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5th Floor, Hunt Library
Carnegie Mellon University
4909 Frew Street
Pittsburgh, PA 15213-3890
Telephone: 412-268-2434
Email: huntinst@andrew.cmu.edu
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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.

Dr. Frank White:
Department of Forestry
Commonwealth Forestry Institute
University of Oxford
Oxford, England

Dear Frank:

We are generally well satisfied with the write up, but as you might expect, have found some places which didn't seem to say what probably should be said. I will give the areas below, and some suggestions for them.

The first one is on page two of the manuscript, the last paragraph, starting "It might be argued that since the taxonomist . . ." and ending with the last line on page 2, ". . . taxonomist's brain." We suggest that all of that be removed, and replaced with some statement including the following ideas:

It might be argued that were a worker to construct two classifications, one by conventional means, the other with the aid of a computer, the two might not differ significantly. If this were the case, what advantage does the computer give us? There are at least two major advantages. The computer is capable of manipulating data with a speed and accuracy far exceeding the capabilities of a conventional worker. Further, the classifications suggested by the computer are interpretable and communicable in the context of the methodologies under whose auspices the machine operates. END OF STATEMENT.

Return to the presentation as it now stands on the top of page three.

The next item which we feel very strongly about is found in the 2nd paragraph, page 4, beginning with "Natural classifications should . . ." and ending with ". . . by some workers in this field." Since many of our investigations have been directed towards removing the types of hurdles which are presented there, and since we have found ways in which the hurdles can be completely removed from the track, I think that this statement, at this time, is untimely, and not in keeping with what we know about the methods of structuring characters. However, to completely cover this important area we would need much more room than is available in this manuscript, and we should indeed write a separate paper on characters, their purpose, methods of construction, and practical considerations of their employment. So if you don't mind, let's just drop out that second paragraph on page 4, I don't think the flow of the argument is disturbed by its removal.

The last item where we wish to modify the manuscript in on page 6, second paragraph, the sentence which now reads, "The second is to develop logically a set of biological rules in the taxonomic area, discover the necessary and sufficient conditions to satisfy these rules, find mathematical models consonant with these rules, and then develop a practical working procedure which can be programmed to follow the mathematical model." We want to revise this sentence to read, "The second is to develop logically a set of biological rules in the taxonomic area, develop mathematical models consonant with these rules, and then discover a practical working ^{pr} procedure which can be programmed to follow the mathematical model."

Aside from these modifications, which I trust you find acceptable, the paper reads very well, and we'll be happy to have it submitted with author arrangement as you suggest.

I have corresponded with Mr. Bisby, giving him the necessary details of working with us, and one or two other points about the computer program he wanted to know about.

Thanks for your efforts - the time lapse you mentioned was not too bad, ~~considering all the obligations which I know you have.~~ considering all the obligations which I know you have.

Best regards,

David J. Rogers
Professor of Biology

DJR:gm

30 July 1968

Dr. Aristid Lindenmayer
Queens College of CUNY
Flushing, New York 11367

Dear Aristid:

Thank you for the reprints which are interesting, and the other tidbits about your own activities. I envy you your opportunity to go to Utrecht.. I don't know how many of our papers you have in hand, but I am sending a couple that may have passed you by.

Thanks again.

Sincerely,

David J. Rogers
~~Professor~~ of Biology

DJR:qm

30 July 1968

Dr. J. L. Cutbill
Department of Geology
Sedgwick Museum
Cambridge, England

Dear John:

I think I'll be tied up in September 1969, but I certainly do wish to have our group involved in your program, so at the moment let's say that if anybody can be there, it will probably be George. I suppose you don't really need a title yet, or if worst comes to worst you know enough about our activities to put in a title for us.

Doesn't anybody have any money to help out the likes of us? We will try to pry out some here, but God knows, the situation looks bleak at the moment. George has your letter to him, and the paper. No comment on it yet but I expect that in our typical fashion we'll beat Gawlik somehow or other.

Regards,

David J. Rogers

DJR:gm

30 July 1968

Dr. Robert A. Davidson
Department of Biology
The Catholic University of America
Washington, D. C. 20017

Dear Bob:

My immediate response to yours of the 23rd with your request as to other granting agencies than NSF is to say "You are a lot closer to the horses mouth than I am." I suggest that you use some of your "intuitive" taxonomic skill to identify the most likely source of funding. You are not the only one who has been shot down this year.

We have found out that it pays to put me in Washington about once a year for a week going around to the major agencies where I get an informal reading of what will and will not grab the fancy of the agencies. I take careful note of the words that are "in" at the moment, then try to come home and use these words to say exactly what I want to do. Following this I make an informal presentation (and you are in a better position than I to do this) and find out whether I have struck a responsive note or not. This kind of feed back seems to pay off.

When you are going after "scratch" forget all your desires to be a scientist and remember you are in the political arena which right now has many lions and tigers in it. Other than these pearly words of wisdom I have no real solid things to say.

Sincerely,

David J. Rogers
Professor of Biology

DJR:cpn

also Mr. Boyd T. Jones, Regional Manager
675 N. 1st Street
San Jose, Calif. 95112

29 July 1968

Mr. William C. Norris, President, CDC
8100 34th Avenue South
Minneapolis, Minn. 55420

Dear Mr. Norris:

We would like to invite you to a demonstration of TAXIR, an information retrieval system for biological data. We have developed the system to run on the CDC 6400 at the University of Colorado, supported by a grant from the National Science Foundation. We anticipate that we will have a small number (30 - 40) potential users of our system here for the demonstration. We are also inviting Mr. Boyd T. Jones, western regional manager for CDC.

The potential users are directors, or curators, of large collections of biological materials in such institutions as the Smithsonian Institution, the University of Michigan, Harvard University, the New York Botanical Garden, etc. Some representatives from the United States Department of Agriculture are also included, as well as the agricultural officers of the Rockefeller Foundation.

The demonstration is to consist of three parts, as follows:

1. A description of the nature and power of the TAXIR information retrieval system. It is intended that this discussion be directed to professional biologists. Technical considerations of computer programming will not be made.
2. A demonstration on the CDC 6400 of the TAXIR system in operation on a biological data bank consisting of data on specimens of the genus Manihot. Any queries you wish to put to the system will be fed to the machine.
3. A question-answer session where we can give individual consideration to specific applications.

The technical computing and machine aspects of the program will not be stressed at the meeting, but we would be glad to answer any questions you may have concerning software aspects of the TAXIR system. The team that has developed this system is composed of biologists, mathematicians and programmers. We have been at work in this type of effort for the past seven years. The initial efforts of this group were made at the New York Botanical Garden, where we also used CDC computers, both at New York University and at your service bureau at Great Neck, Long Island.

29 July 1968

We are enclosing a questionnaire which indicates the possible times for holding this demonstration. If it is not possible for you to attend, you may care to designate another individual from CDC who may be interested in the system.

Please return the questionnaire indicating your interest in attending.

Sincerely,

David J. Rogers

DJR:gm

We would like to invite you to a demonstration of 12

Dear Mr. Norris:

Mr. William C. Norris, President, CDC
8100 34th Avenue, South
Minneapolis, Minn. 55420

29 July 1968

19 July 1968

Miss Aiello
Barss, Reitzel & Associates, Inc.
134 Mt. Auburn Street
Cambridge, Mass. 02138

Dear Miss Aiello:

My associate, Mr. Brill, did indeed receive from you on the day you mentioned, a listing of our program which you converted to the IBM 360.

However we would be very happy to have a source deck and any documentation which you have done. The reason for this request is that many of our collaborators want to know if a conversion has been done to the 360 system and we would like to be able to supply them with listings. In as much as we gave the program to Barss, Reitzel and Associates in the first place, we thought it would not be too much to ask for a source deck. If you find this unreasonable, however, we would pay the postage for the cards.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

Taximetrics Laboratory

18 July 1968

Armory 101

Dr. A. G. G. Menon
Agricultural College and Research Institute
Vellayani P.O.
TRIVANDRUM, Kerala, India

Dear Dr. Menon:

Thank you very much for sending a copy of your paper on the effect of Seradix on the yield of tapioca.

I am sending some papers on Manihot which may be interesting to you.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

16 July 1968

Mr. J. M. Malone II
Engineering and Scientific Systems Design
United States Steel Corporation
525 William Penn Place
Pittsburgh, Penna. 15230

Dear Mr. Malone:

A listing, write-up and supplementary materials for the Similarity Clustering Program is available as Number 3501 from the SHARE Library at IBM's Program Information Department, 40 Saw Mill River Road, Hawthorne, New York 10532.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

Taxinetrics Laboratory

16 July 1968

Arbory 101

Mr. F. A. Bisby
Forest Herbarium - Dept. of Forestry
Commonwealth Forestry Institute
University of Oxford
Oxford, England

Dear Mr. Bisby:

We are pleased to offer you a standard graduate research assistant's grant at the rate of \$275 a month for the period January 1969 to June 1969. Your duties will be to carry out research under my direction during that period. This involves investigation of computer methodologies for taxonomic purposes. You will aid us in the gathering of and computation of data from various plant materials.

I suggest that when you come you bring with you satisfactory materials for your own investigations. If this involves plant materials I suggest that you inform me sufficiently well in advance so that we can make arrangements for the proper care and storage of these plant specimens. Office space and a very minimal supply of laboratory equipment will be available here.

We look forward to seeing you upon your arrival. Please let me know at your earliest convenience your requirements for living arrangements and so forth. We can help you to organize these things.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm
3 CC

Taximetrics Laboratory

Armory 101

16 July 1968

Dear Mr. Bisby:

In answer to the questions that you have about the computer facilities and various parts of our program, I have the following comments to make, separate from the other letter which you will probably wish to show to your various administrators there.

We have a CDC 6400 with the 120 k, 60 bit word internal store, drums and tapes, of course, as auxiliary storage are available. CDC FORTRAN IV is the basic language. I am sending under separate cover several reprints which will give you the basic understandings of our programs on the similarity clustering. Considering the size and complexity of the program, I have taken the route to not send you the program listing because we felt that it would be much more advantageous for you, at least at this stage of the game, to prepare data there and send it to run in our program here. Since this is a very large program, something like 1500 FORTRAN cards, it would take you a considerable amount of time to convert it to any machines that you have there. Why not just allow us to run any data or do any actual computation that you may require in advance of your arrival here and save the extra time of doing the converting that would be necessary.

I hope that this arrangement is satisfactory to you. We prefer it ourselves. Looking forward to seeing you in January.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

16 July 1968

Mr. Richard A. Barnes
Bars, Reitzel and Associates, Inc.
134 Mt. Auburn Street
Cambridge, Mass. 02138

Dear Mr. Barnes:

The Taximetrics Laboratory would appreciate receiving from you a source deck and program write-up, including flow charts and other explanatory documents which you may have for your recent transcription to IBM 360 of our program GRAPH, which we made available to you last year. These documents and decks are not only of ~~extreme~~ interest to us in our own research, but may also prove of use to the many scientists who cooperate with us.

Please note our change of address. Thank you.

Sincerely,

David J. Rogers
Professor of Biology

DJR:cm

MEMO TO: Dr. Askeff Löve, Chairman, Department of Biology
FROM: David J. Rogers
SUBJECT: Recommendations to incorporate the Taximetrics Laboratory in
the Department of Biology and the University
DATE: July 15, 1968

For some time I have been concerned about the relationships of the Taximetrics Group to the Department, and to the whole academic structure of the University. I have not seen fit to make any recommendations earlier, hoping that we would be able to define our activities and responsibilities more clearly after operating for a year on an informal basis. Now that we have had a year's experience, I feel that it is time to make our position more formal, and to achieve proper recognition of our activities on campus.

First of all, it is perhaps useful to give some background of the Taximetrics Group and then give some indications of our service to the University, and potential future work.

I coined the word "taximetrics" in 1963, to indicate a concern for the application of rigorous mathematical methods to the largely intuitive field of biological taxonomy. The work should have the same connotation for taxonomy as Biometrics does for the whole field of biology. Since the initial application of the word, we have discovered that there is sufficient commonality between taxonomic work, evolutionary studies and ecological efforts to allow the expansion of the definition to include the latter two disciplines, as well as the more strict application to taxonomy. Furthermore, we have found that, fundamentally, many other scientific efforts, in sociology, psychology, anthropology and even in the humanities, are concerned with the same types of efforts as we have in biology. Methods developed since the formation of the taximetric group in New York in 1961 have been applied in each of the diverse disciplines mentioned above, with some rather surprising, interesting and useful results.

We realized that the efforts to make taximetrics work required the best thinking possible between biology, mathematics and computer programming. As a result, we have brought together a small group of workers trained well in each of these disciplines, and have consistently pooled our efforts to give the best possible application of computers to support work in classification, in information retrieval, and other similar endeavors. In the formative years of the group, we spent many days discovering the fundamental thought processes employed in the discipline, and have, as a result, been able to produce satisfactory, sound, methodologies to support taxonomic efforts. I think that our group is unique, not only in this country, but in the world. Its significance is measurable by various yardsticks, but perhaps the best is the frequency of visits to this laboratory from outstanding biologists from this country and abroad. We have had thirty-five outstanding workers visit for as long as a week during this last academic year.

We soon realized that our efforts were valuable in training taxonomists, ecologists, and other biologists, and that we need to move from asstrictly research oriented organization (The New York Botanical Garden) to an institution which would be formally charged with the education of young people. We moved from New York as a group to Colorado State University, Ft. Collins, in 1965, precisely because we wanted to teach. Unfortunately, we were caught in an administrative situation in Fort Collins which did not allow the full development of courses for this purpose, but fortunately, you and others here in Boulder recognized the significance of our efforts, and invited us to join this faculty. We deeply appreciate your support, and your active and able assistance in furthering our goals.

Unfortunately, in our original contacts with you, it was not possible to give us the needed academic support on campus because of difficulties known to you and to others. We feel, however, that now is the time to reconsider our original agreements, and to put the whole taximetrics group into a more formal arrangement within the University. My personal preference is to keep the group within the Departmental framework, rather than to have some special status. I feel that the needs of teaching within the department take precedence over research activities, and we wish to become much more involved in both undergraduate and graduate teaching than we are presently allowed. Quite frankly, we have engaged in teaching, but this has had to be informal, with members of my staff ^{not} being recognized for their real efforts because of the arrangements which demands 100% time from them for research activities. As long as we are paid largely from grants, with no pay from the University, we will not be able to fulfill the mission which we want to fulfill.

I recognize that there are difficulties in putting on five full time academic positions, and would therefore suggest that we consider the possibility of half-time employment for three of the individuals, and meet their salaries by continuing grants. The three people to be recognized immediately are Henry Fleming, taxonomist, George Estabrook, mathematician, and Robert Brill, computer systems analyst. (THE capacity of these men is well known to you and others.) Later, we may wish to add another mathematician, Howard Christensen, and another programmer, but will not wish to burden the initial application for academic status with these two at the moment.

Our efforts in teaching would be as follows:

1. an introduction to biomathematics for all undergraduate biology majors.

2. a course in statistical procedures for biology.
3. a course in theoretical taxonomy, applicable to all students, whether botanically or zoologically oriented.
4. a general course for a larger audience than those strictly within biology, giving fundamental procedures for anyone concerned with classification.
5. a series of graduate and post-graduate seminars for interested professionals, faculty members, and similar types from other campuses, emphasizing (a) the methodologies for particular problems, and (b) the basic similarity of all scholarly endeavor, whether in the humanities or science.

This suite of courses fits nicely into the program of the present department, and will, as well be equally valid if and when the new structuring of biology occurs. No major shift will be required. It is important to recognize that we have well-trained people available now, and that no new recruiting will be required, with all the difficulties that this entails.

Some alternate procedures could be thought of in the event that we cannot be accommodated in the framework of the College of Arts and Sciences, but I would rather not consider them until we have explored this avenue.

15 July 1968

MEMO TO: Circulation Desk

SUBJECT: Renewal

We apologize for letting this book become overdue, but may we please renew for the summer session?

QL 351 Blackwelder, Taxonomy
B54
c. 2 (College)

Charged to Prof. David J. Rogers, Biology
Armory 101A

15 July 1968

DR. Ralph W. Richardson, Jr.
The Rockefeller Foundation
111 West 50th Street
New York, N. Y. 10020

Dear Ralph:

You will recall back in February that we were developing an information retrieval system which would be directly applicable to some of the activities of the agricultural work done by Rockefeller. As I recall it was your intention to get together with Dr. Wellhausen in March sometime, and if there were an opportunity Dr. Wellhausen would try to correspond with ~~us~~ to show if he was particularly interested in the work. Since we haven't heard anything we are assuming that interest still exists.

The reason I am writing now is to discover whether or not you, as well as Dr. Wellhausen, would be interested to come here for a demonstration of the computerized information retrieval system sometime in the fall. At the moment we are planning to put on a demonstration for a number of people who would be potential users of our system. We expect that we will invite about 15 or 20 people around the country to come for about two days, or perhaps one day if they can't make it any longer, for a demonstration and explanation of the system and its use. We think that this is perhaps the most powerful tool that can be developed for the storage of information and its retrieval in the biological sciences. We think that to really understand the system, it is necessary to spend at least one day, and preferably two, getting the system explained so that it can be incorporated onto your own kinds of activity.

The system we have developed was designed primarily to be an aid to the working biologist, and has a number of different ways in which it can be used as an aid.

I hope you will be thinking about this. We will send out shortly a questionnaire to find out if you are interested and what times are available to you. After we have heard from several other people we will then try to find a date which will be agreeable to all, but I would like to have a preliminary response from you to know if this kind of effort

has significance and interest to you.

Looking forward to hearing from you,

Sincerely,

David J. Rogers
Professor of Biology

DJR:gn

Taximetrics Laboratory

Armory 101

15 July 1968

Dr. U. J. Grant
The Rockefeller Foundation
Apartado Aereo 58-13
Bogota, Colombia

Dear Jerry:

On June 11 I submitted a bill for the write-up on cassava to Dr. Rodenhiser. Perhaps Dr. Rodenhiser has not had an opportunity to look after this matter.

Just by chance over the weekend I ran into Dr. Stonaker while he was visiting here in Colorado. He told me that Dr. Rodenhiser is now in Kenya. He also gave me the good news that you folks had had a big meeting there in Bogota about CIAT, and from what he knew it looked as though everything was progressing very nicely toward the development of that center. I certainly hope that everything is going well.

Sorry to trouble you about the consulting fee, but I do hope that it can be taken care of. Looking forward to hearing from you.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

12 July 1968

Dr. F. A. Stafleu
106 Lange Nieuwstraat
Utrecht, Nederlands

Dear Dr. Stafleu:

May we ask if you have received a paper entitled
"Application of an Information Theory Model for Character
Analysis in the genus Arceuthobium (Viscaceae)"[?] by
Estabrook, Hawksworth and Rogers, which we mailed on June 17?

We have received no word of its arrival and would like
to know if it has gone astray.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

12 July 1968

Dr. Alfred Etter
P. O. Box 117
Aspen, Colorado 81611

Dear Al:

My thanks for your and Helen's kindnesses during our visit.
We enjoyed seeing both of you very much.

I do hope that we can pick up some cooperative effort on the
Indian paintbrushes. If you care to do so, it would be well for
you to come over sometime for a couple of days (we'll put you up)
and bring with you your data sheets as well as some of the specimens.
Then we can go ahead with the work. What we usually do is to give
you some runs on the computer for free. In the meantime I am send-
ing along some of our reprints which bear on the computer work.

Thanks again for everything.

Sincerely,

David J. Rogers

DJR:cm

MEMORANDUM

11 July 1968

To: Dr. Hugo Rodeck
Museum

Dear Hugo,

In response to your memo of 9 July, I pick a time during the week of September 16, 1968 for a meeting with you, Weber, Maslin and Lanham.

David J. Rogers

P.S. I am pleased that we can start in on this now.

11 July 1968

Dr. Elizabeth M. Zipf
BIOSIS
2100 Arch Street
Philadelphia, Penna. 19103

Dear Betty:

I am sorry that the questionnaire on editorial policy got lost, strayed or stolen. Since I feel you folks are way ahead of me in terms of what is good for the biological scientist I am sorry that I can't give you any good suggestions in Part 8 of the Questionnaire. You also ask in your earlier letter what has happened to some abstracts which were sent to me. To my knowledge and remembrance all the abstracts that I had were returned. Nothing seems to be left over in my files, though I will not guarantee that this is the case. Sorry you had to job me - it won't happen again.

Sincerely,

David J. Rogers
Professor of Biology

DJR:cm

9 July 1968

D. G. Coursey, Esq.
Tropical Products Institute
56/62 Gray's Inn Road
LONDON W.C.1, England

Dear Pat:

I think your idea for funds for ITRIC travel is admirable. My only remembrance of anyone in UNESCO is Ted Nicholson. This was five or six years back that I knew him and I have had no contact with him since. He may not now be there, but his address at that time (which may have changed, of course) was Headquarters of the U.N.E.S.C.O., Place de Fontenoy, Paris 7, France; his telephone number Suffren 98-70, extension 35-40.

I knew Nicholson when he worked for Special Funds of the United Nations, which job he left to go to U.N.E.S.C.O. Sorry I have no other contacts and none in F.A.O. but he might, if still there, be useful.

I have nothing particular planned for travel in India, but do hope to sometime, to see the Tuber Crops Research Institute at Trivandrum. As you may know I have a graduate student from there working for me now, a Mr. S. G. Appan. He is an excellent student and we are working on the systematics of the genus Manihot, with him as my research assistnat.

I suppose my last letter to you on BIOSIS has arrived by now.

Sincerely,

David J. Rogers
Professor of Biology

DJR:cm

Same Letter To:
Dr. Vernon Heywood
Dept. of Botany
University of Reading
Reading, England

Dr. Peter Davis
Royal Botanical Garden
Edinburgh, Great Britain

Dr. P. S. Dixon
Univ. of Calif. Dept of Botany
Irvine, Calif. 92664

8 July 1968

Dr. B. L. Turner
Department of Botany
University of Texas
Austin, Texas 78712

Dear Billie:

J. McNeill of Liverpool University has indicated an interest in working here with us in 1969-70. It is possible we would like to have him join us. I am particularly concerned to know how Dr. McNeill would work as a team member in our taxometrics group. If you could tell me whether his personality would make it possible (or impossible) for him to share in the give and take of a team I will be pleased to know about it. Any other comments about Dr. McNeill (family, etc.) will be appreciated.

Sincerely,

David J. Rogess
Professor of Biology

DJR:gm

Taximetrics Laboratory
Department of Biology
Armory 101
University of Colorado
Boulder, Colorado 80302
8 July 1968

Dr. John McNeill
The Hartley Botanical Laboratories
The University
Liverpool, 3, England

Dear Dr. McNeill:

We are attracted to the possibility of your spending some time here in 1969-70. Dr. Askeff Löve has indicated his willingness to have you here, provided satisfactory arrangements can be made. Your background, general knowledge, and interests all fall well within the framework we find useful. Perhaps you will wish to consider the following problems, however, before you make any decisions to accept an offer, provided we can make one.

First of all, I plan to spend the year 1969-70 in Australia, after attending the Botanical Congress in Seattle. My staff, however, will all be here and you could work as well with them as with me. Our prime requirement is that you be willing to work as a team member, with the usual give and take which this type of endeavor requires. We find it necessary to exchange and question ideas rather sharply amongst ourselves, and the staff (composed of an entomological taxonomist, a mathematician and computer programmer) has become adept and used to the idea that no thought goes unchallenged. This does not mean an unfriendly atmosphere, but one which some are not used to accepting. If you have any qualms about participating in such a group, then I suggest that you would not be pleased to be here.

One of the requirements for you would be to teach two courses, one in Angiosperm taxonomy, and the other, a part of the taximetrics course. In the former, you would be charged with lectures, and the direction, though not the actual contact, with the laboratory. In the latter, you would attempt to give the theoretical, biological, aspects of taxonomy as they relate to taximetrics, as a member of the team mentioned above. You would have the assistance of and advice from Henry Flening, the entomological taxonomist, for your part in taximetrics.

We would hope that between times, you would help with the generation of new ideas for work in taximetrics. We are constantly developing new ideas, new methods, etc., useful in computer taxonomy. Certainly, we would hope that you would work on your own problems with the Umbelliferae, as a part of the work of the taximetrics group.

I cannot be specific at this moment concerning financial arrangements. First, can you provide transportation costs to and from the U.K.? This would be very helpful, and perhaps even a requirement. Second, could you come to Colorado some time in August, in advance of the Botanical Congress so that we could meet before I leave here, and then stay through June of the year 1970? Precisely what salary could be paid is something quite dependent on arrangements which Dr. Löve will have to make. But as I said earlier, Dr. Löve is quite interested in

having you come and he will, I am certain, make every effort to provide a suitable emolument.

If the above arrangements and restrictions, duties, etc., meet with your approval, and again, provided suitable arrangements for the financial aspects are mutually suitable, we will hope to see you in 1969. In the meantime, I will check with your references, asking them for their comments.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

Taximetrics Laboratory

Armory 101

3 July 1968

D. G. Coursey, Esq.
Tropical Products Institute
56/62, Gray's Inn Road
London, W.C.1, England

Dear Pat:

Enclosed is a letter (copy) from the Director of BIOSIS. This is a letter following up my preliminary inquiry about helping us with the ITRIC bibliography. It would be nice if you would address yourself to some of the questions asked in her letter, and let me have the benefit of your thinking on them as soon as possible. I expect to attend the AIBS meeting and speak with Dr. Parkins further on the possible activity. Before I do it would be good to have your reaction as well as how far we should go; indeed, how we can approach it financially.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

3 July 1968

Dr. Phyllis V. Parkins
Biosciences Information Service
2100 Arch Street
Philadelphia, Penna. 19103

Dear Phyllis:

Thanks for yours of the 28th. I expect to be at the AIBS meetings and look forward to meeting with you on the various aspects of the Tropical Root Crop bibliography.

I will also hope at that time to tell you of our significant developments in the information retrieval work.

Looking forward to seeing you.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

MEMORANDUM

Ray Pitsker, Computer Center

Dear Ray:

This is to inform you that Bruce Handley is no longer on our staff and is not to use our account # 0010.

Sincerely,

David J. Roberts
Professor of Biology

DJR:gm

3 July 1968

Dr. Grady Webster
Department of Botany
University of California
Davis, California 95616

Dear Grady:

Thanks a heap for your recommendation for me on the Fulbright to Australia. I think it would be wonderful if we could have a collaborative "go" at the Euphorbs of that continent. I would be pleased to hear what you have to say after your sojourn in Queensland.

We will hope that your graduate student (the unencumbered one) does indeed decide to join us for a session of taxinetrics.

Your materials on Manihot, Stillingia and others has arrived. We are pleased to have them. The Manihot specimens are all "dups" of ones of yours we have already but provide good additional information. Do you mind if I mount these up? We would rather work with them that way than chance the complete fragmentation of the material kept in newspaper. They will of course be returned after we have done our job.

I hope your field work is successful and I look forward to hearing from you on your return.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

2 July 1968

Dr. Howard S. Irwin
The New York Botanical Garden
Bronx Park
Bronx, New York 10458

Dear Howard:

The enclosed letter of comments is self-explanatory. I am sending whatever reprints I have available and from reading the comments you will be able to see which ones you will have to have Xeroxed. I still think that the only way to get Brieger into the right frame of mind is to have him visit us some way or other.

With regard to the root specimens I am sorry that I have not previously indicated the real significance which these root specimens have for us. They are very important. For that reason I will ask you the favor of going to the extra bother of returning those which you have sorted out according to your letter of June 28.

Thank you for your efforts.

Sincerely,

David J. Rogers
Professor of Biology

DJR:qgm

2 July 1968

To Drs. Brieger and Irwin:

I think it is evident from Dr. Brieger's letter to Dr. Irwin on the criticisms of the Cassia, section Apoucuita, paper that the philosophy behind the work is what needs discussion. In this connection, let me say that our efforts are to reinforce the decisions of the taxonomist, not to replace him with some "objective procedure. Let me say that I find nothing wrong with the subjective approach to taxonomy which has proved itself in numerous applications before the recent rise of models in mathematical framework which are intended to reflect the procedures of the taxonomist. The most important thing to realize is that there are many different possible types of classifications which are equally valid. It behooves the individual to select that type which is important to him. In most classifications of species, genera, families, etc., of plants, we rely very heavily on the phenotype, and only in very rare cases can we bolster our classifications with chemical, cytological, ecological and evolutionary types of information. From our classifications of the phenotype (phenetic classification of Sokal et al.) we may be able to derive some hints about the phylogeny of the group (phylogenetic classification).

With regard to our derivation of similarities, it is very important to understand about characters. All you can say about a character is that it is some basis for comparison of the organisms under study. Which characters you employ are your responsibility, and no statistical model can dictate to the taxonomist how many, or what kind can be employed. How you structure your characters is the business of the professional taxonomist, and is your prerogative. Again, no statistical model can or should be allowed to tell the taxonomist what he must do in establishing his attributes within the character. This philosophy throws the burden onto the shoulders of the taxonomist, where the burden should rest, to do the very best job possible to structure his characters in such a way that they do the job they are intended to do - make a classification. But there is nothing sacred about the way characters are structured, and there should be some system which gives the taxonomist the most aid in establishing the attributes of a character in such a way that the character does what the taxonomist knows the character must do - to make a satisfactory classification. Our approaches are not intended to dictate, but to be hints to the professional about how he can best use the information which he gathers.

This philosophy is back of my earlier statements, in the first letter, which said that it behooves the taxonomist to know the rules of classification, precisely defining his problem, and then seek out the most powerful mathematical expression of those rules. To apply a statistical technique established for an entirely different purpose is to do damage to the taxonomist's desires. If Brieger thinks otherwise, I am sorry for him. We

have tested enough of these "ad hoc" approaches to know what we're talking about, and I haven't got time to rebut any statistical arguments. But to get stuck with only one small branch of applied mathematics, not knowing even the mathematical base of the statistical approach is to do damage to oneself, and to be laughed at by professional mathematicians.

Now that is out of the way, I would suggest the following list of readings, some of which you will have to provide because we are completely out of reprints.

1. For an understanding of the graph theory model of classification, read:

Wirth, Estabrook and Rogers, *Syst. Zool.*

Estabrook, *J. Theor. Biol.*, 12: 297-310. 1966. (We're out of this)

Irwin and Rogers, *Mem. NYBG*, Cassia.

2. For an understanding of characters, read:

Estabrook and Rogers, *BioScience*.

Estabrook, *Taxon*.

3. For an overall look at computers in taxonomy and evolution, read:

Rogers, Fleming and Estabrook, Chapt. 6 in *Evolutionary Biology*, Vol. 1, 1967. (eds. Dobzhanski, Hecht, and Steere; Appleton, Century, Crofts, N.Y.) (We're out of reprints)

Since our mutual work on *Cassia*, we have come quite some distance in understanding ways of supplying the taxonomist much more flexibility in using the computing machine to back up his work. For example, the *BioScience* article by Estabrook and Rogers (under 2 above) indicates how you can structure characters to reflect the various situations which arise with regard to qualitative and quantitative characters. How to estimate the value of a character as a classificatory structure is given by Estabrook in *Taxon*.

More papers are in press which I will forward as they come out. It will be difficult to see how our approach differs from the Kansas school (Sokal et al.) from reading of the individual papers, but perhaps something of our philosophy can be read in the *Evolutionary Biology* chapter.

I know that I have not answered any of Brieger's individual questions, but I think it more important for him to know that our philosophy is quite different from the other approaches, which might be termed "heuristic" for want of a better description of the work done in Kansas. Knowing this difference, he may read the reprints with more understanding. He should also know that we continue to refine our techniques, and that we are not entirely satisfied with any of them. We're still in the experimental stage, and to damn the experiments is to damn the usual approach to scientific developments.

1 July 1968

Dr. George H. Hepting
Forest Disease Research - USDA, FS
P.O. Box 2570
Asheville, N. C. 28802

Dear Dr. Hepting:

Thank you for your letter of June 21. I shall be very pleased to attend the meeting in Columbus provided I have an opportunity to attend, which is not yet certain. I will let you know more details on that later.

I feel there is some confusion transmitted to you by Fred Wellman concerning our efforts. We have developed our program more to handle primary (raw) biological data, rather than to work on retrieval of information from literature. Our effort supports more the work of the pathologist in keeping track of his own experimental figures as he collects them. We can also employ our system for data recording on specimens of interest to workers much as a museum curator would take care of "curatorial information." We have felt that this was a more important area of activity for our purposes because we are aware of such efforts as yours, Biological Abstracts and others who are either developing or have developed systems for the retrieval of the literature. I suspect that our techniques for the computer are not too entirely different from those which you have, but this is difficult to know until we have seen your system in detail. I hope there will be an opportunity sometime for us to meet and I will do my best to get to the Meetings at Ohio State.

Thank you for your reprints.

Sincerely,

David J. Rogers
Professor of Biology

DJR:qm

1 July 1968

Dr. K. I. Wilson
Senior Lecturer cum Asstt. Virologist
Agricultural College and Research Institute
Vellayani, Trivandrum, S. India

Dear Dr. Wilson:

I fear there is some confusion in names. I think that the man you are interested to correspond with is

Dr. Donald P. Rogers
Department of Botany
University of Illinois
Urbana, Ill. 61801.

I personally have no knowledge or experience with the fungi, and am therefore in no position to do more than refer you to the other Dr. Rogers.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

1 July 1968

Miss Beryl Robichaud
McGraw-Hill, Inc.
Hightstown, New Jersey 08520

Dear Miss Robichaud,

I was pleased to have your letter of June 14 awaiting me after a short Manihot hunting trip to Mexico.

The news of your activities was good to have. I hope between you and Dr. Dansereau the master's project can be published. It would certainly be an interesting application for others to see, and the best way to do it, I guess, is to ask if our good friend Murray Buell would accept it for publication in the Bulletin of the Torrey Club.

Our group is still intact and we are in the final phases of the development of an information retrieval system for primary (raw) biological data.

We would welcome a visit from you to hear about this development and certainly would be pleased to see you for any other cooperative effort you may care to develop with us.

Sincerely,

David J. Rogers
Professor of Biology

DJR?qm

1 July 1968

Mrs. Nancy J. Wolf
University of Colorado Museum
Campus

Dear Mrs. Wolf:

Enclosed is what we have in the way of biography for Dr. Rogers. He has just returned from two weeks in Mexico collecting Manihot specimens.

He will illustrate his talk with Kodachrome slides, so a 2 x 2 projector would be in order.

Sincerely yours,

(Mrs.) Genevra Metcalf
Secretary

gm

1 July 1968

Dr. M. T. Hall
Morton Arboretum
Lisle, Ill. 60532

Dear Truf,

Misty Fogg is due to show up here on the 15th of July. He has sent me a few pages of numbers which appear somewhat "manipulated," apparently for an ecological analysis of Juniperus. He seems to have the idea that I am aware of the project that the two of you have, and that you have communicated with me some of the work. Somewhere or other I have not caught up with the project, though I am interested to know if there is something I can do to be useful. I'd appreciate it if you would lay on some of the objectives and background, questions you are asking, etc. to bring me up to date. I really want to work in on this project if there is anything useful we can do.

There are several interesting straws in the wind that we are doing that I think you would find helpful if your own operation of the Arboretum, and I would love to have a chance to tell you in detail about these. Is there any possibility that you could pop out here during the time that Fogg is here, so that we may go over them? We would be happy to have you. Let me hear from you as soon as possible and I can make arrangements for putting you up.

Sincerely,

David J. Rogers
Professor of Biology

DJR:qm

1 July 1968

Dr. R. S. MacNeish
Department of Archaeology
The University of Calgary
Calgary, Alberta

Dear Scotty:

Almost at the same time that I got the sad news from you about the cancellation of the symposium, I received a bunch of papers from M. Suzuki saying that I should submit an abstract.

Naturally I am sorry that we do not have a chance to put on the symposium, particularly so since I had convinced our University to foot the bill for my travel. I would like to have more details if you would care to give them to me about what happened. It's too bad that you had to spend so much time arranging things, only to find it all stopped cold. I hate to see that idea lost. I wonder how you feel about putting on the symposium under other auspices. We really ought to have that kind of work presented somewhere.

I will be interested to have your reaction and information about what really happened.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

30 August 1968

Miss Gladys L. Lytle
c/o Dr. W. L. Minckley
Department of Zoology
Arizona State University
Temp, Arizona 85281

Dear Miss Lytle:

We will be pleased to send you the information you requested concerning our graph-theory clustering program. However, I must suggest that we have an alternate proposal which I believe you should listen to. In our work with other users of our program we have discovered that a considerable amount of time, effort and energy can be saved if it is at all possible for you, as the investigator, to come to our laboratory for a day or two and discover the processes necessary to make this program do the best work for you. My staff and I will be glad to discuss your problem and advise you on the procedures which we have found to be most useful. Primarily we are concerned with the structuring of your data. There are many hidden processes which are unfortunately extremely difficult to express in published works, which if known about can give you results that are of considerable more benefit than otherwise.

Let me suggest therefore that if at all possible you visit our laboratory, bringing with you your data as you presently have it constructed. We will then be able to give you all the necessary advice for the continuing operation. I suggest that perhaps one full day will be required, and if you can spend another half day with us this will be an even better arrangement for you to understand the intricacies of the methodology. Thank you for your inquiry and I do hope that you will find it convenient for you to visit us here. If however it is inconvenient ~~and you cannot find ways~~ to take off time to come here then we will send you the documents that you have requested.

Sincerely,

30 August 1968

U. S. National Committee for the IBB
National Academy of Sciences
National Research Council
2101 Constitution Avenue, N.W.
Washington, D. C. 20518

Gentlemen:

Will you please add my name to your mailing list for
the IBB Inter-American News in English?

Thank you very much.

Sincerely,

David J. Fogers
Professor of Biology

DJR:ms

30 August 1968

Dear Robert M. Johnson
Florida State University
Tallahassee, Florida 32306

Dear Bob:

Congratulations on your appointment as Director of Research and Graduate Dean at Florida State University. FSU is also to be congratulated in attracting you to this significant job.

As an old Florida native, born and reared about 156 miles west of Tallahassee, in DePuniak Springs, I have been interested in the University, first when it was an all-girl school, and therefore an attractive place to spend a pleasant weekend, and then as it developed into a fine University. It was certainly pleasing to me to see the progress to a first-rate institution when I visited Herb Taylor and his family earlier this month.

I do hope you can find ways to bolster the biological efforts there, which seem to be going well now. Bob Godfrey, the associate chairman, is an old friend of mine, and a very capable botanist. If there's anything I can do to help out, just give me a call, and I'll be pleased to do what I can.

You might be interested to know that the computerized information retrieval project you so capably guided us on when we were at CSU has now been nearly completed, almost a year ahead of scheduled completion.

Best regards, and with best wishes for success.

Very sincerely,

David J. Rogers
Professor of Biology

DJR:qms

TO: Mr. Ray Pitsger, Assistant Director, University Computing Center
FROM: Dr. David J. Rogers, Department of Biology, Taximetrics Laboratory
DATE: 29th August 1968
SUBJECT: Key-punch operator difficulties.

It has been recently brought to my attention by our programmer, Mr. Wong, that on three separate occasions, we have encountered difficulties with your key-punching staff at the Computing Center.

Mr. Wong asserts that during the last week of July, when the head key-punch operator was asked to punch and verify data, the request was denied, ostensibly on the grounds that the key-punching staff was over-loaded and would continue to be so for the next several weeks. We subsequently hired a key-punch operator to come in off-hours. After a week Mr. Wong reports that he telephoned the head key-punch operator inquiring as to when the key-punching staff might again be free to do our data. He was then told that the staff was again over-loaded with work - this time with programs to be punched for a FORTRAN class held at the Computing Center, according to the head key-punch operator.

During the first week of August Mr. Wong submitted our current coding sheets to the key-punching staff. When Mr. Wong returned to pick up the punched cards he noticed that some of the cards were not verified. My own estimate is that 80-85% out of a total of 500 cards were not, in fact, verified. The excuse, Mr. Wong reports, given by the head key-punch operator, was that our data, being a combination of mixed alphanumeric with three odd punch positions prevented the operators from verifying our data.

This Monday, 25 August 1968, Mr. Wong submitted an IBM 407 listing to the head key-punch operator. On this listing were clear corrections made painstakingly at a great man-hour expense of two of our staff. Mr. Wong reports that the head key-punch operator at first refused to punch the corrections maintaining that the Computing Center accepted punching material in the form of coding sheets only. After a bit of persuasion on the part of Mr. Wong, the listing was finally accepted and the cards were promised FOR the following morning. The following morning the cards were not there. The excuse given was that the listing was illegible. I later reviewed the corrections and found this excuse untenable.

This lack of cooperation from the key-punching staff has been disconcerting to say the least. It has cost us more in terms of man-hours than is reasonable expected for such ancillary service; I'm sure you will agree that using a programmer as a page boy and two trained biologists as proof-readers - which, I might add, would have been entirely unnecessary had the punched cards been verified initially - is something bordering the economically absurd. In light of our contentions we suggest that some action be taken to improve this service.

Sincerely,

30 August 1968

Mr. H. A. W. Southon, Exec. Secretary
IBP Central Office
7 Marylebon Road
London, N.W.1, U.K.

Dear Mr. Southon:

The most recent Newsletter for the Association for Tropical Biology lists several publications of the IBP available from the Central Office. Would you please put us on the mailing list for the

IBP News
The Biosphere?

We would like to have, also, the pamphlet: The IBP: What it is; what it does.

Thank you very much for your courtesy.

Sincerely yours,

David J. Rogers
Professor of Biology

DJR:gm

P.S.: The Executive Committee of the United States IBP program has approved our computerized information retrieval system as part of the IBP efforts in this country.

29 August 1968

Mr. Harvey E. Sheppard
National Research Council
2100 Constitution Avenue
Washington, D. C. 20418

Dear Mr. Sheppard:

Herewith is the reworded version for Part 2, Report No. 3,
for the Executive Committee for the International Biological
Project.

I look forward to the opportunity to review our activities
with you personally.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

Conducting a feasibility study for a biological information retrieval system that will:

1. Incorporate the taxonomist's concept of character (descriptor) and character state (descriptor state).
2. ^{Implement} ~~Realize~~ an efficient computing algorithm for storing, updating, and retrieving information,
3. Make available a language (TAXIR) with sufficient power and flexibility to enable the user, through the grammar and syntax of TAXIR, to input information, and pose enquiries in whatever terminology is natural to his field of investigation,
4. Eliminate the need for computer specialists to stand, as interpreters, between the biologist and his IR system,
5. Be field tested in full on an operative biological data bank (the world collection of the genus Manihot, about 15,000 specimens),
6. Be analysed for cost and economic impact,
7. Be an appropriate tool for international organizations interested in facilitating mutual cooperation and interaction through information exchange,
8. Be a working foundation for other retrieval-system designers facing problems similar to those which this system solves.

This feasibility study is largely complete: objectives 1, 2, 3, 4, 7, and 8 have been met essentially in full. Objective 5 will be met in part in October 1968 with a public demonstration of the system. The report of objective 6 is presently being prepared.

This development is supported by the National Science Foundation.

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This development is supported by the National Science Foundation.

Institution: Department of Biology, Armory 101, University of Colorado, Boulder, Colorado 80302. Phone 303 - 443-2211, X 6712.

Investigators. David J. Rogers, Henry S. Fleming, Robert C. Brill, George P. Estabrook, and Gilbert N. Hersh (address same as above).

29 August 1968

Colorado Computing Corporation
2490 28th Street
Boulder, Colorado
ATT: Mr. John Lauer

Dear Mr. Lauer:

Our Mr. Wong informs us that you are equipped and willing to do some work for us.

Enclosed is a book of Fortran Coding Sheets (pages numbered 67 through 100). We would like the information on these sheets punched on standard data cards and verified against the original statements.

Each serial number (written in red) signals the beginning of a new card and each asteris (*) signals the end of a card. Otherwise, all 80 columns are to be punched exactly as the information appears on the coding sheets.

We understand that for punching and verifying the rate of charge is ~~4.50~~ U|S| Dollars 4.50 per hour of work.

Mr. Wong will answer any additional questions you may have, and please do not hesitate to call us.

When the work is completed please notify us and bill us directly.

Thank you for your time and cooperation.

Sincerely,

David J. Rogers
Professor and Project Director

DJR:gh

29 August 1968

Memo to: Morris Garnsey
From: David J. Rogers

Dear Morris:

We hope that you will be able to set aside the days of October 7 and 8 to join us for the demonstration of the information retrieval system. Actually we will begin the activities on the 7th, Monday, evening, at 8:00 o'clock with an informal gathering at my house; the intent of this gathering is merely to get acquainted with the people who will be here and not to put on any formal part of the demonstration. That begins the next morning at 9:00 A.M. and we will continue all day long, finishing up with a dinner at 6:00 P.M.

I hope that this will be instructive to you although we will pitch most of our talk to actual biological users of the system. Let me know if it is possible for you to attend.

Sincerely,

29 August 1968

Dr. Richard A. Howard
Arnold Arboretum
22 Divinity Avenue
Cambridge, Mass. 02138

Dear Dick:

I know that you have been extremely busy since your return from Europe and I hope that you will not mind too much that we have had to go ahead and establish dates for the demonstration of our information retrieval system. A sufficient number of people have responded and tell us that the dates of October 7 and 8, Monday and Tuesday, are satisfactory for the demonstration. On that basis we have established those days to actually carry out the demonstration.

I do hope you can join us because I think the best understandings can be had by actually seeing the program working. As we indicated earlier this demonstration is oriented specifically for the working biologist and not for the computernik. It is therefore couched in language which will be meaningful to you.

We do hope you can join us, and do let us know soon if you can. Other information will be forthcoming as we develop it.

Sincerely yours,

David J. Rogers
Professor of Biology

DJR:qm

29 August 1968

Mr. Kirby W. Brown
Department of Entomology
School of Agricultural Sciences
University of California
Riverside, Calif. 92502

Dear Mr. Brown:

In answer to yours of August 23rd, we will be pleased to run your data on your insects here at Boulder. I am including herewith two papers which are significant and need to have your attention before any further operations. The first by Estabrook and myself gives you something about the necessary operations to establish your information in the best possible way to get good results with our graph-clustering method. The second is actually how to set up the decks for the computer.

I strongly recommend that you consider the possibility of spending a day or two here with us. The reason I suggest this so strongly is that in the past we have discovered that when other users wish to get the most benefit from our programs there are many nuances which are not apparent in any of our papers with which you should be familiar before you begin the arduous task of data preparation and punching. We will be glad to give you time here if you can find some way to come to Boulder for a day or two. This will save you time, money and much sweat to come here ~~before here~~ before you begin the process, so the sooner you can make it the better.

We no longer use the portapunch cards as the input to the system. It turned out that the portapunch cards were not of the same thickness as the readers of the regular size cards and we had to write special programs to get the portapunch cards into a format for processing. Let me know as soon as you can if its possible for you to spend a day or two with us.

Sincerely yours,

David J. Rogers
Professor of Biology

DJR:gm

28 August 1968

Dr. Edwin J. Wellhausen
International Maize and Wheat Improvement Center
Londres 40 3er piso
Mexico 6, D. F.

Dear Dr. Wellhausen:

We have pretty well firmed up the dates of October 7 and 8, Monday and Tuesday, for the demonstration of our Information Retrieval System. We are sorry that we didn't have your reply before we made the choice of dates, but we hope that you will plantto attend. I think that we do have something valuable to offer you and your staff for use in the germ-plasm banks, and hope that we can have the pleasure of demonstrating it to you. If you care to bring someone along with you, please foal free to do so.

We will shortly send out details about travel to Boulder, motel accomodations, etc.

Looking forward to hearing from you.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

28 August 1968

Wenner-Gren Foundation for Anthropological Research, Inc.
14 E. 71st Street
New York, N. Y. 10021

Gentlemen:

I have been invited by J. C. Gardin of the Centre D'Analyse Documentaire pour L'Archeologie to participate in the International Symposium on the Use of Computers in Archeology, Semiological and Mathematical Problems to be held in Marseilles, April 7 - 12, 1969. As the symposium's funds are limited, it has not been possible to finance my transportation to and from Marseilles. My years of successful experience with the use of computers and mathematics to address very analogous problems in descriptive biology indicate that I could contribute meaningfully to the symposium.

Biology undertook to imlicate the computing machine as a research tool over ten years ago. Only recently has the noise of confusion started to abate and meaningful results begun to emerge. Because of the analogues in scientific method (if not subject matter) which exist between such of archaeology and the areas of descriptive or synthetic biology, archeology is in a position to learn from and take advantage of the mistakes and experiences we in biology are just beginning to weather. For these reasons I believe, as does J. C. Gardin and the symposium's organizational committee, that it is important to the progress of modern archeology that the symposium be allowed to hear from me on these matters.

The total amount of assistance I would need comes to less than a thousand dollars, sic

\$695	Round trip coach, Boulder-Marseilles
160	8 days per diem
100	Ground transport
<hr/>	
\$955	Total

I would appreciate it if the Wenner-Gren Foundation would entertain this request.

Yours truly,

George F. Estabrook

GFE:gm

28 August 1968

Dra. Nuesa Diniz da Cruz
Instituto Agronomico
Caminas, S. P., Brazil

Dear Dra. Cruz:

Thank you very much for sending separates describing the species Manihot jolyana. Because we are making a world monograph of the genus Manihot it is very important for us to incorporate your new species into our study. We would be pleased, therefore, if you would send or loan the specimen cited in your description of this species, including any allied material to your own holotype.

Thank you for your consideration.

Sincerely,

David J. Rogers
Professor of Biology

DJR:cm

28 August 1968

Senator Jennings Randolph
Senate Office Building
Washington, D. C.

Dear Senator Randolph:

May I please have a copy of "The prospect for Technical Transfer", the report of your subcommittee on Science and Technology. I am interested to know whether or not my research has anything to offer somewhere within the framework of the recommendations of that report. I have a small team that has developed a computerized information retrieval system useful in science and other areas and would like to be able to contribute this system if it is possible to do so. Inasmuch as the information system was developed with federal funds from the Office of Information Services of the N.S.F. I should think that we should make an effort to "get the system off the shelf" and into use in such areas as your subcommittee's efforts have been investigating, particularly on a transfer of technology.

Thank you for your efforts.

Sincerely yours,

Sincere

David J. Rogers
Professor of Biology

DAJR:gm

Taximetrics Laboratory

27 August 1968

Armory 101

Dr. George Eiten
Caixa Postal 4005
Sao Paulo (SP), Brazil

Dear George:

Thanks for your letter of 30 July. I have already received the bibliography on mandioca and have corresponded with its author.

I am sorry to say that the Manihot species seeds which you send when we were in New York died. The usual care of the plants was given by the gardeners of the N.Y.B.G. It seems that I do not have any herbarium material of that species, and therefore am in no position to describe it. In as much as I have to borrow all of your Manihot material from Sao Paulo would you be kind enough to include your collection of that species along with that general loan. Furthermore, is it proper for me to ask you directly for the loan of Manihot from your Herbarium? Or should I write a letter to Alcides to make the request for the loan formal? If it is proper to ask for the loan through you could you consider this letter to be a formal request to send the materials? I know that this lady, Nuesa da Cruz in Campinas, has described a new species of Manihot from Sao Paulo State. It is certain that I have to see this species in order to incorporate it into my monographic studies.

Our efforts here are bent mostly toward developing a new computer programming method for taxonomy. Our latest efforts are to develop an information retrieval system for taxonomy. We have not yet made any formal publication on this system but now have it just about completed and ready to be tested in several different museum settings. Some of our other efforts in this line can be seen from the reprints which I am sending separately.

Thank you for your letter, and best regards to all there in Sao Paulo.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

27 August 1968

Dr. Carlos E. Fernandez
I.I.C.A.
Apartado 478
Lima, Peru

Dear Dr. Fernandez:

Jorge Leon has told me of your work with Manihot. He further indicated that you probably would be in charge of a collecting expedition some time next year. Earlier I had suggested to Dr. Leon that I would like to have one of my students accompany that expedition.

I would be very pleased if you could let me know the proposed objectives of the collecting expedition and the proposed area where you expect to make collections. Perhaps my graduate student could be added as a team member if the expedition if we can find satisfactory funds to aid in his living and allied expenses.

I would be pleased to hear from you soon concerning your plans.

Sincerely yours,

David J. Rogers
Professor of Biology

DJR:cm

27 August 1968

Dr. Richard M. Klein
Department of Botany
Hills Building
University of Vermont
Burlington, Vermont 05401

Dear Dick:

Herewith is about all I have to say about conservation.
Read it, suggest changes, but for God's sake, no additions!

I am working on the other pieces now and will shortly send
you the whole thing for the last time.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

27 August 1968

Dr. Murray F. Buell
Box 234
Middlebush, New Jersey 08873

Dear Murray:

I'm really surprised that Dave Fairbrothers would let this paper out with his name on it. I don't think it's worth publishing, at least with its present status..

First of all, one cannot do much with the taxonomy of a species, and certainly cannot come to any classificatory rearrangements on the basis of a study which admittedly takes in only a very small portion of the total range of the species, which does not consider the relationships of this species to any other species in the genus, and which is only descriptive of plants in eleven sites. Very obviously, the authors did not examine type material, where such exists, nor compare historical usage of the names, and all they did say was that Gleason and Cronquist are probably right in their choice of the name for this variable taxon. Secondly, I can see little value in the primitive statistical techniques employed when pure old "eye-balling" the data would have shown the same things.

The paper's purpose is not given, in spite of the fact that there is a paragraph headed with that title. There is no summary at the end, which is probably a good thing because there's nothing to summarize; though not very wise in such a paper where the title leads one to think that there should be.

About the only suggestion I can make is that this paper be mimeographed, and stuck in the files of the botany department, and later picked up and added to by more studies along the lines suggested in paragraph two above.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

26 August 1968

Dr. Lawrence W. Barsa
Barsa, Reitzel and Associates, Inc.
134 Mt. Auburn Street
Cambridge, Mass. 02138

Dear Dr. Barsa:

I am (finally) in a position to respond to your letter of July 22, and to acknowledge, with thanks, the various documents and tapes which Dr. Barnes and Miss Aiello have sent.

It was kind of you to explain your position in response to what was unintentionally, and unjustified, a fit of pique on our part. May the whole matter rest now that we understand your position, so well displayed in your letter. We are aware of the problems of soft-ware protection, and of the difficulty of making its sale a profitable (or even break-even) venture. While we in this shop are not able to sell our product for dollars, we do get our "pay-off" by use of our programs, and in this sense, we are grateful to you for taking up our similarity-clustering program. We hope we have a satisfied customer in Barsa, Reitzel et al. and that you may have luck in getting users of the program. We recognize that your input to the program development was nontrivial, both in converting to IBM hardware, and in the new sorting routine which is much more efficient than the one we had.

Since we are a "satellite" to the University of Colorado, we sympathize with your organization's desire to more easily cut across departmental lines for interesting work. We are interdisciplinary, with biologists, mathematicians, economists and programmers, yet we have not made a complete break with the University, and since we gain all our support from grants from NSF, NIH, etc., we must produce sufficiently satisfactory work to keep these agencies willing to continue our grants. It is therefore important that we get recognition from people for our efforts. We would be pleased if you could give us that recognition when you find customers for our methods, and further, let us know the type of application made of the program. Also, if this isn't too privy information, the names of the users. We use such information only for purposes of gaining additional grant support, for impact-studies etc., and would under no circumstances, infringe upon your territory.

Since you have, for some reason, found the single-linkage program interesting, I wonder if you would also be interested in companion programs to it? For example, our program CHARANAL, intended (in an information-theoretic sense) to give measures of the values of the input data in a study, where, given the value of one piece of information, another information is found to cover some part of the first, is distance from the first, or is identical to the first. This program has been very useful to us and to other users. Our big effort now is TAXIR, an information retrieval system for biology, and we have nearly completed version one. There are some quite distinct methodologies in this system, both in terms of efficiency of storage of information, and in terms of user facility. An important feature of the system is that the data input technique is nearly identical to data structuring of the two other major programs, thus allowing data massaging in several interesting ways.

If either of these more recent developments are interesting to you, we would be happy to explain them in more detail.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

6 August 1968

Dr. Richard S. Cowan
Museum of Natural History
Smithsonian Institution - USNM
Washington, D. C. 20560

Dear Dick:

By all means invite Drs. Manning and Watson. I am enclosing forms for them to fill out. They have some idea of what we are doing as a result of our conversations last year. Drs. Hale, Peters and Shetler have already accepted.

We have not invited Nick Suszynski because we have selected the invitees solely on the basis of their being biologists with an information retrieval problem. With only a couple of exceptions such as Peters they only have an academic interest, if that much, in computer technicalities. We will at some future date have a session for the Computernics.

We have been keeping Don informed about our activities and have not extended an invitation to him at this time, because at this time he is not directly concerned with information retrieval at Stony Brook, and is very likely occupied with the logistics of settling himself in.

We have also been trying to keep the group as small as possible so that a really meaningful exchange can be attained. However, if for your institution you feel the necessity of having Don, bring him along with you.

Dave is in Florida for a couple of weeks (not at the convention but looking at Manihot). Give my best to John Wurdack.

Sincerely,

Henry S. Fleming

HBF:gm

6 August 1968

Dr. Theodore J. Crovello
Department of Entomology - Snow Museum
The University of Kansas
Lawrence, Kansas 66044

Dear Ted:

I am very sorry but we have no travel funds available. However, other institutions are funding their respective attendees because of the pertinence to museums, etc. of information retrieval. Have you tried your own institution?

It would be impractical to try to squeeze the demonstration in during the NT conference. However, if you wish to stay over a couple of days, George Estabrook will try to give you a concentrated session.

I suggest you wait on your Greene Herbarium data until you see us. We will have live data made up from the genus Manihot (Euphorbiaceae) for which we have the world collection here and are in the process of monographing.

Hope you can find a way to make the demonstration. There should be a very broad airing of museum and biological aspects of information retrieval.

Sincerely,

Henry S. Fleming

HSF:gm

5 August 1968

Dr. Yehudah L. Werner
Auditory Research Laboratories
Forrestal Road North
Princeton University
Princeton, New Jersey 08540

Dear Dr. Werner:

Thank you for your recent communication. I will place you on our permanent reprint list. Please be assured that we are interested in aiding you with your systematic problems to the extent that any collaboration continues to be mutually satisfying.

May you enjoy many pleasurable and productive hours with your new scope.

Sincerely,

George F. Estabrook

GFE:gm

2 August 1968

Dr. Nelson G. Hairston
Museum of Zoology
University of Michigan
Ann Arbor, Michigan 48104

Dear Nelson:

Thank you for your prompt response.

I am writing at this time because I am not sure whether we extended to you the option of also inviting other interested members of your institution. For instance you mentioned a vice-president while you were here, and if you are still considering herpetology as the likely department for a pilot effort, you might like someone from that group to attend. If you do, just drop us a line with the names, (and dates if they are different from yours).

Dave is off to Florida for a couple of weeks (not the convention).

Sincerely,

Henry S. Flering

HSP:gm

1 August 1968

Mr. Richard A. Brown
College of Agriculture
University of Delaware
Newark, Delaware 19711

Dear Mr. Brown:

It has been our experience that workers wishing to use our classification techniques have benefited greatly from two or three days personal contact with members of our technical staff. Getting the program to run on your local hardware is the least of the problem. The real trick is to get a feeling for how to structure the input data (i.e., select objects, characters, character states, etc.) and to learn how to interpret the output. A visit with us would be the best way to gain this experience. If you can spare the time and the funds for a trip to Boulder we would be glad to spend some time helping you familiarize yourself with our techniques. We would also be willing to run your data on our hardware (CDC 6400) for the cost of the computer time, and help you analyse your results.

You would be well advised to read the enclosed documents for a better understanding of the method.

Sincerely, yours,

Robert C. Brill

RCB:gm

30 September 1968

Prof. E. Rex Krueger
Computing Center
East Campus

Dear Rex:

We want to demonstrate our I.R. system from 2 - 3 P.M.,
Tuesday, October 8, 1968. We will give you a full descrip-
tion of our requirements shortly.

Thanks for your cooperation, aid, advice, etc.

Sincerely,

David J. Rogers
Professor of Biology
Project Director

DJR:gm

26 September 1968

Dr. Elizabeth M. Zipf
Biosciences Information Service
2100 Arch Street
Philadelphia, Penna. 19103

Dear Betty:

Glad you're coming to our demonstration. Please give me your flight information - it probably will be best to fill out the enclosed form.

We will reserve a room for you at the Harvest House, Boulder. If you want to come from Denver with someone else also attending, there is a good chance that you can find someone arriving about the same time. We'll have a representative at the airport to meet your flight.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

26 September 1968

Dean William E. Briggs
Bellevue 102
Boulder Campus

Dear Bill:

I would like to invite you to come to a demonstration of our computerized biological information retrieval system on October 7 and 8. Some forty interested scientists, about half of whom are from the University have been invited and expect to attend. The outside participants are biologists and computer specialists from various institutions in the country. The schedule of activities is as follows:

October 7, 8:00 P.M. Informal gathering at Mountain Shadows
Club House
October 8, 9:00 A.M. Seminar at Computing Center, Room 375A
12:00 Noon Lunch at Harvest House
2:00 P.M. Demonstration of TAXIS at Computing Center
3:00 P.M. Questions and answers
6:00 P.M. Dinner at Harvest House

In as much as the work that has gone into this system is intended for use by members of this community as well as by others at both the undergraduate and graduate levels, we hope that you can come and view the demonstration with an eye to assessing its value for the operations of this University. We hope you can attend some or all of the sessions.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gn

25 September 1968

Dr. Howard S. Irwin
The New York Botanical Garden
Bronx Park
Bronx, New York 10458

Dear Howard:

Of all the people I had hoped to have come to this meeting, I had hoped most for you. I am terribly sorry that your duties there prevent your attendance. It is remarkable, isn't it, that we are getting six or seven members of the Natural History Museum of the Smithsonian including the director as well as five or six department heads.

I recognize the significance of politics, but I've always wondered why it is that administrators think it more important for science, to do publicity activities rather than scientific ones. In the long run we all must turn to a better management system for our collections. While it is not the full answer to management of collections it certainly offers a step in the direction which will make of collections much more meaningful, useful, and productive. I do believe that the herbarium or museum is becoming the focal point for much of knowledge, recognized as a significant contributor to modern day needs. I believe that the excitement of a museum can be made much more broadly known through application of modern communication techniques of which the computer is one of the most significant.

Perhaps after the Board of Managers has turned you loose they might be willing to let you come for a private demonstration here. I hope so anyway.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

25 September 1968

Dr. Alan Beetle
Department of Agronomy
University of Wyoming
Laramie, Wyoming 82070

Dear Dr. Beetle:

On the advice of Bill Weber we are asking you if it is possible for one of my students, Allan Hale, to borrow a small sample of wheat collections; specifically, Mr. Hale is interested in using the sample in a study of numerical taxonomy (taximetrics). He needs approximately 75 specimens of wheat and the designation of the actual specimens is not a critical matter - that is, his needs are for any set of varieties which you can allow him to use and return at the end of the academic semester. In the event that you have some samples that might be released for such use, Mr. Hale will be glad to travel to Laramie to tell you more specifically the details of his need and to take care of physical arrangements for borrowing these specimens.

Obviously we do not wish to have material which is of critical importance to you, or ones which you cannot afford to release for purposes of student work. Mr. Hale who has some competence already in these studies understands the need for care and preservation of such samples and I have confidence that anything that he does will be useful both from the standpoint of classification of wheat varieties and in educating him in the complexities of such work.

Thanks for your consideration and I hope that we can make arrangements for Mr. Hale to get the required material. If you need further information about the purpose and nature of this work and its requirements, please reverse charges on a phone call to me.

Sincerely,

David J. Rogers
Professor of Biology

DJR:qm

Greenhouse Committee Meeting - 23 September 1968

- AGENDA:
1. Arrangements for use of Macky greenhouse.
 2. Build bins; soils, pots etc.
 3. Laboring house
 4. New greenhouse? Schwartz's offer
 5. Budget for greenhouse operations?

THINGS TO BE DONE:

Get a record of the things to be built up inside the greenhouse.

1. Corrugated Transite bottoms for benches. Gravel to cover Transite.
2. Estimate requirements for bins 7 soil and other
3. Ask Jay Windell what requirements he might have for use of one section of the greenhouse.

COORDINATOR

Erik Bonde has assumed responsibility for coordinating all requests for greenhouse use. Channel all requests thru him.

Send memo to all faculty to this effect.

NEW GREENHOUSE

Contact Don Schwartz about possibilities of sources for new research greenhouse.

19 September 1968

Mr. F. A. Bisby
Forest Herbarium
Dept. of Forestry
University of Oxford
Oxford, U.K.

Dear Mr. Bibby:

Governmental red tape has raised its ugly head. What you and I thought would a very simple arrangement for your coming to work with us now turns out to be a matter of visas et al.

As I see it two alternatives exist to get you into this country and to allow you to work with us.

1. Come to this country as "Nonimmigrant temporary worker or trainee" (see form with this title, enclosed).
2. Apply for recognition as a graduate student at the University of Colorado, non-degree candidate.

Some of the considerations in choosing which of these two courses to follow - if you choose number 1 above then you will not have the opportunity to live in any of the University residence halls; whereas if you choose number 2 alternative you will have that opportunity as well as some other values such as unrestricted use of the library.

If I were making a choice myself (trying to equate my desires with yours) I would choose the first alternative because I do not believe that you are concerned with having any formal recognition with having worked with us. Certainly I would be glad to give you a letter ~~at~~ the end of your period here which documented your work with us. I would think that this would sufficiently well to establish this historically.

Whichever alternative you choose, will you please act upon it immediately. As I see it, it will be necessary for us here to fill in the U. S. Department of Justice form entitled "Petition to Classify Nonimmigrant as Temporary Worker or Trainee." However, please note in this form that some information is required from you and I will ask you to provide these pieces of information so that I may proceed with the filing of this form. I will ask you to fill out the numbered boxes 5, 12a, 13, 14, 15, 16, 17, 18 and 19. You will notice in the instructions on the back of the form that certain documents must accompany this application. Please provide me with these documents at your very earliest convenience.

To: F. A. Bisby

19 September

2.

I am sorry that this red tape has interfered with what otherwise would be a simple matter, but such is not possible, I fear. In answer to your query concerning what dates would be preferable I would suggest that you should try to be here by January 2 or 3, 1969.

Sincerely yours,

David J. Rogers
Professor of Biology

DJR:gm
Enc.

18 September 1968

Dr. Howard Mills
Marshall University
Runtington, West Va. 25701

Dear Howard:

Since we haven't heard from you we wonder what happened to the agreement on the ecological study. Sometime back I also sent an invoice for the agreed-on costs for consultation. I wonder if you would mind checking out and see what happened - whether or not the right office received it, or what has happened to it.

We are looking forward to a continuation of our studies together.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

17 September 1968

Dr. John Popenoe
Fairchild Tropical Garden
10901 Old Cutler Road
Miami, Florida 33156

Dear Dr. Popenoe:

I have mailed a small packet of seeds of the undescribed Manihot species. The seeds may, or may not, be sufficiently mature to germinate. As indicated in my earlier letter, this species is quite different from M. pringlei, sent earlier, and fits into a different section of the genus. As indicated on the vial, these seeds are from my collection, Rogers & Appan #525. Incidentally, the seeds of M. pringlei are from my collection, #528, which I think it would be useful to have a record on. There are documenting herbarium specimens of both these in my own herbarium, not yet distributed to the various large institutions.

The collection site of #525, the undescribed species, is Nuevo Leon, Mamulique Pass, just off the road on old highway, near milestone Km. 1051, on east-facing slopes, 38 mi. N. of Monterrey, alt. ca. 600 m. The habitat is described as loose, rocky, disturbed, limestone base, in soil dumped after road construction.

The plant is a sprawling shrub, 2-2 1/2 feet high, many branched from base. Roots tuberous, penetrating 1-3 feet.

We can provide further descriptions of both collections, if you want this information.

Good luck with these plants.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

16 September 1968

Dr. Petr Beckmann, Chairman
Council on Research and Creative Work
Graduate School

Dear Dr. Beckmann:

You are correct in assuming that my project, collecting trip to Mexico, has been completed and that the account may be closed out. I appreciate having been granted the funds to make this research possible.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gn

16 September 1968

Mr. Edward Weiss, Program Director
Special Projects Program
Office of Scientific Information Services
National Science Foundation
Washington, D. C. 20550

Dear Mr. Weiss:

We understand from the U. S. Government Surplus Property Officer here that we are eligible to obtain U. S. Government surplus property at no cost. To do this we must present a letter of authorization from our contracting officer.

Would you be kind enough to send us such a letter? Are we eligible to purchase supplies and enumerated equipment through G.S.P.? If so, what are the procedures to which we must attend?

Sincerely,

David J. Rogers
Professor of Biology
Project Director

DJR:ga

11 September 1968

Committee on International Exchange of Persons
2101 Constitution Avenue, N.W.
Washington D. C. 20418

Gentlemen:

May I inquire about the time of notification of awards of Fulbright grants? I must make arrangements with the University in order to accept this, and will have to have at least nine months for making appropriate arrangements.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

6 September 1968

Mr. Paul Holden
USDI - FWS
Utah Cooperative Fishery Unit
Utah State University
Logan, Utah 84321

Dear Paul:

A little bird at Arizona State said that they have a copy of your finished thesis. If there is an extra copy available, we would be interested in seeing what you finally came forth with.

Our work currently has been with the problems of data storage and retrieval, but it has progressed to the point that we are planning a demonstration for museum curator-types the second week in October.

Should this be addressed to "Doctor" Molden? Congratulations on your progress.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

Dr. Frank White:
Department of Forestry
Commonwealth Forestry Institute
University of Oxford
Oxford, England

Dear Frank:

We are generally well satisfied with the write up, but as you might expect, have found some places which didn't seem to say what probably should be said. I will give the areas below, and some suggestions for them.

The first one is on page two of the manuscript, the last paragraph, starting "It might be argued that since the taxonomist . . ." and ending with the last line on page 2, ". . . taxonomist's brain." We suggest that all of that be removed, and replaced with some statement including the following ideas:

It might be argued that were a worker to construct two classifications, one by conventional means, the other with the aid of a computer, the two might not differ significantly. If this were the case, what advantage does the computer give us? There are at least two major advantages. The computer is capable of manipulating data with a speed and accuracy far exceeding the capabilities of a conventional worker. Further, the classifications suggested by the computer are interpretable and communicable in the context of the methodologies under whose auspices the machine operates. END OF STATEMENT.

Return to the presentation as it now stands on the top of page three.

The next item which we feel very strongly about is found in the 2nd paragraph, page 4, beginning with "Natural classifications should . . ." and ending with ". . . by some workers in this field." Since many of our investigations have been directed towards removing the types of hurdles which are presented there, and since we have found ways in which the hurdles can be completely removed from the track, I think that this statement, at this time, is untimely, and not in keeping with what we know about the methods of structuring characters. However, to completely cover this important area we would need much more room than is available in this manuscript, and we should indeed write a separate paper on characters, their purpose, methods of construction, and practical considerations of their employment. So if you don't mind, let's just drop out that second paragraph on page 4, I don't think the flow of the argument is disturbed by its removal.

The last item where we wish to modify the manuscript in on page 6, second paragraph, the sentence which now reads, "The second is to develop logically a set of biological rules in the taxonomic area, discover the necessary and sufficient conditions to satisfy these rules, find mathematical models consonant with these rules, and then develop a practical working procedure which can be programmed to follow the mathematical model." We want to revise this sentence to read, "The second is to develop logically a set of biological rules in the taxonomic area, develop mathematical models consonant with these rules, and then discover a practical working ^{or} procedure which can be programmed to follow the mathematical model."

Aside from these modifications, which I trust you find acceptable, the paper reads very well, and we'll be happy to have it submitted with author arrangement as you suggest.

I have corresponded with Mr. Bisby, giving him the necessary details of working with us, and one or two other points about the computer program he wanted to know about.

Thanks for your efforts - the time lapse you mentioned was not too bad, ~~considering all the obligations which I know you have.~~ considering all the obligations which I know you have.

Best regards,

David J. Rogers
Professor of Biology

DJR:gm

30 July 1968

Dr. Aristid Lindenmayer
Queens College of CUNY
Flushing, New York 11367

Dear Aristid:

Thank you for the reprints which are interesting, and the other tidbits about your own activities. I envy you your opportunity to go to Utrecht.. I don't know how many of our papers you have in hand, but I am sending a couple that may have passed you by.

Thanks again.

Sincerely,

David J. Rogers
~~Professor~~ of Biology

DJR:gm

30 July 1968

Dr. J. L. Cutbill
Department of Geology
Sedgwick Museum
Cambridge, England

Dear John:

I think I'll be tied up in September 1969, but I certainly do wish to have our group involved in your program, so at the moment let's say that if anybody can be there, it will probably be George. I suppose you don't really need a title yet, or if worst comes to worst you know enough about our activities to put in a title for us.

Doesn't anybody have any money to help out the likes of us? We will try to pry out some here, but God knows, the situation looks bleak at the moment. George has your letter to him, and the paper. No comment on it yet but I expect that in our typical fashion we'll beat Gawlik somehow or other.

Regards,

David J. Rogers

DJR:gm

30 July 1968

Dr. Robert A. Davidson
Department of Biology
The Catholic University of America
Washington, D. C. 20017

Dear Bob:

My immediate response to yours of the 23rd with your request as to other granting agencies than NSF is to say "You are a lot closer to the horse's mouth than I am." I suggest that you use some of your "intuitive" taxonomic skill to identify the most likely source of funding. You are not the only one who has been shot down this year.

We have found out that it pays to put me in Washington about once a year for a week going around to the major agencies where I get an informal reading of what will and will not grab the fancy of the agencies. I take careful note of the words that are "in" at the moment, then try to come home and use these words to say exactly what I want to do. Following this I make an informal presentation (and you are in a better position than I to do this) and find out whether I have struck a responsive note or not. This kind of feed back seems to pay off.

When you are going after "scratch" forget all your desires to be a scientist and remember you are in the political arena which right now has many lions and tigers in it. Other than these pearly words of wisdom I have no real solid things to say.

Sincerely,

David J. Rogers
Professor of Biology

DJR:qjn

also Mr. Boyd T. Jones, Regional Manager
675 N. 1st Street
San Jose, Calif. 95112

04 July 1968

Mr. William C. Norris, President, CDC
8100 34th Avenue South
Minneapolis, Minn. 55420

Dear Mr. Norris:

We would like to invite you to a demonstration of TAXIR, an information retrieval system for biological data. We have developed the system to run on the CDC 6400 at the University of Colorado, supported by a grant from the National Science Foundation. We anticipate that we will have a small number (30 - 40) potential users of our system here for the demonstration. We are also inviting Mr. Boyd T. Jones, western regional manager for CDC.

The potential users are directors, or curators, of large collections of biological materials in such institutions as the Smithsonian Institution, the University of Michigan, Harvard University, the New York Botanical Garden, etc. Some representatives from the United States Department of Agriculture are also included, as well as the agricultural officers of the Rockefeller Foundation.

The demonstration is to consist of three parts, as follows:

1. A description of the nature and power of the TAXIR information retrieval system. It is intended that this discussion be directed to professional biologists. Technical considerations of computer programming will not be made.
2. A demonstration on the CDC 6400 of the TAXIR system in operation on a biological data bank consisting of data on specimens of the genus Manihot. Any queries you wish to put to the system will be fed to the machine.
3. A question-answer session where we can give individual consideration to specific applications.

The technical computing and machine aspects of the program will not be stressed at the meeting, but we would be glad to answer any questions you may have concerning software aspects of the TAXIR system. The team that has developed this system is composed of biologists, mathematicians and programmers. We have been at work in this type of effort for the past seven years. The initial efforts of this group were made at the New York Botanical Garden, where we also used CDC computers, both at New York University and at your service bureau at Great Neck, Long Island.

29 July 1968

We are enclosing a questionnaire which indicates the possible times for holding this demonstration. If it is not possible for you to attend, you may care to designate another individual from CDC who may be interested in the system.

Please return the questionnaire indicating your interest in attending.

Sincerely,

David J. Rogers

DJR:gm

We would like to invite you to a demonstration of 12

Dear Mr. Norris:

Mr. William C. Norris, President, CDC
8100 34th Avenue, South
Minneapolis, Minn. 55420

29 July 1968

19 July 1968

Miss Aiello
Barss, Reitzel & Associates, Inc.
134 Mt. Auburn Street
Cambridge, Mass. 02138

Dear Miss Aiello:

My associate, Mr. Brill, did indeed receive from you on the day you mentioned, a listing of our program which you converted to the IBM 360.

However we would be very happy to have a source deck and any documentation which you have done. The reason for this request is that many of our collaborators want to know if a conversion has been done to the 360 system and we would like to be able to supply them with listings. In as much as we gave the program to Barss, Reitzel and Associates in the first place, we thought it would not be too much to ask for a source deck. If you find this unreasonable, however, we would pay the postage for the cards.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

Taximetrics Laboratory

18 July 1968

Armory 101

Dr. A. G. G. Menon
Agricultural College and Research Institute
Vellayani P.O.
TRIVANDRUM, Kerala, India

Dear Dr. Menon:

Thank you very much for sending a copy of your paper on the effect of Seradix on the yield of tapioca.

I am sending some papers on Manihot which may be interesting to you.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

18 July 1968

Mr. J. M. Malone II
Engineering and Scientific Systems Design
United States Steel Corporation
525 William Penn Place
Pittsburgh, Penna. 15230

Dear Mr. Malone:

A listing, write-up and supplementary materials for the Similarity Clustering Program is available as Number 3501 from the SHARE Library at IBM's Program Information Department, 40 Saw Mill River Road, Hawthorne, New York 10532.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gn

Taxinetrics Laboratory

16 July 1968

Armory 101

Mr. F. A. Bisby
Forest Herbarium - Dept. of Forestry
Commonwealth Forestry Institute
University of Oxford
Oxford, England

Dear Mr. Bisby:

We are pleased to offer you a standard graduate research assistant's grant at the rate of \$275 a month for the period January 1969 to June 1969. Your duties will be to carry out research under my direction during that period. This involves investigation of computer methodologies for taxonomic purposes. You will aid us in the gathering of and computation of data from various plant materials.

I suggest that when you come you bring with you satisfactory materials for your own investigations. If this involves plant materials I suggest that you inform me sufficiently well in advance so that we can make arrangements for the proper care and storage of these plant specimens. Office space and a very minimal supply of laboratory equipment will be available here.

We look forward to seeing you upon your arrival. Please let me know at your earliest convenience your requirements for living arrangements and so forth. We can help you to organize these things.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm
3 CC

Taximetrics Laboratory

Armory 101

16 July 1968

Dear Mr. Bisby:

In answer to the questions that you have about the computer facilities and various parts of our program, I have the following comments to make, separate from the other letter which you will probably wish to show to your various administrators there.

We have a CDC 6400 with the 120 k, 60 bit word internal store, drums and tapes, of course, as auxiliary storage are available. CDC FORTRAN IV is the basic language. I am sending under separate cover several reprints which will give you the basic understandings of our programs on the similarity clustering. Considering the size and complexity of the program, I have taken the route to not send you the program listing because we felt that it would be much more advantageous for you, at least at this stage of the game, to prepare data there and send it to run in our program here. Since this is a very large program, something like 1500 FORTRAN cards, it would take you a considerable amount of time to convert it to any machines that you have there. Why not just allow us to run any data or do any actual computation that you may require in advance of your arrival here and save the extra time of doing the converting that would be necessary.

I hope that this arrangement is satisfactory to you. We prefer it ourselves. Looking forward to seeing you in January.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

16 July 1968

Mr. Richard A. Barnes
Barrs, Reitzel and Associates, Inc.
134 Mt. Auburn Street
Cambridge, Mass. 02138

Dear Mr. Barnes:

The Taximetrics Laboratory would appreciate receiving from you a source deck and program write-up, including flow charts and other explanatory documents which you may have for your recent transcription to IBM 360 of our program GRAPH, which we made available to you last year. These documents and decks are not only of ~~extreme~~ interest to us in our own research, but may also prove of use to the many scientists who cooperate with us.

Please note our change of address. Thank you.

Sincerely,

David J. Rogers
Professor of Biology

DJR:cm

MEMO TO: Dr. Askeff Löve, Chairman, Department of Biology
FROM: David J. Rogers
SUBJECT: Recommendations to incorporate the Taximetrics Laboratory in
the Department of Biology and the University
DATE: July 15, 1968

For some time I have been concerned about the relationships of the Taximetrics Group ~~to~~ the Department, and to the whole academic structure of the University. I have not seen fit to make any recommendations earlier, hoping that we would be able to define our activities and responsibilities more clearly after operating for a year on an informal basis. Now that we have had a year's experience, I feel that it is time to make our position more formal, and to achieve proper recognition of our activities on campus.

First of all, it is perhaps useful to give some background of the Taximetrics Group and then give some indications of our service to the University, and potential future work.

I coined the word "taximetrics" in 1963, to indicate a concern for the application of rigorous mathematical methods to the largely intuitive field of biological taxonomy. The work should have the same connotation for taxonomy as Biometrics does for the whole field of biology. Since the initial application of the word, we have discovered that there is sufficient commonality between taxonomic work, evolutionary studies and ecological efforts to allow the expansion of the definition to include the latter two disciplines, as well as the more strict application to taxonomy. Furthermore, we have found that, fundamentally, many other scientific efforts, in sociology, psychology, anthropology and even in the humanities, are concerned with the same types of efforts as we have in biology. Methods developed since the formation of the taximetric group in New York in 1961 have been applied in each of the diverse disciplines mentioned above, with some rather surprising, interesting and useful results.

We realized that the efforts to make taximetrics work required the best thinking possible between biology, mathematics and computer programming. As a result, we have brought together a small group of workers trained well in each of these disciplines, and have consistently pooled our efforts to give the best possible application of computers to support work in classification, in information retrieval, and other similar endeavors. In the formative years of the group, we spent many days discovering the fundamental thought processes employed in the discipline, and have, as a result, been able to produce satisfactory, sound, methodologies to support taxonomic efforts. I think that our group is unique, not only in this country, but in the world. Its significance is measurable by various yardsticks, but perhaps the best is the frequency of visits to this laboratory from outstanding biologists from this country and abroad. We have had thirty-five outstanding workers visit for as long as a week during this last academic year.

We soon realized that our efforts were valuable in training taxonomists, ecologists, and other biologists, and that we need to move from asstrictly research oriented organization (The New York Botanical Garden) to an institution which would be formally charged with the education of young people. We moved from New York as a group to Colorado State University, Ft. Collins, in 1965, precisely because we wanted to teach. Unfortunately, we were caught in an administrative situation in Fort Collins which did not allow the full development of courses for this purpose, but fortunately, you and others here in Boulder recognized the significance of our efforts, and invited us to join this faculty. We deeply appreciate your support, and your active and able assistance in furthering our goals.

Unfortunately, in our original contacts with you, it was not possible to give us the needed academic support on campus because of difficulties known to you and to others. We feel, however, that now is the time to reconsider our original agreements, and to put the whole taximetrics group into a more formal arrangement within the University. My personal preference is to keep the group within the Departmental framework, rather than to have some special status. I feel that the needs of teaching within the department take precedence over research activities, and we wish to become much more involved in both undergraduate and graduate teaching than we are presently allowed. Quite frankly, we have engaged in teaching, but this has had to be informal, with members of my staff ^{not} being recognized for their real efforts because of the arrangements which demands 100% time from them for research activities. As long as we are paid largely from grants, with no pay from the University, we will not be able to fulfill the mission which we want to fulfill.

I recognize that there are difficulties in putting on five full time academic positions, and would therefore suggest that we consider the possibility of half-time employment for three of the individuals, and meet their salaries by continuing grants. The three people to be recognized immediately are Henry Fleming, taxonomist, George Estabrook, mathematician, and Robert Brill, computer systems analyst. (THE capacity of these men is well known to you and others.) Later, we may wish to add another mathematician, Howard Christensen, and another programmer, but will not wish to burden the initial application for academic status with these two at the moment.

Our efforts in teaching would be as follows:

1. an introduction to biomathematics for all undergraduate biology majors.

2. a course in statistical procedures for biology.
3. a course in theoretical taxonomy, applicable to all students, whether botanically or zoologically oriented.
4. a general course for a larger audience than those strictly within biology, giving fundamental procedures for anyone concerned with classification.
5. a series of graduate and post-graduate seminars for interested professionals, faculty members, and similar types from other campuses, emphasizing (a) the methodologies for particular problems, and (b) the basic similarity of all scholarly endeavor, whether in the humanities or science.

This suite of courses fits nicely into the program of the present department, and will, as well be equally valid if and when the new structuring of biology occurs. No major shift will be required. It is important to recognize that we have well-trained people available now, and that no new recruiting will be required, with all the difficulties that this entails.

Some alternate procedures could be thought of in the event that we cannot be accommodated in the framework of the College of Arts and Sciences, but I would rather not consider them until we have explored this avenue.

15 July 1968

MEMO TO: Circulation Desk

SUBJECT: Renewal

We apologize for letting this book become overdue, but may we please renew for the summer session?

QL 351 Blackwelder, Taxonomy
B54
c. 2 (College)

Charged to Prof. David J. Rogers, Biology
Armory 101A

15 July 1968

DR. Ralph W. Richardson, Jr.
The Rockefeller Foundation
111 West 50th Street
New York, N. Y. 10020

Dear Ralph:

You will recall back in February that we were developing an information retrieval system which would be directly applicable to some of the activities of the agricultural work done by Rockefeller. As I recall it was your intention to get together with Dr. Wellhausen in March sometime, and if there were an opportunity Dr. Wellhausen would try to correspond with me to show if he was particularly interested in the work. Since we haven't heard anything we are assuming that interest still exists.

The reason I am writing now is to discover whether or not you, as well as Dr. Wellhausen, would be interested to come here for a demonstration of the computerized information retrieval system sometime in the fall. At the moment we are planning to put on a demonstration for a number of people who would be potential users of our system. We expect that we will invite about 15 or 20 people around the country to come for about two days, or perhaps one day if they can't make it any longer, for a demonstration and explanation of the system and its use. We think that this is perhaps the most powerful tool that can be developed for the storage of information and its retrieval in the biological sciences. We think that to really understand the system, it is necessary to spend at least one day, and preferably two, getting the system explained so that it can be incorporated onto your own kinds of activity.

The system we have developed was designed primarily to be an aid to the working biologist, and has a number of different ways in which it can be used as an aid.

I hope you will be thinking about this. We will send out shortly a questionnaire to find out if you are interested and what times are available to you. After we have heard from several other people we will then try to find a date which will be agreeable to all, but I would like to have a preliminary response from you to know if this kind of effort

has significance and interest to you.

Looking forward to hearing from you,

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

Taximetrics Laboratory

Armory 101

15 July 1968

Dr. U. J. Grant
The Rockefeller Foundation
Apartado Aereo 58-13
Bogota, Colombia

Dear Jerry:

On June 11 I submitted a bill for the write-up on cassava to Dr. Rodenhiser. Perhaps Dr. Rodenhiser has not had an opportunity to look after this matter.

Just by chance over the weekend I ran into Dr. Stonaker while he was visiting here in Colorado. He told me that Dr. Rodenhiser is now in Kenya. He also gave me the good news that you folks had had a big meeting there in Bogota about CIAT, and from what he knew it looked as though everything was progressing very nicely toward the development of that center. I certainly hope that everything is going well.

Sorry to trouble you about the consulting fee, but I do hope that it can be taken care of. Looking forward to hearing from you.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

12 July 1968

Dr. F. A. Stafleu
106 Lange Nieuwstraat
Utrecht, Nederlands

Dear Dr. Stafleu:

May we ask if you have received a paper entitled
"Application of an Information Theory Model for Character
Analysis in the genus Arceuthobium (Viscaceae)"[?] by
Estabrook, Hawksworth and Rogers, which we mailed on June 17?

We have received no word of its arrival and would like
to know if it has gone astray.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

12 July 1968

Dr. Alfred Etter
P. Rte. Box 117
Aspen, Colorado 81611

Dear Al:

My thanks for your and Helen's kindnesses during our visit.
We enjoyed seeing both of you very much.

I do hope that we can pick up some cooperative effort on the
Indian paintbrushes. If you care to do so, it would be well for
you to come over sometime for a couple of days (we'll put you up)
and bring with you your data sheets as well as some of the specimens.
Then we can go ahead with the work. What we usually do is to give
you some runs on the computer for free. In the meantime I am send-
ing along some of our reprints which bear on the computer work.

Thanks again for everything.

Sincerely,

David J. Rogers

DJR:gm

MEMORANDUM

11 July 1968

To: Dr. Hugo Bodeck
Museum

Dear Hugo,

In response to your memo of 9 July, I pick a time during the week of September 16, 1968 for a meeting with you, Weber, Maslin and Lanham.

David J. Rogers

P.S. I am pleased that we can start in on this now.

11 July 1968

Dr. Elizabeth M. Zipf
BIOSIS
2100 Arch Street
Philadelphia, Penna. 19103

Dear Betty:

I am sorry that the questionnaire on editorial policy got lost, strayed or stolen. Since I feel you folks are way ahead of me in terms of what is good for the biological scientist I am sorry that I can't give you any good suggestions in Part 8 of the Questionnaire. You also ask if your earlier letter what has happened to some abstracts which were sent to me. To my knowledge and remembrance all the abstracts that I had were returned. Nothing seems to be left over in my files, though I will not guarantee that this is the case. Sorry you had to job me - it won't happen again.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

9 July 1968

D. G. Coursey, Esq.
Tropical Products Institute
56/62 Gray's Inn Road
LONDON W.C.1, England

Dear Pat:

I think your idea for funds for ITRIC travel is admirable. My only remembrance of anyone in UNESCO is Ted Nicholson. This was five or six years back that I knew him and I have had no contact with him since. He may not now be there, but his address at that time (which may have changed, of course) was Headquarters of the U.N.E.S.C.O., Place de Fontenoy, Paris 7, France; his telephone number Suffren 98-70, extension 35-40.

I knew Nicholson when he worked for Special Funds of the United Nations, which job he left to go to U.N.E.S.C.O. Sorry I have no other contacts and none in F.A.O. but he might, if still there, be useful.

I have nothing particular planned for travel in India, but do hope to sometime, to see the Tuber Crops Research Institute at Trivandrum. As you may know I have a graduate student from there working for me now, a Mr. S. G. Appan. He is an excellent student and we are working on the systematics of the genus Manihot, with him as my research assistnat.

I suppose my last letter to you on BIOSIS has arrived by now.

Sincerely,

David J. Rogers
Professor of Biology

DJR:cm

Same Letter To:

Dr. Vernon Heywood
Dept. of Botany
University of Reading
Reading, England

Dr. Peter Davis
Royal Botanical Garden
Edinburgh, Great Britain

Dr. P. S. Dixon
Univ. of Calif. Dept of Botany
Irvine, Calif. 92664

8 July 1968

Dr. B. L. Turner
Department of Botany
University of Texas
Austin, Texas 78712

Dear Billie:

J. McNeill of Liverpool University has indicated an interest in working here with us in 1969-70. It is possible we would like to have him join us. I am particularly concerned to know how Dr. McNeill would work as a team member in our taxometrics group. If you could tell me whether his personality would make it possible (or impossible) for him to share in the give and take of a team I will be pleased to know about it. Any other comments about Dr. McNeill (family, etc.) will be appreciated.

Sincerely,

David J. Rogess
Professor of Biology

DJR:qm

Taximetrics Laboratory
Department of Biology
Armory 101
University of Colorado
Boulder, Colorado 80302
8 July 1968

Dr. John McNeill
The Hartley Botanical Laboratories
The University
Liverpool, 3, England

Dear Dr. McNeill:

We are attracted to the possibility of your spending some time here in 1969-70. Dr. Askeff Löve has indicated his willingness to have you here, provided satisfactory arrangements can be made. Your background, general knowledge, and interests all fall well within the framework we find useful. Perhaps you will wish to consider the following problems, however, before you make any decisions to accept an offer, provided we can make one.

First of all, I plan to spend the year 1969-70 in Australia, after attending the Botanical Congress in Seattle. My staff, however, will all be here and you could work as well with them as with me. Our prime requirement is that you be willing to work as a team member, with the usual give and take which this type of endeavor requires. We find it necessary to exchange and question ideas rather sharply amongst ourselves, and the staff (composed of an entomological taxonomist, a mathematician and computer programmer) has become adept and used to the idea that no thought goes unchallenged. This does not mean an unfriendly atmosphere, but one which some are not used to accepting. If you have any qualms about participating in such a group, then I suggest that you would not be pleased to be here.

One of the requirements for you would be to teach two courses, one in Angiosperm taxonomy, and the other, a part of the taximetrics course. In the former, you would be charged with lectures, and the direction, though not the actual contact, with the laboratory. In the latter, you would attempt to give the theoretical, biological, aspects of taxonomy as they relate to taximetrics, as a member of the team mentioned above. You would have the assistance of and advice from Henry Fleming, the entomological taxonomist, for your part in taximetrics.

We would hope that between times, you would help with the generation of new ideas for work in taximetrics. We are constantly developing new ideas, new methods, etc., useful in computer taxonomy. Certainly, we would hope that you would work on your own problems with the Umbelliferae, as a part of the work of the taximetrics group.

I cannot be specific at this moment concerning financial arrangements. First, can you provide transportation costs to and from the U.K.? This would be very helpful, and perhaps even a requirement. Second, could you come to Colorado some time in August, in advance of the Botanical Congress so that we could meet before I leave here, and than stay through June of the year 1970? Precisely what salary could be paid is something quite dependent on arrangements which Dr. Löve will have to make. But as I said earlier, Dr. Löve is quite interested in

having you come and he will, I am certain, make every effort to provide a suitable emolument.

If the above arrangements and restrictions, duties, etc., meet with your approval, and again, provided suitable arrangements for the financial aspects are mutually suitable, we will hope to see you in 1969. In the meantime, I will check with your references, asking them for their comments.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

Taximetrics Laboratory

Armory 101

3 July 1968

D. G. Coursey, Esq.
Tropical Products Institute
56/62, Gray's Inn Road
London, W.C.1, England

Dear Pat:

Enclosed is a letter (copy) from the Director of BIOSIS. This is a letter following up my preliminary inquiry about helping us with the ITRIC bibliography. It would be nice if you would address yourself to some of the questions asked in her letter, and let me have the benefit of your thinking on them as soon as possible. I expect to attend the AIBS meeting and speak with Dr. Parkins further on the possible activity. Before I do it would be good to have your reaction as well as how far we should go; indeed, how we can approach it financially.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

3 July 1968

Dr. Phyllis V. Parkins
Biosciences Information Service
2100 Arch Street
Philadelphia, Penna. 19103

Dear Phyllis:

Thanks for yours of the 28th. I expect to be at the AIBS meetings and look forward to meeting with you on the various aspects of the Tropical Root Crop bibliography.

I will also hope at that time to tell you of our significant developments in the information retrieval work.

Looking forward to seeing you.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

MEMORANDUM

Ray Pitsker, Computer Center

Dear Ray:

This is to inform you that Bruce Handley is no longer on our staff and is not to use our account # Q010.

Sincerely,

David J. Roberts
Professor of Biology

DJR:gm

3 July 1968

Dr. Grady Webster
Department of Botany
University of California
Davis, California 95616

Dear Grady:

Thanks a heap for your recommendation for me on the Fulbright to Australia. I think it would be wonderful if we could have a collaborative "go" at the Euphorbs of that continent. I would be pleased to hear what you have to say after your sojourn in Queensland.

We will hope that your graduate student (the unencumbered one) does indeed decide to join us for a session of taxinetrics.

Your materials on Manihot, Stillingia and others has arrived. We are pleased to have them. The Manihot specimens are all "dups" of ones of yours we have already but provide good additional information. Do you mind if I mount these up? We would rather work with them that way than chance the complete fragmentation of the material kept in newspaper. They will of course be returned after we have done our job.

I hope your field work is successful and I look forward to hearing from you on your return.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

2 July 1968

Dr. Howard S. Irwin
The New York Botanical Garden
Bronx Park
Bronx, New York 10458

Dear Howard:

The enclosed letter of comments is self-explanatory. I am sending whatever reprints I have available and from reading the comments you will be able to see which ones you will have to have Xeroxed. I still think that the only way to get Brieger into the right frame of mind is to have him visit us some way or other.

With regard to the root specimens I am sorry that I have not previously indicated the real significance which these root specimens have for us. They are very important. For that reason I will ask you the favor of going to the extra bother of returning those which you have sorted out according to your letter of June 28.

Thank you for your efforts.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

2 July 1968

To Drs. Brieger and Irwin:

I think it is evident from Dr. Brieger's letter to Dr. Irwin on the criticisms of the Cassia, section Apoucouita, paper that the philosophy behind the work is what needs discussion. In this connection, let me say that our efforts are to reinforce the decisions of the taxonomist, not to replace him with some "objective procedure. Let me say that I find nothing wrong with the subjective approach to taxonomy which has proved itself in numerous applications before the recent rise of models in mathematical framework which are intended to reflect the procedures of the taxonomist. The most important thing to realize is that there are many different possible types of classifications which are equally valid. It behooves the individual to select that type which is important to him. In most classifications of species, genera, families, etc., of plants, we rely very heavily on the phenotype, and only in very rare cases can we bolster our classifications with chemical, cytological, ecological and evolutionary types of information. From our classifications of the phenotype (phenetic classification of Sokal et al.) we may be able to derive some hints about the phylogeny of the group (phylogenetic classification).

With regard to our derivation of similarities, it is very important to understand about characters. All you can say about a character is that it is some basis for comparison of the organisms under study. Which characters you employ are your responsibility, and no statistical model can dictate to the taxonomist how many, or what kind can be employed. How you structure your characters is the business of the professional taxonomist, and is your prerogative. Again, no statistical model can or should be allowed to tell the taxonomist what he must do in establishing his attributes within the character. This philosophy throws the burden onto the shoulders of the taxonomist, where the burden should rest, to do the very best job possible to structure his characters in such a way that they do the job they are intended to do - make a classification. But there is nothing sacred about the way characters are structured, and there should be some system which gives the taxonomist the most aid in establishing the attributes of a character in such a way that the character does what the taxonomist knows the character must do - to make a satisfactory classification. Our approaches are not intended to dictate, but to be hints to the professional about how he can best use the information which he gathers.

This philosophy is back of my earlier statements, in the first letter, which said that it behooves the taxonomist to know the rules of classification, precisely defining his problem, and then seek out the most powerful mathematical expression of those rules. To apply a statistical technique established for an entirely different purpose is to do damage to the taxonomist's desires. If Brieger thinks otherwise, I am sorry for him. We

have tested enough of these "ad hoc" approaches to know what we're talking about, and I haven't got time to rebut any statistical arguments. But to get stuck with only one small branch of applied mathematics, not knowing even the mathematical base of the statistical approach is to do damage to oneself, and to be laughed at by professional mathematicians.

Now that is out of the way, I would suggest the following list of readings, some of which you will have to provide because we are completely out of reprints.

1. For an understanding of the graph theory model of classification, read:

Wirth, Estabrook and Rogers, *Syst. Zool.*

Estabrook, J. *Theor. Biol.*, 12: 297-310. 1966. (We're out of this)

Irwin and Rogers, *Mem. NYBG*, Cassia.

2. For an understanding of characters, read:

Estabrook and Rogers, *BioScience*.

Estabrook, *Taxon*.

3. For an overall look at computers in taxonomy and evolution, read:

Rogers, Fleming and Estabrook, Chapt. 6 in *Evolutionary Biology*, Vol. 1, 1967. (eds. Dobzhanski, Recht, and Steere; Appleton, Century, Crofts, N.Y.) (We're out of reprints)

Since our mutual work on *Cassia*, we have come quite some distance in understanding ways of supplying the taxonomist much more flexibility in using the computing machine to back up his work. For example, the *BioScience* article by Estabrook and Rogers (under 2 above) indicates how you can structure characters to reflect the various situations which arise with regard to qualitative and quantitative characters. How to estimate the value of a character as a classificatory structure is given by Estabrook in *Taxon*.

More papers are in press which I will forward as they come out. It will be difficult to see how our approach differs from the Kansas school (Sokal et al.) from reading of the individual papers, but perhaps something of our philosophy can be read in the *Evolutionary Biology* chapter.

I know that I have not answered any of Erieger's individual questions, but I think it more important for him to know that our philosophy is quite different from the other approaches, which might be termed "heuristic" for want of a better description of the work done in Kansas. Knowing this difference, he may read the reprints with more understanding. He should also know that we continue to refine our techniques, and that we are not entirely satisfied with any of them. We're still in the experimental stage, and to damn the experiments is to damn the usual approach to scientific developments.

1 July 1968

Dr. George H. Hepting
Forest Disease Research - USDA, FS
PO O. Box 2570
Asheville, N. C. 28802

Dear Dr. Hepting:

Thank you for your letter of June 21. I shall be very pleased to attend the meeting in Columbus provided I have an opportunity to attend, which is not yet certain. I will let you know more details on that later.

I feel there is some confusion transmitted to you by Fred Wellman concerning our efforts. We have developed our program more to handle primary (raw) biological data, rather than to work on retrieval of information from literature. Our effort supports more the work of the pathologist in keeping track of his own experimental figures as he collects them. We can also employ our system for data recording on specimens of interest to workers much as a museum curator would take care of "curatorial information." We have felt that this was a more important area of activity for our purposes because we are aware of such efforts as yours, Biological Abstracts and others who are either developing or have developed systems for the retrieval of the literature. I suspect that our techniques for the computer are not too entirely different from those which you have, but this is difficult to know until we have seen your system in detail. I hope there will be an opportunity sometime for us to meet and I will do my best to get to the Meetings at Ohio State.

Thank you for your reprints.

Sincerely,

David J. Rogers
Professor of Biology

DJR:qm

1 July 1968

Dr. K. I. Wilson
Senior Lecturer cum Asstt. Virologist
Agricultural College and Research Institute
Vellayani, Trivandrum, S. India

Dear Dr. Wilson:

I fear there is some confusion in names. I think that
the man you are interested to correspond with is

Dr. Donald P. Rogers
Department of Botany
University of Illinois
Urbana, Ill. 61801.

I personally have no knowledge or experience with the
fungi, and am therefore in no position to do more than refer
you to the other Dr. Rogers.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

1 July 1968

Miss Beryl Robichaud
McGraw-Hill, Inc.
Hightstown, New Jersey 08520

Dear Miss Bobichaud,

I was pleased to have your letter of June 14 awaiting me after a short Manihot hunting trip to Mexico.

The news of your activities was good to have. I hope between you and Dr. Dansereau the master's project can be published. It would certainly be an interesting application for others to see, and the best way to do it, I guess, is to ask if our good friend Murray Buell would accept it for publication in the Bulletin of the Torrey Club.

Our group is still intact and we are in the final phases of the development of an information retrieval system for primary (raw) biological data.

We would welcome a visit from you to hear about this development and certainly would be pleased to see you for any other cooperative effort you may care to develop with us.

Sincerely,

David J. Rogers
Professor of Biology

DJR?qm

1 July 1968

Mrs. Nancy J. Wolf
University of Colorado Museum
Campus

Dear Mrs. Wolf:

Enclosed is what we have in the way of biography for Dr. Rogers. He has just returned from two weeks in Mexico collecting Manihot specimens.

He will illustrate his talk with Kodachrome slides, so a 2 x 2 projector would be in order.

Sincerely yours,

(Mrs.) Genevra Metcalf
Secretary

gm

1 July 1968

Dr. M. T. Hall
Morton Arboretum
Lisle, Ill. 60532

Dear Truf,

Misty Fogg is due to show up here on the 15th of July. He has sent me a few pages of numbers which appear somewhat "manipulated," apparently for an ecological analysis of Juniperus. He seems to have the idea that I am aware of the project that the two of you have, and that you have communicated with me some of the work. Somewhere or other I have not caught up with the project, though I am interested to know if there is something I can do to be useful. I'd appreciate it if you would lay on some of the objectives and background, questions you are asking, etc. to bring me up to date. I really want to work in on this project if there is anything useful we can do.

There are several interesting straws in the wind that we are doing that I think you would find helpful if your own operation of the Arboretum, and I would love to have a chance to tell you in detail about these. Is there any possibility that you could pop out here during the time that Fogg is here, so that we may go over them? We would be happy to have you. Let me hear from you as soon as possible and I can make arrangements for putting you up.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

1 July 1968

Dr. R. S. MacNeish
Department of Archaeology
The University of Calgary
Calgary, Alberta

Dear Scotty:

Almost at the same time that I got the sad news from you about the cancellation of the symposium, I received a bunch of papers from H. Suzuki saying that I should submit an abstract.

Naturally I am sorry that we do not have a chance to put on the symposium, particularly so since I had convinced our University to foot the bill for my travel. I would like to have more details if you would care to give them to me about what happened. It's too bad that you had to spend so much time arranging things, only to find it all stopped cold. I hate to see that idea lost. I wonder how you feel about putting on the symposium under other auspices. We really ought to have that kind of work presented somewhere.

I will be interested to have your reaction and information about what really happened.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

30 August 1968

Miss Gladys L. Lytle
c/o Dr. W. L. Minckley
Department of Zoology
Arizona State University
Temp, Arizona 85281

Dear Miss Lytle:

We will be pleased to send you the information you requested concerning our graph-theory clustering program. However, I must suggest that we have an alternate proposal which I believe you should listen to. In our work with other users of our program we have discovered that a considerable amount of time, effort and energy can be saved if it is at all possible for you, as the investigator, to come to our laboratory for a day or two and discover the processes necessary to make this program do the best work for you. My staff and I will be glad to discuss your problem and advise you on the procedures which we have found to be most useful. Primarily we are concerned with the structuring of your data. There are many hidden processes which are unfortunately extremely difficult to express in published works, which if known about can give you results that are of considerable more benefit than otherwise.

Let me suggest therefore that if at all possible you visit our laboratory, bringing with you your data as you presently have it constructed. We will then be able to give you all the necessary advice for the continuing operation. I suggest that perhaps one full day will be required, and if you can spend another half day with us this will be an even better arrangement for you to understand the intricacies of the methodology. Thank you for your inquiry and I do hope that you will find it convenient for you to visit us here. If however it is inconvenient ~~and you cannot find ways~~ ~~to take off time to~~ come here then we will send you the documents that you have requested.

Sincerely,

30 August 1968

U. S. National Committee for the IBP
National Academy of Sciences
National Research Council
2101 Constitution Avenue, N.W.
Washington, D. C. 20418

Gentlemen:

Will you please add my name to your mailing list for
the IBP Inter-American News? in English?

Thank you very much.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

30 August 1968

Dear Robert M. Johnson
Florida State University
Tallahassee, Florida 32306

Dear Bob:

Congratulations on your appointment as Director of Research and Graduate Dean at Florida State University. FSU is also to be congratulated in attracting you to this significant job.

As an old Florida native, born and reared about 156 miles west of Tallahassee, in DeFuniak Springs, I have been interested in the University, first when it was an all-girl school, and therefore an attractive place to spend a pleasant weekend, and then as it developed into a fine University. It was certainly pleasing to me to see the progress to a first-rate institution when I visited Herb Taylor and his family earlier this month.

I do hope you can find ways to bolster the biological efforts there, which seem to be going well now. Bob Geoffrey, the associate chairman, is an old friend of mine, and a very capable botanist. If there's anything I can do to help out, just give me a call, and I'll be pleased to do what I can.

You might be interested to know that the computerized information retrieval project you so capably guided us on when we were at CSU has now been nearly completed, almost a year ahead of scheduled completion.

Best regards, and with best wishes for success.

Very sincerely,

David J. Rogers
Professor of Biology

DJR:qm

TO: Mr. Ray Pitsger, Assistant Director, University Computing Center
FROM: Dr. David J. Rogers, Department of Biology, Taximetrics Laboratory
DATE: 29th August 1968
SUBJECT: Key-punch operator difficulties.

It has been recently brought to my attention by our programmer, Mr. Wong, that on three separate occasions, we have encountered difficulties with your key-punching staff at the Computing Center.

Mr. Wong asserts that during the last week of July, when the head key-punch operator was asked to punch and verify data, the request was denied, ostensibly on the grounds that the key-punching staff was over-loaded and would continue to be so for the next several weeks. We subsequently hired a key-punch operator to come in off-hours. After a week Mr. Wong reports that he telephoned the head key-punch operator inquiring as to when the key-punching staff might again be free to do our data. He was then told that the staff was again over-loaded with work - this time with programs to be punched for a FORTRAN class held at the Computing Center, according to the head key-punch operator.

During the first week of August Mr. Wong submitted our current coding sheets to the key-punching staff. When Mr. Wong returned to pick up the punched cards he noticed that some of the cards were not verified. My own estimate is that 80-85% out of a total of 500 cards were not, in fact, verified. The excuse, Mr. Wong reports, given by the head key-punch operator, was that our data, being a combination of mixed alphanumeric with three odd punch positions prevented the operators from verifying our data.

This Monday, 25 August 1968, Mr. Wong submitted an IBM 407 listing to the head key-punch operator. On this listing were clear corrections made painstakingly at a great man-hour expense of two of our staff. Mr. Wong reports that the head key-punch operator at first refused to punch the corrections maintaining that the Computing Center accepted punching material in the form of coding sheets only. After a bit of persuasion on the part of Mr. Wong, the listing was finally accepted and the cards were promised for the following morning. The following morning the cards were not there. The excuse given was that the listing was illegible. I later reviewed the corrections and found this excuse untenable.

This lack of cooperation from the key-punching staff has been disconcerting to say the least. It has cost us more in terms of man-hours than is reasonable expected for such ancillary service; I'm sure you will agree that using a programmer as a page boy and two trained biologists as proof-readers - which, I might add, would have been entirely unnecessary had the punched cards been verified initially - is something bordering the economically absurd. In light of our contentions we suggest that some action be taken to improve this service.

Sincerely,

30 August 1968

Mr. H. A. W. Southon, Exec. Secretary
IBP Central Office
7 Marylebon Road
London, N.W.1, U.K.

Dear Mr. Southon:

The most recent Newsletter for the Association for Tropical Biology lists several publications of the IBP available from the Central office. Would you please put us on the mailing list for the

IBP News
The Biosphere?

We would like to have, also, the pamphlet: The IBP: What it is; what it does.

Thank you very much for your courtesy.

Sincerely yours,

David J. Rogers
Professor of Biology

DJR:gm

P.S.: The Executive Committee of the United States IBP program has approved our computerized information retrieval system as part of the IBP efforts in this country.

29 August 1968

Mr. Harvey E. Sheppard
National Research Council
2100 Constitution Avenue
Washington, D. C. 20418

Dear Mr. Sheppard:

Herewith is the reworded version for Part 2, Report No. 3,
for the Executive Committee for the International Biological
Project.

I look forward to the opportunity to review our activities
with you personally.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

Conducting a feasibility study for a biological information retrieval system that will:

1. Incorporate the taxonomist's concept of character (descriptor) and character state (descriptor state).
2. ^{Implement} ~~Realize~~ an efficient computing algorithm for storing, updating, and retrieving information,
3. Make available a language (TAXIR) with sufficient power and flexibility to enable the user, through the grammar and syntax of TAXIR, to input information, and pose enquiries in whatever terminology is natural to his field of investigation,
4. Eliminate the need for computer specialists to stand, as interpreters^f, between the biologist and his IR system,
5. Be field tested in full on an operative biological data bank (the world collection of the genus Manihot, about 15,000 specimens),
6. Be analysed for cost and economic impact,
7. Be an appropriate tool for international organizations interested in facilitating mutual cooperation and interaction through information exchange,
8. Be a working foundation for other retrieval-system designers facing problems similar to those which this system solves.

This feasibility study is largely complete: objectives 1, 2, 3, 4, 7, and 8 have been met essentially in full. Objective 5 will be met in part in October 1968 with a public demonstration of the system. The report of objective 6 is presently being prepared.

This development is supported by the National Science Foundation.

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This development is supported by the National Science Foundation.

Institution: Department of Biology, Armory 101, University of Colorado, Boulder, Colorado 80302. Phone 303 - 443-2211, X 6712.

Investigators. David J. Rogers, Henry S. Fleming, Robert C. Brill, George P. Estabrook, and Gilbert N. Hersh (address same as above).

29 August 1968

Colorado Computing Corporation
2490 28th Street
Boulder, Colorado
ATT: Mr. John Lauer

Dear Mr. Lauer:

Our Mr. Wong informs us that you are equipped and willing to do some work for us.

Enclosed is a book of Fortran Coding Sheets (pages numbered 67 through 100). We would like the information on these sheets punched on standard data cards and verified against the original statements.

Each serial number (written in red) signals the beginning of a new card and each asteris (*) signals the end of a card. Otherwise, all 80 columns are to be punched exactly as the information appears on the coding sheets.

We understand that for punching and verifying the rate of charge is ~~4.50~~ U.S. Dollars 4.50 per hour of work.

Mr. Wong will answer any additional questions you may have, and please do not hesitate to call us.

When the work is completed please notify us and bill us directly.

Thank you for your time and cooperation.

Sincerely,

David J. Rogers
Professor and Project Director

DJR:gh

29 August 1968

Memo to: Morris Garnsey
From: David J. Rogers

Dear Morris:

We hope that you will be able to set aside the days of October 7 and 8 to join us for the demonstration of the information retrieval system. Actually we will begin the activities on the 7th, Monday, evening, at 8:00 o'clock with an informal gathering at my house; the intent of this gathering is merely to get acquainted with the people who will be here and not to put on any formal part of the demonstration. That begins the next morning at 9:00 A.M. and we will continue all day long, finishing up with a dinner at 6:00 P.M.

I hope that this will be instructive to you although we will pitch most of our talk to actual biological users of the system. Let me know if it is possible for you to attend.

Sincerely,

29 August 1968

Dr. Richard A. Howard
Arnold Arboretum
22 Divinity Avenue
Cambridge, Mass. 02138

Dear Dick:

I know that you have been extremely busy since your return from Europe and I hope that you will not mind too much that we have had to go ahead and establish dates for the demonstration of our information retrieval system. A sufficient number of people have responded and tell us that the dates of October 7 and 8, Monday and Tuesday, are satisfactory for the demonstration. On that basis we have established those days to actually carry out the demonstration.

I do hope you can join us because I think the best understandings can be had by actually seeing the program working. As we indicated earlier this demonstration is oriented specifically for the working biologist and not for the computernik. It is therefore couched in language which will be meaningful to you.

We do hope you can join us, and do let us know soon if you can. Other information will be forthcoming as we develop it.

Sincerely yours,

David J. Rogers
Professor of Biology

DJR:qm

29 August 1968

Mr. Kirby W. Brown
Department of Entomology
School of Agricultural Sciences
University of California
Riverside, Calif. 92502

Dear Mr. Brown:

In answer to yours of August 23rd, we will be pleased to run your data on your insects here at Boulder. I am including herewith two papers which are significant and need to have your attention before any further operations. The first by Estabrook and myself gives you something about the necessary operations to establish your information in the best possible way to get good results with our graph-clustering method. The second is actually how to set up the decks for the computer.

I strongly recommend that you consider the possibility of spending a day or two here with us. The reason I suggest this so strongly is that in the past we have discovered that when other users wish to get the most benefit from our programs there are many nuances which are not apparent in any of our papers with which you should be familiar before you begin the arduous task of data preparation and punching. We will be glad to give you time here if you can find some way to come to Boulder for a day or two. This will save you time, money and much sweat to come here ~~before here~~ before you begin the process, so the sooner you can make it the better.

We no longer use the portapunch cards as the input to the system. It turned out that the portapunch cards were not of the same thickness as the readers of the regular size cards and we had to write special programs to get the portapunch cards into a format for processing. Let me know as soon as you can if its possible for you to spend a day or two with us.

Sincerely yours,

David J. Rogers
Professor of Biology

DJR:gm

28 August 1968

Dr. Edwin J. Wellhausen
International Maize and Wheat Improvement Center
Londres 40 3er piso
Mexico 6, D. F.

Dear Dr. Wellhausen:

We have pretty well firmed up the dates of October 7 and 8, Monday and Tuesday, for the demonstration of our Information Retrieval System. We are sorry that we didn't have your reply before we made the choice of dates, but we hope that you will plantto attend. I think that we do have something valuable to offer you and your staff for use in the germ-plasm banks, and hope that we can have the pleasure of demonstrating it to you. If you came to bring someone along with you, please feel free to do so.

We will shortly send out details about travel to Boulder, motel accomodations, etc.

Looking forward to hearing from you.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

28 August 1968

Wenner-Gren Foundation for Anthropological Research, Inc.
14 E. 71st Street
New York, N. Y. 10021

Gentlemen:

I have been invited by J. C. Gardin of the Centre D'Analyse Documentaire pour L'Archeologie to participate in the International Symposium on the Use of Computers in Archeology, Semiological and Mathematical Problems to be held in Marseilles, April 7 - 12, 1969. As the symposium's funds are limited, it has not been possible to finance my transportation to and from Marseilles. My years of successful experience with the use of computers and mathematics to address very analogous problems in descriptive biology indicate that I could contribute meaningfully to the symposium.

Biology undertook to imlicate the computing machine as a research tool over ten years ago. Only recently has the noise of confusion started to abate and meaningful results begun to emerge. Because of the analogues in scientific method (if not subject matter) which exist between such of archaeology and the areas of descriptive or synthetic biology, archeology is in a position to learn from and take advantage of the mistakes and experiences we in biology are just beginning to weather. For these reasons I believe, as does J. C. Gardin and the symposium's organizational committee, that it is important to the progress of modern archeology that the symposium be allowed to hear from me on these matters.

The total amount of assistance I would need comes to less than a thousand dollars; sic

\$695	Round trip coach, Boulder-Marseilles
160	8 days per diem
100	Ground transport
<hr/>	
\$955	Total

I would appreciate it if the Wenner-Gren Foundation would entertain this request.

Yours truly,

George F. Estabrook

GFE:cm

28 August 1968

Dra. Nuesa Diniz da Cruz
Instituto Agronomico
Caminas, S. P., Brazil

Dear Dra. Cruz:

Thank you very much for sending separates describing the species Manihot jolyana. Because we are making a world monograph of the genus Manihot it is very important for us to incorporate your new species into our study. We would be pleased, therefore, if you would send or loan the specimen cited in your description of this species, including any allied material to your own holotype.

Thank you for your consideration.

Sincerely,

David J. Rogers
Professor of Biology

DJR:cm

28 August 1968

Senator Jennings Randolph
Senate Office Building
Washington, D. C.

Dear Senator Randolph:

May I please have a copy of "The prospect for Technical Transfer", the report of your subcommittee on Science and Technology. I am interested to know whether or not my research has anything to offer somewhere within the framework of the recommendations of that report. I have a small team that has developed a computerized information retrieval system useful in science and other areas and would like to be able to contribute this system if it is possible to do so. Inasmuch as the information system was developed with federal funds from the Office of Information Services of the N.S.F. I should think that we should make an effort to "get the system off the shelf" and into use in such areas as your subcommittee's efforts have been investigating, particularly on a transfer of technology.

Thank you for your efforts.

Sincerely yours,

Sincere

David J. Rogers
Professor of Biology

DJR:gm

Taximetrics Laboratory

27 August 1968

Armory 101

Dr. George Eiten
Caixa Postal 4005
Sao Paulo (SP), Brazil

Dear George:

Thanks for your letter of 30 July. I have already received the bibliography on maniocca and have corresponded with its author.

I am sorry to say that the Manihot species seeds which you send when we were in New York died. The usual care of the plants was given by the gardeners of the N.Y.B.G. It seems that I do not have any herbarium material of that species, and therefore am in no position to describe it. In as much as I have to borrow all of your Manihot material from Sao Paulo would you be kind enough to include your collection of that species along with that general loan. Furthermore, is it proper for me to ask you directly for the loan of Manihot from your Herbarium? Or should I write a letter to Alcides to make the request for the loan formal? If it is proper to ask for the loan through you could you consider this letter to be a formal request to send the materials? I know that this lady, Nuesa da Cruz in Campinas, has described a new species of Manihot from Sao Paulo State. It is certain that I have to see this species in order to incorporate it into my monographic studies.

Our efforts here are bent mostly toward developing a new computer programming method for taxonomy. Our latest efforts are to develop an information retrieval system for taxonomy. We have not yet made any formal publication on this system but now have it just about completed and ready to be tested in several different museum settings. Some of our other efforts in this line can be seen from the reprints which I am sending separately.

Thank you for your letter, and best regards to all there in Sao Paulo.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

27 August 1968

Dr. Carlos E. Fernandez
I.I.C.A.
Apartado 478
Lima, Peru

Dear Dr. Fernandez:

Jorge Leon has told me of your work with Manihot. He further indicated that you probably would be in charge of a collecting expedition some time next year. Earlier I had suggested to Dr. Leon that I would like to have one of my students accompany that expedition.

I would be very pleased if you could let me know the proposed objectives of the collecting expedition and the proposed area where you expect to make collections. Perhaps my graduate student could be added as a team member if the expedition if we can find satisfactory funds to aid in his living and allied expenses.

I would be pleased to hear from you soon concerning your plans.

Sincerely yours,

David J. Rogers
Professor of Biology

DJR:gn

27 August 1968

Dr. Richard M. Klein
Department of Botany
Hills Building
University of Vermont
Burlington, Vermont 05401

Dear Dick:

Herewith is about all I have to say about conservation.
Read it, suggest changes, but for God's sake, no additions!

I am working on the other pieces now and will shortly send
you the whole thing for the last time.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

27 August 1968

Dr. Murray P. Buell
Box 234
Middlebush, New Jersey 08873

Dear Murray:

I'm really surprised that Dave Fairbrothers would let this paper out with his name on it. I don't think it's worth publishing, at least with its present status..

First of all, one cannot do much with the taxonomy of a species, and certainly cannot come to any classificatory rearrangements on the basis of a study which admittedly takes in only a very small portion of the total range of the species, which does not consider the relationships of this species to any other species in the genus, and which is only descriptive of plants in eleven sites. Very obviously, the authors did not examine type material, where such exists, nor compare historical usage of the names, and all they did say was that Gleason and Cronquist are probably right in their choice of the name for this variable taxon. Secondly, I can see little value in the primitive statistical techniques employed when pure old "eye-balling" the data would have shown the same things.

The paper's purpose is not given, in spite of the fact that there is a paragraph headed with that title. There is no summary at the end, which is probably a good thing because there's nothing to summarize; though not very wise in such a paper where the title leads one to think that there should be.

About the only suggestion I can make is that this paper be mimeographed, and stuck in the files of the botany department, and later picked up and added to by more studies along the lines suggested in paragraph two above.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

26 August 1969

Dr. Lawrence W. Barsz
Barsz, Reitzel and Associates, Inc.
134 Mt. Auburn Street
Cambridge, Mass. 02138

Dear Dr. Barsz:

I am (finally) in a position to respond to your letter of July 22, and to acknowledge, with thanks, the various documents and tapes which Mr. Barnes and Miss Aiello have sent.

It was kind of you to explain your position in response to what was unintentionally, and unjustified, a fit of pique on our part. May the whole matter rest now that we understand your position, so well displayed in your letter. We are aware of the problems of software protection, and of the difficulty of making its sale a profitable (or even break-even) venture. While we in this shop are not able to sell our product for dollars, we do get our "pay-off" by use of our programs, and in this sense, we are grateful to you for taking up our similarity-clustering program. We hope we have a satisfied customer in Barsz, Reitzel et al. and that you may have luck in getting users of the program. We recognize that your input to the program development was nontrivial, both in converting to IBM hardware, and in the new sorting routine which is much more efficient than the one we had.

Since we are a "satellite" to the University of Colorado, we sympathize with your organization's desire to more easily cut across departmental lines for interesting work. We are interdisciplinary, with biologists, mathematicians, economists and programmers, yet we have not made a complete break with the University, and since we gain all our support from grants from NSF, NIH, etc., we must produce sufficiently satisfactory work to keep these agencies willing to continue our grants. It is therefore important that we get recognition from people for our efforts. We would be pleased if you could give us that recognition when you find customers for our methods, and further, let us know the type of application made of the program. Also, if this isn't too private information, the names of the users. We use such information only for purposes of gaining additional grant support, for impact-studies etc., and would under no circumstances, infringe upon your territory.

Since you have, for some reason, found the single-linkage program interesting, I wonder if you would also be interested in companion programs to it? For example, our program CHARANAL, intended (in an information-theoretic sense) to give measures of the values of the input data in a study, where, given the value of one piece of information, another information ^{is} found to cover some part of the first, is distance from the first, or is identical to the first. This program has been very useful to us and to other users. Our big effort now is TAXIR, an information retrieval system for biology, and we have nearly completed version one. There are some quite distinct methodologies in this system, both in terms of efficient of storage of information, and in terms of user facility. An important feature of the system is that the data input technique is nearly identical to data structuring of the two other major programs, thus allowing data massaging in several interesting ways.

If either of these more recent developments are interesting to you, we would be happy to explain them in more detail.

Sincerely,

David J. Rogers
Professor of Biology

DJR:qns

6 August 1968

Dr. Richard S. Cowan
Museum of Natural History
Smithsonian Institution - USNM
Washington, D. C. 20560

Dear Dick:

By all means invite Drs. Manning and Watson. I am enclosing forms for them to fill out. They have some idea of what we are doing as a result of our conversations last year. Drs. Hale, Peters and Shetler have already accepted.

We have not invited Nick Suszynski because we have selected the invitees solely on the basis of their being biologists with an information retrieval problem. With only a couple of exceptions such as Peters they only have an academic interest, if that much, in computer technicalities. We will at some future date have a session for the Computernics.

We have been keeping Don informed about our activities and have not extended an invitation to him at this time, because at this time he is not directly concerned with information retrieval at Stony Brook, and is very likely occupied with the logistics of settling himself in.

We have also been trying to keep the group as small as possible so that a really meaningful exchange can be attained. However, if for your institution you feel the necessity of having Don, bring him along with you.

Dave is in Florida for a couple of weeks (not at the convention but looking at Manihot). Give my best to John Wurdack.

Sincerely,

Henry S. Fleming

HBF:gm

6 August 1968

Dr. Theodore J. Crovello
Department of Entomology - Snow Museum
The University of Kansas
Lawrence, Kansas 66044

Dear Ted:

I am very sorry but we have no travel funds available. However, other institutions are funding their respective attendees because of the pertinence to museums, etc. of information retrieval. Have you tried your own institution?

It would be impractical to try to squeeze the demonstration in during the NT conference. However, if you wish to stay over a couple of days, George Estabrook will try to give you a concentrated session.

I suggest you wait on your Greene Herbarium data until you see us. We will have live data made up from the genus Manihot (Euphorbiaceae) for which we have the world collection here and are in the process of monographing.

Hope you can find a way to make the demonstration. There should be a very broad airing of museum and biological aspects of information retrieval.

Sincerely,

Henry S. Fleming

HSF:gm

5 August 1968

Dr. Yehudah L. Werner
Auditory Research Laboratories
Forrestal Road North
Princeton University
Princeton, New Jersey 08540

Dear Dr. Werner:

Thank you for your recent communication. I will place you on our permanent reprint list. Please be assured that we are interested in aiding you with your systematic problems to the extent that any collaboration continues to be mutually satisfying.

May you enjoy many pleasurable and productive hours with your new scope.

Sincerely,

George F. Estabrook

GFE:gm

2 August 1968

Dr. Nelson G. Hairston
Museum of Zoology
University of Michigan
Ann Arbor, Michigan 48104

Dear Nelson:

Thank you for your prompt response.

I am writing at this time because I am not sure whether we extended to you the option of also inviting other interested members of your institution. For instance you mentioned a vice-president while you were here, and if you are still considering herpetology as the likely department for a pilot effort, you might like someone from that group to attend. If you do, just drop us a line with the names, (and dates if they are different from yours).

Dave is off to Florida for a couple of weeks (not the convention).

Sincerely,

Henry S. Fleming

HSF:gm

1 August 1968

Mr. Richard A. Brown
College of Agriculture
University of Delaware
Newark, Delaware 19711

Dear Mr. Brown:

It has been our experience that workers wishing to use our classification techniques have benefited greatly from two or three days personal contact with members of our technical staff. Getting the program to run on your local hardware is the least of the problem. The real trick is to get a feeling for how to structure the input data (i.e., select objects, characters, character states, etc.) and to learn how to interpret the output. A visit with us would be the best way to gain this experience. If you can spare the time and the funds for a trip to Boulder we would be glad to spend some time helping you familiarize yourself with our techniques. We would also be willing to run your data on our hardware (CDC 6400) for the cost of the computer time, and help you analyse your results.

You would be well advised to read the enclosed documents for a better understanding of the method.

Sincerely, yours,

Robert C. Brill

RCB:gm

30 September 1968

Prof. E. Rex Krueger
Computing Center
East Campus

Dear Rex:

We want to demonstrate our I.R. system from 2 - 3 P.M.,
Tuesday, October 8, 1968. We will give you a full descrip-
tion of our requirements shortly.

Thanks for your cooperation, aid, advice, etc.

Sincerely,

David J. Rogers
Professor of Biology
Project Director

DJR:gm

26 September 1968

Dr. Elizabeth M. Zipf
Biosciences Information Service
2100 Arch Street
Philadelphia, Penna. 19103

Dear Betty:

Glad you're coming to our demonstration. Please give me your flight information - it probably will be best to fill out the enclosed form.

We will reserve a room for you at the Harvest House, Boulder. If you want to come from Denver with someone else also attending, there is a good chance that you can find someone arriving about the same time. We'll have a representative at the airport to meet your flight.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

26 September 1968

Dean William E. Briggs
Bellevue 102
Boulder Campus

Dear Bill:

I would like to invite you to come to a demonstration of our computerized biological information retrieval system on October 7 and 8. Some forty interested scientists, about half of whom are from the University have been invited and expect to attend. The outside participants are biologists and computer specialists from various institutions in the country. The schedule of activities is as follows:

October 7, 8:00 P.M. Informal gathering at Mountain Shadows
Club House
October 8, 9:00 A.M. Seminar at Computing Center, Room 375A
12:00 Noon Lunch at Harvest House
2:00 P.M. Demonstration of TAXIR at Computing Center
3:00 P.M. Questions and answers
6:00 P.M. Dinner at Harvest House

In as much as the work that has gone into this system is intended for use by members of this community as well as by others at both the undergraduate and graduate levels, we hope that you can come and view the demonstration with an eye to assessing its value for the operations of this University. We hope you can attend some or all of the sessions.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

25 September 1968

Dr. Howard S. Irwin
The New York Botanical Garden
Bronx Park
Bronx, New York 10458

Dear Howard:

Of all the people I had hoped to have come to this meeting, I had hoped most for you. I am terribly sorry that your duties there prevent your attendance. It is remarkable, isn't it, that we are getting six or seven members of the Natural History Museum of the Smithsonian including the director as well as five or six department heads.

I recognize the significance of politics, but I've always wondered why it is that administrators think it more important for science, to do publicity activities rather than scientific ones. In the long run we all must turn to a better management system for our collections. While it is not the full answer to management of collections it certainly offers a step in the direction which will make of collections much more meaningful, useful, and productive. I do believe that the herbarium or museum is becoming the focal point for much of knowledge, recognized as a significant contributor to modern day needs. I believe that the excitement of a museum can be made much more broadly known through application of modern communication techniques of which the computer is one of the most significant.

Perhaps after the Board of Managers has turned you loose they might be willing to let you come for a private demonstration here. I hope so anyway.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

25 September 1968

Dr. Alan Beetle
Department of Agronomy
University of Wyoming
Laramie, Wyoming 82070

Dear Dr. Beetle:

On the advice of Bill Weher we are asking you if it is possible for one of my students, Allan Hale, to borrow a small sample of wheat collections, specifically, Mr. Hale is interested in using the sample in a study of numerical taxonomy (taximetrics). He needs approximately 75 specimens of wheat and the designation of the actual specimens is not a critical matter - that is, his needs are for any set of varieties which you can allow him to use and return at the end of the academic semester. In the event that you have some samples that might be released for such use, Mr. Hale will be glad to travel to Laramie to tell you more specifically the details of his need and to take care of physical arrangements for borrowing these specimens.

Obviously we do not wish to have material which is of critical importance to you, or ones which you cannot afford to release for purposes of student work. Mr. Hale who has some competence already in these studies understands the need for care and preservation of such samples and I have confidence that anything that he does will be useful both from the standpoint of classification of wheat varieties and in educating him in the complexities of such work.

Thanks for your consideration and I hope that we can make arrangements for Mr. Hale to get the required material. If you need further information about the purpose and nature of this work and its requirements, please reverse charges on a phone call to me.

Sincerely,

David M. Rogers
Professor of Biology

DJR:qm

Greenhouse Committee Meeting - 23 September 1968

- AGENDA:
1. Arrangments for use of Macky greenhouse.
 2. Build bins; soils, pots etc.
 3. Laboring house
 4. New greenhouse? Schwartz's offer
 5. Budget for greenhouse operations?

THINGS TO BE DONE:

Get a record of the things to be built up inside the greenhouse.

1. Corrugated Transite bottoms for benches. Gravel to cover Transite.
2. Estimate requirements for bins 7 soil and other
3. Ask Jay Windell what requirements he might have for use of one section of the greenhouse.

COORDINATOR

Erik Bonde has assumed responsibility for coordinating all requests for greenhouse use. Channel all requests thru him.

Send memo to all faculty to this effect.

NEW GREENHOUSE

Contact Don Schwartz about possibilities of sources for new research greenhouse.

19 September 1968

Mr. F. A. Bisby
Forest Herbarium
Dept. of Forestry
University of Oxford
Oxford, U.K.

Dear Mr. Bibby:

Governmental red tape has raised its ugly head. What you and I thought would be a very simple arrangement for your coming to work with us now turns out to be a matter of visas et al.

As I see it two alternatives exist to get you into this country and to allow you to work with us.

1. Come to this country as "Nonimmigrant temporary worker or trainee" (see form with this title, enclosed).
2. Apply for recognition as a graduate student at the University of Colorado, non-degree candidate.

Some of the considerations in choosing which of these two courses to follow - if you choose number 1 above then you will not have the opportunity to live in any of the University residence halls; whereas if you choose number 2 alternative you will have that opportunity as well as some other values such as unrestricted use of the library.

If I were making a choice myself (trying to equate my desires with yours) I would choose the first alternative because I do not believe that you are concerned with having any formal recognition with having worked with us. Certainly I would be glad to give you a letter at the end of your period here which documented your work with us. I would think that this would sufficiently well to establish this historically.

Whichever alternative you choose, will you please act upon it immediately. As I see it, it will be necessary for us here to fill in the U. S. Department of Justice form entitled "Petition to Classify Nonimmigrant as Temporary Worker or Trainee." However, please note in this form that some information is required from you and I will ask you to provide these pieces of information so that I may proceed with the filing of this form. I will ask you to fill out the numbered boxes 5, 12a, 13, 14, 15, 16, 17, 18 and 19. You will notice in the instructions on the back of the form that certain documents must accompany this application. Please provide me with these documents at your very earliest convenience.

To: F. A. Bisby

19 September

2.

I am sorry that this red tape has interfered with what otherwise would be a simple matter, but such is not possible, I fear. In answer to your query concerning what dates would be preferable I would suggest that you should try to be here by January 2 or 3, 1969.

Sincerely yours,

David J. Rogers
Professor of Biology

DJR:gm
Enc.

18 September 1968

Dr. Howard Mills
Marshall University
Huntington, West Va. 25701

Dear Howard:

Since we haven't heard from you we wonder what happened to the agreement on the ecological study. Sometime back I also sent an invoice for the agreed-on costs for consultation. I wonder if you would mind checking out and see what happened - whether or not the right office received it, or what has happened to it.

We are looking forward to a continuation of our studies together.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

17 September 1968

Dr. John Popenoe
Fairchild Tropical Garden
10901 Old Cutler Road
Miami, Florida 33156

Dear Dr. Popenoe:

I have mailed a small packet of seeds of the undescribed Manihot species. The seeds may, or may not, be sufficiently mature to germinate. As indicated in my earlier letter, this species is quite different from M. pringlei, sent earlier, and fits into a different section of the genus. As indicated on the vial, these seeds are from my collection, Rogers & Appan #525. Incidentally, the seeds of M. pringlei are from my collection, #528, which I think it would be useful to have a record on. There are documenting herbarium specimens of both these in my own herbarium, not yet distributed to the various large institutions.

The collection site of #525, the undescribed species, is Nuevo Leon, Mamulique Pass, just off the road on old highway, near milestone Km. 1051, on east-facing slopes, 38 mi. N. of Monterrey, alt. ca. 600 m. The habitat is described as loose, rocky, disturbed, limestone base, in soil dumped after road construction.

The plant is a sprawling shrub, 2-2 1/2 feet high, many branched from base. Roots tuberous, penetrating 1-3 feet.

We can provide further descriptions of both collections, if you want this information.

Good luck with these plants.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

16 September 1968

Dr. Petr Beckmann, Chairman
Council on Research and Creative Work
Graduate School

Dear Dr. Beckmann:

You are correct in assuming that my project, collecting trip to Mexico, has been completed and that the account may be closed out. I appreciate having been granted the funds to make this research possible.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

16 September 1968

Mr. Edward Weiss, Program Director
Special Projects Program
Office of Scientific Information Services
National Science Foundation
Washington, D. C. 20550

Dear Mr. Weiss:

We understand from the U. S. Government Surplus Property Officer here that we are eligible to obtain U. S. Government surplus property at no cost. To do this we must present a letter of authorization from our contracting officer.

Would you be kind enough to send us such a letter? Are we eligible to purchase supplies and enumerated equipment through G.S.A.? If so, what are the procedures to which we must attend?

Sincerely,

David J. Rogers
Professor of Biology
Project Director

DJR:gm

11 September 1968

Committee on International Exchange of Persons
2101 Constitution Avenue, N.W.
Washington D. C. 20418

Gentlemen:

May I inquire about the time of notification of awards of Fulbright grants? I must make arrangements with the University in order to accept this, and will have to have at least nine months for making appropriate arrangements.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

6 September 1968

Mr. Paul Holden
USDI - FWS
Utah Cooperative Fishery Unit
Utah State University
Logan, Utah 84321

Dear Paul:

A little bird at Arizona State said that they have a copy of your finished thesis. If there is an extra copy available, we would be interested in seeing what you finally came forth with.

Our work currently has been with the problems of data storage and retrieval, but it has progressed to the point that we are planning a demonstration for museum curator-types the second week in October.

Should this be addressed to "Doctor" Holden? Congratulations on your progress.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm