CACTACEAE
1470	CALAMOPITYACEAE
1499	CALLITRICHACEAE
1525	CALYCANTHACEAE
1527	CALYCERACEAE
1562	CAMPANULACEAE
1595	CANELLACEAE
1597	CANNACEAE

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1617	CAPPARACEAE
1619	CAPRIFOLIACEAE
1641	CARICACEAE
1679	CARYOCARACEAE
1683	CARYOPHYLLACEAE
1708	CASUARINACEAE
1753	CELASTRACEAE
1778	CENTROLEPIDACEAE
1795	CEPHALOTACEAE
1797	CEPHALOTAXACEAE
1814	CERATOPHYLLACEAE
1823	CERCIDIPHYLLACEAE
1924	CHEIROLEPIDACEAE
1932	CHENOPODIACEAE
1982	CHLORANTHACEAE
2069	CISTACEAE
2109	CLETHRACEAE
2136	CNEORACEAE
2154	COCHLOSPERMACEAE
2221	COLUMELLIACEAE
2233	COMBRETACEAE
2238	COMMELINACEAE
2248	COMPOSITAE
2263	CONNARACEAE
2277	CONVOLVULACEAE
2299	CORDAITACEAE
2315	CORIARIACEAE
2321	CORNACEAE
2348	CORYLACEAE

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2355	CORYNOCARPACEAE
2359	CORYSTOSPERMACEAE
2411	CRASSULACEAE
2457	CROSSOSOMATACEAE
2464	CRUCIFERAE
2474	CRYPTERONIACEAE
2495	CUCURBITACEAE
2510	CUNONIACEAE
2516	CUPRESSACEAE
2543	CYANASTRACEAE
2550	CYATHEACEAE
2561	CYCADACEAE
2563	CYCLANTHACEAE
2611	CYNOMORIACEAE
2614	CYPERACEAE
2626	CYRILLACEAE
2692	DAPHNIPHYLLACEAE
2706	DATISCACEAE
2740	DEGENERIACEAE
2872	DICKSONIACEAE
2802	DESFONTAINIACEAE
2836	DIAPENSIACEAE
2855	DICHAPETALACEAE
2874	DICLIDANTHERACEAE
2903	DIDIEREACEAE
2928	DILLENIACEAE
2957	DIOSCOREACEAE
3001	DIPSACACEAE
3005	DIPTEROCARPACEAE
3139	DROSERACEAE

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3205	EBENACEAE
3266	ELAEAGNACEAE
3268	ELAEOCARPACEAE
3273	ELATINACEAE
3327	EMPETRACEAE
3379	EPACRIDACEAE
3383	EPHEDRACEAE
3401	EQUISETACEAE
3429	ERICACEAE
3440	ERIOCAULACEAE
3492	ERYTHROXYLACEAE
3519	EUCOMMIACEAE
3521	EUCRYPHIACEAE
3540	EUPHORBIACEAE
3548	EUPOMATIACEAE
3549	EUPTELEACEAE
3619	FAGACEAE
3694	FLACOURTIACEAE
3696	FLAGELLARIACEAE
3737	FOUQUIERIACEAE
3746	FRANKENIACEAE
3772	FUMARIACEAE
3831	GARRYACEAE
3861	GEISSOLOMATACEAE
3880	GENTIANACEAE
3895	GERANIACEAE
3902	GESNERIACEAE
3925	GINKGOACEAE

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3956	GLOBULARIACEAE
3988	GNETACEAE
4009	GOMORTEGACEAE
4038	GOODENIACEAE
4063	GRAMINEAE
4109	GRUBBIACEAE
4145	GUTTIFERAE
4198	GYROSTEMONACEAE
4216	HAEMODORACEAE
4241	HALORAGACEAE
4244	HAMAMELIDACEAE
4418	HERNANDIACEAE
4453	HETEROPYXIDACEAE
4491	HIMANTANDRACEAE
4498	HIPPOCASTANACEAE
4503	HIPPURIDACEAE
4571	HOPLESTIGMATACEAE
4650	HYDNORACEAE
4658	HYDROCHARITACEAE
4663	HYDROPHYLLACEAE
4665	HYDROSTACHYACEAE
4686	HYMENOPHYLLACEAE
4700	HYPERICACEAE
4738	ICACINACEAE
4757	ILLICIACEAE
4787	IRIDACEAE
4879	JUGLANDACEAE
4881	JULIANIACEAE

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4886	JUNCACEAE
5032	LABIATAE
5055	LACTORIDACEAE
5110	LARDIZABALACEAE
5144	LAURACEAE
5161	LEBACHIACEAE
5174	LECYTHIDACEAE
5183	LEGUMINOSAE
5192	LEITNERIACEAE
5200	LEMNACEAE
5201	LENNOACEAE
5204	LENTIBULARIACEAE
5334	LILAEACEAE
5336	LILIACEAE
5342	LIMNANTHACEAE
5353	LINACEAE
5379	LISSOCARPACEAE
5400	LOASACEAE
5404	LOBELIACEAE
5417	LOGANIACEAE
5458	LORANTHACEAE
5521	LYCOPODIACEAE
5524	LYGINOPTERIDACEAE
5540	LYTHRACEAE
5598	MAGNOLIACEAE
5628	MALESHERBIACEAE
5640	MALPIGHIACEAE
5643	MALVACEAE

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5672	MARANTACEAE
5675	MARATTIACEAE
5680	MARCGRAVIACEAE
5682	MARCHANTIACEAE
5703	MARSILEACEAE
5710	MARTYNIACEAE
5739	MAYACACEAE
5755	MEDULLOSACEAE
5757	MEDUSAGYNACEAE
5796	MELASTOMATACEAE
5798	MELIACEAE
5800	MELIANTHACEAE
5830	MENISPERMACEAE
5983	MISODENDRACEAE
6046	MONIMIACEAE
6089	MORACEAE
6098	MORINGACEAE
6142	MUSACEAE
6159	MYOPORACEAE
6163	MYRICACEAE
6169	MYRISTICACEAE
6175	MYROTHAMNACEAE
6178	MYRSINACEAE
6180	MYRTACEAE
6197	NAJADACEAE
6309	NEPENTHACEAE
6378	NOLANACEAE
6422	NYCTAGINACEAE

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6427	NYMPHAEACEAE
6430	NYSSACEAE
6441	OCHNACEAE
6452	OCTOKNEMACEAE
6478	OLACACEAE
6480	OLEACEAE
6490	OLINIACEAE
6509	ONAGRACEAE
6532	OPHIOGLOSSACEAE
6537	OPILIACEAE
6550	ORCHIDACEAE
6592	OROBANCHACEAE
6625	OSMUNDACEAE
6664	OXALIDACEAE
6738	PALMACEAE
6739	PALMAE
6750	PANDACEAE
6751	PANDANACEAE
6760	PAPAVERACEAE
6806	PARKERIACEAE
6828	PASSIFLORACEAE
6857	PEDALIACEAE
6884	PELTOSPERMACEAE
6887	PENAEACEAE
6910	PENTAPHYLACACEAE
7057	PHILYDRACEAE
7087	PHRYMACEAE
7142	PHYTOLACCACEAE
7182	PINACEAE

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7192	PIPERACEAE
7225	PITTOSPORACEAE
7227	PITYACEAE
7249	PLANTAGINACEAE
7253	PLATANACEAE
7327	PLUMBAGINACEAE
7341	PODOCARPACEAE
7351	PODOSTEMACEAE
7380	POLEMONIACEAE
7402	POLYGALACEAE
7404	POLYGONACEAE
7410	POLYPODIACEAE
7439	PONTEDERIACEAE
7453	POROXYLACEAE
7463	PORTULACACEAE
7471	POTAMOGETONACEAE
7508	PRIMULACEAE
7523	PROTEACEAE
7537	PROTOPINACEAE
7619	PSILOTACEAE
7695	PUNICACEAE
7725	PYROLACEAE
7752	QUIINACEAE
7770	RAFFLESIACEAE
7794	RANUNCULACEAE
7797	RAPATEACEAE
7860	RESEDACEAE
7862	RESTIONACEAE
7882	RHAMNACEAE

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7927	RHIZOPHORACEAE
7944	RHOIPTELEACEAE
8019	ROSACEAE
8045	RUBIACEAE
8068	RUTACEAE
8086	SABIACEAE
8112	SALICACEAE
8123	SALVADORACEAE
8127	SALVINIACEAE
8142	SANTALACEAE
8147	SAPINDACEAE
8149	SAPOTACEAE
8163	SARCOLAENACEAE
8177	SARRACENIACEAE
8193	SAURURACEAE
8202	SAXIFRAGACEAE
8224	SCHEUCHZERIACEAE
8235	SCHISANDRACEAE
8243	SCHIZAEACEAE
8351	SCROPHULARIACEAE
8366	SCYTOPETALACEAE
8392	SELAGINELLACEAE
8495	SIMAROUBACEAE
8563	SOLANACEAE
8588	SONNERATIACEAE
8612	SPARGANIACEAE
8693	STACHYURACEAE
8695	STACKHOUSIACEAE

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8708	STAPHYLEACEAE
8743	STEMONACEAE
8780	STERCULIACEAE
8830	STRASBURGERIACEAE
8889	STYLIDIACEAE
8902	STYRACACEAE
8954	SYMPLOCACEAE
8996	TACCACEAE
9016	TAMARICACEAE
9054	TAXACEAE
9056	TAXODIACEAE
9100	TETRACENTRACEAE
9160	THEACEAE
9167	THELIGONACEAE
9175	THEOPHRASTACEAE
9215	THURNIACEAE
9221	THYMELAEACEAE
9243	TILIACEAE
9298	TOVARIACEAE
9325	TRAPACEAE
9335	TREMANDRACEAE
9396	TRIGONIACEAE
9459	TRIURACEAE
9467	TROCHODENDRACEAE
9472	TROPAEOLACEAE
9506	TURNERACEAE
9516	TYPHACEAE
9532	ULMACEAE

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9538	UMBELLIFERAE
9578	URTICACEAE
9599	VALERIANACEAE
9641	VELLOZIACEAE
9654	VERBENACEAE
9693	VIOLACEAE
9704	VITACEAE
9715	VOCHYSIACEAE
9722	VOLZIACEAE
9777	WELWITSCHIACEAE
9823	WINTERACEAE
9903	XYRIDACEAE
9958	ZINGIBERACEAE
9995	ZYGOPHYLLACEAE

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COUNTRY OF ORIGIN CODES

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001	ADEN
002	AFGHANISTAN
600	AFRICA
601	AFRICA, CENTRAL
602	AFRICA, EAST
603	AFRICA, NORTH
604	AFRICA, NORTHEAST
605	AFRICA, NORTHWEST
609	AFRICA, WEST
003	ALBANIA
004	ALGERIA
620	AMERICA (NOT UNITED STATES)
626	AMERICA, EAST
621	AMERICA, CENTRAL
622	AMERICA, NORTH
623	AMERICA, NORTHEAST
624	AMERICA, NORTHWEST
625	AMERICA, SOUTH
005	AMERICAN SAMOA
006	ANDORRA
007	ANGOLA
008	ARGENTINA
630	ASIA
631	ASIA, CENTRAL
632	ASIA, EASTERN-
633	ASIA MINOR
634	ASIA, SOUTHEAST
635	ASIA, WESTERN
009	AUSTRALIA
010	AUSTRIA

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011	AZORES
021	BAHAMA ISLANDS
022	BAHRIAN (BAHREIN)
023	BARBADOS
024	BELGIUM
025	BERMUDA
026	BHUTAN
027	BOLIVIA
028	BONIN ISLANDS (OGASAWARA)
029	BOTSWANA
036	BRAZIL
030	BRITISH HONDURAS
708	BRITISH ISLES (UNITED KINGDOM)
031	BRITISH SOLOMON ISLANDS
032	BRUNEI
033	BULGARIA
034	BURMA
035	BURUNDI
041	CAMBODIA
042	CAMEROON
043	CANADA
044	CANARY ISLANDS
045	CAPE VERDE ISLANDS
712	CAPRI ISLES
713	CELEBES ISLES
046	CENTRAL AFRICAN REPUBLIC
047	CEYLON
048	CHAD
049	CHANNEL ISLANDS
050	CHILE

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051	CHINA (MAINLAND)
052	CHINA (TAIWAN)
053	CHRISTMAS ISLAND
054	COCOS ISLAND (KEELING)
055	COLOMBIA
056	COMORO ISLANDS
057	CONGO REPUBLIC
058	COOK ISLANDS
059	COSTA RICA
060	CUBA
061	CYPRUS
062	CZECHOSLOVAKIA
717	DAGELET ISLE
081	DAHOMEY
082	DENMARK
083	DOMINICAN REPUBLIC
101	EASTER ISLAND
102	ECUADOR
103	EGYPT (UAR)
104	EL SALVADOR
105	ENGLAND
106	EQUATORIAL GUINEA
721	EAST INDIES
107	ETHIOPIA - ABYSSINIA
640	EURASIA
650	EUROPE
651	EUROPE CENTRAL
652	EUROPE, EASTERN
653	EUROPE, NORTHERN
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121	FAEROE ISLANDS
122	FALKLAND ISLANDS
727	FERNANDO POO
123	FIJI ISLANDS
124	FINLAND
125	FRANCE
126	FRENCH GUIANA
127	FRENCH POLYNESIA
128	FRENCH SOMALILAND
141	GABON (GABUN)
142	GALAPAGOS ISLANDS
143	GAMBIA
144	GERMANY
147	GHANA (GANA)
148	GIBRALTAR
149	GILBERT + ELLICE ISLANDS
150	GREECE
151	GREENLAND
152	GUADELOUPE
153	GUATEMALA
732	GUIANA
154	GUINEA
155	GUINEA (NEW)
156	GUYANA (FORMERLY BRITISH GUIANA)
171	HAITI
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182	IFNI
183	INDIA
184	INDONESIA
185	IRAN (PERSIA)
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187	IRELAND
188	ISLE OF MAN
189	ISRAEL
190	ITALY + SICILY
191	IVORY COAST
211	JAMAICA
212	JAPAN
747	JAVA
213	JORDAN
214	JUAN FERNANDEZ ISLANDS
231	KENYA
232	KOREA
234	KUWAIT (KOWAIT OR KOWEIT)
241	LAOS
242	LEBANON
243	LEEWARD + WINDWARD ISLANDS
758	LESSER ANTILLES
244	LESOTHO (BASUTOLAND)
245	LIBERIA
246	LIBYA
247	LIECHTENSTEIN
759	LORD HOWES ISLAND
248	LUXEMBOURG
261	MACAU
262	MADEIRA ISLANDS

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263	MALDIVE ISLANDS
264	MALAGASY REPUBLIC (MADAGASCAR)
265	MALAYSIA (MALAYA) (MALACCA)
266	MALAWI (NYASALAND)
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268	MALTA
269	MARTINQUE
762	MASCARENE ISLANDS
270	MAURITANIA
271	MAURITIUS
272	MEXICO
273	MIDWAY ISLAND
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275	MONGOLIAN REPUBLIC
276	MOROCCO
277	MOZAMBIQUE
278	MUSCAT + OMAN
291	NEPAL
292	NETHERLANDS (HOLLAND)
293	NETHERLANDS ANTILLES (DUTCH WEST INDIES)
294	NEW CALEDONIA
768	NEW HEBRIDES
295	NEW ZEALAND
296	NICARAGUA
297	NIGER
298	NIGERIA
299	NIUE ISLAND (SAVAGE)
300	NORFOLK ISLAND
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321	PACIFIC ISLAND
322	PAKISTAN
325	PANAMA
326	PAPUA AND THE BISMARCKS
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328	PERU
329	PHILIPPINES
330	PITCAIRN ISLAND
331	POLAND
778	POLYNESIA
332	PORTUGAL
333	PORTUGUESE GUINEA
334	PORTUGUESE TIMOR
335	PRINCE EDWARD ISLANDS
341	QATAR (KATAR)
351	REPUBLIC OF THE CONGO
352	REUNION
353	RHODESIA
354	RUMANIA (ROMANIA)
355	RWANDA (RUANDA)
356	RYUKYU ISLANDS (LIUCHIU OR NANSEI)
779	SACHALIN ISLES
371	SAN FELIX + SAN AMBROSIO ISLANDS
372	SAN MARINO
373	SAO TOME (SAO THOME OR ST. THOMAS)
374	SAUDI ARABIA
375	SCOTLAND
376	SENEGAL
377	SEYCHELLES
378	SIERRA LEONE

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379	SIKKIM
380	SINGAPORE
781	SOCIETY ISLES
782	SOLOMON ISLES
381	SOMALI REPUBLIC (SOMALIA)
382	SOUTH AFRICA, UNION OF
783	SOUTH SEA ISLES
383	SOUTHERN + ANTARTIC TERRITORIES
384	SOUTHWEST AFRICA
385	SPAIN
386	SPANISH SAHARA
387	ST. HELENA
388	ST.PIERRE + MIQUELON
389	SUDAN
390	SURINAM (DUTCH GUIANA)
391	SVALBARD + JAN MAYEN ISLANDS
392	SWAZILAND
393	SWEDEN
394	SWITZERLAND
395	SYRIA
411	TANZANIA
412	THAILAND
413	TOGO
414	TOKELAU ISLANDS (UNION)
415	TONGA (FRIENDLY ISLANDS)
416	TRINIDAD + TOBAGO
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419	TURKEY
431	UGANDA

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432	UNION OF SOVIET SOCIALIST REPUBLICS (USSR) (RUS
434	URUGUAY
433	UPPER VOLTA
451	VATICAN CITY
452	VENEZUELA
453	VIET NAM (COCHIN - CHINA)
455	VOLCANO ISLANDS
461	WAKE ISLAND
462	WALES
463	WALLIS + FUTUNA
803	WEST INDIES
464	WESTERN SAMOA
471	YEMEN
472	YUGOSLAVIA
481	ZAMBIA
817	ZANZIBAR
900	UNITED STATES (USA)
901	ALABAMA
902	ALASKA
903	ARIZONA
904	ARKANSAS
905	CALIFORNIA
906	COLORADO
907	CONNECTICUT
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909	FLORIDA
910	GEORGIA
911	HAWAII
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920	MARYLAND
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922	MICHIGAN
923	MINNESOTA
924	MISSISSIPPI
925	MISSOURI
926	MONTANA
927	NEBRASKA
928	NEVADA
929	NEW HAMPSHIRE
930	NEW JERSEY
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952	DISTRICT OF COLUMBIA
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954	PUERTO RICO
955	VIRGIN ISLANDS

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30 ARBOR LODGE STATE PARK ARBORETUM, NEBRASKA CITY, NEB.

40 ARNOLD ARBORETUM, JAMAICA PLAIN, MASS.

50 ARTHUR HOYT SCOTT HORTICULTURAL FOUNDATION, SWARTHMORE, PA.

60 ATKINS GARDEN AND RESEARCH LABORATORY OF HARVARD UNIVERSITY, SOLEDAD, CUBA

65 BARNARDS INN FARM, WILMINGTON, DELAWARE

70 BARNES FOUNDATION, ARBORETUM OF THE, MERION, PA.

80 BAYARD CUTTING ARBORETUM, OAKDALE, N. Y.

90 BEAL-GARFIELD BOTANIC GARDEN, EAST LANSING, MICH.

100 BERKSHIRE GARDEN CENTER, STOCKBRIDGE, MASS.

110 BOTANICAL GARDEN, UNIVERSITY OF CALIFORNIA, LOS ANGELES, CALIF.

120 BOTANICAL GARDEN OF THE UNIVERSITY OF HAVANA, HAVANA, CUBA

130 BOTANIC GARDEN OF SMITH COLLEGE, NORTHAMPTON, MASS.

140 BOTANICAL PLANTATIONS OF UNIVERSITY OF MAINE, ORONO, MAINE

150 BOWMANS HILL WILD FLOWER PRESERVE, WASHINGTON CROSSING, PA.

160 BOYCE THOMPSON SOUTHWESTERN ARBORETUM, SUPERIOR, ARIZ.

170 BROOKGREEN GARDENS, GEORGETOWN, S.C.

180 BROOKLYN BOTANIC GARDEN, BROOKLYN, N.Y.

190 BUFFALO BOTANIC GARDEN, BUFFALO, N.Y.

200 CANADA EXPERIMENTAL FARM, MORDEN, MANITOBA, CANADA

210 CEDAR BROOK PARK, PLAINFIELD, N.J.

220 THE COKER ARBORETUM, CHAPEL HILL, N.C.

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650 MONT ALTO STATE FOREST ARBORETUM, MONT ALTO, PA.

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670 MORGAN ARBORETUM, MONTREAL, QUEBEC, CANADA

680 MORRIS ARBORETUM OF THE UNIVERSITY OF PENNSYLVANIA, PHILADELPHIA, PA.

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700 MT. AIRY ARBORETUM, CINCINNATI, OHIO

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720 NEW YORK BOTANICAL GARDEN, NEW YORK, N.Y.

730 NEW YORK STATE AGR. EXPT. STA., GENEVA, N.Y.

740 NICHOLD ARBORETUM, ANN ARBOR, MICH.

750 NORFOLK BOTANIC GARDEN, NORFOLK, VA.

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860 SANTA BARBARA BOTANIC GARDEN, SANTA BARBARA, CALIF.

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960 UCLA BOTANICAL GARDEN, LOS ANGELES, CALIF.

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ADAMS	ADAMS, J.W. 32 PLEASANT STREET, PHILADELPHIA, PENN.
ADAMS COUNTY N	ADAMS COUNTY NURSERY + FRUIT FARMS, ASPERS, PENN.
ADAMS H	ADAMS, HELEN H. WELLESLEY, MASS.
ADAMS P	ADAMS, PERCY JENKINTOWN, PENN.
AITKEN	AITKEN, T.H.G. THOMAN H. G. TRINADAD
AIKEN N	AIKEN NURSERY PUTNEY, VERMONT
AGRONOMICA	AGRONOMICA ADE ANGOLA NOVA LISBOA, ANGOLA
ALBRECHT	ALBRECHT, J. NARBERTH, PENN
ALBYN N	H.A.ALBYN NURSERY NEWARK, OHIO
ALEXANDER	ALEXANDER, HELEN MRS. BUCK + DOE RUN RANCH UNIONVILLE, PA.
ALKEMADE	ALKEMADE, GEO. INC. MILLTOWN, N. Y.
ALLEN	ALLEN, P.H. WEST JAVA, INDONESIA
ALPINE G SOC	ALPINE GARDEN SOCIETY ENGLAND
AMATEIS	AMATEIS, EDMOND BREWSTER, N.Y.
AME BEGONIA SOC	AMERICAN BEGONIA SOC 10331 S. COLIMA RD. WHITTIER, CAL
AME FERN SOC	AMERICAN FERN SOC(NEILL D. HALL)1225 N.E.95 ST,SEATTLE WASH
AME HORT SOC	AMERICAN HORTICULTURE SOCIETY 201 CALVERT ST. NW,WASH,DC
AME ROCK G SOC	AMERICAN ROCK GARDEN SOCIETY ROCHESTER, N Y
AME RHODO SOC	AMERICAN RHODODENDRON SOC. 617 FAIRWAY DR.,ABERDEEN, WASH.
ANDERSON	ANDERSON, E. B. CHELTENHAM, ENGLAND
ARMSTRONG N	ARMSTRONG NURSERY ONTARIO, CAL.
ARNOLD	ARNOLD, DR. (G. W. FORD)
ASHCROFT ORC	ASHCROFT ORCHIDS SEATTLE, WASH.
AVES	AVES, J.J. PRETORIA, P.O. BOX 1454, TRANSVALL, S. AFRICA
BABIKOW	BABIKOW, W.E., SONS BALTIMORE, MD.
BACHOFER	BACHOFER, WILLIAM MRS. 315 THOMPSON AVE., SPRINGFIELD, PENN
BAILEY O.W.	BAILEY, O.W. MRS. 425 HILLCREST RD., YORK, PENN.
BALLARD	BALLARD, ERNESTA D. DIRECTOR PENN. HORT. SOC.PHILA., PENN.
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BALL	BALL, G. INC. CHICAGO, ILL.

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BARRY	BARRY, BETTY
BARTH	BARTH, OTTO 46 WASH. AVE., LEONARDO, N.J.
BATTEN	BATTEN, H.H. RD 2 KENNETT SQUARE, PENN
BAWEUTT	BAWEUTT, G. NORFOLK, VA
BEALL GH	BEALL GREENHOUSE CO. P.O. BOX 467, VASHON, WASH.
BEARD	BEARD, CHARLES LANCASTER, PENN
BELIN	BELIN, F.H.
BENARY	BENARY, ERNEST
BEWS	BEWS BOTANICAL LABORATORY
BILLINGS	BILLINGS, DR. WILMINGTON, DEL.
BILTMORE ESTATE	BILTMORE ESTATE ASHVILLE, N. C.
BLAAUM	BLAAUM, J. + CO. LINCROFT, NEW JERSEY
BLACKBURN	BLACKBURN, A. G. P.O. BOX 2128, TUCSON, ARIZ.
BLACKBURN B	BLACKBURN BENJAMIN THE WILLOWWOOD ARB., GLADSTONE, N.J.
BLUEMOUNT N	BLUEMOUNT NURSERY MONCKTON, MD. (KURT BLUEMEL)
BOERNER	BOERNER, ALFRED L. HALES CORNERS, WIS.
BOGARIENSIS	BOGOR BOTANIC GARDENS INDONESIA
BOHLENDER N	BOHLENDER NURSERY TIPP CITY, OHIO
BOURGONDIEN	BOURGONDIEN, VAN K. + SONS INC. BOX A,BABYLON, N.Y.
BRACEY	BRACEY + CO. 2363 S.E. MESA DR., SANTA ANNA, CALIF.
BRAEMER ORC	BRAEMER ORCHIDS 3139 BRAEMER RD., SANTA BARBARA, CALIF.
BRANDT	BRANDT, J. H. MR. UPPER FALLS, MD.
BREWER	BREWER, R.P. MRS. DEVON APT., WILMINGTON, DEL.
BRIMFIELD N	BRIMFIELD GARDENS NURSERY WETHERSFIELD, CONN.
BRISBANE BG	BOTANIC GARDENS BRISBANE, AUSTRALIA
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BROWNELL HOLLY	BROWNELL HOLLY FARMS MILWAUKEE, ORE.

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BUSCH	BUSCH, ROBERT MRS. 1506 ROBIN DR., COATESVILLE, PENN.
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CLARK	CLARK, MILO WILMINGTON, DEL.
CODD	CODD, DR. L. W. W.
COE ESTATE	COE ESTATE, PLANTING FIELDS OYSTER BAY, N.Y.
COE F	COE, FREDERICK W. DR. SAN ANSELMO, CALIF.
COIMBRA	HORTUS BOTANICUS COIMBRA, PORTUGAL
COLE	COLE, LLOYD E. 403 ARGENTI PLACE, NORTHVALE, N.J.
COLES N	COLES NURSERY BAINESVILLE, OHIO
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COWGILL	COWGILL, CARL F. TAMPA, FLA.
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DAWES ARB	DAWES ARBORETUM NEWARK, OHIO
DE FREITAS	DE FREITAS, C. L. SAINT VINCENT, WEST INDIES
DELEON	DE LEON NAT. PARROT JUNGLE, MIAMI, FLA.
DENANTES	DENANTES VILLES, FRANCE
DENNISON	DENNISON, DR. SWARTHMORE COLLEGE, SWARTHMORE, PENN.
DERMEN	DERMEN, DR. BELTSVILLE, MD.
DERICKSON	DERICKSON, R. B. MR. 10 BREEZE HILL RD., WILMINGTON, DEL.
DERRICK	DERRICK, JOE GARDENER FOR MRS. LAMMOT DU PONT, WILM., DEL 3
DICKLER	DICKLER, HARVEY F. 69 HEATHERFIELD RD., VALLEY STREAM, N.Y.
DICKSON	DICKSON, H.H. MR. GREENVILLE, S.C.
DODD N	DODD, TOM NURSERY, INC. U.S. HIGHWAY 98, SEMMES, ALA.
DOS PUEBLOS ORC	DOS PUEBLOS ORCHID CO. GOLETA, CAL.
DOYLE N	DOYLE, PAUL NURSERY PHOENIXVILLE, PENN.
DUKE ESTATE	DUKE, DORIS ESTATE SOMERVILLE, N. J.
DUNCAN	DUNCAN, EVA G. 213 E. FRONT ST., BERWICK, PENN.
DUNGS	DUNGS, FRITZ DR. RIO DE JANEIRO, BRAZIL
DUNN	DUNN, H. A. BALBOA, CANAL ZONE
DUNN, H.	DUNN, H.S. ANCON, CANAL ZONE
DU PONT H.F.	DU PONT, H. F. MR. WILMINGTON, DEL.
DU PONT I.	DU PONT, IRENE GRANOGUE, DEL.
DU PONT	DUPONT, NICHOLAS MRS. GREENVILLE, DEL.
DU PONT H.P.	DU PONT, H.B. MRS. 3600 MONTCHANIN RD., WILMINGTON, DEL.
DU PONT H.S.	DU PONT, HALLOCK S. HENRY CLAY, WILMINGTON, DEL.
DU PONT MRS. L.	DU PONT, LAMMOT MRS. WILMINGTON, DEL.
DU PONT P.S.	DU PONT, P.S. III WILMINGTON, DEL.
EDINBURGH BG	ROYAL BOTANIC GARDENS, EDINBURGH, SCOTLAND
EDSALL	EDSALL, JOHN

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ELLIS	ELLIS
ELM N	ELM CITY NURSRY NEW HAVEN, CONN
ELY	ELY, VAN HORN MRS. PAOLI, PENN.
ESPINOSA	ESPINOSA, H. SANTIAGO, CHILLE
EVANS	EVANS, BILL LOS ANGELES, CAL.
EVERITT	EVERITT, T.H. NEW YORK BOTANICAL GARDEN, BRONX, N.Y.
FAIRCHILD MRS.	FAIRCHILD, B. TAPPEN MRS. LONG ISLAND, N.Y.
FAIRCHILD TG	FAIRCHILD TROPICAL GARDENS MIAMI, FLA.
FAIRVIEW N	FAIRVIEW EVERGREEN NURSERY FAIRVIEW, PENN.
FANTASTIC G	FANTASTIC GARDENS S. MIAMI, FLA.
FENNELL ORC	FENNELL ORCHID CO. HOMESTEAD, FLA.
FINK	FINK, CHARLES MEDIA, PENN.
FLEU	C. B. FLEU
FLORIDA	FLORIDA NURSERY + LANDSCAPE CO. LEESBURG, FLA.
FLOWERFIELD	FLOWERFIELD BULB FARM OYSTER BAY, N.Y.
FORD	FORD, G. LONGWOOD, PENN.
FOSTER M.	FOSTER, MULFORD, M.B. DR. ORLANDO, FLA.
FREDERICK	FREDERICK, BILL SANTO, BRAZIL
FRENCH	FRENCH, HOWARD J. LIMA, PENN
FULLER	FULLER, HENRY R. 41 SHERWOOD RD., EASTON, CONN. 06612
FURNESS	FURNESS, FERMAN MR. MEDIA, PENN
GARFIELD PARK	GARFIELD PARK CONS. CHICAGO, ILL.
GASKINS	GASKINS, M. H. MAYAGUEZ, PUERTO RICA
GEORGE	GEORGE, J. I. SON INC. FAIRPORT, N.Y.
GERANIUM G	S. CALIF GERANIUM GARDENS RT 4,BOX 403, ESCONDIDO, CALIF.
GERMAIN	GERMAIN MR. JENKINTOWN, PENN.
GILLIES	GILLIES, G.H. HUNTINGTON, LONG ISLAND, N.Y.
GILMER	GILMER, GEORGE CHARLOTTESVILLE, VA.
GIRARD N	GIRARD BROTHERS NURSERY GENOVA, OHIO
GLASNEVIN	NATIONAL BOTANIC GARDEN GLASNEVIN, DUBLIN, IRELAND

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GOLDEN HOURS G	GOLDEN HOURS GARDENS (WM + MARY THORP) WEST CHESTER PENN.
GOTTSCHALL	GOTTSCHALL, MR. WILMINGTON, DEL.
GREGG	GREGG, JOHN W. KOLOA, HAWAII
GRIEL	GRIEL, JACK HAMORTON, PENN.
GRIESHABER	GRIESHABER, CARL MENDENHALL, PENN.
GRUNWALD	A. GRUNWALD WIENER-NEUSTRADT, AUSTRIA
GUICHARD	GUICHARD SISTERS FRANCE
HAAS	HAAS, DR. COLLEGE OF PHARMACY, PHILADELPHIA, PENN.
HAMBRIGHT	HAMBRIGHT, MRS. WILMINGTON, DEL.
HAMBURG BG	BOSTANISCHER GARDEN HAMBURG, GERMANY
HAMILTON R BG	ROYAL BOTANIC GARDENS HAMILTON, ONTARIO, CANADA
HAMPFLER	HAMPFLER, G. LONGWOOD, PENN.
HANBURY BG	HANBURY INSTITUTE BOTANICAL GARDEN UNIV. VENTIMIGLIA, ITALY
HAUSERMANN ORC	HAUSERMANN ORCHIDS, INC. BOX 363, ELMHURST, ILL.
HAYES	HAYES, ROSS H. MRS. TICK TOCK CAMELLIS N. THOMASVILLE,GA.
HEINZELMAN	HEINZELMAN, EDWARD 367 SOUTHERN AVE., CHILLICOTHE OHIO
HEISER	HEISER, CHARLES BLOOMINGTON, INDIANA
HELFRICK	HELFRICK, ABEL
HERB FARM	HERB FARM LTD. SEAL, SEVENOAKES, KENT, ENGLAND
HERB GROWER	GERTRUDE B. FOSTER, THE HERB GROWER, FALLS VILLAGE, CONN.
HEWLETT	HEWLETT, A. P. 38 TIP TOP WAY, BERKELEY HEIGHT, N. J.
HICKS N	HICKS NURSERY INC. LONG ISLAND, N. Y.
HIGGINS	HIGGINS, MRS. CALIF. (CACTUS SOCIETY)
HIGHLAND PARK H	HIGHLAND PARK HERBARIUM ROCHESTER, N.Y.
HILL	HILL, JULIAN MRS. WILMINGTON, DEL.
HILLIER + SONS	HILLIER + SONS WINCHESTER, ENGLAND
HILLTOP N	HILLTOP NURSERY CASSTOWN, OHIO
HINKSON	HINKSON, J. H. WARD CHESTER, PENN.
HIXON	HIXON, BLAIR MR.
HODGE	HODGE, W. H. DR.

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HOFF	HOFF, CLAYTON M. BRANDYWINE VALLEY ASSOC., PENN.
HOFFMAN N	LUDWIG HOFFMAN NURSERY BLOOMFIELD, CONN.
HOHENHEIN C	HOHENHEIN COLLEGE GERMANY (DAVID BECHTLE)
HOHMAN	HOHMAN, H. J. KINGSVILLE, MD.
HOLDEN ARB	HOLDEN ARBORETUM MENTOR, OHIO
HOLLAND N	HOLLAND NURSERY PRODUCTS PO BX339 MADISON SQ STATION NY NY
HOLLINGER	HOLLINGER, THEODORE RD 1, MANHEIM, PENN.
HOLLY SOC	HOLLY SOCIETY P.O. BOX 8445, BALTIMORE, MD.
HORN	HORN, ROBERT S. JR.
HORTON N	HORTON NURSERIES MADISON, OHIO
HOSHIZAKI	HOSHIZAKI, BARBARA 565 N. WESTMORELAND AV., LOS ANGELES CALIF
HOUSE OF ORC	HOUSE OF ORCHIDS MIAMI, FLA.
HUMBOLDT ST. C	HUMBOLDT STATE COLLEGE ARCATA, CAL.
HUNT	HUNT, R. A. MRS.
HUNTINGTON G	HUNTINGTON GARDENS HUNTINGTON LIBRARY + ARB. SAN MARINO, CAL
HUTTLESTON	HUTTLESTON, DR. LONGWOOD, PENN.
HYATT	HYATT, GLENN
ILGENFRITZ	ILGENFRITZ, MARGARET MONROE, MICHIGAN
IMPERIAL C	THE IMPERIAL COLLEGE OF TROPICAL AGRICULTURE, TRINIDAD, BWI
INT SUCCULENT	INTERNATIONAL SUCCULENT INST., INC. MILLBRAE, CALIF.
ITHACA C	ITHACA COLLEGE ITHACA, NEW YORK (C.R. WORTH)
J + L ORC	J + L ORCHIDS POTTSTOWN, PENN.
JARDIN ALPINE	JARDIN ALPINE D-ACCLIMATION SWITZERLAND
JEFFERIS	JEFFERIS, RAYMOND MRS. JR. MEDIA, PENN.
JONES	JONES, GORDON E. MR. OYSTER BAY, N.Y.
JONES + SCULLY	JONES + SCULLY INC. MIAMI, FLA.
JOHNSON	JOHNSON, STEWART GREAT HILL, MARION, MASS.
JOHNSON CACTUS	JOHNSON CACTUS GARDENS PARAMOUNT, CAL.
JOHNSON J	JOHNSON, J.M.
JOHNSON N	JOHNSON AVE. RARE PLANT NURSERY 272 JOHNSON AVE. SAYVILLE, NY

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JOHNSON P	JOHNSON PEG.
JOHNSON R	JOHNSON, ROY LONGWOOD, PENN.
JOHNSTON E	JOHNSTON, ED. VERO BEACH, FLA.
JUHREN	JUHREN, MRS. GUSTOF
KANE	KANE, G. G. MR. NEAR MARSHALLTON, PENN.
KARL MARZ BG	BOTANIC GARDEN DER KARL MARZ UNIVERSITY
KEEN	KEEN, RICHARD LONGWOOD, PENN.
KEHR	KEHR, A. ABINGTON, PENN.
KELLY N	KELLY BROS. NURSERY DANVILLE, N.Y.
KELSEY N	KELSEY NUERSERY SERVICE HIGHLANDS, NEW JERSEY
KENNEDY	KENNEDY, ANDREW R. NEW YORK, N.Y.
KENSINGTON ORC	KENSINGTON ORCHIDS KENSINGTON, MD.
KERNIS ESTATE	KERNIS, JOSEPH ESTATE OF PHILADELPHIA, PENN.
KEW BG	ROYAL BOTANIC GARDENS KEW, ENGLAND
KIESEWETTERS	KIESEWETTERS ORCHARD GARDENS LONG LISLAND, N.Y.
KINGDON-WARD	KINGDON-WARD, F. BURMA (DEAD)
KIRCH ORC	WM. KIRCH ORCHIDS HONOLULU, HAWAII
KIRGHISTANIAE	HORTUS BOTANICUS ACADEMICE SCIENTIARUM KIRGHISTANIAE USSR
KIRSTENBOSCH	NATIONAL BG OF S. AFRICA (KIRSTENBOSCH)
KNEELING N	FOREST KNEELING NURSERY ELSBERRY MISSOURI
KOHANKIE	HENRY KOHANKIE + SON PAINESVILLE, OHIO
KONDO	KONDO, KATSUHIKO MR. 4-12, SHIOJI-CHO,MIZUHO-KU,NAGOYA,JAPAN
KNERR	KNERR, JOHN N. JR. PHOENIXVILLE, PENN.
KRAMER N	KRAMER BROS. NURSERY UPLAND, CAL.
KRAUSE	KRAUSE, LAWRENCE GILLETT, WIS.
KUMMERT	KUMMERT, FRITZ AUSTRIA
LAGER	LAGER, JOHN SUMMIT, N. J.
LAMBERT	LAMBERT, JAMES FORT WORTH, FLA.
LANDIS ARB	GEORGE LANDIS ARB. ESPERANCE, N.Y.
LANGLOIS	LANGLOIS, A.C. NASSAU, BAHAMAS

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LANSER	LANSER, GEORGE
LAPOSTELLE	LAPOSTELLE, MARINER JR. FRANCE
LASCA	LOS ANGELES STATE + COUNTY ARB., CAL.
LAYTON	LAYTON, WILBERT MRS.
LEACH	LEACH, DAVID G. 15 CALDWELL ST.BROOKVILLE,PENN.
LEATHERMAN	LEATHERMAN, SYLVIA EL MONTE, CAL.
LECOUFLE	LECOUFLE, MARCEL PARIS, FRANCE
LEHDE N	EDWARD LEHDE NURSERY 86 FRENCH RD., BUFFALO, N.Y. 14224
LEIDEN	NORTUN BOTANICUS LEIDEN, NETHERLANDS
LEITRIM	COUNTESS OF LEITRIM,MULROY,CARRIGART CO.DONEGAL,ERIE,IRELAND
LEWIS	LEWIS BROS. EUSTIS, FLA.
LIGHTY	LIGHTY, DR. LONGWOOD, PENN.
LITTLE	LITTLE, MRS. KENNETT SQUARE, PENN.
LOCKWOOD	LOCKWOOD, T. E. LONGWOOD, PENN.
LOGEE GH	LOGEE-S GREENHOUSES DANIELSON, CONN.
LONG	LONG, F. R. SUNNERSTRAND, SOUTH AFRICA
LONG ISLAND IN	LONG ISLAND INST. FARMINGDALE, N.Y.
LOUISIANNA IN	SOUTHWESTERN LOUISANA INST. LAFAYETTE, LA.
LUITWIELER	LUITWEILER, JAMES
LUNDQUIST	LUNDQUIST, H. T. MRS. LOCUST LANE, KENNETT SQUARE, PENN.
MCARTHUR	MCARTHUR, BILLINGS 40 LAKE DRIVE, WINTER PARK, FLA.
MC KEE G	MC KEE JUNGLE GARDENS VERO BEACH, FLA.
MC KINNEY	MC KINNEY, WM. MRS. MIDDLETOWN ROAD, MEDIA, PENN.
MC LEESTER	UNIVERSITY OF MINN. MINNEAPOLIS, MINN.
MC LELLAN	MC LELLAN, ROD + CO. SAN FRANCISCO, CAL.
MCPEAK	MCPEAK, EDGAR DR.
MACBRIDE	MACBRIDE, P. D. MRS. HOLLYWOOD FARM, WOODINVILLE, WASH.
MALMBORG	MALMBORG, GUS MANHEIM, PENN.
MANSELL	MANSELL + HATCHER LEEDS, ENGLAND
MARKS	MARKS, LESTER A. MR. HONOLULU, HAWAII

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MARTIN	MARTIN, A.M. HUNTINGTON VALLEY, PENN.
MARTIN H.	MARTIN, HENRY VETERANS HOSP., COATESVILLE, PENN.
MATHIAS	MATHIAS, DR. U. OF CALIF., LOS ANGELES, CAL.
MATTHEWS	MATTHEWS, ROBERT MR. + MRS. NORFOLK, VA.
MAYAQUEZ ES	FEDERAL EXPERIMENT STA. MAYAQUEZ, PUERTO RICO
MAYO N	MAYO NURSERY AUGUSTA, GEORGIA
MEDFORD	MEDFORD, MR.
MENNINGER	MENNINGER, E. A. STUART, FLA.
MENS GC	MENS GARDEN CLUB NEW YORK, N.Y.
MESERVE	MESERVE, MRS. ST. JAMES, LONG ISLAND, N. Y.
MEYER	MEYER, F. G. U.S. NATIONAL ARB., WASHINGTON, D. C.
MICHAUD	MICHAUD + CO.
MIDDLEPEN	MIDDLEPEN PLANTATION ORANGEBURG, S. C.
MILLER	MILLER, E. LONGWOOD, PENN.
MISSION G	MISSION GARDENS TECHNY, ILL.
MISSOURI BG	MISSOURI BOTANICAL GARDENS ST. LOUIS, MISSOURI
MOIR	MOIR, W. W. G. P.O. BOX 2298, HONOLULU, HAWAII
MONROE N	MONROE NURSERY MONROE, MICHIGAN
MONTE CARLO	JARDINS BOTANIQUES MONTE CARLO
MOORE	MOORE, HAL. CORNELL UNIVERSITY
MOORE LEE	MOORE, LEE P.O. BOX 504, MIAMI, FLA.
MORTON ARB	MORTON ARBORETUM LISLE, ILLINOIS
MORRISON	MORRISON, CARLTON MR.
MOUDRY	MOUDRY,G.J. CLYBURN PARK, 4915 GREENSPRING AVE.,BALTO.,MD.
MOYER	MOYER, MRS. (G. FORD)
MUNOZ	MUNOZ,CARLOS PROF. UNIV. OF CHILE, SANTIAGO, CHILE
MURPHEYS	MURPHEYS, R. H. SONS + CO. URRANA, OHIO
NA	NATIONAL ARBORETUM WASH., D.C.(NA NO. UNKNOWN)
NAGANO	NAGANO, DR. + MRS. Y. 216 EIFUKUCHO,SUGINAMI,TOKYO,JAPAN
NAF	NAF, ULRICH ROCKEFELLER INST., N. Y.

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NATIVE	SPONTANEOUS NATIVE PLANT
NATORP N	NATORP NURSERY CINCINNATI, OHIO
NC STATE U	NORTH CAROLINA STATE UNIVERSITY RALEIGH,N.C.(J.C. TAYLOR)
NE PISTA PIS	NE PISTA REG. PLT. INTRO STATION
NEVILLE ORC LTD	NEVILLE ORCHIDS LTD. GLASTONBURY, SOMERSET, ENGLAND
NEW YORK ES	PLANT EXP. STATION GENEVA, N. Y.
NOLT	NOLT, MR. SILVER SPRING, PENN.
NORTHEASTERN	NORTHEASTERN FORESTRY CO. CHESIRE, CONN.
NUT TREE N	NUT TREE NURSERY DOWNINGTOWN, PENN.
OAKS N	ORCHID OAKS NURSERY MIAMI, FLA.
OESTERBO	OESTERBO, JAMES MEDIA, PENN.
OHIO AES	OHIO AGRICULTURE EXPERIMENT STATION WOOSTER, OHIO
OLSON	OLSON, OLLE MONROVIA, CAL.
OPIE	OPIE,NORMAN MR. UNIONVILLE, PENN.(SUPT. OF THOURON ESTATE)
ORC SOC	GREATER PHILADELPHIA ORCHID SOC. PHILADELPHIA, PENN.
OREGON BULB	OREGON BULB FARMS INC. GRESHAM, OREGON
ORLANDO ORC	ORLANDO ORCHIDS 1717 EDGEWATER DR., ORLANDO, FLA. 32804
OULU BG	OULU, HORTUS BOTANICUS UNIVERSITATIS, FINLAND
PARK SEED	PARK SEED CO. GREENWOOD, S.C.
PARKS	PARKS, CLIFFORD R. DR. LASCA, ARCADIA, CAL.
PARIS BG	JARDIN BOTANIQUE PARIS, FRANCE
PARVERS	PARVERS, BOB
PATERSON	PATERSON, DAVE LONGWOOD, PENN.
PATTERSON H.	H. PATTERSON + SONS BERGENFIELD, N. J.
PATTERSON ORC	PATTERSON ORCHIDS BERGENFIELD, N. J.
PAUL	PAUL, LOIS MRS. LONGWOOD, PENN.
PEARCE SEED	PEARCE SEED CO MORRISTOWN, N. J.
PECORA	PECORA, CHARLES MRS. ROKEBY FARMS, UPPERVILLE, VA.
PENN HORT SOC	PENNSYLVANIA HORT. SOC., PHILADELPHIA, PENN.
PENN STATE U	PENNSYLVANIA STATE UNIVERSITY STATE COLLEGE, PENN.

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PETERSON	PETERSON, ROBERT MR. WILMINGTON, DEL.
PHILA CACTUS	PHILADELPHIA CACTUS + SUCCULENT SOCIETY, PENN.
PI	PLANT INTRODUCTION (NO. UNKNOWN)
PIETERBURG BG	PIETERMARITZBURG BOTANICAL GARDENS SOUTH AFRICA
PLANT ES	PLANT EXPERIMENTAL STATION GENEVA, N. Y.
PRETORIA	CHIEF, DIVISION OF BOTANY PRETORIA, SOUTH AFRICA
PRIDE	PRIDE, ORLANDO S. BUTLER, PENN.
PRINCETON N	PRINCETON NURSERIES PRINCETON, NEW JERSEY
PRINCIPALIS HB	HORTUS BOTANICUS, PRINCIPALIS, USSR
PROSSER	PROSSER, L. DIR. OF PARKS PORT ELIZABETH, SOUT AFRICA
PUMPIN	PUMPIN,BENJAMIN JARDIN SUIZO,CASILLA 1886,VALPARAISON,CHILE
PUSEY	PUSEY, NORMAN 172 W. EVERGREEN, WEST GROVE, PENN. (DEAD)
PYLE + SON	HARRY PYLE + SON CHADDS FORD, PENN.
RANCHO BG	RANCHO SANTA ANA BOTANIC GARDENS CLAREMONT, CAL.
RANKIN	RANKIN, J. D. SALISBURY, N. C.
RARAFLORA	BERGMAN, FRED W., FEASTERSVILLE, PENN.
RAYSTON BULB	DAVID+RAYSTON BULB CO.5256 W.WASH BLVD. LOS ANGELES,CALIF.
REDLINGER	REDLINGER, JOSEPH MIAMI, FLA.
RESEARCH CENTER	N.GREAT PLAINS RESEARCH CENTER BX 459 MANDAN, N. DAKOTA
RINGALL	RINGALL, TONY MR.
RIVERMONT ORC	RIVERMONT ORCHIDS SIGNAL MOUNTAIN, TENN.
ROBBINS	E. C. ROBBINS ASKFORD, NORTH CAROLINA
ROEHRS	ROEHRS, JULIUS RUTHERFORD, N. Y.
ROKUJO	ROKUJO, DR. TOKYO, JAPAN
ROSE	ROSE, FRANK H.
ROSS	ROSS, D. P. MRS. WILMINGTON, DEL.
ROUEN BG	JARDIN BOTANIQUE DE LA VILLEDE, ROUEN, FRANCE
SACHER	SACHER, RICHARD 94 ALBERT DR., PARLIN, N. J.
SAIER	SAIER, HARRY E. DIMONDALE, MICH.
SANTA BARB BG	SANTA BARBARA BOTANICAL GARDEN,SANTA BARBARA, CALIF.

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SARATOGA	SARATOGA HORT. FOUNDATION SARATOGA, CAL.
SATTERTHWAITE	SATTERTHWAITE, F. B. SHORT HILLS, N. J.
SAUNDERS	SAUNDERS, SYLVIA MISS PO BX 157, CLINTON, N.Y.
SCHEEPERS	SCHEEPERS, JOHN NEW YORK, N. Y.
SCHEARER	JOHN SCHEARER FLORIST HAVERTOWN, PENN.
SCHELPE	SCHELPE, E. A. SOUTH AFRICA
SCHERER	N. W. SCHERER PAINSVILLE, OHIO
SCHETKY	SCHETKY, G. L. MRS. DAVISVILLE RD. NORTH, KINGSVILLE, R.I.
SCHWOEBEL N	SCHWOEBEL, RICHARD NURSERY ARDMORE, PENN.
SCHROTHS N	SCHROTH-S NURSERY CLYMER, PENNSYLVANIA
SCHWARTZ	SCHWARTZ, RANDY 555 CHEROKEE BLVD., KNOXVILLE, TENN.
SCHWOEBEL N	SCHWOEBEL, RICHARD NURSERY ARDMORE, PENN.
SCHULTES	SCHULTES, R. E. + BARCLAY, A.S.
SCOTT	SCOTT, MRS. CHESTER, PENN
SEGER	SEGER BROS. LISSE, HOLLAND
SEIBERT E	SEIBERT, E. W.
SEIBERT	SEIBERT, RUSSELL DR. LONGWOOD, PENN.
SHARP	SHARP, RODNEY WILMINGTON, DEL. (DEAD)
SHAW	SHAW, PAUL LONGWOOD, PENN.
SHERWOOD N	SHERWOOD NURSERY CO. CORBETT, OREGON
SINCLAIR	SINCLAIR, FRANCIS M. EXETER, N. H.
SLOCUM	SLOCUM, PERRY D. WINTER HAVEN, FLA.
SMIRNOW	SMIRNOW, LOUIS BROOKVILLE, LONG ISLAND, N. Y.
SMITH	SMITH, FRED (IRENEE DU PONT, WILMINGTON, DEL.)
SMITH OWEN	SMITH, OWEN + CO. GUATALON, GUATEMALA
SOFIA	UNIVERSITY BOTANICAL GARDEN 49 MOSCOVSKA ST.,SOFIA,BULGARIA
SOREN	SOREN, PARKER MANCHESTER, CONN.
SPETCHLEY	SPETCHLEY PARK GARDEN WORCHESTER, ENGLAND
SPRING	SPRING, JOHN STRYBING ARB. SAN FRANCISCO, CAL.
STADT BG	BOTANISCHER GARTEN DER STADT ESSEN, GERMANY

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STALS S	STALS SANITORIUM CAPETOWN, SOUTH AFRICA
STARK	STARK, GEORGE WAWA, PENN.
STEIGER	STEIGER, HARWOOD MRS. REDHOOK, N. Y.
STEWART	STEWART, FRED R. INC. 8606 E.LAS TUNAS DR. SAN GABRIEL, CAL.
STORRS AND H	STORRS AND HARRISON
STOUTEMYER	STOUTEMYER, VERNON DR. U.C.L.A.
STRASBOURG BG	JARDIN BOTANIQUE 7, RUE DE L-UNIVERSITE, STRASBOURG, FRANCE
STRAWBERRY N	STRAWBERRY HILL NURSERY RHINEBECK, N. Y.
STUART	STUART, LOU LTD. SUSSEX, ENGLAND
SUMMERS	SUMMERS, ALEX J. RFD BOX 208A, ROSLYN, N. Y.
SUNCREST N	SUNCREST EVERGREEN NURSERY HOMER CITY, PENN.
SW LA IN	SOUTHWESTERN LOUISIANA INST. LAFAYETTE, LOUISIANA
TAYLOR ARB	TAYLOR MEMORIAL ARB. CHESTER, PENN.
TAYLOR R	TAYLOR, ROGER R. J. DR. BALTIMORE, MD.
TEMPLETON	TEMPLETON, HARVEY WINCHESTER, TENN.
TENCH	TENCH MR. SARASOTA, FLA.
THOMAS C A	THOMAS, C. A. MR. KENNETT SQUARE, PENN.
THOMAS MRS E	THOMAS, EDWARD MRS. 400 W. SPRINGFIELD ST., CHESTNUT HILL, PENN
THOMAS MRS V	THOMAS, VIOLET MRS. KENNETT SQUARE, PENN.
THOMPSON	THOMPSON, MR. NEWARK, DEL.
THOMPSON ARB	BOYCE THOMPSON ARBORETUM PO BX AB, SUPERIOR, ARIZ
THOURNTON	THOURNTON, FRED WEST PALM BEACH, FLA.
THOURON	THOURON, J. R. H. UNIONVILLE, PENN.
THREE SPRINGS	THREE SPRINGS FISHERIES LILYPONDS, MD. (G.L. THOMAS, JR.)
TINGLE N	TINGLE NURSERY CO. PITTSVILLE, MARYLAND
T PLANT PRODUCT	TROPICAL PLANT PRODUCT, INC. CHESTER, PENN.
TRAUB	TRAUB, H. P. LA JOLLA, CAL.
TRICKERS	TRICKERS SADDLE RIVER, N. J.
TROPICAL ES	SUB. TROPICAL EX. STATION HOMESTEAD, FLA.
TSE	HONG KONG

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TUCSON BG	TUCSON BOTANICAL GARDEN TUCSON, ARIZ. (HARRISON YOCUM)
TURNER	TURNER, MARIE
TYLER ARB	TYLER ARBORETUM, BOX 216, LIMA, PENN.
UNITED BULB	UNITED BULB CO. MT. CLEMENS, MICH.
US PIS FLA	U. S. PLANT INTRODUCTION STATION, COCONUT GROVE, FLA.
U BRITISH	UNIVERSITY OF BRITISH COLUMBIA VANCOUVER, CANADA
U COLO MUSEUM	UNIVERSITY OF COLORADO MUSEM BOULDER, COLORADO
U CONN	UNIVERSITY OF CONN. STORRS, CONN.
U DEL	UNIVERSITY OF DELAWARE NEWARK, DEL.
U MICH	UNIVERSITY OF MICHIGAN ANN ARBOR, MICH.
U MINN	UNIVERSITY OF MINNESOTA MINNEAPOLIS, MINN.
U PENN	UNIVERSITY OF PENNSYLVANIA PHILADELPHIA, PENN.
U WASH	UNIVERSITY OF WASHINGTON SEATTLE, WASH.
U WASH DRUG G	DRUG PLANT GARDENS + LAB. UNIV. OF WASHINGTON, SEATTLE, WASH
UNKNOWN	UNKOWN
URBAN	GARDENS DIVISION URBAN SERVICES HONG KONG
US BG	UNITED STATES BOTANICAL GARDEN WASHINGTON, D.C.
USDA	UNITED STATES DEPT. OF AGRICULTURE WASHINGTON, D. C.
US PIG FLA	U. S. PLANT INTRODUCTION GARDEN, COCONUT GROVE, FLA.
VACHEROT	VACHEROT + LECOUFLE FRANCE
VACRATAT	HORTUS BOTANICUS VACRATAT, HUNGARY
VAN ZYVERDEN	VAN ZYVERDEN BROS. INC. P. O. BOX 345, METUCHEN, N. J.
VERMEULEN N	VERMEULEN + SONS NURSERY NESHANIC STA., N. Y.
VACHEROT	VACHEROT + LECOUFLE FRANCE
VACRATAT HB	HORTUS BOTANICUS VACRATAT, HUNGARY
VANDERBILT	VANDERBILT, DICK KENNETT SQUARE, PENN.
VAN VLECK	VAN VLECK, HOWARD MONTCLAIR, N.J.
VERO BEACH TN	VERO BEACH TROPICAL NURSERY VERO BEACH, FLA.
VETTERLE	VETTERLE + REINELT CAPITOLA, CALIF.
VICKS G	VICKS WILDGARDENS GLADWYNE, PENN.

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VIETTE N	VIETTE, MARTIN NURSERY LONG ISLAND, N. Y.
VILLA TARANTO G	VILLA TARANTO GARDENS, PALLANZA, ITLAY
VOSTERS N	VOSTERS NURSERY+GREENHOUSES,SOUTH+FRANKLIN AVE., SECANE,PA
WACKER	WACKER, LOUIS G. JR. GIBBSBORO, N. J.
WAGENINGEN ARB	WAGENINGEN ARB., NETHERLANDS
WALSH	WALSH, T. J. DR. DUBLIN, IRELAND
WARNE	WARNE, MILTON J. 260 JACK LANE, HONOLULU, HAWAII
WATNONG N	WATNONG NURSERY MORRISVILLE, N. J. (THE DON SMITHS)
WAYSIDE G	WAYSIDE GARDENS MENTOR, OHIO
WEISSE	WEISSE, L. C. SHEBOYGAN FALLS, WISCONSIN
WELLS	WELLS, ARTHUR (PRES. - PHILA. CACTUS SOC.), PENN.
WELLS	WELLS, JAMES NURSERY RED BANK, N.J.
WENTWORTH	WENTWORTH, MR. PAOLI, PENN.
WESTBURY ROSE	WESTBURY ROSE CO., INC. LONG ISLAND, N.Y.
WHALER	WHALER, MR. WILMINGTON, DEL.
WHIPPO	WHIPPO, PAUL 2828 LINE LEXINGTON RD. HATFIELD, PENN.
WHITAKER	WHITAKER, T. W. DR. LA JOLLA, CAL.
WHITNEY ESTATE	WHITNEY ESTATE (MRS. HILL) LONG ISLAND, N. Y.
WICKMANN	WICKMANN, H. CELLE, W. GERMANY
WIHTOL	WIHTOL, KARL MRS. MIDDLETOWN, N. J.
WILLIAMS	WILLIAMS, J. G. MRS. 831 BLACK ROCK RD., GLADWYNE, PENN.
WILLOWDELL N	WILLOWDELL NURSERY ASHLAND, OHIO
WILSON	WILSON, ROBERT COSTA RICA
WILSON ROB	WILSON, ROBERT G. SAN VITO, DE JAVA, COSTA RICA
WILSON W W	WILSON, W. W. 239 OLD GULPH ROAD, WYNNEWOOD, PENN.
WINANS	WINANS, HELEN 2205 MIRASOE, BROWNSVILLE, TEXAS
WIRKUS	WIRKUS, LEONARD H. MIAMI, FLA.
WISLEY	ROYAL HORTICULTURE SOCIETY GARDEN, WISLEY, SURREY, ENGLAND
WOHL	WOHL, MARGARET MRS. 283 DALLAM ROAD, NEWARK, DEL.
WOODIE	WOODIE LINNIE JEFFERSON, N. C.

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WRIGHT	WRIGHT, W. DR. PITMAN, N. J.
YOCUM	YOCUM, HARRISON (TUCSON BG) 1628 N. JEFFERSON, TUCSON, ARIZ.
YOUNG	YOUNG, J. H. CHADDS FORD, PENN.
ZACK	H. J. ZACK DEEP RIVER, CONNECTICUT
ZIMMERMAN	ZIMMERMAN, MRS. NEW CASTLE, DEL.
ZONEN	WED. P. EVELEENS + ZONEN AALSMEER, HOLLAND

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