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About the Institute

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

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

Taximetrics Laboratory

Armory 101

31 July 1967

Mr. S. G. Appan
Radhanivas Kumarapuram
Near Medical College
TRIVANDRUM, India

Dear Mr. Appan:

We are pleased to let you know that the Admissions Office of the University of Colorado has acted favorably on your application and a letter to this effect should be forthcoming soon.

It strikes me that it would be nice if you could, before you leave, India, discover what local publications concerning *Manihot esculenta* are available and bring with you copies which could improve our bibliography in this field. I am sending two Importation Labels which will allow you to bring in a collection of plants which may be of interest to us. If you have any varieties (cultivars) of these plants which may have characteristics in any aspect, it might be nice to have some of those here growing in our green house. I would suggest that you not bring more than a few. - More instructions will be forthcoming. We of course hope that you will notify us what your travel plans are, your schedule and airline.

Sincerely yours,

David J. Rogers
Professor of Biology

DJR:gm

Taximetrics Laboratory

Armory 101

31 July 1967

Dr. Peter A. Rauch
Department Of Entomology
University of California
Riverside, California 92502

Dear Dr. Rauch:

Thank you for your interesting letter of the 24th. I am sending along the reprint requested but am also sending other material of interest in connection with the graph theory model. In particular I am sending a mimeographed copy of a paper which appeared in *Bioscience* 1966. We are out of reprints but the copy contains all of the elements as well as directions for structuring the input data. The clustering program is quite sensitive and requires the biologist to be pretty much on his toes when he goes about the process of making up his characters. The instructions for structuring the input data follow as closely as possible the "normal" way of putting taxonomic data together, but still the biologist must pay close attention to this paper for best results with the graph clustering model.

I trust that your computer center at Riverside uses IBM equipment. If you do, you may request them to send to the SHARE Library for Program #3501. Included with the SHARE material should be a statement on "How to Read the Printout." If you do not have that piece of paper from SHARE, let me know, because the output from the material, which is easy to understand, still looks like gibberish unless you know how to use it. This has been written down, and hopefully will come to you with the package from SHARE.

If your center has no IBM equipment then write to us and we will have to fix you up with the program deck (or listing) and flow charts. Again, do let me know if you'd need these.

It is a pleasure to see others write down their opinion about the right way to use computing machines for taxonomic problems. We are certainly agreed and my whole fight is to do a job for taxonomy, not taximetrics or numerical taxonomy or quantitative taxonomy or any other set of names.

Thanks for the lead on Keith Justice concerning identification programs. I shall contact him right away.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

Taxonomy Laboratory

Armory 161

28 July 1967

Dr. John R. Reeder
Osborn Memorial Laboratories
Yale University
New Haven, Connecticut 06520

Dear John,

You may send me Dr. Crovello's manuscript entitled "The Effect of Change of Number of DYO's in a Numerical Taxonomic Study." I think that I know pretty well what is in it already, but I'll look it over and let you know.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

Taximetrics Laboratory

Armory 101

27 July 1967

Miss Hazel Niehaus, Administrative Assistant
University of California Press
2223 Fulton Street
Berkeley, California 94720

Dear Miss Niehaus:

I enclose herewith my comments concerning Dr. Crovello's manuscript. The manuscript is coming along separately according to your instructions for mailing. The postage charge for the package is \$1.55.

My social security number is 160-28-4983, I am a citizen of the United States and my home address is Route 2, Box 44 H, Fort Collins, Colorado 80521. I am not sure how much longer that will continue to be my address, for we are in the process of selling that place to move to Boulder; but for your purposes, I suppose that will do. Please send any future correspondence to this letterhead address.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gn

Report on
A Numerical Taxonomic Study of the Genus Salix

Section Sitchenses

by

Theodore J. Crovello

1. Short précis of the content:

The paper essentially describes a set of methods, either put together by the author, or his application to a new area of other workers' methods. The area of application is taxonomy, or more properly, biological classification. The author starts with a problem in the classification of a group of west coast willows (Salix), and discovers (before this work began) that he cannot employ existing techniques of classification to provide a classification which satisfies him. He therefore turns to methods of using computers in classification, and finds a set of methods which take their directions from various statistical methods (in the main, cluster analysis). The author proceeds then to apply his methods to the originally selected problem of several species of willows.

2. Is the subject worthy of study: yes.

3. Does it warrant the extent of the treatment given in this manuscript: yes, but you need not publish all of it - some condensing might be discreetly done - see my discussions later.

4. Extraneous or irrelevant items: pages 25-30 on sex differentiation is much too lengthy and wordy, and doesn't contribute that much to the argument. He should have made some biological argument, rather than all the emphasis on this or that statistical problem. This latter should be mentioned only by name, with some reference to the voluminous literature on these techniques.

5. Original and significant contribution: While I have been involved in this field for some ten years, I would hesitate to cast judgment on Dr. Crovello's contribution because I could as easily be wrong as right. It is original, whether it

is also significant, I am unwilling to say. It may be. I probably will not employ his methodologies, but I may get some benefit by having the discussion published and in my library. If we can equate significant with "useful" I will say that the paper is useful.

6. Scholarly Objectivity: In some respects, it is objective, in others not. It is objective in that the methods selected were chosen because the author considered them best for his problem. It is not objective in that the author tries to consider that "numerical taxonomy" is something superior to any other kind of taxonomy. This is evident both in his introduction and in his conclusion. To my mind, he has not entirely proved the validity of this position, but is acting somewhat defensively. It seems that he is championing a point of view which is not really helpful to his work. Those who have accepted the ideas of "numerical taxonomy" need no further convincing, but those who might, but haven't, will be antagonized by the conclusion's "chip on the shoulder" approach.

But the argument is deeper. The subject of taxonomy is broad, and this approach only tackles part of the subject. Taxonomy is in need of many such techniques, and to indicate that "numerical taxonomy" is "better than" some other undefined approach is useless.

7. Notes applicable - none included.
8. Material well organized: Satisfactory.
9. Style clear and understandable: Not always. Author used too many initials without reference back to the initial point of use. Furthermore, there are many undefined terms, perhaps well-known to the author, but not to the readers. These have generally been marked in the manuscript, and I will not copy them here.
10. There are some needs for editorial work, catching obvious grammatical errors, spellings, etc. I wouldn't do much to the reorganization of the data.
11. I think the study is good.
- 12, 13, 14. I recommend the study be published, after the modifications mentioned above

Taxinetrics Laboratory

Armory 101

25 July 1967

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

Dear Mr. Coursey:

Your letter of 10th July has been sitting in front of me for some days now. I have put off a decision about your request not because I do not wish to participate on a book on cassava, but because I know that it is one more committment on top of a heavy schedule. However, if you can get Jones to join us in this effort, I will be pleased to participate in it because I think that this group could do a good job. I am pleased that you will be willing to put your considerable ability to work on it.

So please proceed with your approach to Longmans and see what transpires. I agree therefore that your point on lending out of reprints is premature.

For convenience in filing of information, I am replying to your ITRIC sub-committee on a separate paper.

Sincerely yours,

David J. Rogers
Professor of Biology

DJR:gm

Taximetrics Laboratory

Armory 101

25 July 1967

D. G. Coursey, Esq.
Tropical Products Institute

Dear. Mr. Coursey,

As an introductory set of comments before passing on to the proposals, may I be so crude as to ask who is supporting the efforts of the proposals. If the Tropical Products Institute, London, is indeed willing to support these efforts (at least for an interim period) then I suggest that there is very little reason not to place the headquarters at that institution. However if the other two named organizations are equally willing to supply personnel and material for collecting and indexing references then we are again back to the present status.

With regard to the proposals: I agree with Proposal 1.

Proposal 2 should have an addendum (or sentence) added which says something to the effect that the collected and indexed references should be disseminated to certain interested organizations via some inexpensive printing process. I suggest that the committee named may wish to contact various commercial reproducing companies in their respective areas to investigate some potential methodology.

Proposal 3 meets with my hearty approval. In order to support this I am sending my own reprints to each of the three potential centers.

Proposal 4 approved.

Proposal 5 approved.

David J. Rogers
Professor of Biology

DJR:gm

25 July 1967

Sr. Rafael Girard
11 Avenida "A" 8-03 Zona 2
Guatemala

Dear Sr. Girard:

Your very complimentary letter strikes a considerable number of notes on my own interests. I will respond to it in a way which I think to be the same order in which you asked me the questions. I will indeed be pleased and honored to have you use the illustrations that you request. I am sending the photograph of Figure 4 which you request. This should be adequate for publication.

In answer to your question as to whether the Maya cultivated the poisonous yuca in the early days, I am really only able to give specific answers to this question by making the following suggestions: These are:

1. There are many variations in the techniques used today to extract the bitter principle. These range from very simple basket-like devices (nothing more than woven mats) through the complex device known as the "tipiti, and various modern milling devices.

2. The variation in the plant's content of prussic acid makes it possible to use some varieties whose content of prussic acid would be sufficient to be called "bitter" but still not sufficiently poisonous to be deadly.

3. It is not known to me how much variation exists in the prussic acid content from one locality to another. As a matter of fact, I am at present in correspondence with a young Dutch scientist who is working on this very problem in the Ivory Coast of Africa. After his investigation I believe we can be more precise in our analysis of the bitter and sweet yuca.

Therefore, I conclude that the Maya could have used some form of the poisonous varieties even though we have no archeological evidence of some device to extract the poison.

You ask my opinion on the approximate time from which yuca could exist. I believe that species of Manihot were present all the way from northern Mexico south through present-day Panama long before man appeared in this area. The very earliest opportunity, I believe, for their use would have been on the order of 9,000 to 15,000 B.C. You request ecological information on the Pacific Coast toward the end of the Pleistocene.

May I please refer you to a man whose experience in this connection is greater than my own. It would be very useful for you to correspond with Dr. Lawrence Kaplan, Department of Biology, University of Massachusetts, Boston, Mass. 02116. Dr. Kaplan has had considerable experience with the West Coast of Mexico and has some interesting hypotheses about the changes in the vegetation which have occurred since man entered the region. I suggest also that you ask Dr. Kaplan your question about beans since he has much interest and knowledge particularly on Phaseolus species.

Your question concerning the origin of Mayan domestication of maize is one which I would rather refer you to Dr. Robert C. Galinat, Agricultural Experiment Station, Waltham, Mass. Dr. Galinat will be able to give you the most recent concepts on maize domestication since he has for a long time worked with Dr. P. C. Mangelsdorff who is the world authority on maize. I am sure that their publications should be available to you if you request them. Another person who would be interested in your question is Dr. Ephraim Hernandez X. at Chapingo near Mexico City. Dr. Hernandez has much experience with the cultivated plants of the southeastern lowlands of Mexico. He is also very simpático.

I am very sorry that I cannot tell you of the address of Dr. Norvell. Perhaps the information service of the Smithsonian Institute in Washington, D.C., would be able to locate him. I am also ignorant of the origins of tobacco, a very interesting but also puzzling study.

Thank you for your interest, and I hope that I have been of some service to you.

Most sincerely,

David J. Rogers
Professor of Biology

DJR:gm

SK
To: Aksel Löve
From: D. J. Rogers
Subject: Mr. Fleming's salary
Date: 24 July 1967

Currently the ^{arguments} ~~agreements~~ about Mr. Fleming's salary are going on ^{at} a level higher than I can reach. It will therefore be necessary in negotiating to

leave this work to you.

there was a ~~quiet~~ ^{or salaries, etc.,} understanding between you and me when we moved here. It was agreed (or I so assumed) that the conditions for our move were OK. Only after we had agreed did we set up our budget for the N.S.F. where the salaries were clearly stated. These were at least available to be known to all of those who signed our budget request. Apparently Mr. Ives was not aware of this budget.

thought I was of the belief

I first knew of his discontent ^{with the rate of} ~~of~~ Mr. Fleming's salary at a meeting between Dean Briggs, Mr. Ives and me in June, where we discussed the rates of pay.

There Mr. Ives made known his objections and we discussed Mr. Fleming and it was my understanding at that meeting that Mr. Fleming's salary was

a bit over ~~the~~ ^{but since} the grades established by the University and ~~that~~ ^{it would be left as stated} nothing could ~~be~~ done about it. ^{was} Mr. Ives stated at that meeting that had he known what Mr.

Fleming's salary was before he came to this position here he would not have agreed to the present rate. *Why that is significant is beyond me*

I understand now from your ^{phone call} ~~communication~~ that Mr. Ives has written letters with copies to you in which he apparently ^{disagreed} ~~agreed~~ that the salary should remain as stated. I further understand from your oral communication that it has been stated by the President's office that Mr. Fleming's salary will be reduced some \$40 a month. I do not understand the basis of this particular reduction. I do not understand why the principal involved has not been ^{informed of the decision} ~~communicated~~. It is not clear to me what policy is being followed. I would appreciate your explaining to me administrative policy so that I may know the procedure in the future.

Taximetrics Laboratory

Armory 101

20 July 1967

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

Dear Phyllis,

I certainly appreciate your recent invitation to me to come to the 40th anniversary celebration and dedication, but unfortunately I just accepted an invitation to attend another symposium at my alma mater the week before and feel that I would be overextending myself.

Let me congratulate you on the marvelous development in the biological information service which you folks have put together. It is a real tribute to your efforts. Best wishes for continued success in this effort of fundamental importance.

Very sincerely yours,

David J. Rogers
Professor of Biology

DJR:gm

Taximetrics Laboratory

Armory 101

19 July 1967

Mr. John S. Jasper
Data Processing Financial and General Corp.
575 Lexington Avenue
New York, New York 10022

Dear Mr. Jasper:

I would like to thank you for your recent letter. The fact that you were willing to write two pages of details about the XPOF-librascope situation even though you are no longer with librascope was very much appreciated by me and my colleagues.

We are looking forward to further information from Mr. Lanheady. Our hardware choice is between the I-3055 and the CDC 6400 already running at the computer center here. A look at the Diagnostic Compiler manuals will indeed be very useful in aiding our decision.

Sincerely,

Robert C. Brill

RCB:gm

Taximetrics Laboratory

Armory 101

19 July 1967

Dr. Lennart A. Bergstrom
Visiting Scholar - Urban Data Center
121 More Hall
Department of Civil Engineering
University of Washington
Seattle, Washington 98105

Dear Dr. Bergstrom:

I am sending herewith the papers you have requested. I am also taking the liberty of sending some further work of ours which has more definite value (in our estimation) for purposes of classification. The graph theory clustering program (mentioned in the reprints) has been deposited in the IBM Share Library - the program was written for the 7044 (it has also been rewritten for the CDC 6400). It is UQ CTCT Similarity Clustering Program of the Taximetrics Laboratory, Share Distribution No. 3501 in the Share Library. The model described in the Science article is not in the Share Library, but may be available as the IBM Taxonomy Model by Tanimoto and Loomis from the Math and Applications Department, I.B.M., Post Road, White Plains, New York.

Please note our new address.

Sincerely yours,

David J. Rogers
Professor of Biology

DJR:gm

Taxinetrics Laboratory

Armory 101

18 July 1967

Dr. Adrian R. Chamberlain
Vice President for Administration
Colorado State University
Fort Collins, Colorado 80521

Dear Dr. Chamberlain:

The below listed equipment is requested to be transferred from Colorado State University to the responsibility of the University of Colorado at Boulder. The basis of our request is that the equipment will be used in work relating to the objectives of the Public Health Service.

Our objectives are as follows:

1. Continuation of the development of mathematical and computer programs for the biological sciences.
2. Investigation of the role of mathematics in the education of students in the biological sciences.
3. Computer classification of plants important to man's health.

I trust that I may have your approval of this transfer.

- 2 Bausch & Lomb No. 31-26-94 power pod with zoom head from 7X to 3X.
- 2 No. 31-26-19 2X adapter
- 2 No. 31-26-96 stand heavy duty with upright and cross arm
- 2 No. 31-26-59 arm with prot for Nicholas illuminator
- 2 No. 31-33-53 lamp 6V with transformer
- 2 No. 31-05-63-02 20X wide field lenses

1 Royal Standard Manual typewriter with mathematical keys
MCS 138036371

1 Olivetti Ivrea-Tetractys Calculator D94750

Sincerely yours,

David J. Rogers
Professor of Botany

DJR:gs

COPI TO:

Dr. Carl A. Kuether
Research Grants Branch
Institute of General Medical Science
National Institutes of Health
Bethesda, Maryland 20014

Taximetrics Laboratory

Armory 101

18 July 1967

Mr. G. H. de Bruijn
Centre Neerlandais
Orstom B.P. 20
Abidjan, Cote d'Ivoire

Dear Mr. de Bruijn:

I am very pleased to have your letter of June 28 concerning your investigations with special regard to the toxicity of cassava roots. In general I think your program is fundamentally important because we have in the past had too few scientifically sound experiments to determine the situation concerning the production of the cyanogenetic glycoside in roots of manioc. You can make a very fine contribution to the understanding of these complex plants.

One comment perhaps will be useful. You have indicated that you are planning a study of different spacing of plants. I believe that this particular work has been done on many occasions, but I am not sure that, unless you have soils of unusual fertility, you will contribute much with this particular study. Might I suggest an alternative? It has been my experience that the consistency of the soils (whether loose and friable as sandy soils or some laterites) or heavy clays has an influence on the distribution and shape of the roots. Perhaps a study of this type of variation which, to my knowledge, has not been done would be a useful contribution and an adjunct to the spacing and direction of planting.

Another comment I would like to make in response to the idea you mention, concerning the crossing of toxic and less toxic varieties: in this respect I recommend that you do not attempt to derive information from crosses of locally occurring cultivars, unless you have some competent plant breeder (geneticist) working with you. I recommend this because of the extremely complex nature of the hereditary mechanism of these plants. I can also predict the crosses of locally occurring cultivars will give you nothing but a very confused product. I recommend strongly therefore that this part of the possible work be left until such time as you may collaborate with some other worker. I trust that this information is useful to you, and I look forward to continued correspondence with you.

I have one more suggestion to make: as you proceed in your studies, you definitely should make documenting herbarium specimens. Since I have spent some time in developing useful techniques to collect these plants, I took the liberty of sending you a set of these directions. I will be very pleased to receive and will hold specimens documenting your work along with my fairly extensive collection of over a thousand cultivars which is possibly the most extensive of this plant species. I cannot overemphasize the importance of documenting with plant specimens the work that you do with these cultivars in the Ivory Coast.

Very sincerely yours,

David J. Rogers
Professor of Biology

DJR:gn
Enc.

Taximetrics Laboratory

Armory 101

18 July 1967

Dr. Robert S. Taylor
Center for the Information Sciences
Lehigh University
Bethlehem, Pennsylvania

Dear Dr. Taylor:

I take the liberty of writing for your suggestions and aid after having read your chapter "Professional Aspects of Information and Technology" in the Annual Review. It seems that your organization is one of the few addressing itself to the problem of training staff members in this new and developing field.

We are looking for a person trained as an information scientist (as differentiated from an engineer) to join in a research program here in Boulder which is intended to eventually develop a generalized information retrieval system useful in biology. We are assembling a team of biologists, mathematicians, programmers and information retrieval experts to develop the system.

We would be able to offer a young person trained in information science and technology a salary of \$10,000 a year for two years. This is a staff non-tenured position but we hope that if we are successful our efforts will be rewarded with continued grants. If you have a student who has recently graduated that you can recommend to us, I would be pleased to hear from him. If you do not have one, would you be kind enough to suggest where I may locate such a person.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

Taximetrics Laboratory

Armory 101

13 July 1967

Dr. Russell B. Stevens
National Research Council
2101 Constitution Avenue
Washington, D. C. 20418

Dear Dr. Stevens:

The answer to your three questions concerning the Systematics Conference are as follows:

1. I am sending the rough notes of my participation in the informal discussion herewith.
2. You have already received my manuscript for my participation.
3. My manuscript has no illustrations.

The discussion in which I participated and which you have circled has been numbered for your convenience.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

30 August 1967

Dr. James Atz
Department of Ichthyology
American Museum of Natural History
77th Street and Central Park West
New York, New York

Dear Jimmy,

This enclosure is what we sent to Don Squires for distribution to people at the Smithsonian as a preliminary to our visit there. We'll be interested in the same things in New York.

Sincerely,

Henry S. Fleming

HSE:gm

Enc.

29 August 1967

Dear Dr. Squires:

Dr. Rogers, who is off at the AIBS Meeting in Texas this week, asked me to send you copies of his Information Retrieval Questionnaire. (I am mailing these separately.) He would like to have these reach people genuinely interested in information retrieval and willing to go along with the use of computers.

He and his colleagues from the Taximetrics Lab expect to be in Washington the week of September 11 - 15. He will have to leave Wednesday afternoon, but the others will stay through Friday.

Sincerely yours,

(Mrs.) Genevra Metcalf

Taximetrics Laboratory

Armory 101

28 August 1967

Dr. James Atz
Department of Ichthyology
American Museum of Natural History
77th Street and Central Park West
New York, New York

Dear Jimmy,

Inclosed is a partial copy of our grant. This is the version that was requested for distribution by the Academy of Sciences, Washington, some months ago. It is essentially a valid description of what we intend to do though as might be expected we have at least modified, if not altered, some details.

I have gotten in touch with Austin of MEDLARS (Medical Literature Analysis and Retrieval System) and he will send on the reprints. I have also requested that he put you on his mailing list so that you will receive the one that is in manuscript now which is more detailed.

I'll call you up from Washington, if I think I can get away on Friday, September 15. I doubt if I can. However, if I don't call I'll be in on Monday morning, the 18th.

By the way, I'll ask you for a letter of recommendation, addressed to Dr. Askeff Love, Chairman of the Department of Biology, University of Colorado, Boulder, Colo. 80302. They want to have me on a joint appointment to the museum as Associate Curator of Botany. Notice the botany - give me a month or two, and the time, and I'll take over the insects too. Nothing like wearing a number of hats. Not having had to have recommendations for years, I have just realized that the people I would normally have had write them are either dead or so near dead that they are a dead loss to me.

Good talking to you over the phone. Give my best around the museum. Antony, Gertsch, Palister, Boquet, etc. See you next month.

Sincerely,

Henry S. Fleming

HSF:gm

Taximetrics Laboratory

Armory 101

25 August 1967

Dr. H. A. Rodenhiser
Rockefeller Foundation
Time-Life Building
New York, New York

Dear Dr. Rodenhiser:

It was a pleasure meeting with you. ~~I am pleased with~~
~~interest in the development of the~~
~~Department.~~

My expenses for the trip were:

Air Transportation	\$195.70
Ground Transportation	14.00
Per diem (one day)	25.00
	<hr/>
	\$234.70

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

Taximetrics Laboratory

Armory 101

24 August 1967

Dr. Walter H. Bernotat
Eldg. Technische Hochschule
Institut für Kristallographie und Petrographie
Sonneggstrasse 5
8006 Zurich, Schweiz

Dear Dr. Bernotat:

I have to respond to your letter to Mr. Estabrook requesting a FORTRAN listing for our program for biological classification. I trust that your Institute possesses or rents equipment from IBM. If you do, it is possible to request from the SHARE Library listings and documentation and flow charts of this program. The address of this organization is:

Program Information Department
International Business Machines
40 Saw Mill River Road
Hawthorne, New York 10532, U.S.A.

and the number of our program in the SHARE Library is: 3501.

If you have no connections with IBM (International Business Machines) and there are no IBM field representatives in Zurich who might make the request for you, we will be pleased to make available a listing from this office.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

Taximetrics Laboratory

Armory 101

23 August 1967

Mrs. Mildred Rodgers Bernhaut, Editor
Scientific Information Notes
National Science Foundation
Washington, D. C. 20550

Dear Mrs. Bernhaut:

Thank you for the extra copy of Scientific Information Notes which you marked for us. You did a good job of condensing the statement of our project to a meaningful set of terms.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

Taximetrics Laboratory

Armory 101

23 August 1967

Mr. H. L. Heaton
Audio-Visual Aids - AIBS Meeting
Texas A&M University
College Station, Texas

Dear Mr. Heaton:

One of our symposium members has just requested an opaque projector. Would it be possible to have one available on Tuesday afternoon, August 29, by 1:30 P.M. in Room 301 of the Electrical Engineering Building?

We appreciate your courtesy at this late date.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm
Copy to: Dr. C. Clark Cockerham

21 August 1967

Dr. John R. Reeder
Editor-in-Chief, BRITTONIA
Osborn Memorial Laboratories
Yale University
New Haven, Conn. 06520

Dear Dr. Reeder:

Herewith are my comments. There are some that do not fit the nine points of your suggested critique form and these are added at the end.

1. This material has not been published previously in this form.
2. This research does not warrant publication.
3. BRITTONIA is not the most suitable journal.
4. The illustrations are extremely confusing and could be improved by deletion.
5. No errors of fact, interpretation and/or calculation were noted.
The material is not presented logically from the standpoint of the taxonomist though it seems to be presented logically from the standpoint of some model descriptions.
6. Yes, methods were adequate.
7. Literary style is unclear. Errors in grammar are not noticeable. The material could be condensed.
8. There is familiarity with the literature; the bibliography is O.K.
9. I do not think the title is appropriate, but hasten to add that I do not know an appropriate title.

In addition to these nine points, the following can be stated:

1. The amount of information conveyed in the paper does not require the amount of space taken to do so. We can restate the problem in terms as old as taxonomy, by asking whether the number of specimens examined has a direct influence on the conclusions reached in making a classification. Another problem can be restated: given correlated characters, what differences exist between two numerical taxonomic procedures.

2. The SPAN illustrations, which are intended to give a quasi-three dimensional pictorialization of the position of objects in a cluster, give very little information to the ordinary taxonomist.

3. The author is more interested in his methodology than in the information about the plants, and while this is a reasonable approach, I think his methodology is not clearly stated in terms meaningful to most systematists. The relationship between the methods employed and the decisions reached taxonomically are not at all clear. For example, the author states, in a sentence of conclusion, that "the difference is small, and centered mostly at the levels of clustering that involve somewhat unique OTU's." How small is "small", and how unique is "somewhat unique"? A numerical taxonomist, whose god is objectivity, is not permitted to make these subjective statements in conclusion.

4. I had a very difficult time reading this paper because of the number of undefined "jargon" type words. The author assumes that all his readers know "taxospecies," "phenograms" or "OTU's", etc. and these are not defined. Reference is made to Sokal and Sneath, 1963, for a definition of OTU, but, after having read that work, I am still in the dark about the meaning of the "operational" when attached to "taxonomic unit."

5. Use of the third person is clumsy and poor. In all cases he should say "I did" or "I published...." etc.

Sincerely yours,

David J. Rogers
Professor of Biology

Taximetrics Laboratory

Armory 101

18 August 1967

American Institute of Biological Sciences
3900 Wisconsin Avenue, N.W.
Washington, D. C. 20016

Gentlemen:

Would it be possible to obtain another one-hundred copies of reprints of the article I wrote with George F. Estabrook, "A General Method of Taxonomic Description for a Computed Similarity Measure," which appeared in Bio-Science, Volume 16, Number 11, pp 789-793, in November 1966?

Sincerely yours,

David J. Rogers
Professor of Biology

DJR:gm

Taximetrics Laboratory

Armory 101

17 August 1967

Mr. C. E. Andrews
Plant Quarantine Division
209 River Street
Hoboken, New Jersey

Dear Mr. Andrews:

Following your phone conversation I would like to request a permit number for the purpose of introducing a small number of stem cuttings of Manihot esculenta. I expect that we will be introducing about 20 to 30 cuttings from the state of Kerala in India. These cuttings should be coming in in the hands of Mr. S. G. Appan who has been for the past eight years the farm manager of the Root Crop Experiment Station at Trivandrum. These cuttings will be a part of Mr. Appan's research work under my direction as he works for his Ph.D. at the University of Colorado. The plants will, of course, be given our best attention since they are research material and there will be no commercial enterprise with them. To my knowledge Manihot esculenta is only grown commercially near Miami, Florida, and at no other location in the United States. We, of course, anticipate that these plants will be given the usual inspection and fumigation treatment by your division.

I expect that Mr. Appan will be in New York via Air India some time next month. I appreciate your attention to this request.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

Taximetrics Laboratory
Taximetric
Armory 101
303-443-2211 Ext. 6712

17 August 1967

Mr. Bruce Handley
242 Hampton
Venice, California 90291

Dear Mr. Handley:

Regarding Mr. Robert Brill's coming visit to the Los Angeles area on August 30:

Would it be more convenient for you to meet a Continental flight at 8:13 A.M. or United at 10:47 A.M.? Or are they both out of the question? If so, what would be a time that would fit your schedule? Other things being agreeable, Mr. Brill would prefer the earlier flight.

Please call us collect to let us know which flight to make the reservation for. Our number is at the top of the page. Is there a number at which you can be reached?

Mr. Brill's destination is the UCLA Institute of Library Research. Can you find out where they are housed, and the easy way to get there from the Airport?

Sincerely yours,

gm

Taximetrics Laboratory

Armory 101

17 August 1967

Sr. Rafael Girard
11 Avenida "A" 8-03 Zona 2
Guatemala

Dear Sr. Girard:

Dear

I am very pleased to correspond with you concerning the very interesting subject of the origin of cultivated plants in the Meso-American areas. I am sorry that I have been narrowly specialized in my studies and am not as familiar with some of the other crops as I should be.

With respect to the question concerning the two areas of concentration noted in my maps, one to the north and one along the Pacific to the south. I did not intend to indicate (with this map) that I considered these areas to be any more than a distribution of wild species. We must use evidence such as you have been so good as to provide as to how and where and when mankind first developed these plants.

You ask me to indicate exactly the number of species which exist in the Pacific region of the Mayan area. I am sorry that I can give you no more than approximations because my research has not focused on that particular problem. I hope to be able to answer that one in another year. You also ask where did yuca reach in North America. I think that only the southern tip of the state of Florida received yuca, and I think that it was brought to Florida via the Antilles by the Carib Indians.

I trust that these remarks are useful and I look forward to a continuing correspondence with you.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

Taximetrics Laboratory

Armory 101

17 August 1967

Dr. J. M. J. de Wet
Department of Agronomy
University of Illinois
Urbana, Illinois 61801

Dear Dr. De Wet:

I was pleased to see your change of address and your relation to the exciting Crop Evolution Laboratory. I notice that you offer opportunities for work in numerical taxonomy, among others. Since I have long had an interest in this subject, and cultivated plant taxonomy, I am glad to see the emphasis placed on these two subjects by you. You know, of course, that I have been working on the cultivars of Manihot esculenta for some time. We are about to publish the first classification of a cultivated species done with a computer. You will be able to hear a short report on this at the annual symposium at the Missouri Botanical Gardens, October 13 - 14.

What are the opportunities for the exchange of students between your lab and ours? I have a student who is coming in to do his studies on Manihot with me, and I think that gentleman would profit from a semester or so with you. I would also suggest that some of your students might gain from taking our course in taximetrics since it is designed for people with interests in cultivated plants. I will be interested in your comments on these subjects.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

Taxinetrics Laboratory

Armory 101

17 August 1967

Dr. Howard S. Irwin
New York Botanical Gardens
Bronx, New York 10458

Dear Howard:

Five Manihot specimens collected by Basset and Cella, et. al.,
showed up yesterday. These are unmounted specimens. Are you
aware of them? Should I acknowledge their receipt to you or to
Basset?

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

Taximetrics Laboratory

Armory 101

16 August 1967

Dr. Arturo Gomez Pompa
Herbario Nacional del Instituto de Biologia
Universidad Nacional de Mexico
Casa del Lago
Chapultepec, Mexico, D.F.

Dear Dr. Gomez:

I have read with interest the efforts of the National Herbarium to employ the computer to facilitate your work. The article in SCIENCE NEWS, for 12 August, entitled the "ELECTRONIC HERBARIUM" prompts me to send you several of our publications which you may find of interest and, we trust, use. We will be pleased to enter into correspondence concerning these programs if you desire further knowledge of them.

You are probably aware that we have accepted an invitation of Dr. Don Squires to participate in the Symposium sponsored jointly by you and the Smithsonian Institution. I look forward to this opportunity to become acquainted with you personally.

We will be honored if you would care to correspond with us further concerning computer methodologies.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

Taximetrics Laboratory
Armory 101

A
A

16 August 1967

Dr. Robert M. Hayes
Institute of Library Research
University of California
Los Angeles, California 90024

Dear Dr. Hayes:

Our phone conversation of August 11 was most gratifying and seemed to hold promise of useful collaboration between our groups. Let me now formally introduce ourselves. We are the Taximetrics Laboratory of the Department of Biology of the University of Colorado. Taximetrics is another term for that field of investigation known variously as quantitative, numerical, or computer taxonomy, and which concerns itself with discovering algorithms for classification which can supplement the poorly understood intuitive processes of professional taxonomists. The programs we've developed over the last few years have (at least on some groups of organisms) yielded good results. When we noticed a conceptual likeness between classification and the organization of data banks, our studies led us into the field of information retrieval.

We are not funded by NSF to design and implement an IR system for biology. The principal investigator under this grant is David J. Rogers. On August 29 Dr. Rogers will be delivering a paper at a conference in Texas and so will not be able to join me in meeting you, but he is looking forward to doing so a bit later on. All of us here are enthusiastic about the prospect of fruitful discussions with you and your staff.

I have enclosed the technical core of our proposal to NSF. It is quite sketchy. Since it was written our ideas have firmed up somewhat, but as we are in the throes of creation we have nothing of our latest ideas on paper to show you. In particular, the section on TAXIR (in which some notions from classification take on new expression) has undergone considerable revision (not in principle, but in detail).

I have enclosed also Mark Halpern's paper on the XPOP system. The principal drawback of this paper is that the examples are all based on IBM 7049 assembly language, which will certainly cause some

difficulty for you if you don't speak the lingo. The paper describes only a few of the considerable battery of features XPOP possesses. Should take a serious interest in this processor, I will put you in touch with Halpern who can provide you with additional XPOP documents.

I am looking forward to our meeting. The best time for me will be August 30, 31. When my reservations are confirmed, I will let you know more precisely when you may expect me. If for any reason these dates give rise to a conflict for you, please let me know and I'll try to juggle my schedule.

Sincerely,

Robert C. Brill

RCB:gm

Taximetres Laboratory

Armory 101

10 August 1967

Mr. Alfred Jones
Agricultural Research Service
Georgia Coastal Plain Experiment Station
Tifton, Georgia 31794

Dear Al,

^{OKay}
~~How about~~ September 14 and 15?

Thank you for the invitation to put me up, but maybe
you'd better reserve me a motel room.

More details later when I have made up my itinerary.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

Taximetrics Laboratory

Armory 101

10 August 1967

Mr. Ljubo Lulich
National Agricultural Library
United States Department of Agriculture
Washington, D. C. 20250

Dear Mr. Lulich:

Enclosed is a copy of the scientific part of our grant proposal. This explains in some detail our operation. From this I hope you can get the direction we are taking. We would be pleased to know how we can work with you such that our own program would be improved.

If after you have read our description, you find anything of merit therein, perhaps you would be kind enough to indicate whether we could be useful collaborators with you. We are already collaborating with the systems people in the Smithsonian (Nick Suszynski is the leader). We (three of my colleagues and I) expect to be in Washington working with the staff from the Natural History Museum sometime between September 6 and 13. If convenient with you, we would like to review our project with you and discover any mutual ground. Let me know if this is convenient with you, and we will be glad to visit during this time.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

Taximetrics Laboratory

Ar@ory 101

10 August 1967

Dr. Louis C. Whiton
49 Partrick Road
Westport, Conn. 06882

Dear Dr. Whiton:

The poisonous substance of the bitter manééc is a cyanogenic glucoside; that is, a sugar with a cyanide radical attached. In the plant the cyanide is bound to the sugar, but apparently on severing the root from the plant, some enzyme system causes the cyanide radical to be broken away from the sugar molecule. Incidentally, the name of the substance is "linamarin". Clearly the substance is not a salt, and the cyanide is both soluble in water and volatile so that the combined grating and cooking removes all but a trace.

I call all cultivated species, bitter or sweet, no matter where found, Manihot esculenta.

I am sorry that I do not have at my finger tips the name of the alkaloid derivable from Lonchocarpus densiflorus. I am certain that the information is available in standard references.

Sincerely,

David J. Rogers
Professor of Biology

DJRYgm

TO: Mr. Willard Cook, University Services
FROM: David, J. Rogers, Biology Department
SUBJECT: Transportation via University car
DATE: 9 August 1967

Because of somewhat involved itinerary, it would be desirable to make the trip to the AIBS Meetings in College Station, Texas, by automobile. The trip would be from 26 August to 1 September (approximately), and will be charged against our research grant, account number 1708-48. We would like the use of University automobile for this trip.

Taximetrics Laboratory

Armory 101

9 August 1967

Dr. T. Wood
Department of Biochemistry
McIntyre Medical Sciences Centre
McGill University
Montreal, Quebec

Dear Dr. Wood:

I appreciate very much receiving your fine paper "The Isolation, Properties, and Enzymic Breakdown of Linamarin from Cassava," a separate of which you recently sent. May I please ask for the first of your papers in this series, published in the Journal of the Science of Food and Agriculture, Vol. 16, page 300, 1965.

I cannot help but comment however, on the conclusion that your paper states that "the combined function of linamarin and linamarase is that of protecting the plant from insects." I suspect that this cannot be defended in as much as I have seen any number of caterpillars chewing happily away on poisonous Manihot leaves, and have seen any number of hull wasps laying eggs in the leaves of these plants. A number of insects attack the growing points of these plants and apparently suffer no harm. I suggest therefore that the statement warrants modification.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

Taximetrics Laboratory

Armory 101

9 August 1967

Mr. P. H. Haynes
Department of Agricultural Crop Production
University of the West Indies
St. Augustine
Trinidad, W.I.

Dear Mr Haynes:

This is a long overdue letter to thank you for your kindness and activities during the Root Crop Symposium. The orchid you gave me is doing nicely and we are pleased with it.

I am sending along a set of my reprints on Manihot for inclusion in your collection. I hope we can soon settle on some procedure for the library and the center for root crops.

You may be interested to know that we are going ahead to establish a collaborative procedure for the classification of the sweet potato. Frank Martin and a chap by the name of Alfred Jones, a geneticist at the U.S.D.A. Experiment Station in Tifton, Georgia, and I will soon meet to plan our collaboration on this project. Perhaps Mr Williams would also be interested in this work.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

Taximetrics Labor tory
Armory 101

9 August 1967

Mr Emmanuel V. Doku
Faculty of Agriculture
University of Ghana
Legon, Ghana

Dear Mr. Do ku:

Thank you kindly for your reprint, "Breeding for yield in Cassava." Unfortunately the paper you send earlier has not arrived. You ask that I send "Origins and Development of M. esculenta and Allied Species" which appeared in the American Journal of Botany. I have no reprints of that paper, unfortunately, but it was only an abstract of a talk given, and most of the material is contained in the papers I am sending.

It was a pleasure to meet you at the International Root Crop Symposium.

Sincerely yours,

David J. Rogge
Professor of Biology

Terrestrial Laboratory
Ta
Armory 101

8 August 1967

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

Dear Grady,

I am sorry I've been jumping around so much but I hope I have landed for a while. I am glad to help your efforts on the euphorbia of Panama as best I can do for you now (the specimen still has not showed up). I will give a guess at what you are sending because I think I know what it will turn out to be, but if I am wrong I can correct it at a later date. You can stop heaping ashes on your head about the names of that genus. Up to now it looks as though people looked in the Kew Index, picked a name and hit the plant with it. They might as well have done that because Pax and Hoffman's monograph is a mess of confusion.

Now here is what I am willing to tell you. If we have evidence that the plant is not cultivated, I am going to call it M. guianensis Blake, the best name for the plants occurring along the west coast of Central America down into Panama. Your plant is not M. carthagenensis nor is it M. grahamii. The plant growing in the Climatron is most likely M. flabellifolia. This is a species which has been introduced from the estuarine areas of the La Plata River in Argentina into the coastal plains along the Gulf coast (Texas east to Florida), and grows quite nicely in green houses. M. grahamii is a synonym for M. Arg.'s species flabellifolia (as is M. tweediana). I hope this sufficiently confuses the issue.

Stop by and see us.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

Taximetrics Laboratory

Armory 101

7 August 1967

IBP Office
Division of Biology and Agriculture
National Academy of Sciences
National Research Council
2101 Constitution Avenue, N. W.
Washington, D.C. 20418

Gentlemen:

Your recent pamphlet offers information on United States participation in the International Biological Program. Would you please be so kind as to send the expanded descriptions of the programs to

Mr. George F. Estabrook
R.F.D. 156
Rindge, New Hampshire.

Yours very truly,

George F. Estabrook

GFE:gm

Also : Request for international program to

IBP Central Office
7 Marylebone Road
London NW 1
England

via Aerogramme

Taximetrics Laboratory

Armory 101

4 August 1967

AIBS Placement Service
3900 Wisconsin Avenue, N.W.
Washington, D. C. 20016

Gentlemen:

I would like to have the opportunity to interview potential candidates for a job as a "biological science information retrieval expert" at the meetings in Texas.

The job I have in mind would require that the candidate work with biologists, mathematicians and programmers in the construction of a computer-based retrieval system. Requirements are a new Ph.D. in the field of systematics (animal or plant) and some math background with an interest in the literature in systematic biology.

The job will be as a research assistant at the University of Colorado, Department of Biology, under the direction of Dr. David J. Rogers. The work is supported by an NSF grant to the undersigned. The position pays \$9000 per annum on a twelve month basis, with some fringe benefits.

Please let me know the necessary details such that I may review the books and interview candidates at the meeting.

Sincerely,

David J. Rogers
Professor of Biology

DJR:ga

Taximetrics Laboratory

Armory 101

2 August 1967

Mr. A. S. Adams, Systems Consultant
DCF Systems Limited
Suite 725, 74 Victoria Street
Toronto 1, Ontario

Dear Mr. Adams:

We would be pleased to comply with your request for information on TAXIR and BIRD. These two unfortunately exist only in our minds and sketchily in a proposal to the National Science Foundation. The description of XPOP is available and the references are:

1. Halpern, Mark I. 1964. XPOP: A Meta-Language without Meta-physics. Proceedings of the Fall Joint Computer Conference, 1964.
2. Halpern, Mark I. Evolution of the Programming System. Datamation, July 1964.
3. Halpern, Mark I. Machine Independence: Its Technology and Economics. Communications of the ACM, December 1965.

I expect that Mr. Halpern would be happy to correspond further with you on XPOP. His address is

IBM
1020 Kifer Road
Sunnyvale, California.

We would be pleased if the opportunity arose to explain in detail (verbally) what we intend to make of BIRD and TAXIR because we are eager to assist organizations such as the one for which you are a consultant. If the opportunity arises for either a visit to us by you, or vice versa, we would be glad to communicate our knowledge and developments to you.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

Taxometrics Laboratory

Armory 101

1 August 1967

Dr. Keith Justice
Department of Population and Environmental Biology
University of California
Irvine, California 92664

Dear Dr. Justice:

Dr. Peter Rauch was kind enough to indicate in a recent letter that you are interested in the development of models and computer programs for plant identification. We are much interested in this field and wonder if you have any papers describing your work. I am sending a set of reprints from our lab which will indicate the nature of our interests so far.

We look forward to corresponding with you. Incidentally we will be presenting a symposium at the AIBS describing some of our projects. It will be on Tuesday afternoon, 29 August, and is jointly sponsored by the Biometrics Society and the American Society of Plant Taxonomists.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

Taximetrics Laboratory

Armory 101

1 August 1967

Dr. Donald F. Squires
Deputy Director, Museum of Natural History
Smithsonian Institution
United States National Museum
Washington, D. C. 20560

Dear Don,

Glad to have your proposal. We took the liberty of Xeroxing it - that is why we are returning your copy so fast. It has lots of goodies in it, and we want longer to see it.

In case you did not get a copy of our proposal I am sending (with yours) a preliminary write-up which says things about the work but not about the time, the staff, or the money. We're out of the complete proposal.

More to you next month about our anticipated visit.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

Taximetrics Laboratory

Armory 101

1 August 1967

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

Dear Howard:

The Cassia article is getting a pretty good distribution.
Enclosed is the copy of our mailing.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

P.S. We signed and returned the loan slips for your specimens
recently.

29 September 1967

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

Dear Grady,

On your Manihot material from Mexico - we are working on it now and I'll give you a rundown on those names shortly.

As regards your request for help with respect to indexing the euphorbs, I may have a system you will want to use. The details of it are still in the computer stage but it should be coming out shortly. Yes, we do want to collaborate with you. We think we will have information for you within a month. What I will do is tell you how to set up your information so that recording of it can begin in a way that is amenable to our computer system.

Drop by to see me if you can, for this is the best way for me to get the ideas to you.

Regards,

David J. Rogers
Professor of Biology

DJR:gm

29 September 1967

Dr. Donald F. Squires
Museum of Natural History
Smithsonian Institution
Washington, D. C. 20560

Dear Don,

I'll buy three (3) only Margaritas in Mexico. The reason for the three - I don't think it is safe for more.

We are working toward a summary report for you. Again, the time spent with you and your colleagues was a real payoff and you'll be hearing about it soon.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

29 September 1967

Dr. Nick Suszynski
Smithsonian Institution
Washington, D. C. 20560

Dear Nick,

Thanks a heap for the copy of Ahumada's retrieval system.
Thanks once more for the time you and your crowd took up
with us.

I think that we carried back some very good ideas and th
though it is a bit early I think we'll have a paper off
even sooner than expected. I look forward to seeing you in
Mexico City.

Best regards,

David J. Rogers
Professor of Biology

DJR:gm

29 September 1967

Dr. Dr. H. A. Rodenhiser
The Rockefeller Foundation
Apartado Aereo 58-13
Bogota, Colombia

Dear Rody,

I had just posted my letter of acceptance of the task to prepare a report along the lines you suggested on Manihot when your kind letter arrived. Not having your Colombia address I sent it to New York, but a carbon of the letter is enclosed for your reference.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

27 September 1967

Mr. Richard See
Acting Program Director, Special Projects
Office of Science Information Service
National Science Foundation
Washington, D. C. 20550

Dear Mr. See;

Sorry to bother you about this, but we don't have a directory handy which lists any specific name and address for Ed Parker at Stanford. Would you be so kind to send the complete information.

Thank you.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

27 September 1967

Dr. Arthur S. Boughey, Chairman
Dept. of Population and Environmental Biology
University of California
Irvine, California 92664

Dear Dr. Boughey:

Thanks for your letter of the 13th. I am pleased to hear of your activities at Irvine. I congratulate you that you now have Dvald Goodall working with you. I met him first in Texas. Our group consists of Henry Fleming (ent.-taxonomy), two mathematicians, Estabrook and Christensen, and two programmers, Grill and Handley. Our major effort at the moment is work on a computerized biological information retrieval system funded by NSF. We are just into this work. Our efforts are to reflect various parts of the systematic whole, and in our shop we have attacked the kind of problems we have (as you can see described in the reprints that I am sending separately). We have done a job in clustering and in character analysis, both of these have programs that may interest you. The clustering program has been flow charted and documented, and now resides in the SHARE Library as program #3501. We are in the process of flow charting and documenting the character analysis program.

Have you heard of the informal get-together in Kansas in November for numerical taxonomists? If not, you might write to Bob Sokal for information.

Sincerely,

David J. Rogers
Professor of Biology

P.S. We have completely exhausted our reprints of the first actual taxonomic job ever done with the computer, namely: "Monographic Studies in Cassia (Leguminosae-Caesalpinioideae). II-A Taximetric Study of Section Apoucoulta, by Irwin and Rogers. Perhaps you can get a reprint from Howard Irwin, at the New York Botanical Garden.

27 September 1967

Dr. Paul W. Barkley
Department of Agricultural Economics
Washington State University
Pullman, Washington 99163

Dear Paul,

Gad! you've really pulled the wool over that outfit. Anybody that will actually pay your full salary must have rocks in their head. I guess economists, however, can fool most of the people most of the time.

Yes, I think we can take your salary dough and spend it on travels, but,, Paul, please be sure not to travel to Acapulco.

I will be glad to see that little paper come mid-October.

Regards to you, et al.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

P.S. Would you be kind enough to suggest references for the following problem? I have to prepare an analysis of the world situation with regard to *Manihot esculenta* (tapioca, manioc, cassava, etc.). Where will I find the most up to date production figures for this crop? both with respect to the export-import dollar value and also the consumption by other than the more sophisticated regions of the world? How much acreage is used up, what is the cost per acre for the crop in terms of labor and product? I will appreciate any suggestions for where to begin the search for this information.

27 September 1967

Dr. H. A. Rodenhiser
The Rockefeller Foundation
111 West 50th Street
New York, New York 10020
Dear Rody,

My delay in answering your kind invitation to prepare a survey of needs for Manihot esculenta has been dictated by my desire to consider the problem rather fully before jumping in. The time element is my major concern, but I think, now that classes have started and other research projects are in full swing, that I can produce a satisfactory and useful report.

I am pleased, therefore, to do the job. Since the outline you gave me is rather comprehensive, and leaves much room for individuals to "move about in," I will welcome any further directives you care to give concerning any and all aspects of the report development.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

Reader's File

UNIVERSITY OF COLORADO

BOULDER, COLORADO 80302

TAXIMETRICS LABORATORY
DEPARTMENT OF BIOLOGY
ARMORY 101

PHONE: 303-443-2211
Ext. 6712

27 September 1967

Dr. Donald Hillman
Center for Information Science
Lehigh University
Bethlehem, Penna. 18015

Dear Dr. Hillman:

Following our pleasant conversation on the phone this afternoon the following information is supplied concerning our position. The title "Biological Information Expert" ^{Desired}
Qualifications: an advanced degree (M.A. or Ph.D.) in a framework of modern library and information retrieval ^{to curriculum}
Salary: \$9,000 per annum. Source: Federal grant to the principal investigator for two years with the prospect of renewal.

The applicant would be a member of a team consisting of two biologists, two mathematicians and two programmers. The applicant's activities with the group would be to aid in the devising of a ~~computerized~~ information retrieval system within the framework of a new computer ~~program~~ system. ^{compiler}

Applicants should notify the principal investigator of their interest, and supply the usual curriculum vitae and references.

Thank you for your kindness, ^{and assistance} Dr. Hillman. I am enclosing herewith a preliminary proposal which describes our work.

Sincerely yours,

David J. Rogers
Professor of Biology

DJR;gm

P.I.

26 September 1967

Mr. A. Severo
Systems Research and Development Division
Center for Computer Sciences and Technology
National Bureau of Standards
Washington, D. C. 20234

Dear Mr. Severo:

In response to your announcement of a software survey we are sending a description of our project on information retrieval. Answers to questions or further information may be obtained from this office.

Sincerely yours,

David J. Rogers
Professor of Biology

DJR:gm

25 September 1967

Dr. Howard S. Irwin
Acting Head Curator
The New York Botanical Garden
Bronx Park
Bronx, New York 10558

Dear Howard,

I have separated 11039 as you suggested into separate numbers. If you care to send me blank labels (I will need twelve) I will supply the pertinent data and number (11039 and 11039a).

Since the flowering data applies apparently to only one of the two, I shall make a note to the effect in both collections. If you don't mind I will hang on to the whole collection of these two numbers until they are identified.

We have had feedback on the symposium from many different places. The only people who really complained were statisticians like David Goodall, an ecological statistician, who has moved to the University of California at Irvine. He made the objection that we were too "informal" about the mathematical model and seemed too ready to pitch out the mathematics in favor of the biology. This to a statistician is anathema, but you heard him say these words and his were not so vehement as others might have been who did not open their lips.

We spent a profitable week at the Smithsonian gaining insight into the information retrieval problem. It seems now that we may have some practical solutions generating for harried curators and taxonomists who want to do monographs. Any developments that occur will be forwarded to you. You might be interested from the standpoint of information retrieval of literature to take a look at the project that Jimmy Atz is doing at the American Museum. It might be relevant at NYBG.

Best regards,

David J. Rogers
Professor of Biology

DRJ:gm

22 September 1967

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

Dear Grady:

The plant sent me from the MGB, collected by Edwin
I. Tyson, labelled by you as M. grahamii is M. gualanensis
Blake.

Do I recall that this specimen is for me to keep (the
herbarium specimen has "ex Herb. MGB")?

Are there other specimens of this number in the MGB?
If so, do you want annotation labels for them?

Regards,

David J. Rogers
Professor of Biology

DJR:gm

22 September 1967

Local Board #16
46 Webster Avenue
Town Hall
Goshen, New York 10924

Gentlemen:

This letter supports Mr. George F. Estabrook's appeal for reclassification to 2A (occupational). Mr. Estabrook continues as he has in the past three years to work as a research mathematician on a project sponsored by the Federal government (under the auspices of the National Science Foundation, Grant No. 656). His work consists of developing necessary, fundamental and basic mathematical models for areas of vitally important biological activities. Precisely, Mr. Estabrook's contribution plays a role in the contribution to our knowledge of how computers may best be used to aid man in his study of plants and animals most closely related to man's need for food and shelter. This area of study is presently contributing to the solution of problems related to the feeding of the world's exploding populations. It is an area of vital concern to us all, and it is an area which requires the best thinking possible by today's scientists.

He also contributes by teaching part time in a course which brings students knowledge about procedures important to modern biologists. It is almost impossible to duplicate the kind of work Mr. Estabrook is doing anywhere in the world. His work is significant and a fundamental contribution to our society.

If I may give further information about Mr. Estabrook, or answer questions concerning his activities, I will be glad to comply.

Sincerely yours,

David J. Rogers
Professor of Biology

DJR:gm

To: Dr. Askeff Löve
From: Dr. David J. Rogers
Subject: Telephone Requirements
Date: 22 September 1967

Telephone requirements for the Taxometrics Lab are as follows:

Two separate lines (on two numbers) - phones to be placed in the secretary's office, Room 118; and in offices, Rooms 101A, 103, and 104, as well as Room 2 in the basement.

This is to be a pushbutton system with intercoms between the secretary and all other offices.

20 September 1967

Dr. and Mrs. F. G. Meyer
7417 Buffalo Avenue
Takoma Park, Maryland 20912

Dear Jean and Fred,

I much appreciated your kind hospitality on Saturday, the ninth. As usual we were fed better than we had been in a very long time. Our activities in Washington the following week were extremely successful and we learned a number of things useful to the development of an IR system.

Fred, I strongly recommend that you get in touch with Mason Hale who is just beginning to develop a system of record keeping using various types of machines. I am sure he would welcome any inquiries from you.

I do hope that you will have the opportunity in the near future to come visit us here in Boulder. We would love to have you come.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

P.S. Two people that I ran into after leaving Washington seemed to be pleased to hear that you would accept documenting herbarium specimens of cultivated material of interest to them. These men are Dr. Frank Martin, Federal Experiment Station, USDA, ARS, CRD, P.O.Box 70, Mayaguez, Puerto Rico, and Dr. Alfred Jones, USDA, ARS, CRD, VEG. AND ORN. R.B., Georgia Coastal Plain Experiment Station, Tifton, Ga. 31794. These two men and I are collaborating on a study of the classification of the section Batatas of Ipomoea. Jones has already a collection of species going, has made a number of chromosome counts and wants to make documenting vouchers of them. You might do well to write them and encourage them in this preparation of specimens.

20 September 1967

Dr. Donald F. Squires
Deputy Director, Museum of Natural History
Smithsonian Institution
United States National Museum
Washington, D. C. 20560

Dear Don,

This is just a note of thanks for your extremely fine cooperation. Details of our interviews will be collated and we will later give you a summary of our visit. It was a very valuable contribution to our developing I.R. system.

I just remembered that I used your or your secretary's private phone number for our telegram. If you could tell me how much we spent I will belatedly pay off for it.

Please accept our thanks ~~in toto~~ for your and your wife's hospitality and we look forward to seeing you in Mexico in December.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

19 September 1967

Mr. E. Pronko, Program Director
Foreign Science Information Program
Office of Science Information Service
National Science Foundation
Washington, D. C. 20550

Dear Mr. Pronko:

As you requested I am sending you the address of
Taxometrics and the editor

L. R. Hill, M.Sc.
National Collection of Type Cultures
Central Public Health Laboratory
Colindale Avenue
London, N.W.9., U.K.

I am also enclosing a copy of our reprint on "A Graph
Theory Model..."

It was a pleasure to meet you; perhaps we can get
together again.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

18 September 1967

Dr. S. H. Sonar
Department of Botany
University of Tennessee
Knoxville, Tenn.

Dear Sy,

There was an indexing of your article "Possible Evolutionary Development of Manihot esculenta" in the ASB Bulletin in BioResearch Index. Why didn't you send me a copy without my asking?

Are you still betraying Manihot for Juncus?

Please note my new address. We moved down here in July.

Sincerely,

David J. Roberts
Professor of Biology

DJR:gm

19 September 1967

Mr. Richard See, Program Director
Office of Science Information Service
National Science Foundation
Washington, D. C. 20550

Dear Mr. See:

It was a pleasure to have made your acquaintance last week. I still have your problem of the most efficient connection between NSF and biologists (whether through societies or universities), but have no really powerful suggestions to offer yet. What usually happens is that I put such problems to my colleagues and try to develop a consensus. If I have any luck with this procedure here I will let you know.

I am enclosing a supplementary application to our Grant No. GN 656, entitled the Development of a Prototype System for the Storage and Retrieval of Biological Data. This request is in keeping with your recommendations.

Again let me express my appreciation to you and the others there for your efforts on my behalf.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

SUPPLEMENT TO PROPOSAL # GN 656

Request for travel funds ^{to Mexico.}

X Reasons for request: ~~for travel funds~~ (1) Since the submission of our grant proposal we have discovered a viable and active group of biological information retrieval workers at the Universidad Nacional Autonoma de Mexico. This group under the direction of Dr. ^{add first name} Gomez Pompa has recently requested us to collaborate with them in the development of a computerized information retrieval system. I have provisionally accepted the invitation depending on the approval from NSF for this addition to our anticipated collaborative efforts. This collaboration will be as follows:

A. The Universidad Nacional will develop a series of data banks based upon the large collections of the Museo Nacional de Biología. The data banks will be structured according to the requirements of the institution depending largely on the nature of the queries expected of the system.

B. We will ~~in this laboratory~~ provide the necessary computer software and procedures for the information system. To establish the necessary connection between this laboratory and this important set of data banks we will travel to Mexico City to instruct the curators of the museum in the proper procedures.

Insert (U) (2) We expect that we will be able to participate in a symposium for information retrieval in Biology ^{sponsored jointly by ---, and ---} in connection with this working visit. Funds are requested for myself and Mr. Robert Brill (both proficient in Spanish).

Budget request

Air transportation - Denver to Mexico and return	\$408
Ground transportation - Boulder-Denver	24
" " Mexico City (for 2)	150
Per diem - 10 days at \$17 each	340
Telephone calls	\$15
Materials for collaboration	
1. Pan cards (preparation)	
2. Paper	
2. Slides (and preparation)	130

8967

Insert (U) Mr. Robert Brill, systems analyst in this group, and I have been invited to present papers on the ^{software} computer and biological aspects of I.R.

Taximetrics Laboratory
Department of Biology
Armory 101
University of Colorado
Boulder, Colorado 80302
7 September 1967

Sr. Alvaro Montaldo
Head, Institute Agronomy
Central University of Venezuela
Maracay, Venezuela

Dear Sr. Montaldo:

Your letter of 29 August arrived while Dr. Rogers was away. He will answer your question about a cross reference for the Bibliography when he returns about 16 September.

Sincerely yours,

(Mrs.) Geneva Metcalf
Secretary

7 September 1967

Dr. W. O. Jones
Food Research Institute
Stanford University
Stanford, California 94395

Dear Bill,

The Rockefeller Foundation has recently asked me to put together a report on the importance of and need for research on manioc. The purpose in asking this is to decide whether they should make such research studies one of their primary objectives for a new tropical lowland agricultural experiment station which they hope to put up in the Cauca Valley of Colombia. A rough outline of what they are asking about follows:

1. Economic importance
 - Nutritional value
 - Geographical distribution
 - Importance for both human and animal consumption
 - Production status (representative yields in different parts of the world)
 - Production hazards (diseases, insects, critical agronomic requirements)
2. Research
 - What is being done, by whom, and what needs to be done to improve these crops?
 - Where are the centers of excellence?
3. What are the prospects for world benefit?
4. What is available in world germ plasm banks and where are they located?

This is a whale of a job. I would certainly like to talk to you about it before going on and doing this piece of work. As you know I am a very optimistic-type botanist and feel I should be pulled back a bit by the ugly facts of life concerning these plants. Would you be willing to spend some day talking with me about the subjects above I listed? If so, I believe we can arrange for the Rockefeller people to pick up the tab for you to come here or me to go there, whichever is most convenient.

Sincerely,

David J. Rogers
Professor of Biology

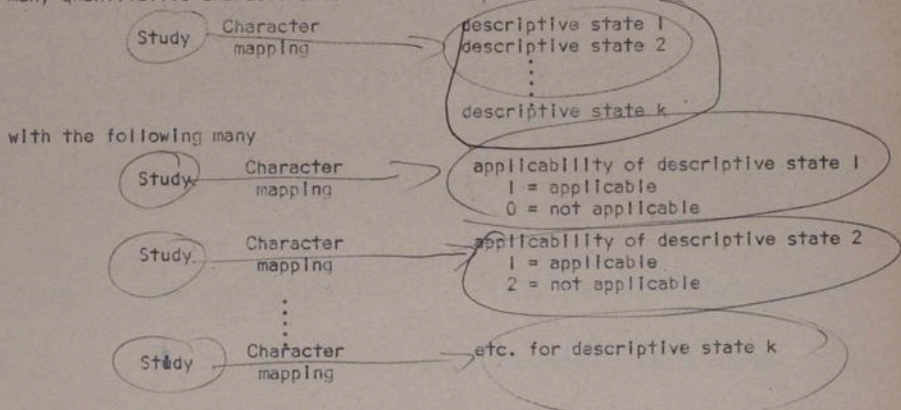
DJR:gm
Signed in his absence

6 September 1967

Dr. Lester Talkington
Department of Zoology
University of Wisconsin
Madison, Wisconsin 53706

Dear Lester,

I have just read with interest your recent paper "A method of scaling for a mixed set of discrete and continuous variables" which we discussed briefly at the recent AIBS meetings. I agree that your choice of Euclidean distance for illustrating your discussion is a good one as it is perhaps the most universally understood of the techniques extant. In its purest form, Euclidean distance can only be computed within a Euclidean space, i.e. an orthogonal coples of the real line. This required that you generalized the notion of Euclidean distance somewhat at the very onset of your discussion (p. 149 bottom of right column) to include a meaningful treatment of qualitative characters of more than two states which do not admit a natural ordering. Given that Euclidean distance be generalized as you have done, your following discussions are interesting and do indeed strike an appropriate balance between mathematical rigor and biological applicability. But let me discuss, for interest's sake, other possible generalizations of Euclidean distance, sensu strictu, to include qualitative characters. As I understand it, your approach is to "replace" a qualitative character with many quantitative characters as follows: Replace



In this way the actual computation of the Euclidean distance may proceed in the traditional arithmetic manner.

Then you continue by arguing that d^2 is made up as a sum of "contributions" as follows:

$$d_{ij}^2 = \sum_{p=1}^n \frac{1}{p} \quad (\text{contribution of character } p \text{ for object pair } i, j)$$

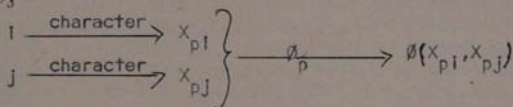
where the contribution for character p , when p is qualitative, takes the form of a sum within the above sum as shown

$$d_{ijp}^2 = \sum_{s=1}^k (x_{ip_s} - x_{jp_s})^2$$

where I have taken the liberty of subscripting p for the sake of my proposed generalization. I agree that conceiving of d^2 as being made up by a sum of contributions is a useful and productive way to think. I would like to suggest that this point of view be generalized as follows:

$$d_{ij}^2 = \sum_{p=1}^n \phi_p(x_{pi}, x_{pj}) \quad \text{where}$$

$\phi(x_{pi}, x_{pj})$ is some function associated with character p , this function assigns to the object pair (i, j) a contribution to the "distance" based on the observed states of character p for object i (x_{pi}) and object j (x_{pj}). This functional composition is illustrated below.



With the data manipulating features of today's computing machines there is very little to be gained in restricting ϕ to the class of function whose values can be arithmetically computed. To turn again to the method of your published discussion, observe that ϕ_p would take the form

$$\phi_p(x_{pi}, x_{pj}) = (x_{pi} - x_{pj})^2$$

and in the case of qualitative characters

$$\begin{aligned} \phi_p(x_{pi}, x_{pj}) &= \sum_{s=1}^k (x_{ip_s} - x_{jp_s})^2 \\ &= 2 \text{ if } x_{pi} \neq x_{pj} \\ &= 0 \text{ if } x_{pi} = x_{pj}. \end{aligned}$$

Clearly if we have the definition of ϕ_p open, in the sense that it would depend on biological considerations private to character p , we can choose

to define it as you have, or we can define it in any other way deemed appropriate. In this way qualitative contributions need not range from 0 to 2, but can be made to behave as we wish. Of course, the question of how they ought to behave has been left entirely open at this point. ~~to have~~

I have included a peprint of our BioScience article which addresses itself to this question somewhat. I'm sure that you will agree that under some of these other generalizing schemes for qualitative characters the relevance of your later discussions will be influenced somewhat.

Please be encouraged to reply to my comments if you feel that they are interesting to you.

Very truly yours,

George F. Estabrook

GFE:gm
Signed in his absence

6 September 1967

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

Dear Dr. Irwin:

Dr. Rogers met an English botanist at the AIBS meeting who would like to have a copy of the Cassia paper. Unfortunately our supply has run out. Would you be able to send a reprint to:

Dr. Barbara Pickersgill
Department of Agricultural Botany
The University
Reading, England.

Thank you very much.

Sincerely yours,

(Mrs.) Genevra Metcalf
Secretary

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

6 Sept 1967

Dr. Alvaro Montaldo
Head of Institute of Agronomy
University Central of Venezuela
Maracay, Venezuela

Dear Dr. Montaldo:

I am interested in having Ingeniero Agronomo Jose Luis Sanchez take some training with me. I would be interested to know whether Sr. Sanchez is interested in some formal university credit for his work, or rather if he desires only an informal instruction in our methods. Either way is agreeable to me. However if he desires formal university recognition we will have much paper work, as you are aware.

If he comes informally I will include him in our research program so that he can get full benefit of our methods. Please let me know as soon as possible the desires both you and he have for this study.

I am very desirous to collaborate with you and him in this work and if satisfactory arrangements can be made I would like to ask that he prepare some specimens of your Venezuelan collection to bring with him. I will provide full instructions on the method of specimen preparation in the event that he desires to work with us.

Sincerely yours,

David J. Rogers
Professor of Biology

DJR:gm

5 September 1967

Dr. Pierre Dansereau
New York Botanical Garden
Bronx Park
Bronx, New York 10458

Dear Pierre,

I would definitely be interested to have as a student F. Gonzalez Bernaldez. If you ask him to apply I will see that all the essential paper work is taken care of. If you wish I can have forwarded to him a set of graduate application forms.

I am looking forward to a report on the work on Viola but donnot think I will have a chance to see you at Christmas. Connie and I are planning to go to a meeting in Mexico City on Biological Information Retrieval during the Christmas time.

Best regards,

David J. Rogers
Professor of Biology

DJR:gm

5 September 1967

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

Dear Billie,

Just a note to thank you for your hospitality in Austin as we passed through. Tell Dr. Marshall for me that I shall now be able to give him a much better description of the Texas Manihot.

I would like to know about that Manihot plant whether it dies back to ground level in winter, or whether it hangs on to its stem during the full year. I suspect from the look of it that the stems die back, but would like to have your knowledge of it.

David J. Rogers
Professor of Botany
Sincerely,

DJR:gm

David J. Rogers

DJR:gm

Taximetrics Laboratory
Department of Biology
Armory 101
University of Colorado
Boulder, Colo. 80302

Mr. S. G. Appan
Radhanivas
Kumarapuram
Near Medical College
Trivandrum, India

Dear Mr. Appan:

We have received information regarding the importation of Manihot cuttings. The Import Permit Number is 37-31665.

When you offer the Manihot cuttings for entry at the port of entry in the United States, please be sure to get in touch with the plant quarantine inspector on duty to arrange for the movement of the cuttings to an inspection station (New York International Airport or Hoboken, New Jersey). You should mention that the cuttings are being imported under the University of Colorado's permit. If there will be a long delay due to the inspection, the cuttings should be forwarded later with shipping charges collect to the Department of Biology, University of Colorado.

We hope that your way has been cleared for your trip to Colorado and that we may expect you soon. Mr. Brij. M. Kapoor of the Biology Department has offered to meet you at the Denver Airport on your arrival, so please let us know when to expect you. (Mr. Kapoor's home telephone number is 444-3970; his office phone is 443-2211, Extension 7921.)

Sincerely yours,

David J. Rogers
Professor of Biology

DJR:gm

5 September 1967

Dr. Frank Gould
Texas A & M University
Department of Botany
College Station, Texas 77843

Dear Frank,

Your meeting arrangements were an outstanding success. Thank you kindly for your efforts on behalf of all of us. Inadvertently I left my program in the back seat of your car Wednesday night. Since I made one or two notes of importance in it I would like to have it back. I'm sorry to trouble you with this small matter.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm

5 September 1967

Dr. Alfred Jones
Agricultural Research Service
Georgia Coastal Plain Experiment Station
Tifton, Georgia 31794

Dear Al,

My schedule is now firmed up and here are my times of arrival and departure. I will arrive in Albany via Southern #290 at 9:07 P.M. on the 13th September. My scheduled departure date is 15th September via Southern #296 at 4:17 P.M. I trust that you can have someone meet me at the Airport.

Looking forward to seeing you.

Sincerely,

David J. Rogers
Professor of Biology

DJR:gm