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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.

GRAY, DWIGHT E

NATIONAL SCIENCE FOUNDATION
WASHINGTON 25, D. C.

Office of Science Information Service

July 24, 1959

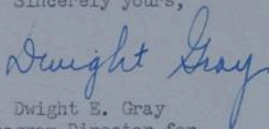
Dr. John M. Fogg, Jr.
Director, Morris Arboretum
University of Pennsylvania
Philadelphia, Pennsylvania

Dear Dr. Fogg:

We would be very grateful for your assistance in evaluating the enclosed proposal from the New York Botanical Garden. The first two pages describe the feasibility study proper; the remainder of the material outlines the long-range plans that the Garden has for a data center of economic botany. We asked Drs. Rogers and Gould to include this background material so reviewers would be able to place the request for feasibility study funds in better perspective.

Any comments you may have on the proposed plan of investigation, the need for this study in the field to which it applies, or the reasonableness of the estimated budget, will be most helpful to us. You may be assured that your remarks will be held in confidence.

Sincerely yours,



Dwight E. Gray
Program Director for
Publications & Information Services

Enc.

NAME AND ADDRESS OF INSTITUTION

The New York Botanical Garden
Bronx Park
New York 58, New York

TITLE OF PROPOSED RESEARCH

Pilot Study of Application of Electronic Data Processing Devices to
Systematic and Economic Botany

PRINCIPAL INVESTIGATORS

Sydney W. Gould
Madison, Connecticut

David J. Rogers
The New York Botanical Garden

TIME PERIOD FOR WHICH SUPPORT IS REQUESTED

Three to four months

AMOUNT REQUESTED

\$3,415.00—

7733

ABSTRACT

A carefully constructed, machine-oriented, coding system for the scientific names, authors of the names, bibliographic references, dates of publications, and use categories of the whole plant kingdom has been proposed. By use of IBM Cards, the encoded information may be employed for catalogues of names, of authors, as bibliographies, or printed combinations of these. The coding system is designed to be used for information retrieval systems of wider application in all fields of plant science.

PLAN OF PILOT STUDY

This study will enable the investigators to place on punched cards selected portions of the over-all program (copy of which is appended) to demonstrate the scope, variety, and precision of the results obtainable. It will also give an opportunity to determine the suitability, the acceptability, and the most outstanding needs of the over-all program. The selection will include, in several useful variations, the following:

- A. The family names of the entire plant kingdom and representative synonyms, giving for each name the author, the place and date of original publication, and assigned numbers for each name;
- B. (1) The generic names of an important family, the Gramineae (grasses) including the same information as in A above;
(2) The species names in that family so far accumulated;
- C. If time and funds permit, other generic names to which numbers have been assigned.

-2-

This "pilot" may be completed in the time proposed because almost all of the bibliographic work for the pilot project has been performed. A considerable amount of work for the over-all project at the generic level has also been done. The portion remaining is the actual machine operation, for details of which reference to the enclosed description of the methods is suggested.

Details of methods, equipment, personnel, and institutions are given in the appended program.

BUDGET

The following general estimated budget is based on four month's work.

1. Punch operator and taxonomist (\$600.00/month, four months) -----	\$2,400.00
2. Social security 2½%-----	60.00
3. IBM cards (75,000 @ \$1.25/100)-----	95.00
4. Paper (printing forms)-----	100.00
5. IBM Punch rental (\$60.00/month, 4 months)-----	240.00
6. 407 Printer rental (Service Bureau), 4,800 cards/ hour, 14 hours, \$13.50/hour-----	190.00
7. Printing of output-----	500.00
8. File cabinet for IBM cards-----	200.00
9. Travel: 6 RT New Haven-New York, @ \$.08/mile-----	96.00
6 days per diem, \$15.00/day-----	90.00
1 RT New Haven-Washington, @ \$.08/mile--	40.00
7 days per diem/Washington-----	105.00
10. Subtotal-----	\$4,116.00
11. 15% indirect costs-----	617.00
12. Total-----	\$4,733.00

PROPOSAL FOR APPLICATION OF ELECTRONIC DATA PROCESSING DEVICES TO SYSTEMATIC BOTANY

INTRODUCTION

The number of known species of plants and animals has reached a fantastic size and is increasing rapidly. Thousands of publications carry vital information on the uses of plants. Botanists must keep track of both the names and the uses if science is to advance.

Present methods of "record management" in the biological sciences are cumbersome and obsolescent. We propose to correct this situation, aided by electronic data processing devices.

One of the merits of the program outlined in the body of this application is its flexibility, allowing modifications in the procedures as deemed necessary. The final form the publications will take can be adjusted to the needs of taxonomists and other users. With the advice and assistance from recognized botanical authorities we expect to be able to produce a highly workable system which will be acceptable internationally.

AIMS: LONG RANGE

1. To record the names of all known biological entities on punched cards with an appropriately assigned number to each species.
2. To maintain the record permanently by the addition of new names as published.

3. To compile card catalogues and printed lists of scientific and vernacular names of all plants.

4. To correlate scientific names of useful plants with their categories of usefulness.

PRODUCT: LONG RANGE

When the work of the project is completed, we propose to publish or have available for publication the following, listed from one through six. With the addition of data from other sources to be added to the project cards, items seven through eleven may be later added to the record.

1. An Index of Plant Names, containing the information in the Index Kewensis, the Gray Herbarium Cards, and the cards of the Index Nominum Genericorum, and in addition, the published names of the families, genera, species and varieties of divisions not in the above indices: namely, the ferns, bryophytes, algae, fungi, lichens, bacteria and viruses, divided into two alphabetical generic sequences, (a) the vascular plants, and (b) the non-vascular plants, to form an index of the entire plant kingdom.

2. An index, using the same cards as above, of the divisions of the plant kingdom alphabetically by the families of that division, and in turn alphabetically by generic names, and the species in the order of their addition to the genera.

3. An alphabetical index of authors who have named plant taxa in published works from 1753 to 1960, giving the birth and death dates (where known) of each author, and the author symbol used in the Index of Plant Names above.

4. A bibliographic index of each author giving the publications and the names of the taxa he published therein, chronologically under the publication name.

5. A bibliography in alphabetical sequence of the names of the publications in which all taxa in the Index of Plant Names were published.

6. An Index of Useful Plants published in the following forms: (a) alphabetically by genus and species names with the vernacular names, (b) alphabetically by the vernacular names, and (c) alphabetically under use categories.

We propose also to be in the position to furnish workers, upon request, with any part of the above indices, such as a family, a genus, or a use category to be either a printed list or a set of cards. Data received from specialists by personal communications or from published works may be added to the project cards and later published, or remain available in the master card file.

7. As knowledge becomes available concerning the location (herbaria) of type specimens, we can add this information to the base card using a herbarium code, to appear in future editions of the indices, or to be given to workers upon request.

8. As geographical distributions of taxa are collected from published work, from herbarium sheets or field observation, these may be added to base cards, and used as above.

9. As chromosome counts are collected, from published work, or from laboratory workers, they will be added to the record and published.

10. As host-parasite relationships are made known to us, we can match base cards of species names and publish lists of these for the use of workers. Until animal names are also placed on punched cards,

these lists will be limited to plant-to-plant taxa, and exclude animal-to-plant, or plant-to-animal taxa.

11. As the names of botanists who have named plants, both in the distant and recent past, will be a necessary part of our record, it would not be difficult to add the names of the working botanists of the present with their names, birth dates, addresses and the fields in which they work, so that new editions of a specialists directory may be readily published.

Under the immediate grant requested, we would propose to assemble, punch, and publish information in logical working groups, in stages from division to family, to genera to species and to variety. This is normal operation of punched card methods. The project can proceed as far as funds will permit with the assurance that the parts finished will be publishable groups. The parts we expect to finish within this grant are outlined in "Aims: This Proposal" below. (P.6.)

In order to show the magnitude of the completed work, the table below has been prepared giving an estimate of the time to prepare each section for publication, and the number of volumes expected. These estimates are based on the following premises: (1) that the number of valid genera and species are about as shown in Table A (Appended) ~~reprint, inside front cover~~, (2) that for each valid name there are two invalid ones, thus 3 x valid would give the total names (tests made in various publications show 4.3 to 1 in genera, and 5.2 to 1 in species, therefore 3 to 1 may be low), (3) that one punch operator can produce 60,000 cards a year worked through to manuscript for publication, therefore 60,000 cards is considered a man/year, (4) that a volume is defined as 1,000 pages with 80 names per page, or 80,000 names per volume.

-5-

PROJECTED PRODUCTIONS

Item No. Above	Name of Product	Total Names	Preparation time in man-years	Volumes each 1,000 pp., 80 names/page
1.	Index of Plant Names, vascular			
	Genera 13,900 x 3	41,700		
	Species 390,800 x 3	1,172,400		
	Total vascular	1,214,100	20.2	15.2
	Index of Plant Names, non-vasc.			
	Genera 6,300 x 3	18,900		
	Species 155,500 x 3	466,500		
	Total non-vascular	485,400	8.1	6.1
	Plant kingdom total	1,700,000*	28.3*	21.3
2.	Index by taxa (in order by divisions, family, and genera and species)	1,700,000	0.3	2.7
3.	Index, authors (probably low, as at 70 spp/man)	25,000*	Negligible	0.3
4.	Index, publications (as- sumed same no. as authors)	25,000*	Negligible	0.3
5.	Bibliography by author (publications with taxa)	1,750,000	0.3	22.0
6.	Index of Useful Plants (assume 90,000 spp x 3 lists)	270,000*	0.5	3.4
	Sum of items marked with *	2,020,000	28.8	
	Total of projected volumes			50.0
	Cost of Base Project			
	At \$40,000 per year with four paid operators or \$10,000 per operation		\$300,000	\$6,000 per vol.

This estimate of time and volume production is probably reasonably accurate, synthesized as it has been. The cost per volume is surprisingly modest, in light of the magnitude of the task postulated. As operators become more experienced, it may be hoped that the volume

of cards per man-year will be greater than the figure used, and thus perhaps further reduce the cost per volume.

From an estimate made by the senior investigator, based on the time required to complete the work for the genera of grasses without electronic devices, the time to prepare the Index of Plant Names alone would consume 500 man-years or 10 persons working for 50 years, or 50 for 10 years. At the rate per person shown above the cost would be \$100,000 per volume or five million dollars for the entire project. On the same basis punched card methods are 17 times as fast.

In sum, in five years six operating people should produce indices from one through six and perhaps considerable work for indices seven through eleven as well.

After bringing the record up-to-date, the maintenance phase of this project probably can be carried on by one person in one quarter of a year (6,000 species, 1/10th of 60,000). However, new names in cultivated plants may add considerably to the work, and requirements for new editions, with the additional duties of answering information requests, may require two permanent staff members.

AIMS: THIS PROPOSAL

The following parts of AIMS: LONG RANGE will be accomplished with funds requested:

1. The recording on punched cards of the Latin names of the genera of the entire plant kingdom.
2. The recording of such species names in selected groups as time will permit.
3. The recording on punched cards of the "Trade" and Latin names of useful plants, accompanied by their categories of usefulness.

4. The publication of books, listings, and card catalogues of both Latin and Useful Plant names in groups completed under this proposal.

5. The circulation of components of the above to both scientific and industrial organization.

PROCEDURE

The Program will be divided for operation into two parts, as follows:

- 1.0 Integration of plant names, authorities, and citations.
 - 1.1 Preparation of a "Number Pattern"
 - 1.2 Design of the punched card
 - 1.3 Design of forms, etc.
 - 1.4 Correlating names and numbers on punched cards
 - 1.5 Specialists's work
- 2.0 Integration of plant names and categories of utilization.
 - 2.1 Listing of genera of useful plants
 - 2.2 Preparation and assignment of categories of use
 - 2.3 Preparation of selected species and variety lists
 - 2.4 Distribution of special lists to appropriate using organization

Details of the operation are given below.

Procedure: Part 1

1.1 The "Pattern" is completed and is explained here in some detail. The first requirement was to find the names, their sequence, and the number of them within the Divisions, Classes, Orders and Families of the plant kingdom, and to obtain an estimate of the genera and species within each category, so that numbers could be assigned intelligently. The summation of this work (Table A) is included, ~~as Appendix A. (inside front cover of reprint.)~~ As disagreement among authorities may begin even at the Division level, the table has had many drafts and has undergone continuous revision, and

formation, as shown below, may be added. The word "Master" is used because, from this card as a base, cards for a multitude of uses will be tied together by the use of the assigned numbers without the need for names while the operation proceeds. The card design with an outline explanation of each field follows:

Field	No. of Columns	Position of Column	Field Name
1.21	14	1-14	Number: Family-Genus-Species-Variety
1.22	16	15-30	Name: Genus
1.23	16	31-46	Name: Species (epithet). Example: <i>Caltha palustris</i>
1.24	4	47-50	Year of publication of name
1.25	6	51-56	Author symbol. Example: LIN707
1.26	14	57-70	Number: Synonym, Hybrid, Variety, etc. Also 57-64: Publication number; author birth and death dates 65-70: Herbarium Code; Geographic code
1.27	5	71-75	Card date
1.28	4	76-79	Card type code
1.29	1	80	Follow card

Explanation of Card Format

1.21 Field 1: Number of entity (taxon). Example: V1234-56789-012-3; from left to right, V = (Plant Kingdom); 1234 = family number; 56789 = genus number; 012 = species number; 3 = variety number. In normal use the family can be omitted, so the identifying number of the same species would be: 56789-012. To allow for large numbers of varieties, as found in many cultivated plants, a "9" would be punched in the base number variety field, thus referring to Field 1.26, where fourteen spaces are available which would permit extensive codification space for variety groupings of that species.

1.22, 1.23 Name fields: Example--Zea mays. 16 columns for genus name, followed by 16 columns for species. Names of authors and publications will be written in full.

1.24 Year of original publication. Example: 1753, the year in which Linnaeus published *Species Plantarum*.

1.25 Author symbol: Example: LIN 707, where "LIN" represents Linnaeus, and "707" represents his birth year (omitting the common fourth digit "1"). Inasmuch as the author citation is one of the essential elements of documentation of a plant name, it is necessary that there be a uniform and standard length representation of it in punched card technique. In fields 1.24 and 1.25 occurs the only true deviation from the traditional writing of a binomial. The publication in which the taxon is first officially added to the literature can be written in the traditional manner. However, the following method to find the original publication should prove effective:

1. The master card and printed listings will contain the year of publication (Field 1.24) and the author symbol (Field 1.25).

2. A chronological bibliography of each author will be listed directly from the punched cards, and reference thereto should provide easy access to the required publication. Flexibility of the punched card technique permits us to write the citation in the manner most useful to taxonomy.

1.26 Second number field. This field will be used as stated above for varieties. For synonyms, Field 1.21 will always contain the number representing the accepted name. If a species has been transferred, this field will contain its "old" number, providing a cross-reference to its former position, heretofore usually untraceable. Fields 1.21 and 1.26 used conjointly may be used to portray accurately the components of hybrids. When not needed for subsidiary numbers, this field will be used for other data, namely, columns 57-64 for Publication Numbers, and also for author birth and death dates; columns 65-70 for a Herbarium Code and also for a Geographic (location of species range) Code.

The Herbarium Code will be used to indicate where type specimens are housed. The type specimen is held to be the definitive validation of a species name, for without it, the authenticity of a species is suspect. Type specimen location will be added only after consultation with specialists, and from monographs or other sources where the type has been accurately designated.

The Geo-Code is a new device suggested here, a four-digit letter code to designate the geographical range of a species. The problem is complicated by the fact that some species are found on the littoral all over the world, while others may be restricted to one small Pacific island. A solution is suggested: by cutting up the land surface of the globe into a series of grids, descending in size (well defined, but not of uniform outline) and represented by letter symbols, a certain defined area small or large could be indicated. For example, if Exxx equals the earth, then a cosmopolitan plant is simply Exxx. If the plant is only found in a county in Connecticut, then if Axxx is North America, xUxx the United States, xxRx Connecticut, and xxxZ a county of that state, the range might be designated by "AURZ". Since the land surface of the globe is about 57,000,000 square miles, the fourth grid would be equivalent to $\frac{57,000,000}{16^4}$, or about 30 x 30 square miles. Further testing will be required to prove the feasibility of this method.

1.27 Card date (office use only)

1.28 Card type code (office use only)

1.29 Follow card (office use only)

1.3 Design of forms. The forms will be used for many purposes to print card data. They will be sent to specialists, and used to prepare manuscripts for off-set printing for publication. The card outlined above would appear in one of the listings about as follows:

-12-

Name	Author Citation Year of Origin	Author Symbol	Number Family-Genus- Species	Range of Type at Species Herbarium
<u>Caltha palustris</u>	1753	LIN707	V0093-01521-004	ANxx 1010

1.4 Correlating names and numbers on punched cards. The basic data for the first "Master" cards will be obtained from many sources, beginning with the 16,000 genus names numbered prior to this project. The Kew Index, Gray Herbarium Cards, monographs, manuals, etc., will be employed. When the first drafts are prepared, the printed lists of related groups will be sent to the appropriate specialists. Procedures for the specialists to follow in checking the data will be formulated in cooperation with them and revised as experience dictates. The inevitable "bugs" that plague any new operations will be worked out as we proceed.

1.5 Honoraria for specialists. Funds are requested to reimburse the specialists who check our work. Some payment to them should insure high quality work, thorough study, and prompt return. It may also guard against superficial acquiescence or dispute. We will ask that revisions made be supported by evidence to confirm the decision taken.

Procedure: Part 2

2.1 The generic names of plants will be checked against horticultural manuals, economic botany texts, special listings of useful plants (ex. Essential Oils), and others, using those with the broadest coverage and first choosing categories that are well defined. The generic names in the manuals that do not match with accepted names will be given to taxonomists, by punched card lists, for the determination of the appropriate generic names. When the latter are

combined with the names that agree with the manuals, a preliminary list can be run for the category chosen, or a group of known categories.

2.2 Categories now known will be used as a base for coding, and temporary codes established broad enough to encompass many additions. The cards made as above will be given category codes, and these punched into the cards. As cards are punched for names, the categories will be added to the cards. As new categories are determined, their codes will be added to the proper cards.

2.3 When the cards are assembled, a category such as essential oils will then be printed, and these listings sent to essential oil specialists and dealers. After the listings have been studied by the essential oil experts, a mutually acceptable technique for such listings will be worked out, and new lists printed with the revisions of both name and category.

2.4 Preliminary listings may then be sent to industrial users for advice, additions and further refinement of categories. For example, lumber used and trade names to The Weyerhaeuser Company and to the Forest Products Laboratory at Madison, Wisconsin. This would serve a double purpose, obtain their assistance technically, and let them know that this program exists for their benefit. Personal interviews will be employed where necessary.

FACILITIES

The New York Botanical Garden

Embarking upon such a program would be out of the question for all but a few organizations in the United States. The New York Botanical Garden is one at which library and herbarium facilities are adequate for this undertaking. The Garden's major endeavor over the

past sixty years in the fields of horticulture, systematic and economic botany have provided an assemblage of plant material and reference worksof almost unparalleled completeness. Its proximity to other world-renowned libraries and laboratories is another valuable asset.

The Connecticut Agricultural Experiment Station of New Haven, Connecticut, through its director, Dr. James G. Horsfall, has offered to house a full working unit of IBM equipment, to permit Mr. Gould to work for two years near his home which is in Madison, Conn.

The electronic data processing equipment will consist of an IBM printer, sorter, and punch at New Haven, and an additional punch at New York. It is planned that at the end of two years the equipment will be transferred to New York, where it will be housed permanently.

Since this program begins as a new venture, the usual items of office equipment such as tables, desks, and chairs will be needed, as well as fire-proof card filing cabinets for Master cards and record cabinets, all in addition to the IBM equipment. There will be miscellaneous items required that we cannot now foresee.

PERSONNEL

At New Haven

Mr. Sydney W. Gould
Taxonomist and punch operator
Stenographer and punch operator

At New York

Dr. David J. Rogers
Punch operator
Taxonomist

Mr. Sydney W. Gould has been investigating the possibilities of tabulating the names of the Plant Kingdom on punched cards, and the study of other uses of them in connection with that work for the past 14 years. First used IBM equipment in 1932 when he applied it to the mortgage investment business and real estate management; used IBM

equipment in the United States Army for the census and control of troop movements, and the inventory and movement of supply; on the committee for the standardization of names and their numbers of supply throughout the Army. Since his retirement from business, he has devoted almost full time to the study of botany and the relationship of it to a working system of punched cards for the Plant Kingdom, and the later adoption of the same methods for the Animal Kingdom. He is a member of a special committee of the Botanical Society of America to advise on employment of electronic data processing devices for botany.

Dr. David J. Rogers is Curator of Economic Botany at the New York Botanical Garden and editor of the Journal of ECONOMIC BOTANY. Engaged in taxonomic researches on an important food plant (Manihot esculenta). Originated a project for systematic analysis of the varieties by the use of IBM computers. He is a member of a special committee of the Botanical Society of America to advise on employment of electronic data processing devices for botany.

BUDGET

	1959	1960
I. Expenses for Gould, Part 1		
a. Per diem and travel between New Haven and New York at \$25.00 per day, 30 trips in two years, two days per trip---	\$ 750.00	\$ 750.00
b. Travel for consultation and advising specialists. Estimated 15 trips; trip to scientific conference to present paper-----	1,000.00	1,000.00
II. Expenses for Rogers, Part 2		
a. Travel, 18 days per diem at \$15/day-----		270.00
Travel @ 8¢ per mile, 9,000 miles-----		720.00
TOTAL EXPENSES (I AND II ABOVE)-----	1,750.00	2,740.00

III. Salaries for additional personnel

a. Taxonomist and punch operator at N.H.--\$	6,300.00	\$ 6,700.00
b. One equipment operator for IBM equipment at New York-----	3,900.00	4,100.00
c. Stenographer and punch operator for Mr. Gould-----	3,900.00	4,100.00
d. Taxonomist at New York-----	6,300.00	6,700.00
Total Salaries-----	20,400.00	21,600.00
Social Security 2 $\frac{1}{2}$ %-----	510.00	540.00
TOTAL SALARIES AND TAXES	20,910.00	22,140.00

IV. Permanent equipment

a. Equipping office for IBM machinery----	2,000.00	
b. Rentals for IBM equipment-----	5,088.00	5,088.00
c. Three working card file cabinets fire-proof (60,000 card capacity per file)-	1,050.00	
d. Permanent card storage cabinets (200,000 card capacity)-----	900.00.	
e. Two letter file cabinets-----	100.00	
f. IBM typewriter (to prepare text to accompany card manuscript, for off-set printing to save cost of type-setting-	700.00	
g. Incidental office equipment-----	600.00	600.00
TOTAL PERMANENT EQUIPMENT-----	10,438.00	5,688.00

V. Expendable equipment and supplies

a. Cards @ \$1.19 per M in quantities over 100,000, 500,000-----	595.00	595.00
b. Printing forms (includes design of forms) 200,000-----	400.00	
c. Stationery and miscellaneous office supplies-----	125.00	125.00
d. Postage-----	125.00	125.00
TOTAL EXPENDABLE EQUIPMENT	1,245.00	845.00

-17-

VI. Honoraria for specialists	5,00.00	5,000.00
VII. Publications		2,500.00
VIII. Totals		
Total Yearly Budget-----	\$39,343.00	38,913.00
Two Year Total-----		78,256.00
15% indirect costs-----		<u>11,738.40</u>
GRAND TOTAL		89,994.40

TABLE A

The Plant Kingdom--System for Assignment of Numbers to Families & Genera

No. Group	NAME	Families	Genera Est'd	Species Est'd	Family Nos	Genera No's From-To
V	PLANTAE The Plant Kingdom	1113	20,210	546,331	1000-8999	00001-89999
1.0	DICOTYLEDONEAE The Dicots	264	13,511	380,070	1000-2599	00001-49999
2.6	MONOCOTYLEDONEAE The Monocots	45			2600-2999	" "
3.0	GYMNOSPERMAE The Gymnosperms	12	61	697	3000-3299	" "
3.3	PTERIDOPHYTA The Ferns, Fern-Allies	35	309	10,063	3300-3999	" "
	TRACHEOPHYTA The Vascular Plants	356	13,881	390,830	1000-3999	00001-49999
4.0	BRYOPHYTA--Mosses, Liverworts, Hornworts	129	916	21,837	4000-4599	50000-59999
5.0	RHODOPHYTA The Red Algae	51	392	2,750	5000-5299	60000-69999
5.3	PHAEOPHYTA The Brown Algae	38	239	900	5300-5499	" "
5.5	PYRRROPHYTA--Cryptomonads, Dinoflagellates	47	163	1,147	5500-5799	" "
6.0	CHRYSOPHYTA--Yellow-Green, Golden-Brown Algae; Diatoms	66	304	5,926	6000-6399	" "
6.4	CHLOROPHYTA The Green Algae	58	245	5,700	6400-6699	" "
6.7	EUGLENOPHYTA The Euglenoids	6	25	480	6700-6799	" "
6.8	CYANOPHYTA The Blue-Green Algae	21	104	1,303	6800-6999	" "
	ALGAE	287	1,472	18,206	5000-6999	60000-69999
7.0	FUNGI (EUMYCOPHYTA) The Fungi	191	3,212	96,000	7000-7999	70000-89999
8.0	LICHENES The Lichens	62	451	17,432	8000-8399	" "
8.4	MYXOPHYTA The Slime Molds	22	66	393	8400-8599	" "
8.6	BACTERIOPHYTA The Bacteria and Viruses	66	212	1,630	8600-8999	" "
	Fungi, Lichens, Slime Molds, Bacteria and Viruses	341	3,941	115,455	7000-8999	70000-89999

August 27, 1959

Dr. Dwight E. Gray
Office of Science Information Service
National Science Foundation
Washington 25, D. C.

Dear Dr. Gray:

Your letter of July 24, with its enclosures, reached me while I was busily engaged in directing our N.S.F. Summer Institute as well as teaching one of the courses included therein. As a result of all this my correspondence has been sadly neglected and I am having to apologise in a wholesale manner for my delay in answering letters; please consider yourself in this category.

I have known a little bit about the Gould-Rogers proposal for some months and am keenly interested in its possibilities. Those of us who work in taxonomy and related fields know that it is often necessary to spend many hours looking up synonyms, authors, dates, location of types, etc., in almost any group of plants with which we are working. The codification of this type of information would represent a significant saving of time and effort.

The present proposal appears to me to be very carefully thought out and I should be greatly in favor of a grant which would enable it to be given a test run. I have certain reservations concerning its complete applicability, e.g., how will the coding handle the evaluation of a variety to rank of species or the reverse? Or, how will it designate the transfer of a species from one genus to another? These are the kinds of "bugs" which can be ironed out only in actual operation and I would be highly enthusiastic about seeing it given a chance.

I believe that the budget estimate for a pilot study is a realistic one, but feel that the over-all budget is too conservative. However, if this project proves successful I am confident that financial support can be found for continuing it.

Sincerely yours,

John M. Foss, Jr.,
Director

JMF:am