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Carnegie Mellon University
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Pittsburgh, PA 15213-3890
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Web site: www.huntbotanical.org

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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.

Received: from violet.berkeley.edu (violet.Berkeley.EDU [128.32.155.22]) by pang
Received: from [128.32.108.42] by violet.berkeley.edu (8.7.1/1.33r)
        id RAA00738; Fri, 17 Nov 1995 17:01:36 -0800
Message-Id: <v02110176acd2d1274e7f@[128.32.108.42]>
Mime-Version: 1.0
Date: Fri, 17 Nov 1995 17:01:49 -0700
To: traverse@ems.psu.edu
From: nanarens@violet.berkeley.edu (Nan Crystal Arens)
Subject: Re: SJF etc.
Content-Type: text/plain; charset="us-ascii"

Dear Alfred:

Thanks for the message. Sarah and I have a lunch date after my classes end. I asked her to think about possible collaborative possibilities with me or perhaps Kevin Padian, who has interests in the Triassic. What I'm not going to be able to do is just grant her access to the facility 'cause she's going to be in town. One has to apply to the Director and Dean for the appointment that she wants and a case for significant collaboration has to be made. We'll see. I hope you are right about best feet.

The plan sounds fine and the $1,000 should get you a significant amount of fuel. I am grateful for anything that you are willing to donate and I'm unlikely to "circular file" any of it. You just never know when you might need..... I'm becoming quite the pack rat in my old age. I guess that's a better attitude than the converse for a museum curator!

I will indeed enjoy the desert. I FEEL like John the Baptist. I really just need to get away from the city and from campus for a while. The course has gone well, I think, but it has been a lot of work and I will have earned a few long walks in the silence of the desert and a sleep or two under the stars!

Have a great trip and I'll look forward to a message from Bruce in early January!

All the best --Nan

Date: Fri, 17 Nov 1995 13:08:53 -0500 (EST)
From: "Alfred Traverse" <traverse@ems.psu.edu>
To: nanarens@violet.berkeley.edu
Cc:
BCc:
Subject: SJF etc.
X-NUPop-Charset: IBM 8-Bit

Dear Nan:

Thanks for your two interesting messages.

I feel pretty sure that Sarah just didn't put her best foot forward, as she told me that she wanted to work on some sort of project (no idea what) with you.

Some $ to cover diesel fuel will be nice, but I won't complain about the exact amount. I believe I'll bring you a further increment of coal balls, as I don't think the notion of using them for a possible fossil plant demo--say in a grandchild's school--is likely to come to anything. There is also going to be a lot of paper stuff--e. g., all of my paleobotanical overhead transparencies. It won't take you long to fire them into the trash if they aren't wanted. Same goes for assorted publications, etc.

We'll be in touch from somewhere along the line, but barring unforeseen events we'll stick to leaving here on 26 Dec. and arrival in Berkeley on about 12 Jan, 1996. Our last stop before you is Santa Barbara for a couple of days. So, I'll probably impose on BT to e-mail you from his office.

Have fun in the desert. Sounds like John the Baptist. Best. Alfred.

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Received: from [128.32.108.42] by violet.berkeley.edu (8.7.1/1.33r)
        id RAA28200; Thu, 16 Nov 1995 17:13:47 -0800
Message-Id: <v0211015facd183dd0070@[128.32.108.42]>
Mime-Version: 1.0
Date: Thu, 16 Nov 1995 17:13:59 -0700
To: traverse@ems.psu.edu
From: nanarens@violet.berkeley.edu (Nan Crystal Arens)
Subject: Re: Sarah
Content-Type: text/plain; charset="us-ascii"

Dear Alfred:

I've been in contact with Sarah Fowell several times today via e-mail and we are going to get together on 18 Decmeber for lunch. Regretably, I think she just wants lab space and not collaboration, which will be problematic. We shall see.

Take care --Nan

****
NAN CRYSTAL ARENS
Department of Integrative Biology
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3060 Valley Life Sciences Building
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Tel. 510-643-0879
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Received: from violet.berkeley.edu (violet.Berkeley.EDU [128.32.155.22]) by pang
Received: from [128.32.108.42] by violet.berkeley.edu (8.7.1/1.33r)
        id SAA26312; Wed, 15 Nov 1995 18:13:51 -0800
Message-Id: <v0211014dacd03c570d66@[128.32.108.42]>
Mime-Version: 1.0
Date: Wed, 15 Nov 1995 18:13:59 -0700
To: traverse@ems.psu.edu
From: nanarens@violet.berkeley.edu (Nan Crystal Arens)
Subject: Re: Sarah
Content-Type: text/plain; charset="us-ascii"

Dear Alfred:

Thank you so much for your message. I owe you a "snail mail" letter from some time ago, but it has fallen below another pile of emergencies. This has been a very hectic semester for me with launching the paleobotany course and all right on top of the collections move in August. Being a professor is deceptively hard work! My lab is also in disarray as I'm unpacking and curating my material (750 lbs.!) from Colombia. Good heavens!

However, I'm definitely looking forward to seeing you in January and the fossils are being awaited with anticipation. I'm tracking $$$ right now to hire a GSR (= RA) for the summer to help with the curation and revision of appropriate teaching materials. This will be a HUGE help. I still have about $1,000 which I have budgeted to contribute to you for bringing the material. I think this will be about right. I will have to contact our budget administrator to see exactly how much is left and if we have some overflow, I might be able to offer a little more. No promises until I check. The $1,000 is a gaurantee, however.

With regards to Sarah Fowell, I have heard positive things of her from several sources and did see your RPP paper recently. I would be delighted to talk with her about future collaborations or maybe a post-doc when she's in the Bay Area. I will contact her immediately to see what we can arrange. New and highly-recommended colleagues are always good things!

I hope you are all well. Take care and please be in touch again before you set off! As it turns out, I won't be going too far afield this winter. However, I am planning a trip to LA just after Christmas to visit one of my Harvard office-mates and his family, and then heading to the Arizona desert for a short (but much-needed) break. Take care!

Best wishes --Nan

****
NAN CRYSTAL ARENS
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Tel. 510-643-0879
FAX. 510-643-6264
e-mail. nanarens@violet.berkeley.edu

Date: Wed, 15 Nov 1995 14:59:25 -0500 (EST)
From: "Alfred Traverse" <traverse@ems.psu.edu>
To: nanarens@violet.berkeley.edu
Cc:
BCc:
Subject: Sarah
X-NUPop-Charset: IBM 8-Bit

Dear Nan:

Ye Gods! It's now only a bit more than a month before we load up the "Penn State Special" with fossil plants, paleobotanical literature, and whatnot and set out for CA. Haven't heard lately, but I assume you're expecting us in about the middle of January. Don't forget to do the final checking on whether some small assistance--say an amount equivalent to freight shipping--to us for diesel fuel--is possible.

However, as you see from the subject line, that is not the purpose of this missive. Another of my "protegees" is Sarah Fowell ("I'm not a bird, I'm a young horse," she explains pronunciation.) She got her Ph. D. at Columbia with Paul Olsen, but as the topic was palynology (of Fundy Basin) she spent two semesters here, and I was the de facto advisor. Perhaps you saw our recent joint paper in RPP. I have a very high opinion of Sarah and have been trying hard to land her an academic post, so far without success. She is on her third post-doc, this one back at Lamont-Doherty with Paul O. She has done some marvellous work lately in Lake Baikal and has had all sorts of fascinating field experience--including a stint in Antarctica. I am just back from L-D, where I conferred with Sarah and Paul about their recent field work in Nova Scotia. Sarah is now very interested in a man who works in the Bay area, and she flits out there for a couple of weeks every third month. She has heard me talk of you, and she now raises the question of whether you'd be willing to meet her, and to discuss the possibility of her doing some sort of project with her. She contemplates, apparently, spending about a quarter of her time out there, and this dynamo of young woman is eager to do something worthwhile with her time. She is especially expert in palynology of nonmarine Triassic-Jurassic and Cenozoic rocks. Her background is mostly geologic, but she has taught herself a lot of botany. I recommend her to you heartily. The two of you have so much energy that you might ignite on contact. She will be in Bay Area the whole month of December. She's a flaming redhead, is deeply into cats (ugh) and weighs about 90 lbs. soaking wet.

Maybe you'd be willing to contact her directly: sjf@ldgo.columbia.edu.

All the best. Alfred.

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DEPARTMENT OF INTEGRATIVE BIOLOGY

BERKELEY, CALIFORNIA 94720-3140
FAX and Voice. 510-643-0879
e-mail. nanarens@violet.berkeley.edu

13 September 1995

Dr. Alfred Traverse
Palynological Laboratories
Department of Geosciences
Penn State University

Dear Alfred:

Thanks for your letter of 6 September and for the itinerary. The dates look fine, and I look forward to seeing you. I have learned recently that I will not be going to Africa this December/January, so I become very flexible relative to timing. It seems that for logistic reasons, the field work planned had to be pushed back to October and November, when I am not at liberty to leave the University. Next time.

All is well here. The collections move is complete save for the types vault. We are still awaiting some retrofit on that room and the installation of custom cases. Now the Museum is all aflutter with the inauguration of the *T. rex* exhibit. The opening is this weekend and includes substantial chaos. We have sold approximately 500 tickets for the "gala" on Sunday.

Paleobotany is going well so far. I have 32 registered and about 10 more who are "sitting in". Labs (two under our belt as of this afternoon) are going well although my teaching assistant does not have a paleobotany background,so I must be there for each laboratory section to help answer questions. This is time-consuming, but enjoyable in that I'm getting to know the students better.

I hope all is well with you both. Take care and please keep in touch.

With Best Wishes,

Nan Crystal Arens

THE PENNSYLVANIA STATE UNIVERSITY
DEPARTMENT OF GEOSCIENCES
PALYNOLOGICAL LABORATORIES
435 DEIKE BUILDING
UNIVERSITY PARK, PA 16802, USA
Phone: (814)863-3419; Fax: 814-863-7823
E-Mail: traverse@ems.psu.edu

11 September, 1995

Dr. Nan C. Arens
Department of Integrative Biology
3060 Valley Life Sci. Bldg.
University of California
Berkeley, CA 94720

Dear Nan:

Well, what do you know, I have a few minutes of comparative quiet to give some thought to the Miller Professorship question.

It would be fun, of course, to have an opportunity to spend some weeks or a couple of months working in your lab on some mutually interesting paleobotanical/paleopalynological problem. The fact that it would take place in such a stimulating environment as Berkeley is an added plus, of course.

We are talking about some period of time between 1 Jan. and 1 June, 1997. The statement says that a semester is the absolute upper limit, and the clear implication is that most visits are expected to be shorter.

I would love it if something came out of it that would again bear both of our names. By the way, I no longer can say that I'm in the literature of microwaving but have no other connection with the phenomenon--I'm a complete convert. Celia gave me a tiny one as a birthday present for the office a while back. For making tea it's superb. About two weeks after discovering THAT I called in a contractor and had our kitchen redone to include a built-in microwave over the stove--has a great evacuating fan too. Looks as if it were always there. Grandson Jason and I soon discovered that the machine is great for drying stamps just soaked off envelopes.

As to subject, I can think of several that interest me and that are the sort of thing that this sort of opportunity is good for--requiring good library and computer facilities and not much more--a lab work problem within such a time frame is not really practical unless it is very tiny, and that is clearly not what UC has in mind for a Miller grant.

For example, I have long been interested in the phytic era business introduced by Gothan and Henri Potonié long ago, and treated by me in Paleopalynology. (Jane Gray had a go at it too

fairly recently and strangely didn't even mention my synthesis. Well, not so strangely--it's typical.) I think some really deep consideration of the whole business is worth doing and could even produce a short book by us. Why aren't plant and animal evolution directly in step? Are they driven by a different set of factors. Do changes in vegetation drive most animal evolution? Etc. Etc.

Another broad problem in which I am interested is whether pollen and spore morphology couldn't be used as a direct measure of environmental conditions, including climate. Along the lines of Wolfe's (Well, it really was introduced by Sinnott and Bailey long ago!) use of leaf morphology. Van der Eem showed that this works in the Triassic. Why not in the Neogene? The literature is full of pollen rain data that could be plugged in.

I enclose my latest biblio./biogr. in case that could be of interest in this connection. Hope it flies.

Yours very truly,

Alfred Traverse

encl: vita stuff

THE PENNSYLVANIA STATE UNIVERSITY
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E-Mail: traverse@ems.psu.edu

6 Sept., 1995

Dr. Nan Crystal Arens
Department of Integrative Biology
3060 Valley Life Sci. Bldg.
University of California
Berkeley, CA 94720

Dear Nan:

There's no substitute for snail mail when you want to send an enclosure: so here's the current version of the AT/EIT Dec.-Feb. itinerary. I suspect that weather conditions and/or other matters will cause deviations, but I hope not too many. In other words, we should indeed show up on about 12 Jan.

It sounds from your e-mail of 30 Aug. that I may have confused you re the "botany cabinets." It's just one, not especially prepossessing case, with homemade drawers, but it's serviceable, and it would certainly come in handy for the teaching collections in the short run. If UC has a surplus and salvage section as does PSU you might start going from time to time with your assistant to check out cabinets. Some kinds of old IBM card cabinets are handy for some things, for example. And they are practically giving them away.

I will be back to you soon regarding the visiting fellowship idea, for 1997. Requires more thought.

Best wishes as ever.

Yours very truly,

Alfred Traverse

encl:itinerary

Received: from violet.berkeley.edu (violet.Berkeley.EDU [128.32.155.22]) by pang
Received: from [128.32.108.42] by violet.berkeley.edu (8.6.10/1.33r)
        id MAA19825; Wed, 30 Aug 1995 12:06:01 -0700
Message-Id: <v02110102ac6a658402b7@[128.32.108.42]>
Mime-Version: 1.0
Date: Wed, 30 Aug 1995 12:06:02 -0700
To: traverse@ems.PSU.EDU
From: nanarens@violet.berkeley.edu (Nan Crystal Arens)
Subject: Re: 2Bmoved
Content-Type: text/plain; charset="us-ascii"

Dear Alfred:

Congratulations on the new truck. Please keep me apprised of your travel schedule so that I can be as much help as is possible. I will be in Berkeley for certain on 9 January and after, so can be as flexible as is necessary. I will likely be traveling during the break, but I'm not yet certain when or where. As my plans become concrete, I'll keep you informed FYI on the assumption is always better than less.

We have eight or ten bays here for the teaching collection, so not having the paleo cabinets will be no problem. However, if you are willing to make a gift of the botany cabinets, that would be wonderful. If they don't fit easily into the curation room for the teaching collection, they will be well-loved in my research space somewhere. Not to worry! The plan sounds just wonderful. I'm so excited to be getting this in place.

Paleobotany is underway here. It looks like I'll have about 30 students and perhaps 10 more "sit-ins". It seems like a good and very mixed group too. So far things are going well, although with the collections move and all, I'm not as prepared as I would like to have been before the semester started. I guess that's the way it often goes, and I'm confident that we'll be up to speed soon.

I hope all is well with you. Take care and please give my best to everyone. --Nan

Date: Wed, 30 Aug 1995 10:17:58 -0500 (EST)
From: "Alfred Traverse" <traverse@ems.psu.edu>
To: nanarens@violet.berkeley.edu
Cc:
BCc:
Subject: 2Bmoved
X-NUPop-Charset: IBM 8-Bit

Dear Nan:

We now have the new truck that will go to CA right after Xmas. So, I am beginning in spare moments getting the trip organized. It's going to take a month, and there will be stops along the way at quite a few places, so the coordination requires management skills.

Regarding the teaching collections. The big paleo cabinets that the basic collection is in probably would be a bone of contention, so I'll pack all those fossils in cartons with lots of newsprint. However, the fossil plant collection I got from Botany when they ruled that fossils are not of interest to botanists are housed in a cabinet they gave me with it, and I have no place to put it after packing your stuff in it. Could you perhaps use it? The drawers the fossils are in were made by me in my home workshop and are crude but serviceable. What do you say? Best. Alfred.

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DEPARTMENT OF INTEGRATIVE BIOLOGY

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14 August 1995

Alfred Traverse
Palynological Laboratories
Department of Geosciences
Pennsylvania State University

Dear Alfred:

Greetings from sunny (and warm) California. We are all embroiled in the paleobotany collection move and to say that things are hectic would be charitable. Fortunately, Diane and the move manager have things well in hand, so I don't have to worry....just work. In my spare time, I'm getting ready for the course. I've had a chance to look through the Lomax slides and am now even more grateful than I was a week ago. What a treasure! Thank you.

I've finally gotten the information on this year's Miller competition (enclosed). I apologize for the quality of the Xerox, but they insisted that they had to FAX it to me..... As you thought, the appointment made in this year's competition will not be in effect until the 1996-97 academic year, so we can think in some leisure about scheduling. I would welcome your thoughts on what you would like to work on while here, and then I will take responsibility for writing the "departmental proposal" and securing the letter from our chair. The cover sheet is prepared by our grants officer and the rest (CV and publications) you will supply for me. We should chat (or e-mail) in the next weeks to develop some good ideas.

I hope all is well on your side of the continent. I'm close to the bottom of my piles of mail and other sundry things to do. I have a feeling that it's a false sense of accomplishment, however! Take care, best to all, and I look forward to hearing from you soon.

With Very Best Wishes,

Nan Crystal Arens
Assistant Professor
Department of Integrative Biology

VISITING MILLER RESEARCH PROFESSORSHIPS

Sponsored by the Adolph C. and Mary Sprague
Miller Institute for Basic Research in Science

Deadline: October 13, 1995

The Advisory Board of the Miller Institute for Basic Research in Science invites department chairs to make nominations for Visiting Miller Research Professorships. The purpose of the Visiting Miller Professorship is to bring promising or eminent scientists to the Berkeley campus on a short-term basis for collaborative research interactions. Nominations are judged competitively, and approximately six awards will be made in each of two annual award periods. It is required that awardees be in residence at Berkeley during their appointment term. It is also stipulated that the appointee do no formal teaching.

ELIGIBILITY Faculty members or research scientists from any place in the world are eligible to be considered for sponsorship. (Faculty members at other UC campuses see Addendum.)

TERM OF APPOINTMENT Terms of appointment may range from a minimum of two weeks to a maximum of one semester. Each appointment starting date will be negotiated separately, with the restriction that appointments must start no later than a year and a half after the award date or no earlier than three months after the award is accepted. Appointment terms must occur in the fall or spring semester. It is not appropriate to request a starting date between semesters or during the summer, and the visit must run in consecutive weeks. When stating a desired starting date, please keep in mind that a minimum lead time of three months is needed to make visa and other arrangements for foreign visitors.

STIPEND The stipend is $2,000 a month plus $100 daily for living expenses. The Institute will pay for travel to and from Berkeley for the appointee, normally up to a maximum of $600 within the U.S. and up to $1,800 for foreign travel, based on advance purchase economy rates. There is no provision for travel for family members. (Faculty at other UC campuses see Addendum.) Per Federal regulations, medical insurance is provided for foreign visitors on a J-1 Visa.

REQUIREMENTS OF THE PROFESSORSHIP Appointees have no regular teaching duties, although they are encouraged to confer informally with graduate students and faculty and to speak before seminars on a limited number of occasions. It is expected that full time and effort will be devoted to research and collaboration. The Miller bequest requires that the research be performed on the Berkeley campus, so appointees are expected to be in residence during their entire tenure in the Institute; ***travel during appointment is not allowed.***

NOMINATION DEADLINE There are two nomination periods each year, one each semester. Complete nomination material for this competition is due October 13, 1995. Nominations for the second competition period are due February 9, 1996. All nomination material must reach the Institute's office, 2536 Channing Way #5190, Campus, by 4 p.m. of the deadline date.

ANNOUNCEMENT OF AWARDS Announcement of the awards will be made in late November.

NOMINATION PROCEDURE AND MATERIALS (PLEASE DO NOT STAPLE)

1. Cover sheet (1 original + 8 copies)
2. Department proposal (1 original + 7 copies)
3. Letter from department chair (1 original + 7 copies)
4. Curriculum vitae (1 original + 7 copies)
5. Publication list (1 original + 7 copies)

Note - Please submit #2 and #3 as separate items. A general bio-bibliography may be substituted for items #4 and #5. All materials should be submitted in English on 8 1/2 by 11 inch paper. Do not staple.

The departmental proposal should detail the benefits to be derived by the visit of the appointee and state the desired length and time of appointment. Please be as specific as possible about the dates of the proposed term. This proposal should be supported by a separate letter from the department chair designating a departmental sponsor with whom the appointee would be associated if appointed and assuring the Institute that space and facilities for the appointee would be available. Nominations from multiple departments are encouraged and welcomed. Please include letters from each department chair.

Available biographical material will normally be sufficient, but it must be accompanied by an evaluation of the major achievements of the nominee. The publication list need not be comprehensive, but it should be sufficient to reflect the level and nature of publications by the candidate. These nominations should not be perfunctory; *the Institute has to be persuaded that the nominee is strong and the proposal to bring the individual here well considered.* If more than one nomination is made by a department, the Institute asks that the department chair rank the nominations and explain the basis for the rankings. Please note that a cover sheet must accompany each proposal.

The Advisory Board of the Institute, which will make the awards, recognizes the problem of ascertaining whether a distinguished scholar would be interested in coming to Berkeley as a Visiting Miller Research Professor. The Board hopes that by indirect inquiry the prospective sponsoring department can determine the likelihood of availability. The Miller Institute will extend an invitation after advising the department of its choice.

ADDENDUM Faculty members at other UC campuses are eligible to be nominated for this program. For UC faculty members, please note that sabbatical leave or leave without pay should not immediately precede or follow a Visiting Miller Professorship. Policy requires that a faculty member be in residence (on the home campus) for at least the same amount of time as the term of appointment between a Visiting Miller Professorship and any such leave. University policy does not permit the Visiting Miller Professorship to be counted toward a sabbatical leave. (See Academic Personnel Manual 740-11 (h).) Payment to a faculty member from another UC campus must conform to University policies governing additional compensation and compensation while on sabbatical leave. (See Academic Personnel Manual Sections 660, 740.18 and 740 Appendix A.)

Any questions regarding this program may be directed to the Institute's office.

Materials may be sent to:

Professor Beth Burnside, Executive Director
Miller Institute for Basic Research in Science
2536 Channing Way #5190
Berkeley, CA 94720-5190
Telephone: (510)642-4088
Fax: (415)643-7393 E-mail address: 4mibrs@garnet

The Institute's hours are: 8:30-12:30, 1-5, Monday - Friday

8/95

Deadline: 4:00 p.m. October 13, 1995

Date: Tue, 8 Aug 1995 14:53:54 -0500 (EST)
From: "Alfred Traverse" <traverse@ems.psu.edu>
To: nanarens@violet.berkeley.edu
Cc:
BCc:
Subject: quick response
X-NUPop-Charset: IBM 8-Bit

Dear Nan:

You are absolutely right about e-mail. Much better than phone because it doesn't interrupt or interfere with anything. Only problem is that if somebody isn't answering it is hard to figure out why. If I hadn't heard from you by today or tomorrow, for example, I was going to use the Bell machine to find out if you were ill....or something.

Diane's friend is 100% Italian.

The Harvard Lomax slides go back far beyond Barghoorn, and even beyond Darrah. I suspect they were acquired by Jeffrey around the turn of the century.

O. K., then, we'll shoot at arrival late in the second week in January, 1996. You'll have your Spring Semester up and running by then. I would think we'd stay 3-4 days, but we'll be free to do pretty much as we please about that. As I said earlier today, I don't think we will be in a position to stay a whole lot longer, tho', because we have too many other obligations, including the trip to the Orient in early May. Our lives are fairly complicated, and it really does take about a year lead time to make a major move, such as going to Germany for a long sabbatical (1991-1992). For example, I have to organize a team to take care of Alphabet, our "estate" you and your little niece visited last year. Then there's our place in the Adirondacks and our rental property in St. Louis, etc.

I still say that even one 18 day is not smart. 14 you can get away with occasionally, but 18 is likely to make you sick. Besides, you'll get so exhausted that you're likely to hurt yourself while driving, or while climbing a ladder, etc.

No need to answer this.

All the best. Alfred.

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Message-Id: <v02110115ac4d80ec0160@[128.32.108.42]>
Mime-Version: 1.0
Date: Tue, 8 Aug 1995 14:02:00 -0700
To: traverse@ems.PSU.EDU
From: nanarens@violet.berkeley.edu (Nan Crystal Arens)
Subject: Re: quick response
Content-Type: text/plain; charset="us-ascii"

Dear Alfred:

>No need to answer this.

....but I usually do out of courtesy anyway. All sounds fine and I'll forward the Miller info by snail-mail when it turns up. I won't push on expediting anything for this year. I was thinking since you were coming anyway.... But, it would be fun to have TWO visits instead of just one. Cheers. --Nan

Received: from violet.berkeley.edu (violet.Berkeley.EDU [128.32.155.22]) by pang
Received: from [128.32.108.42] by violet.berkeley.edu (8.6.10/1.33r)
        id KAA05999; Tue, 8 Aug 1995 10:27:29 -0700
Message-Id: <v02110114ac4d469c4e24@[128.32.108.42]>
Mime-Version: 1.0
Date: Tue, 8 Aug 1995 10:27:31 -0700
To: traverse@ems.PSU.EDU
From: nanarens@violet.berkeley.edu (Nan Crystal Arens)
Subject: Re: response
Content-Type: text/plain; charset="us-ascii"

Dear Alfred:

Thanks so much for your message. In spite of the volume (I'm only on two list servers), I like e-mail because it is immediate but not as intrusive as the phone, which I prefer to reserve for when interaction or negotiation is required. I can spend a half hour at the beginning of the day answering e-mail and be done with it. It's also a good way to keep in touch with academic friends far away, of which Inow have many.

I wasn't sure whether Diane's friend was of Spanish or Portegeuse ancestry--that would make the difference on vowels give the pronunciation. The apparently had no trouble with the US Route 22 locality and did collect some fine-looking coal balls that will need to be sectioned when the dust clears here a little bit. The Lomax slides are indeed a prize. For many years I enjoyed the Bargoorn collection that Andy still has. They are really priceless. I'm going to have to think carefully about where and how to store them so that they aren't damaged when the continents start drifting in ernest.

You did mention that you got a new truck. I think it would be the same as my father's. They find it very comfortable traveling, and I hope you both do too.

Let me gather the information on the Miller and then we can make a mutually convenient decision. The ideas relative to what happenes to vegetation during moments of environmental crisis sounds good. We'll talk more in January if nothing sorts out before then. As for arrival dates, my January is still somewhat up in the air pending a grant I finished last spring. However, our semester starts on 9 January, so I have to be back then anyway. Good Heavens!

Don't worry, I'll only be working three 18-hour days during the move and that's unavoidable. Other than that, 12 is about my limit. I'm getting old! Do take care and keep in touch. I hope to hear from the Miller folk today and I'll keep you advised. With best wishes --Nan

****
NAN CRYSTAL ARENS
Department of Integrative Biology
University of California
3060 Valley Life Sciences Building
Berkeley, CA 94720-3140 U.S.A.

Tel. 510-643-0879
FAX. 510-643-6264
e-mail. nanarens@violet.berkeley.edu

Date: Tue, 11 Jul 1995 15:07:17 -0500 (EST)
From: "Alfred Traverse" <traverse@ems.psu.edu>
To: nanarens@violet.berkeley.edu
Cc:
BCc:
Subject: paleobot. etc.
X-NUPop-Charset: IBM 8-Bit

Dear Nan:

I note than most of my e-mail correspondents don't use a salutation, but it seems decent to me. What do you think? One of my correspondents (Jane Gray) even eschews all capitalization and most punctuation.

Hope that Diane Erwin and her dynamite companion made it o. k. When they left here they were loaded up super, but were headed for the coal-ball locality along US 22 near Pittsburgh, and God knows what happened after that. I'd like news that it went o. k., and that you got, for example, the coal balls in ethylene glycol in good shape. The Lomax slides are an especially neat thing for you to have.

I'm still holding to the tentative idea of delivering the megafossils and some other things by truck in Jan.

Which reminds me--the major reason I'm contacting you is to inquire what you think about paleobotanical and/or palynological reprints and other publications. I have been distributing duplicates to various previous students, including a huge consignment to one former student who doesn't I think really appreciate it--maybe didn't even want it. I could set up boxes labelled N. A., which in this case would not mean what the column in the stock reports for P.E. means when it says "N. A.." Then in January I could pack said boxes along with the fossils. Do you want duplicate paleobot./palynol. reprints that come up in this way?

All the best. Alfred. (Our trip to WA-OR-BC was great.)

Date: Mon, 5 Jun 1995 10:34:39 -0500 (EST)
From: "Alfred Traverse" <traverse@ems.psu.edu>
To: nanarens@violet.berkeley.edu
Cc:
BCc:
Subject: plans
X-NUPop-Charset: IBM 8-Bit

Dear Nan:

Thanks for yours of 31 May. Ms. Erwin and "friend" will be here--I invited her to lunch, but she seemed uncertain that she could actually get on the road early enough to make it possible.

As you know we still have the idea we might drive the megafossils out personally, just for a winter holiday. Should have a new truck by then!

No need to get very specific about what Betty and I will accomplish during the stay in Berkeley until it actually is finalized. However, Betty found it interesting that there actually is a person in precisely her field: mittelhochdeutsche Literatur.

All the best. Alfred.

Date: Wed, 31 May 1995 12:08:53 -0500 (EST)
From: "Alfred Traverse" <traverse@ems.psu.edu>
To: nanarens@violet.berkeley.edu
Cc:
BCc:
Subject: collections
X-NUPop-Charset: IBM 8-Bit

Dear Nan:

In the meantime Ms. Erwin (Irwin?) has called, and we've arranged to meet on the 22nd of June for her to pick up the slides. It's really quite a nice bunch of stuff, and you can see from my manual where I used the various items. I've also had a conference with our department head who sees no problem with giving you this stuff, as it is of no or marginal research significance. He does register sadness that paleobotany is expiring here.

On a different subject, one of these days when you are at loose ends for something to do, look into the question of whether there is a program in Berkeley on Mediaeval Studies. Might interest my spouse, in case your proposal ever really does come to fruition. She is now preparing her thesis for publication--about the 13th century minstrel, Neidhart von Reuental.

All the best. Alfred.

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Phone: (814)863-3419; Fax: 814-863-7823
E-Mail: traverse@ems.psu.edu

29 May, 1995

Dr. Nan C. Arens
Department of Integrative Biology
3060 Valley Life Sci. Bldg.
University of California
Berkeley, CA 94720

Dear Nan:

It was great to talk with you the other day, but very distressing to hear that you have had so many personal problems. I really feel for you in all of them. I even understand your devotion to canines, though that requires a big leap. It's probably the only thing imaginable that you share with Adolf Hitler.

Enclosed are copies of this year's paleobotanical syllabus, with my latest version of the lab book. One of these years you and I could get out a paleobot. lab manual? It would differ from all existing such by putting heavy emphasis on plant anatomy and morphology. As of last semester my paleobot. course was the only course at this huge university in which one could learn what plant tissues and cells are like.

I'm hoping your friend from U. P. will contact me beforehand and not just arrive. In June I tend to be irregular in my attendance, and this June will be worse than usual.

Your info about the (if I remember correctly) Miller Professorships was very interesting. I would greatly enjoy that and think I could do something mutually profitable. First thing that pops into mind would be a detailed look at palynological aspects of what happened at the great biologic crossroads--Late Ord., Frasnian/Famennian, P/Tr, Tr/Jr, K/Pg (="K/T")--perhaps others? I send you herewith a couple of reprints my records show that you haven't yet received. No. 64 was a preliminary presentation of some of my ideas on the subject. Just a thought.

All the best. Please be kind to yourself.

Yours very truly,

encl.:reprints;420 stuff Alfred Traverse

.eceived: from violet.berkeley.edu by pangaea.ems.psu.edu
(4.1/PSU_ESSC/GEOSC-2.02) id AA14067; Mon, 27 Feb 95 16:57:35 EST
Received: from [128.32.108.42] by violet.berkeley.edu (8.6.8/1.33r)
id NAA05631; Mon, 27 Feb 1995 13:57:19 -0800
Date: Mon, 27 Feb 1995 13:57:19 -0800
Message-Id: <199502272157.NAA05631@violet.berkeley.edu>
Mime-Version: 1.0
Content-Type: text/plain; charset="us-ascii"
To: traverse@ems.psu.edu
From: nanarens@violet.berkeley.edu (Nan Crystal Arens)
Subject: Congratulations!

Dear Drs. Traverse:

My most delighted congratulations on Betty's defense. You both must be very proud. It is an impressive and inspiring accomplishment.

I received your letter of 20 February this afternoon. I will answer in kind later this week. I hope you are well.

With best wishes --Nan

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E-Mail: traverse@ems.psu.edu

20 February, 1995

Dr. Nan C. Arens
Department of Integrative Biology
University of California
Berkeley, CA 94720-3140

Dear Nan:

I'm answering yours of 5 Feb. in snail mail kind, because Betty is hogging the computer which has the e-mail connection--actually, she has now finished her dissertation (defense on 27 Feb.) and is using the machine to work on the second edition of Paleopalynology (cleaning up the WP files for me to work on), so I can hardly complain.

Your news interesting and impressive. I remember that VW once said that she would apply for the curatorial job. Reminds me to caution you not to accept opinions she may now have of AT without being a little critical of them. As of the last time I encountered her she was still very angry with me. It turned out, in my opinion, that although she is a very talented woman in some ways, the long series of academic hurdles between her and a Ph. D. at PSU is not something she can realistically hope to surmount. I therefore made it clear that I would not encourage her to go on with a doctoral program in palynology. This means that I was saving her some years of her life, but students who are washed out of a program seldom see it that way.

I haven't forgotten about the teaching collections in paleobotany. It gives me a funny feeling to be using them for the last time. The students have now made their preparations of modern plants and are beginning with coal ball peels. Except for the two exercises with modern plants (great fun), the lab is pretty much the same as the one for the Harvard course when I took it, updated of course (in 1947 we never heard of rhyniophytes, trimerophytes, etc., etc.). I would think that the first time you do it, you could simply take over the lab manual I have put together. Last year I tried storing a bunch of the coal balls in ethylene glycol (antifreeze--Walmart, $5 a gal.--the books advocate glycerine, at $90 a gal.). It worked just fine. I think I'll buy a few more sweater boxes and antifreeze this year, so that you'll get all of them in ethylene glycol!

Are you really sure you don't want the cabinets? I can use them for other sample storage, if you don't want or need them. I

suppose that realistically, I can't hope in the near future to make that long a trip with my truck. But, who knows, it would be a way for us to get to California again, say next winter. I'd like to keep it in mind as a fun possibility.

We made it to the Rose Bowl and some days before and after it, getting out just at the beginning of the big rains (on 4 Jan.). Spent another neat day at the Huntington, among other things. Another day in the bird collections of the LA Nat. Hist. Mus., which turns out to be right across the street from USC. Etc.

Our next daffiness is that we're going to Indianapolis for the Big Ten Womens' Basketball tournament in ten days. We are such big fans of the Lady Lions, that one of the kids gave us a basketball signed by all members of the team for Xmas. (Celia has a friend who is connected with the coach somehow.)

All the best.

Yours very truly,

Alfred Traverse

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5 February 1995

Dr. Alfred Traverse
Palynological Laboratories
Department of Geosciences
435 Deike Building
University Park, PA. 16802

Dear Alfred:

Thanks so much for your letter of 24 October. I have nothing in the way of excuse for not responding sooner; I hope you will accept my apology instead. Things have been very busy here, beginning at about the time your letter appeared. I have now moved into my permanent office/lab and the refit to the laboratory spaces I need is almost finished. Most of my equipment is ordered, some has arrived, some will arrive shortly (microscopes, mainly), and the remainder will be ordered soon. I'm aiming for having the lab "operational" by the end of February--only five months after originally planned! So go the best laid plans of mice and Nans.

In addition, I'm responsible for two graduate courses this semester and my first Ph.D. student arrived a few weeks ago. Add that to the meetings surrounding selection of the 1995 crop of graduate students, meetings surrounding our search for a new faculty member, and meetings surrounding the Museum's search for two curatorial types (one in paleobotany--hence I co-chair the committee), and my plate becomes quite full. Oh well. By the end of the semester I should know whether I was successful in keeping all of this properly balanced.

Please do keep me up to date on the paleobotany collections. Various bureaucratic mix-ups and my own time limitations have led me to conclude that I won't offer a "full" laboratory with the first try at a paleobotany course here. I won't have a teaching assistant and I think it may be too much to ask to try to write lectures and a laboratory at the same time, given that we are still uncertain about when the Museum of Paleontology will move into its new quarters, and hence, when I'll have access to the UCB material. I'll try for a "demonstration section" and scale up next time around. By that time, we should be moved, un-packed, and (I hope) have the teaching collection augmented somewhat and curated properly. This takes some of the timing pressure off on your end.

Please do keep me up-to-date on your thinking relative to transport possibilities. Having movers do the whole job would certainly be the low-work alternative and we could do that. Since we won't need the cabinets, the specimens would have to be individually packed and re-crated, which can get expensive when the "professionals" do it. Alternatively, I think I would prefer to come up and do the

packing myself to ensure that it is done properly and I know what I'll have when I un-pack. Perhaps after my curatorial assistant is in place, we could make the trip and quick work of it with multiple hands! Similarly, if you want to make the trip yourself, your visit would be more than welcome. That seems like a lot of work for a busy person, however. Up to you, of course. In any event, please keep me informed on your current thoughts. We will need a fair amount of lead-time on this end to ensure that the money is available when we need it. Also, if there is someone else in the department who I (or UCMP director) should contact to smooth the political non-sense, please let me know. I will rely on your good judgment on that end.

I hope you managed to get to LA for the Rose Bowl. I was in the field at the time (Death Valley and southern Nevada) with the U.S.G.S. crew from Reston at the time and didn't even get to see the game! I'm coordinating paleobotany for their project which is looking at climate/vegetation/geographic reconstruction of one Westphalian-D cyclothem. It's a neat little project and I've really enjoyed working with Blaine Cecil.

I hope you all have survived the recent storm. I spoke to my parents in Connecticut yesterday and they were having a rough time of it. I think of you often, particularly as Betty finishes her dissertation. Tread carefully. Best wishes to all.

With warm regards,

Nan

Nan Crystal Arens
Assistant Professor
Department of Integrative Biology

Received: from violet.berkeley.edu by pangaea.ems.psu.edu
(4.1/PSU_ESSC/GEOSC-2.02) id AA15257; Sun, 11 Dec 94 16:06:16 EST
Received: from [128.32.108.42] by violet.berkeley.edu (8.6.8/1.33r)
id NAA18309; Sun, 11 Dec 1994 13:06:13 -0800
Date: Sun, 11 Dec 1994 13:06:13 -0800
Message-Id: <199412112106.NAA18309@violet.berkeley.edu>
Mime-Version: 1.0
Content-Type: text/plain; charset="us-ascii"
To: traverse@ems.psu.edu
From: nanarens@violet.berkeley.edu (Nan Crystal Arens)
Subject: Re: paleobotany

>Dear Nan: Well, the pipedreams about driving to CA with fossils, etc., are,
>in this case literally, academic: Geosciences/Biology 420, which a few
>weeks ago at preregistration had only 4 students, now has the capacity 16 and
>will have to go. I have mixed emotions. It certainly is flattering that so
>many of the palynology students are so happy with me that they have dropped
>something else and added paleobotany. We are very busy with the class term
>papers, etc.--they seem to be the tardiest group in history, but they are
>just delightful people. All the best. Alfred.

Alas..... It may be somewhat moot on this end for fall 1995 as well because I haven't successfully gotten the lab thorugh the faculty senate committee on courses yet. I've not given up but it has been frustrating and too time consuming. I may decide not to run a full lab this time around and go with a larger-scale operation when the collections have moved and I'm a bit more set up. Perhaps the repeated problems are an omen. I owe you a letter that I hope will be written soon. Things have been a bit hectic as I had to make an emergency trip to Connecticut in November as my mother was ill. I also just got back from a week in Colombia where I had been invited to give a keynote address with accompanying paper at a national congress on biodiversity and conservation. It was nice to see that paleontology is being taken seriously as a decipline in the discussion of biodiversity, but it did divert a lot of time an energy for the two weeks preceeding the trip.

More soon--my best to all and Happy Holidays!

Nan

Arens

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Phone: (814)863-3419; Fax: 814-863-7823
E-Mail: traverse@ems.psu.edu
24 October, 1994

Dr. Nan Crystal Arens
Dept. of Integrative Biology
University of California
Berkeley, CA 94720-3140

Dear Nan:

Yours of 15 October just in--not very good service, but I suspect that getting through two university mail operations is most of the explanation.

I don't know what to say about your new puppy. I guess I'll say "that's nice," and let it go at that.

For the moment I think we've about covered the question of the paleobotany collections. Sometime in the not too distant future I could pack it all into my pickup and drive to CA. Whether that occurs before summer of '95 depends on enrollment. At present there are only 4 in the class. It won't go unless I pick up 4 more. If I do, it will go. I mean that with 7 I don't have to teach it, but if 8 show up and want it, I have to give the course.

What I meant about possible (very unlikely) problems is that at some juncture I have to ask for permission. I intend to put in a pitch for the cabinets too. I contemplate that they'll be glad to get rid of the whole thing, but there is a chance someone might object, for example about the cabinets. I really anticipate clear sailing. I would need to cover expenses of about 10 days and 6000 miles on the road, I suppose. @$50 per day and $.25 per mile, that's $2000. That's obviously bare minimum. Can you swing it? As a wild guess, we're probably talking about materials that would fill my large pickup bed, i. e., 8'x4' by 4' (inside of cap)=128 cu.ft., or perhaps more likely will require my stake set with waterproof cover=8'x4'x6'=192 cu.ft. You might do some calculations of how much that would cost if it all were packed in suitable corrugated boxes and shipped, and perhaps forget the cabinets. That would reduce the bulk quite a bit, and if you don't need the cabinets, would be no loss. Mayflower Movers, for example, would do it. Perhaps a more sensible idea? Enough!

Betty and I will be in LA for the Rose Bowl, if PSU goes. All the best.

Alfred Traverse

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15 October 1994

Dr. Alfred Traverse
Palynological Laboratories
Department of Geosciences
435 Deike Building
University Park, PA. 16802

Dear Alfred:

Thanks so much for your letter of 3 October. I hope you enjoyed your trip to Spain. At the moment, I'm the season's first flu victim, but I suppose there are worse things than having to stay home with my new puppy, a nine-week-old blue merle Sheltie named Sancho. Despite the complications of having a baby of any species, he's improved the quality of my life at least 200%. By the way, I did receive a reply from Harlan Banks, who said that although they do train and show Shelties, they don't "produce" them.

I hope that PSU won't object to the transfer of the paleobotany materials. What is the process for getting the necessary permissions? If a letter from me or somebody "higher up" in the UC Museum of Paleontology (UCMP) would help, I would be glad to organize that for you. Please do keep me informed. As for the expenses, I would imagine most any arrangement would be possible up to the amount it would cost to ship the material by independent carrier. I'm not sure how much that would be as I don't have a good image of how much there is. I can try to get more specifics when I next meet with the UCMP director (Jere Lipps) in November (he's out of town at the moment). Relative to timing, obviously that's in your hands. January or February 1995 would be ideal. If we had to wait until early '96, that would be okay, although it would mean I would not have the collection for the first round of Cal's revived paleobotany course, now scheduled for Fall semester 1995. I would imagine I'll teach it again, however, so in the long run it's fine. In any event, please keep me informed.

Best wishes to all.

Best wishes,

Nan Crystal Arens
Assistant Professor
Department of Integrative Biology

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3 October, 1994

Dr. Nan C. Arens
Department of Integrative Biology
University of California
Berkeley, CA 94720-3140

Dear Nan:

Enjoyed yours of 22 Sept., which was waiting for us on return from Spain a few days ago.

I won't change my mind about the paleobotany stuff. It is conceivable but very unlikely that PSU would object. As to timing, I would think that there are two possibilities. If paleobotany doesn't go in Spring, 1995, and unlike palynology it sometimes doesn't, I might want to take the materials out to you sometime during Jan. or Feb of '95. If it does go, then I fear that we are looking at early '96 because Spring and Summer of'95 are very full--Betty's graduation, my 70th birthday, etc. Betty and I might make a camping trip of it and have some fun. How much help with cost can I expect? (One way of recovering part of cost would be for UCB to accept my expenses as a gift, which would pay me 30% of it, free to UCB. Then perhaps I could get a small honorarium somehow or other, to cover the rest of the expenses, or whatever.)

Best regards.

Yours very truly,

Alfred Traverse

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22 September 1994

Dr. Alfred Traverse
Palynological Laboratories
Department of Geosciences
435 Deike Building
University Park, PA

Dear Alfred:

Thanks you very much for your letter of 9 September; as always, it is good to hear from you. I apologize for being so tardy in reply, but the month has slipped away finishing a slew of proposals. I've finished four and have one more to go--I'm taking a breather to catch up on neglected correspondence.

With respect to Andrew, we discovered that he had a very aggressive form of cancer, unrelated to the trip. It appears that I will not get another dog until December or January. This delay is more for emotional than practical reasons, although I do have a couple of short trips planned. I respect you opinion that other life responsibilities should be sorted out before adding a pet. However, if I were to wait for a stable living situation and a career lull, I would probably never get another dog! That's clearly not an option for me, particularly being as alone as I am here. The more germane question is whether I can wait until January!

For my and Berkeley's sake, I hope you do not change your mind about depositing PSU's paleobotany teaching collection in our care. I am in desperate need of material from which to teach paleobotany (beginning in Fall 1995--so timing is excellent). Also, there was general excitement among the faculty and curators when I informally mentioned that this was a possibility. We are also in the process of hiring a full-time curatorial associate to work with me on the development of the collections for both teaching and research (big NSF curatorial proposal planned for a year or so). I've taken the revival of fossil botany at Berkeley on as a personal challenge for my time here (I'm thinking specifically toward the next six years--their opportunity to boot me at tenure review!).

My summer of 1995 looks to be busy too. I hope to spend most of it in Colombia teaching and doing field work. We would have to compare schedules and decide when and how would be best to transport the collections once you have made a decision. Even if you are unable to transport the collections yourself (I can testify

for the difficulty of that journey and would particularly not recommend it in summer), you are welcome to visit any time. Moreover, we have several visiting faculty programs and I would be delighted to sponsor you if that sounds at all interesting.

Please do keep all of this in mind and let me know what plans you would like to make. In the meantime, please give my very best wishes to everyone there and particularly Betty and Carmen.

Best wishes,

Nan

Nan Crystal Arens

Assistant Professor
Department of Integrative Biology

P.S. I've found faculty meetings quite entertaining so far. Then again, we pretty much all like each other here!

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¤ Date: Sun, 11 Sep 1994 12:22:54 -050 ôôôôôôôô ôôôôôôôô ôôôôôôôô ôôôôôôôô ¤
¤ From: "Alfred Traverse" <traverse@ems.psu.edu> Transfer ¤
¤ To: nanarens@violet.berkeley.edu ôôôôôôôô ¤
¤ Cc: ± Delete É ¤
¤ BCc: ôôôôôôôô ¤
¤ ForwardÉ ¤
¤ Subject: shelties ôôôôôôôô ¤
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¤ Æåí ôôôôôôôô ¤

¤Yes, it is Banks (but more specifically øæÄ wife, Kit) who is or was in the ¤
¤Sheltie business. I once met him accidentally in a mens' room on the New ý¤
¤York Thruway when he and Kit were on their way to a sheltie show. My mother ý¤
¤was with me, so that was a while ago! Why not try a lower maintenance model,ý¤
¤such as a standard poodle? (More intelligent, too.) Above all, why not ý¤
¤give yourself a rest for a while? ý¤
¤ ý¤
¤All the best. Alfred. ý¤
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¤ Date: Sun, 11 Sep 1994 12:22:54 -050 ôôôôôôôô ôôôôôôôô ôôôôôôôô ôôôôôôôô ¤
¤ From: "Alfred Traverse" <traverse@ems.psu.edu> Transfer ¤
¤ To: nanarens@violet.berkeley.edu ôôôôôôôô ¤
¤ Cc: ± Delete É ¤
¤ BCc: ÅîØ ôôôôôôôô ¤
¤ Æåí ForwardÉ ¤
¤ Subject: shelties øæÄ ôôôôôôôô ¤
¤ Reply É ¤
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¤Yes, it is Banks (but more specifically his wife, Kit) who is or was in the ¤
¤Sheltie business. I once met him accidentally in a mens' room on the New ý¤
¤York Thruway when he and Kit were on their way to a sheltie show. My mother ý¤
¤was with me, so that was a while ago! Why not try a lower maintenance model,ý¤
¤such as a standard poodle? (More intelligent, too.) Above all, why not ý¤
¤give yourself a rest for a while? ý¤
¤ ý¤
¤All the best. Alfred. ý¤
¤ ý¤
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¤ Date: Sun, 11 Sep 1994 12:22:54 -050 ôôôôôôôô ôôôôôôôô ôôôôôôôô ôôôôôôôô ¤

Received: from violet.berkeley.edu by pangaea.ems.psu.edu
        (4.1/PSU_ESSC/GEOSC-2.02) id AA19274; Sun, 11 Sep 94 15:25:57 EDT
Received: from [128.32.110.147] by violet.berkeley.edu (8.6.8/1.33r)
        id MAA13943; Sun, 11 Sep 1994 12:25:54 -0700
Date: Sun, 11 Sep 1994 12:25:54 -0700
Message-Id: <199409111925.MAA13943@violet.berkeley.edu>
Mime-Version: 1.0
Content-Type: text/plain; charset="us-ascii"
To: traverse@ems.psu.edu
From: nanarens@violet.berkeley.edu (Nan Crystal Arens)
Subject: Shelties
Status: U

Dear Alfred:

Thanks for the message. I just sent a letter to Banks asking about shelties. I thought a lot about getting a different breed, or a "pound puppy" (which would be high-risk in that you never know what you're going to end up with!), but shelties really are my favorite and an ideal size and activity level for my lifestyle (i.e., apartment living with limited yard space, but more opportunity for leash exercise). Anyway, it never hurts to ask the question.

In any event, I probably won't get the dog until after the semester, just to give myself some "recovery time" as they say. However, one thing became abundantly clear when the shock and first wave of grief passed, I don't like being completely alone. My sister (Heather's mother) often teased me that Andrew was my child-substitute. In an odd way she's right because the career choices I've made preclude me having a husband and family like "normal" people. However, I still need somebody in my life to love and care for, even if that "somebody" has four feet and fur.

Do take care and my best to everyone there!

Nan

THE PENNSYLVANIA STATE UNIVERSITY
DEPARTMENT OF GEOSCIENCES
PALYNOLOGICAL LABORATORIES
435 DEIKE BUILDING
UNIVERSITY PARK, PA 16802, USA
Phone: (814)863-3419; Fax: 814-863-7823
E-Mail: traverse@ems.psu.edu
9 September, 1994

Dr. Nan Arens
Dept. of Integrative Biology
University of California
Berkeley, CA 94720

Dear Nan:

Having just sent off an e-mail missive (to see if I could do it, in part), I turn to the ordinary mail and find yours of 30 August in the pile. Nice letter, but I'm very sorry to hear about Andrew. The trip was clearly too much for him. I hope you'll consider waiting a while before complicating life with a major pet again. One needs to have some other things well sorted out in a new job and new place of residence before adding a canine companion to the picture.

I will be teaching the paleobotany course in Spring of 1995. At the moment it is my feeling that that will be the end of fossil plants at PSU, but something unforeseen could happen to make me change my mind. However, I would think it's better than 80% certain that Betty and I might want to drive out with a truckload of the stuff for you, some time after May, 1995. The summer of '95 is shaping up as very busy, with my formal retirement, a big family wedding (my nephew who is at the UCBerk. Law School--George Turner by name--he's a first cousin of Kathleen, the actress, by the way), and Betty's Ph. D. commencement, among other things. If I give palynology in the Fall of '95, the first time to bring the paleobot stuff would be in the summer of '96? Or maybe in the winter, early '96--by taking a southern route!

Must go to a (&^%$#@*) faculty meeting now. All the best.

Yours very truly,

Alfred Traverse

encl.:xerox from the Collegian

Received: from violet.berkeley.edu by pangaea.ems.psu.edu
(4.1/PSU_ESSC/GEOSC-2.02) id AA05928; Wed, 7 Sep 94 13:04:02 EDT
Received: from [128.32.110.147] by violet.berkeley.edu (8.6.8/1.33r)
id KAA15861; Wed, 7 Sep 1994 10:03:58 -0700
Date: Wed, 7 Sep 1994 10:03:58 -0700
Message-Id: <199409071703.KAA15861@violet.berkeley.edu>
Mime-Version: 1.0
Content-Type: text/plain; charset="us-ascii"
To: traverse@ems.psu.edu
From: nanarens@violet.berkeley.edu (Nan Crystal Arens)
Subject: Happy Birthday

Dear Alfred:

HAPPY BIRTHDAY! I did, by the way, already know that it is your birthday and had written in my agenda "e-mail AT with birthday greetings". However, the time zones got the best of me and you beat me to the surprise. I do hope you have a wonderful day.

Toward the compromise with the electronic medium, I have discovered the print function on my e-mail, so I can keep a paper copy of important messages, along with the original. That seems like a wonderful middle ground. FAXes are also useful for different sorts of things, but you are right that they can be a bit too public. Our departmental receptionist is very discrete and efficient, but still.... I usually end up encouraging my colleagues to write in Spanish if they can, which makes it a little more private. When I was communicating with the friend in Boston who was keeping my finances last year, we actually had to invent a code to maintain privacy in FAXes that had to travel through many hands. Oh well.

As Vicki may have told you, I had to put Andrew to sleep a few weeks ago. As you can imagine, I'm pretty sad about it. He was about all I had, particularly at this moment of so many big changes and being so far removed from anything I would call "home". However, life is full of hard challenges, and it was the right thing to do when we learned of the problem (an agressive form of epithelial cancer in his absomen). I recall you mentioning that Harlan Banks, I believe, raised Shelties. Do I remember correctly that it is Banks? I was thinking of writing and inquiring. I'll get a new dog soon--I can't imagine life without one!

Well, must get back to work. I'm preparing a talk to give at the Bay Area Biosystematists dinner next week. It's apparently an old and venerable group full of very big shots (from my point of view, anyway). They invited me to be their first speaker of the new academic year. I think it's mostly because I'm new (certainly not because I'm a systematist!). Anyway, connections and positive first impressions are very important and it's been a challenge to come up with something interesting to talk about!

Do take care and please keep in touch!

Affectionately--Nan

>Dear Nan:
>
>This is my first effort without Betty even in State College! E-mail also
>has the advantage of not being as public as fax--I got a very embarrassing
>message from a clown-colleague the other day which sat on top of the fax
>pile in the mail room long enough to cause some merriment. You are right
>about phone calls being intrusive--the caller is absolutely in charge. You
>are also right that hard copy snail-mail has great archival value. If I

Date: Wed, 7 Sep 1994 10:26:06 -0500 (EST)
From: "Alfred Traverse" <traverse@ems.psu.edu>
To: nanarens@violet.berkeley.edu
Cc:
BCc:
Subject: hi there
X-NUPop-Charset: IBM 8-Bit

Dear Nan:

This is my first effort without Betty even in State College! E-mail also has the advantage of not being as public as fax--I got a very embarrassing message from a clown-colleague the other day which sat on top of the fax pile in the mail room long enough to cause some merriment. You are right about phone calls being intrusive--the caller is absolutely in charge. You are also right that hard copy snail-mail has great archival value. If I ever really retire, I plan to do some writing based on some of my files of such items. Thanks for yours of 30 Aug. Today is my birthday. In ancient times it was thought to be the luckiest day of the year on which to be born-the seventh day of the (then) seventh month. I do feel in many ways very lucky.

Best regards.

Alfred

Received: from violet.berkeley.edu by pangaea.ems.psu.edu
(4.1/PSU_ESSC/GEOSC-2.02) id AA09116; Tue, 30 Aug 94 14:52:50 EDT
Received: from [128.32.110.147] by violet.berkeley.edu (8.6.8/1.33r)
id LAA16014; Tue, 30 Aug 1994 11:52:41 -0700
Date: Tue, 30 Aug 1994 11:52:41 -0700
Message-Id: <199408301852.LAA16014@violet.berkeley.edu>
Mime-Version: 1.0
Content-Type: text/plain; charset="us-ascii"
To: traverse@ems.psu.edu
From: nanarens@violet.berkeley.edu (Nan Crystal Arens)
Subject: Hello

Dear Alfred:

I am in the midst of writing a letter in reponse to yours of 24 August. I like electronic mail because it's quick and not as intrusive as the telephone, but paper mail still seems more civilized to me. I have no particular aversion to technology, I would just hate to lose all the other old familiar things, like letters that one can pass on to the next generation...

In any case, I wanted to give your address a try. Why "violet" in my address? I don't know. We have two large main-frames at Berkeley, one called "violet" and the other "garnet" (I don't know the origin of the names), and a wed-server named "uclink". Probably by virture of where space was, I was assigned an account on "violet".

Best wishes to all and a "snail mail" letter to follow shortly!

Nan

UNIVERSITY OF CALIFORNIA, BERKELEY

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SANTA BARBARA • SANTA CRUZ

DEPARTMENT OF INTEGRATIVE BIOLOGY

BERKELEY, CALIFORNIA 94720

Tel. 510-643-0879
e-mail. nanarens@violet.berkeley.edu

30 August 1994

Dr. Alfred Traverse
Palynological Laboratories
Department of Geoscience
Deike Building
University Park, PA 16802

Dear Alfred:

Many thanks for your letter of 24 August and many enclosures. Actually, I don't have many or maybe not any of your reprints, although I have read most of the papers in the course of various classes and work. I'll have to look carefully at the company reports from Colombia when I have a moment. I'm going to have to dig a little to figure out where they are from. Definition of units and correlation were very inexact sciences in Colombia until a few years ago. If nothing else, they are of tremendous historical interest to me. Thanks also for the card and photo from some time ago. I had it on my "to be answered" pile pending some solid information on the possibilities for acquiring the PSU paleobotanical collection. Your letter pre-empted that reply...read on.

Don't worry: I won't forget the collections! They are not only desperately needed (through the years the teaching collection hasn't been kept close track of, and you know how fossils tend to wander off!), but will also be very well cared for. I spoke to the Jere Lipps (director of the Paleontological Museum at the moment = the man with the dough) and he told me that we do indeed have money to ship collections that are being given us. I'll try to find out the details within the next couple of weeks and get back to you. Perhaps we can arrange to pay Traverse Inc. or equivalent to ship them if you are still interested in making the trip yourself. You and Betty are, of course, most welcome in my home and laboratory.

The timing also looks good for both of us to make good use of the collections. I was planning to teach paleobotany in the Spring of 1995, but since we don't need another lab course during that semester, the department suggested that I inaugurate the course during Fall 1995 instead. Fine with me and the collection would be in place and curated by then. I can't tell you how grateful I am about this; I was really dreading trying to put together a lab with only our current material!

Still no new news on my laboratory. The latest gossip is that they will try to "take the building" in latest September and then quickly re-fit my space to move me in by mid-October. I have various other commitments to be here until then also, and lots of writing that I want to catch up on. After that, if there is no solid word on the lab, I may try to go back into the field. We'll have to see. Just last week I met a visitor who is a palynologist and looking for something interesting to do for several months. She is South African and here until the end of November with her husband, a post-doc in another lab in our department. If she would like to help out, that's incentive for me to try to find some sort of interim nook. I can always use the help!

As Vicki may have told you, I had to have Andrew the Dog put to sleep last week. Of course, I knew that that was an eventuality--he was an old fellow. However, the awareness that it was necessary and appropriate does little to blunt the grief. I've never truly lived alone before and I miss my furry companion tremendously.

I hope you are both well and that your semester is off to a good start. Please do keep in touch and I'll keep you apprised of arrangements for the collections. Please give my best to Betty, Carmen, Vicki, and all others who may remember me.

As always...best wishes,

Nan Crystal Arens

Assistant Professor
Department of Integrative Biology

THE PENNSYLVANIA STATE UNIVERSITY
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Phone: (814)863-3419; Fax: 814-863-7823

24 August, 1994

Dr. Nan C. Arens
Department of Integrative Biology
3060 Valley Life Sciences Building
University of California
Berkeley, CA 94720

Dear Nan,

Many thanks for what I suspect is a form letter, but so cleverly done that one can't be sure. Your new addresses may trigger a new card for you here--though I hate to do that--the old info is so interesting historically!

Why "violet" in your email add.? They've just laid email on me, and I've sent two messages. One went through. Address: TRAVERSE@EMS.PSU.EDU Beats yours for compactness, I must say.

Don't forget about the PSU paleobotanical collections. The slides include many Lomax originals, and the whole thing is invaluable for teaching. I might even be willing to crate it up and personally drive it to Berkeley in my pickup just for the lark. I will offer paleobotany in Spring 1995 but perhaps never again. Palynology I will continue to offer as long as I'm in good shape.

Some reprints enclosed. Could duplicate ones I've already given you, as I seldom remember to write it down when it's not a mailing.

Also enclosed are two company reports that may interest you. They were in George Fournier's library, along with a lot of palynological reprints dealing with Colombia. If I run into duplicates, will send to you.

Hang in there. You are the source of many happy memories.

Yours very truly,

Alfred Traverse

encl.:reprints;co. repts.

Nan Crystal Arens
Botanical Museum
26 Oxford Street
Cambridge, MA 02138

19 November 1993

Dr. Alfred Traverse
Palynological Laboratories
Department of Geosciences
Deike Building
University Park, Pennsylvania

Dear Alfred:

Thank you so much for your letter of 14 November and my deepest sympathies on the passing of Betty's mother. I have not yet lost a parent, but my experience with my dearest grandmother was that I marked her passing when she ceased to know us any longer. Tragically, that may precede death of the body by many years these days. My condolences.

I met Vicky Weintraub on the coal geology field trip before GSA and we hatched the idea that she would come for a visit. I'm always delighted to show off Colombia and perhaps, one of these days, I'll interest someone in working there too. She wanted to visit the cloud forest and I could use an extra pair of hands in setting up plots for a project I'm planning, which deals with the distribution of several species within the tree fern genus *Cyathea*. Eventually, this little project will be the catalyst for the PhD thesis of a Colombian student, Patricia Sánchez B., I've been working with informally for a year and a half. She has applied to various universities, including Harvard and Berkeley, so we'll see where she lands. Her particular interest is developing a population model and molecular phylogeny for the Andean species and using that to shed light on the evolution of some of the ecologies. My contribution is more on the ecological end and so she might be better off at Harvard working with Michael Donoghue on the phylogenetic aspects. We'll see what happens.

My own work has come to a grinding halt while I wait to have my visa sorted out. I've finished all the writing/submitting of papers I can do here and have prepared all the palynological samples I brought back. Now it's just waiting. Since I didn't plan this lengthy stay, I didn't bring reference materials (or clothing) that I need, or manuscripts in preparation that I might productively work on---alas. The problem is a comedy of errors and folks not doing what they were supposed to when they were supposed to do it; this is coupled with a very recalcitrant Colombian Consul in Boston. I'm still waiting for two documents, police record reports, and then for the Consul to make a decision. She, of course, has latitude to resolve this problem at any time she chooses, but wants to make sure that everyone is quite sure that she's in charge. I don't think it's particularly

personal, but there may be a touch of PhD-envy. It's been *very* frustrating and a challenge toward me keeping my temper--diplomacy training. I hope that it will all be resolved within the next few weeks, but it could drag on almost indefinitely.

The offer of my hosting a visit to Colombia still stands open until the end of May 1994 and after that you would always be welcome on future field trips. We will have to stay in touch and find some time for you to see South America. I would also be delighted to collaborate with you on another project. If you have any particular ideas, please let me know; I'll keep my eyes open as well.

Do take care and please give my very best to Betty and Carmen Moy, who I chatted with at the Penn State reception at GSA. It was wonderful to see her again. Luck with all your work and please reserve a copy of the new book for me.

With very best wishes,

Nan Crystal Arens

THE PENNSYLVANIA STATE UNIVERSITY
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PALYNOLOGICAL LABORATORIES
435 DEIKE BUILDING
UNIVERSITY PARK, PA 16802, USA
Phone: (814)863-3419; Fax: 814-863-7823

14 November, 1993

Nan Crystal Arens
Botanical Museum, Harvard University
26 Oxford St.
Cambridge, MA 02138

Dear Nan:

Yours of 20 Oct. has been sitting here far too long. It's been a difficult time. The page proofs for the new book came in early Oct. 600 pp. is a lot of proofing, if you do it right (one person reading aloud, the other following every word with a ruler). Then Betty's mother entered the final struggle of her long existence. She finally expired on 4 Nov. We never were able to educate the folks in the nursing home that it wasn't necessary to wake us every night at 3:00 a. m. to report that dear Mother was a little worse. We are just back from Indianapolis, where we took care of everything necessary, organized a funeral, etc. Strange experience. The mother-in-law I knew and loved actually expired in stages, beginning about 15 yrs. ago. She hasn't known either of us for years.

Your field area and your plans to work in it sound fascinating. I met recently an incoming grad student, Vicky Weintraub, who says she knows you and will be visiting you down there.

Well, the book problem and the mother problem, among other things, have shattered my Fall plans since my letter of August, and there is now, rats, no chance of getting away from here next month. I sure appreciated the invitation and am wondering once again if I'll ever see S. A. I'd love to have another joint project with you one of these years. The last one was sure fun.

All the best.

Yours very truly,

Alfred Traverse

P.S. a colleague of yours visiting a student of mine in our lab told me yesterday that you have visa problems and are in fact in Cambridge. I'll send this there. It was originally addressed to S. A.

Nan Crystal Arens
A.A. 33659
Cali
Colombia

20 October 1993

Dr. Alfred Traverse
Palynological Laboratories

Dear Alfred:

Thanks for your letter of 15 August. Unfortunately, it arrived in Cambridge after I had left, so I just received it when I returned to Boston for GSA. The Cali address will be effective from 1 August 1993 to approximately 15 June 1994 but I'm sure things would be forwarded after that. Berkeley will receive mail for me anytime but the particular address I sent will only be effective for another eight months or so until they move in to the new building, which is shiny new and supposedly earthquake safe. I would imagine they would forward mail as well, but it's hard to know. My ambiguity was partially out of just not knowing precisely myself!

My work in Colombia is going well. Immediately before returning to the States, I managed to get into the field to look at the major Cretaceous-Tertiary section in the north, with which I will be working. I spent about ten days walking outcrop, collecting, and getting a sense for geological and structural relationships within the sequence of about 3,000 m. The exposure is actually a lot better than I expected, although far from perfect. I will see within a few hours how productive the samples are. I "grab" sampled throughout the sequence to get a better handle on age-relationships within the section, which are very poorly known at this point. The coal mine around which I was working was spectacular and the geologists were incredibly helpful and kind. When I return to Colombia, I'll be visiting several other correlative sections farther south, which, together, should make a nice story. Amid all of this, I'll be prospecting for megafossil localities, because I think it would be interesting to look at leaves and pollen in tandem throughout the Cretaceous, if possible.

I also have two tree fern projects running at the cloud forest reserve (La Planada) in Nariño where I worked for my thesis. I'm collecting data on leaf demography to try to devise a way to age stems using leaf scars. I don't know whether it will work, but it's worth a try. I've also set up a series of plots in regenerating forest of different ages to record how species composition within the five *Cyathea* species changes during regeneration. That should be an interesting bit of the puzzle to add as well. In addition to contributing to the small pool of knowledge about the ecology of this genus, I'm learning a lot about how these plants respond to the disturbance mosaic, which will, I hope, give me better insight into thinking about ancient ferns etc. Besides, I'm enjoying the forest tremendously!

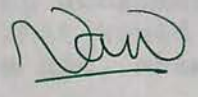
The only down side to all this is that the area has recently become more interesting for one of the guerilla factions. They have branched out to growing poppies as a way to raise money and the indigenous peoples around the reserve have lots of unexploited land in which they (the guerilla) would like to do it. I haven't heard any news for a couple of weeks, but there was certainly a lot more tension and activity the last time I was there. I'll be going out there as soon as I return in November (first week, I hope) so I'll be able to see for myself.

I'm back in the States for a little less than three weeks, which includes a trip to Berkeley to see my new lab and get to know the area a bit, a GSA field trip, the meeting, and a little work time here and there. I'm trying to get a couple of papers submitted, some library work done, and my new samples prepared. I certainly can't complain of being bored.

Actually, altitude probably won't be too much of a problem in visiting Colombia if you are interested in seeing forest. Bogotá is at about 2,800 m but La Planada (the reserve) is at 1,800 m. I sometimes have trouble with altitude--don't feel well--for a couple of days when I arrive in Bogotá but I've never have trouble at La Planada. I'm actually quite sensitive to altitude and tend to be totally incapacitated above 3,000 m. As to time: December would be fine. My time is basically my own these days and although I'm working hard, my schedule is quite flexible. Just let me know when you would like to come, what you would like to see, who you would like to meet etc. and I'll do my best to arrange things.

I hope you are all well there and having a productive semester. Please give my best to Betty and the crowd. I hope to hear from you soon.

Best wishes,



Nan Crystal Arens

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Phone: (814)863-3419; Fax: 814-863-7823

15 August, 1993

Nan Crystal Arens
Botanical Museum, Harvard University
26 Oxford ST.
Cambridge, MA 02138

Dear Nan:

Thanks for the (as usual) very interesting letter of 9 August.

I can't believe I misspelled Colombia, if I did. I was the one who was responsible for Jansonius having to correct dozens of his cards, where that error was made. Hmmm. Did you know that the Discoverer's name in English would be Chris Pigeon?

The invitation to visit you in Colombia is very generous and very interesting. I suppose I might have altitude problems, come to think of it, as I note that Bogota is at about 9,000 ft., and I fear that your field station is even higher? I remember an AASP meeting in Colorado at 10,000 where I didn't sleep very well, but I wasn't there long enough to get acclimated. As to time, what are you doing about December? That would be the only time I could very well get away as I am not, ahem, retired.

The rest of your letter is fascinating, about your plans, etc. At the foot of the letter you give two addresses, for Colombia and for Berkeley, but there are no dates associated with same. Maybe you could drop a postcard indicating those more or less precisely, or just saying that the above address will always result in appropriate forwarding.

All the best.

Yours very truly,

Alfred Traverse

Medullosa

Nan Crystal Arens
Botanical Museum
26 Oxford Street
Cambridge, MA 02138
U.S.A.

9 August 1993

Dr. Alfred Traverse
Palynological Laboratories
Department of Geosciences
Deike Building
University Park, Pennsylvania

Dear Alfred:

Thanks for your letter of 4 August. If you would like to visit Colombia, please consider this an open invitation for the next ten months and beyond. I will be making frequent trips to the field station in Nariño where I did my tree fern work as well as spending lots of time collecting in the Andes so company is always welcome. American Airlines round trips on a tourist visa are only about $800 or 30,000 frequent flyer miles. Please do consider it.

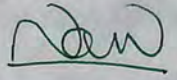
Actually, my love affair with Colombia (FYI--note correct spelling of the country as opposed to the English version "Col*u*mbia" as in University) began before I met Cristián, but it has certainly been enhanced since. He is indeed Colombian although his mother is from the States and he holds duel U.S. and Colombian citizenship. He is a conservation biologist with a primary expertise in Andean plant ecology. He did his PhD here (1992) with Peter Ashton and we got to know each other in the department. We've been "involved" for about a year and a half, although we met shortly after I arrived in 1988, at which time he was departmental Graduate Student Representative. He's currently working for a conservation N.G.O. in Colombia and doing regional, national, and international conservation and environmental policy, and a little biology on the side. He misses science and academics (in the U.S.), hence (part of) his interest in coming to California with me. It will be a difficult move for him to give up his job there and move to the States so it's a hard call whether he'll do it. We'll certainly have a lot to talk about in the next year or so. The only real down side to this relationship is that his cousin is likely to be the next president of Colombia (election in April 1994) and that makes us a little more "high profile" than I would like. Oh well--I guess it's really no more dangerous than driving to work every day!

My post-doc work will be focusing in three areas. First (and the actual *funded* part) will deal with looking for a K-T boundary crossing section that is complete. Once located, I would like to look at what was happening with the vegetation there. We know a lot about the consequences of the "event" on western North America, and have extrapolated globally from that and some other scattered and not always high-quality data. I'm interested in looking in detail at what was happening at tropical latitudes that are about as far from the big crater at the well-studied North American localities. My check into this is the experience at Joggins looking at ecological-time scale things in ancient material. Second, there is an amazing upper Lower Cretaceous through Eocene section in the eastern Andes that is quite rich in plant fossils and quite unstudied. We've done a lot of arm-waving about angiosperm evolution in the tropics but haven't had a chance to look. This will be a big switch for me, but this is also a long-term project that I hope to involve a lot of people in. It's going to be hard to keep working in the Pennsylvanian if I'm situated on the west coast, and this is such an unexploited gold mine of information that it's hard to pass up. E.O. Wilson is fond of saying that part of being successful in science is stumbling on a novel project and sticking with it--perhaps this is my novelty. Third, I want to do some more ecology and natural history on the tree ferns I worked with for my thesis. I've discovered that we don't know a whole lot about them and should if we are going to hope to generalize about *plant* ecology, rather than calling angiosperm ecology "plant ecology." I'm going to start by looking at leaf demography as a vehicle for looking at whole plant demography (as it appears, though not demonstrated, that leaf production is seasonal--hence, one can age the plants by counting whorls of scars). This, too, will be on-going, and I'm already working with one Colombia woman. I'm sure that more things will surface as I look around more, but that will certainly keep me out of trouble and in the journals for a while. Cretaceous and/or tropical stuff is also a little more fund-able these days. That sort of stuff shouldn't be a consideration in selecting a research area, but we, unfortunately, live in a less-than-ideal world.

I will be keeping a journal while I'm in Colombia and I've actually toyed with the idea of trying to publish excerpts from it in some form. It certainly should be interesting reading if nothing else. In the meantime, I've attached my Colombia and Berkeley addresses so we can keep in touch.

Best wishes with everything, have a productive semester, give my very best to everyone there--especially Betty. Please do keep in touch!

Best wishes,



Nan Crystal Arens

A.A. 33659
Cali
Colombia

Department of Integrative Biology
345 Mulford Hall
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Berkeley, CA 94720

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4 August, 1993

Nan Crystal Arens
Botanical Museum, Harvard
26 Oxford St.
Cambridge, MA 02138

Dear Nan:

Thanks for yours of 26 July and the huge pile of news it contains! I can hardly believe I know somebody as adventurous as you. I'm admiring and just a little envious of all the great things you are up to. Heavens, I've never even managed to GET to South America, though I'd love to!

I read between the lines that your boyfriend is Colombian and that his existence may help to explain the love affair with Columbia. What does he do? The two of you seem to have little trouble with, ahem, funding.

The vacation trip sounds marvellous. Hope a snake or broken arm doesn't get you or whatnot--you'll be a long way from the nearest emergency room.

I look forward in due course to hearing more about the post-doc work.

We hope you do stop here enroute to CA next June, assuming that we're here (sometimes go up to the Adirondacks at that time for a few days). We'd like you to stay with us at "Alphabet," if you like.

Summer here has been very busy. We took a frivolous trip to LA in July to celebrate our wedding anniversary. Used frequent flyer tickets generated by Betty's incessant trips to Indy about her mother. Have got several manuscripts completed. Etc.

You're a fun person to know. All the best.

Yours very truly,

Alfred Traverse

Medullosa

Nan Crystal Arens
Botanical Museum
26 Oxford Street
Cambridge, MA 02138
U.S.A.

Tel. 617-495-7602
FAX. 617-495-5667
e-mail. arens@husc.bitnet

26 July 1993

Dr. Alfred Traverse
Palynological Laboratories
Department of Geosciences
Deike Building
University Park, Pennsylvania

Dear Alfred:

Just a quick note to let you know that I passed my thesis defense on Friday, 23 July. Somehow I can't quite believe it. I'm now working on getting my thesis revisions finished and some of the manuscripts out before I leave. On 13 August I'm headed to Colombia for a little vacation and to begin my post-doc on 1 September. I can certainly use the break.

We (my boyfriend, Cristián Samper, and I) are planning to spend a week in Las Islas del Rosario in a house on one of the islands north of Cartagena. The house is owned by a friend of Cristián's and apparently comes complete with air compressor so I'm hoping to spend a large chunk of that time scuba diving. The reefs are spectacular and largely untouched by divers despite their proximity to the mainland. Then we are going to hike to the "Lost City" of Santa Marta which is the largest Precolumbian city known in the Andes. It was only discovered about 20 years ago on a mountain (Santa Marta) near the coast (actually near one of my field areas); archaeological study is still on-going. They believe that it was probably abandoned at about the time of the conquest but nobody knows for sure. All the stone work is still in place and undisturbed, but the city has been overtaken by primary forest, which should be just beautiful. It's a three-day hike in, you stay for a day or two, and then a three-day hike out. You hire a guide with a mule so that you don't have to carry your own packs---just walk up hill. I'm really looking forward to that because it's someplace that very few (relatively speaking) people have ever seen in person. It is possible to take a helicopter in and just stay for the day, but I told Cristián that I would rather hike and make a real adventure of it. Besides, we'll get to see more of the forest that way.

I'll check in for my post-doc on 1 September and it will probably take me another couple of weeks to organize my first field trips. Things move more slowly as one gets closer to the equator. I'm hoping to have some preliminary data--or at least a better idea of the stratigraphy--by the time I come back for GSA in October.

I hope you are having a productive summer. Please give my best to everyone there. If I don't see you at GSA, I may try to stop in State College on my way to California with my worldly possessions next June. In any event, I hope to have a chance to visit with you at some point.

Best wishes,

Nan

Nan Crystal Arens

Addresses for the next year and beyond...

Nan's Itinerary 1993-1994

Well, I'm off. I'm really going to miss you all a lot and I hope we can keep in touch. Here are my travel plans and addresses for the next year or so...

13 August - 12 October Bogotá and Cali, Colombia

Address: Nan Crystal Arens
A.A. 33659
Cali
Colombia

Tel. 011-57-23-891930 (home)

13 October - 1 November U.S.A. (I'll be based in Boston for GSA, making a short trip to California, and taking a GSA field trip into the Appalachians)

Contact: Botanical Museum
26 Oxford St.
Cambridge, MA 02138

Tel. 617-495-7602

1 November 1993 - Early June 1994 Bogotá and Cali, Colombia

I'll be back in Boston for a week or so in June and then I'm Goin' West. My departmental address at Berkeley will be:

Department of Integrative Biology
345 Mulford Hall
University of California
Berkeley, CA 94720
U.S.A.

Take care and Keep in Touch!

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2 May, 1993

Nan Crystal Arens
Botanical Museum
26 Oxford St.
Cambridge, MA 02138

Dear Nan:

Yours of 26 April was indeed good news! Congratulations! I am sure my letter didn't hurt. Don't know if I ever mentioned it before, but in 1957 I was considered for the ancestor of that job. I was there a week and gave a bunch of lectures. I don't know if I would have gotten the job, because after considering what the salary would have been ($7500--I was making $16,000 at Shell, which allowing for inflation is more than I now make here.) and a brief look at expenses in the Berkeley area I couldn't see it and took myself out of consideration. But I loved the place.

So, get the thesis done and get on with it. All the best.

Yours very truly,

Alfred Traverse

Medullosa

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e-mail. arens@husc.bitnet

26 April 1993

Dr. Alfred Traverse
Palynological Laboratories
Department of Geosciences
Deike Building
University Park, Pennsylvania

Dear Alfred:

Just a short note to pass along some good news. I received a call from Jere Lipps last week and I have been offered (and plan to accept) the Berkeley job. Needless to say I'm still in shock, but very excited. It's all quite overwhelming. They are also encouraging me to take a first year's (unpaid) leave to do a post doc and I'm currently trying to scrape some money together to spend a year in Colombia getting my projects going there. I'm still waiting to hear on the NATO post doc, but the other two were unsuccessful.

I'm planning to defend in late July and am on schedule toward that. I've got a lot of work ahead in the next months, but it's "do-able" as they say. Knowing that I have a place to land after I finish has really helped morale toward getting the thesis done.

I hope you are all well there and that your semester has finished successfully. We are just in our last week of classes. I hope also that you are enjoying the long-awaited spring; I certainly am. This winter seemed unusually long. Please give my best to everyone there.

Best wishes,

Nan

Nan Crystal Arens

Medullosa

Nan Crystal Arens
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25 February 1993

Dr. Alfred Traverse
Palynological Laboratories
435 Deike Building
University Park, Pennsylvania

Dear Alfred:

Thank you for your letter of 19 February. Eighteen students seems a little more realistic to me. There doesn't now exist a specific cut-off for number of students in a paleobotany section. In our case, there just isn't physical space to fit that many bodies in the room allowed us. It also makes life a lot easier for me during the lab session, as people aren't always cued up three deep to have questions answered. In this case, getting the second section is the one advantage of your advisor being chair of department.

With respect to Colombia...yes, car bombs do kill innocent bystanders. However, I would be willing to bet that in a given year more people die on Route 95 between my home in Bedford and Cambridge. I've nearly been taken out twice on that stretch of highway, and given that I drive a rather ramshackle Ford, an accident at highway speed would undoubtedly kill me. The message, I suppose, is that there are risks in life no matter what and the best one can do is try to be careful. I personally am a lot more afraid of the highway in Massachusetts than I am of Bogotá--all it's troubles considered. But then again, I wouldn't willingly go to New York City either!

Just finished the palynology (biostratigraphy) exercise in paleobotany lab. I'd say that we had about 75% success--inevitably there are people who can't follow even the most detailed instructions when they get into the lab. With only one shot in the wet lab and a few hours at the microscope, it's unrealistic to expect perfection. My goal is mainly to expose the students to the technique and it's potential. That was 100% successful!

I'm glad to hear that you heard from Carlos Jaramillo. I hope something can be worked out. I am, however, a little concerned that his research interests sound

similar to mine, particularly since they certainly weren't when I talked to him the first time, and I did discuss my proposed projects with him. I suspect that it's just that he's something of a sponge at this stage and may take me to be a model of what one does in palynology in the States (bad first assumption!). I'm trying to keep in touch with him and will perhaps be a little more careful with my ideas until I'm more firmly established.

I hope you are enjoying the snowy weather. I haven't made it out cross country skiing yet; that's my winter love. However, it's been a very busy month since I arrived back in the States. Perhaps I'll make it out before the thaw.

All my best to you and everyone there.

Very truly yours,

Nan

Nan Crystal Arens

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19 February, 1993

Nan Crystal Arens
Botanical Museum of Harvard University
26 Oxford St.
Cambridge, MA 02138

Dear Nan:

Thanks for yours of 12 Feb. But are you pulling my leg or what? I meant 18 students, not 18 sections, of course. I just meant to illustrate that there didn't seem to be a cutoff beyond which I would have had two sections.

I still tremble when I hear about you going to Colombia. Car bombs can take out innocent bystanders, nicht wahr?

Took yesterday off and worked on income taxes (ugh), plus plowing and digging out from our most recent storm. I left one side of the lane unplowed for my sled. It's .2 mi. from garage to mailbox, mostly down and very winding. Marvellous sled run. I seem to recall that my best time is 14 seconds! That's moving.

Biodiversity. Fascinating subject. I especially like the historical perspective. Something like 10x as many plant species in Pennsylvania as in Germany! The reasons are totally unrelated to the present environment.

All the best.

Yours very truly,

Alfred Traverse

P. S. Since typing the above, I've had a letter from Carlos Jaramillo, as you indicated might happen. Says he'd like to study here. I am writing him to say that I'd love to have him here, if it can be arranged. If he could work on Colombian material, I'd like that too--sounds like a good opportunity. The things he wants to do sound very similar to what you mentioned as possible research projects in S. A. for NCA. Hmmmm.

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26 OXFORD STREET
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12 February 1993

Dr. Alfred Traverse
Palynological Laboratories
435 Deike Building
University Park, Pennsylvania

Dear Alfred:

Thank you for your letter of 8 February. I just got word today that Georgia has received my letters and that my application is complete. Now, I suppose I just have to wait. Thank you again for all your help. I haven't heard a peep from Berkeley, but I trust my material arrived there too. I suspect, despite the ad that said they wanted someone in place by 1 July, that they aren't moving too fast. They apparently haven't even appointed a chair of the search committee. In my mind, that doesn't speak too highly of the department. We'll see what happens.

Eighteen sections in paleobotany! Wow! We have gotten two for the course this year with the appropriate increment in pay for me. I'm feeling more financially secure now. It may also make it possible to accept the invitation to give a talk (informal job talk, I think) at La Universidad de Antioquia (in Medellin, Colombia) in March. I'm still wavering, but they offered to help pay for part of my trip, which will help.

The Biodiversity seminar is also looking to be interesting. I'm still formulating my essay topic, but I think it's going to be a commentary on the ecological closest packing model for biodiversity and why it's not supported by paleontological evidence. The biodiversity perspective is still relatively new to me so I'm still in the process of un-muddling my thinking.

I hope you are all well. Take care and please keep in touch.

Best wishes,

Nan

Nan Crystal Arens

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8 February, 1993

Nan Crystal Arens
Botanical Museum of Harvard University
26 Oxford St.
Cambridge, MA 02138

Dear Nan:

Thanks for the interesting letter of 4 Feb. I'd love to go to Colombia some day--you certainly are a good salesperson for it!

Two lab sections sounds like a good idea. However, I think I had as many as 18 when I was the TA. It met in a huge room in the basement of the Museum. Jane Gray was in the class one of the years. That was an experience.

Best wishes.

Yours very truly,

Alfred Traverse

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4 February 1993

Dr. Alfred Traverse
Palynological Laboratories
435 Deike Building
University Park, Pennsylvania

Dear Alfred:

Thank you for your letter of 1 February and for sending along letters of recommendation. To be quite honest, I doubt that I'll get past the first cut on an academic job at this point in my career (*i.e.*, my thesis publications aren't out yet and I'm academically very young--no post doc), but I suppose there's no harm in applying. I will have some experience with the process when (and if) I do this for real some day.

The reference for the reprint (Arens, 1991) is below; you can just clip it off and attach it to the Xerox. Sorry for the confusion, I've corrected the oversight on my master. Thank you for pointing out the mistake.

You definitely must visit South America one day. Colombia is rapidly becoming one of my favorite places, in spite of all the political and social problems. It is a very culturally rich country with many treasures for a botanist and paleontologist. Knowing that there are cloud forests is what sustains me through this very long winter of thesis writing.

I don't know what financial resources might be available to Carlos Jaramillo, the student I mentioned. I honestly don't know how serious he is about coming to the states for graduate work at this time. However, I suggested that he write to you and inquire. My philosophy is that there's no harm in asking. Also, Latin America operates on a system of connections and introductions, so it is important for him, more so than for you, to know that I've mentioned his name to you before his letter arrives. Does that make sense?

Andy is teaching paleobotany again this semester. He hadn't planned to teach at all this year as he just took over as head of department. However, when I started making noises about graduating, he decided that he had best get another semester out of me. We expected about 10 students and got 22! Needless to say, we now have a problem because the lab room can only hold 10 people at a time. We will see how many actually enroll and then I'm going to start negotiating for another lab section and the accompanying increase in pay. I'm in a good position because there is no one else here who could pick up and teach the course. I also did triple duty the last time the course was offered without appropriate

compensation so the department owes me (my perspective, of course). We'll see what happens. It's particularly good to see so much interest in paleobotany! The course got very good "reviews" last time and I think that's contributing too.

Well, I must close for now. This semester I'm attending E.O. Wilson's new seminar on Biodiversity as well as Spanish--the initial meetings for both are this afternoon and I must take some time to prepare. Then, of course, there's my thesis... Work is actually progressing well if more slowly than I would like, but that's always the case. I'm starting to feel the pressure, however, and I hope that I find a way to hold up through the next six months.

Best wishes to all!

Yours very truly,

Nan

Nan Crystal Arens

Arens, N.C., 1991, Wildfire in the Paleozoic: Preliminary results of a case study on the fire ecology of a Pennsylvanian clastic swamp forest, Joggins, Nova Scotia, Canada. In: S.C. Nodvin and T.A.Waldrop (eds.), Fire and Environment: Ecological and Cultural Perspectives: Asheville, North Carolina, Southeastern Forest Experiment Station, p. 279-288.

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1 February, 1993

Ms. Nan Crystal Arens
Botanical Museum, Harvard University
Cambridge, MA 02138

Dear Nan:

It's always a joy to hear from you!--even when it involves work!

Let's see, there are a lot of things to deal with. First of all, while I am thinking of it: your xerox-reprint contains no literature ref. for it. Go at once to the master from which you make the copies and insert the ref. Also send me a postcard with the info, so that I can write it in on my copy.

We did have a nice Xmas break. John and family were here from Memphis, and Celia and new husband and boy, and Martha and boy, live locally. We had nice times. I taught 9-yr.-old Anna, the oldest grandchild, to play a very acceptable game of cribbage, which is one of my few nonsensical diversions. It's a family disease on my mother's side.

Wow! Another month in Colombia. I must visit South America one of these years. I am now a Korrespondierendes Mitglied der Senckenbergischen Naturforschende Gesellschaft (there are only about twenty at a time), a distinction once held by Charles Darwin. How could I tell him I've never been to S. A.?

Yes, if the right person is out there, I am more than willing to take on another grad student. I have no plans to retire. However, I also have no grant. The student must come with his/her own money or be so good that the department or university will offer support.

I will take care of the recommendation letters as soon as I finish with this missive. Curiously, I just finished typing up a letter for the job at Georgia for Bruce Cornet. You provide them with a quite different choice! You would love the CA job. Friedman at Georgia has lectured here several times, on his work with cycad and Ginkgo pollen.

Now I'd better terminate this and get on with the two recs.

Best regards.

Yours very truly,

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1 February, 1993

Chair, Paleobotany Search Committee
Department of Integrative Biology
University of California
Berkeley, CA 94720

Dear Friend:

This letter is to support the application of Nan Crystal Arens, a doctoral candidate (near defense) at Harvard, for your position in paleobotany.

Ms. Arens was an undergraduate advisee of mine here at Penn State. She was simply an outstanding student, with many interests and great fun to have around. She was even at one time the editor-in- chief of our large, daily campus newspaper. She also found time for undergrad research, including a study by her and me on the effect of microwaving on pollen, which was later published in Taxon.

Nan is almost incredibly energetic, hard-working, and innovative. Her interest in natural phenomena is genuine and infectious. I would dearly have loved to have her as a Ph. D. student here, but I encouraged her to go to Harvard to study with Andy Knoll, and I was responsible for him taking her. As I told Andy, in my 27 years at PSU I have only ever had one other student at any level who is Nan's peer in ability, originality, and commitment to science. Her work on wildfire and charcoal in sediments has been most interesting. Her proposed research on the K/T boundary in South America, which has already taken her to that continent three times, is a potential big winner. She is a keen observer and marvellous lab technician. She is a fine teacher and lecturer. She gave, for example, a very well received lecture here on her charcoal research vis a vis oxygen in the atmosphere last year. Many people thought it the best lecture of a program with about six others, all senior people.

In brief, Ms. Arens is a unique talent whom you would be very lucky to get. She would grow with your department and, I am sure, develop research programs in collaboration with others. Her courses in palynology and paleobotany would soon become standards. I hear from colleagues at Harvard that her work as teaching assistant in their courses in these subjects has been outstanding.

Best wishes in your decision.

Yours very truly

Alfred Traverse
Professor of Palynology

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1 February, 1993

Dr. William E. Friedman
Chair, Search Committee
Department of Botany
University of Georgia
Athens, GA 30602

Dear Dr. Friedman:

Having just sent off to you a letter about Bruce Cornet, who is an unusual older candidate for your opening in plant structure, etc., it is odd that I received this morning a request for the same thing for Nan Crystal Arens, a Ph. D. candidate at Harvard in the very last stages of completion.

Ms. Arens was an undergraduate advisee of mine here at Penn State. She was simply an outstanding student, with many interests and great fun to have around. She was even at one time the editor-in- chief of our large, daily campus newspaper. She also found time for undergrad research, including a study by her and me on the effect of microwaving on pollen, which was later published in Taxon.

Nan is almost incredibly energetic, hard-working, and innovative. Her interest in natural phenomena is genuine and infectious. I would dearly have loved to have her as a Ph. D. student here, but I encouraged her to go to Harvard to study with Andy Knoll, and I was responsible for him taking her. As I told Andy, in my 27 years at PSU I have only ever had one other student at any level who is Nan's peer in ability, originality, and commitment to science. Her work on wildfire and charcoal in sediments has been most interesting. Her proposed research on the K/T boundary in South America, which has already taken her to that continent three times, is a potential big winner. She is a keen observer and marvellous lab technician. She is a fine teacher and lecturer. She gave, for example, a very well received lecture here on her charcoal research vis a vis oxygen in the atmosphere last year. Many people thought it the best lecture of a program with about six others, all senior people.

In brief, Nan is a complete contrast with Dr. Cornet, for whom I wrote recently. Ms. Arens would develop a program at Athens that would from the start mesh in with the research of others there. She is also a very appealing person who will have instant rapport with your students. You should give her very serious

consideration.

Enjoyed your lecture here on Ginkgo pollen several years ago.

All the best.

Yours very truly,

Alfred Traverse

BOTANICAL MUSEUM OF HARVARD UNIVERSITY

26 OXFORD STREET
CAMBRIDGE, MASSACHUSETTS 02138

25 January 1993

Dr. Alfred Traverse
Palynological Laboratories
Department of Geosciences
Deike Building
University Park, PA

Dear Alfred:

I hope you had a pleasant holiday and that the new semester is off to a good start. I just returned from a month in Colombia--mostly visiting friends this time, but I did have a chance to get into the field a little bit and made many new contacts. In fact, I met an old palynology student of yours, Jaime Reyes, who was a masters student in the department several (~ 15) years ago and took the course with you. He sends his best wishes. I also met a recently graduated (B.S.) geology student who is interested in graduate work in palynology. I suggested that he contact you. His name is Carlos Jaramillo. I don't know whether you are interested in new students at the moment, but he seems like a very motivated and promising guy. If you are interested, I have a copy of his B.S. thesis publication and can tell you more about him.

I hate to bother you again, but I'm applying for two jobs (paleobotanist both, one at University of Georgia and the other at Berkeley) and would appreciate letters of evaluation from you. As I've said before, in many ways you probably know me better than Andy does. To help, I've enclosed copies of the announcements, my current C.V., my statements of research and teaching interests, and the only reprint I have yet from my PhD work. Unfortunately, I've chosen a thesis where the answers (and thus the publications) come at the end. I should have three and perhaps four papers out this year.

Letters of evaluation should go to the following addresses. I've also noted the closing dates on each of the searches. I apologize for the short notice, but the ads came out just before I left for South America and I only arrived back a few days ago.

Chair
Paleobotany Search Committee
Department of Integrative Biology
university of California
Berkeley, CA 94720

Closing date: 29 January 1993

Dr. William E. Friedman, Chair
Search Committee
Department of Botany
University of Georgia
Athens, GA 30602

Closing date: 1 February 1993

Thank you so much for your help. Please give my very best to everyone in the lab and especially to Betty.

Very Best Wishes,

Nan Crystal Arens

BOTANICAL MUSEUM OF HARVARD UNIVERSITY

26 OXFORD STREET
CAMBRIDGE, MASSACHUSETTS 02138

31 October 1992

Dr. Alfred Traverse
Palynological Laboratories
Deike Building
University Park, Pennsylvania

Dear Alfred:

Enclosed is the final draft of the Guajira K-T boundary proposal to NSF. As you can see, it has changed quite a bit from the draft that I sent to you earlier, thanks to a few comments from Andy. Thank you again for your help and letters of recommendation. I'm now in the process of polishing up the NATO proposal. As I mentioned before, the NATO is to work on the same basic project, but will only encompass the first phase of biostratigraphic work-up of the sections as the NATO only offers one year of stipend.

Although it has been very interesting to think about something different for a while, I'll be glad to get back to work on the thesis when all the proposals are in the mail and midterms (taking and grading) are finished. Both of those things will happen toward the end of next week.

I hope you are well. Please give my best to everyone there.

Best wishes,

Nan Crystal Arens

The Effects of the Cretaceous-Tertiary Boundary Bolide Impact On Tropical Plant Communities: A Palynological and Carbon Isotope Study, Guajira and Cesar, Colombia

Nan Crystal Arens

Environmental Collapse at the Cretaceous-Tertiary Boundary

In the decade that followed Alvarez's *et al.* (1980) proposal that a bolide impact caused the terminal Cretaceous extinctions, a grim picture of global catastrophe has emerged. Primary productivity in the oceans ceased (Zachos *et al.*, 1989). Dust obscured the sun and brought a killing freeze to mid and high latitudes (Wolfe, 1991). Global wildfires consumed vegetation (Wolbach *et al.*, 1985). The Earth was drenched in sulfuric acid rains (McKinnon, 1992). Standing vegetation was destroyed (Nichols *et al.*, 1986; Nichols and Fleming, 1988) and terrestrial ecosystems collapsed. Carbon dioxide added to the atmosphere triggered a greenhouse warming of up to 10C (O'Keefe and Ahrens, 1989; Wolfe, 1990) that disrupted climate patterns for thousands to a million years. Cretaceous biological communities were ripped apart and major extinctions resulted. The survivors were the foundations of Tertiary biodiversity.

Our picture of global catastrophe in terrestrial ecosystems comes primarily from well-studied boundary sections in western North America. The proximity of this region to a proposed secondary impact site (Manson Crater, Iowa) and its position in the mid to high latitudes raises questions about how general these conclusions may be. How much can North American sections tell us about the impact's effects on centers of biodiversity and tropical cradles of Tertiary evolutionary radiations? Perhaps very little. If we are curious about the impact's effects on the neotropical terrestrial biosphere, then we should look to South America for answers. Until now, however, few appropriate sections have been available for detailed study.

Cretaceous-Tertiary Sediments of Northeastern Colombia

In the Guajira and Cesar regions of northeastern Colombia (Figure 1), a thick section of Late Cretaceous and Early Tertiary sediments is preserved (Figure 2). Most Middle and Late Cretaceous rocks are marine, consisting of shallow-shelf carbonates and organic-rich shales. Orogenic uplift began during Late Cretaceous time and many regions changed to marginal marine or fully terrestrial deposition in the Maastrichtian and Paleocene. The proximity of these sections to the proposed primary impact site, Chicxulub Crater in the Yucatán of México (Pope *et al.*, 1991; Hildebrand *et al.*, 1991; Swisher *et al.*, 1992), makes these sections particularly interesting. With them we can compare tropical localities with those described in North America, which are approximately equidistant from the main impact site.

The age relations of most Cretaceous-Tertiary boundary sections in Colombia are poorly known. Two problems exist: (1) Most sections have not been studied in detail. While formations have been described and dated for geologic mapping and resource exploration, detailed stratigraphic study and correlation have not been performed. Since most formations are delimited by facies transitions and most transitions are time transgressive, only the broadest generalizations can be drawn from published biostratigraphic work. (2) Regional tectonic blocks behaved independently. Individual fault-bounded blocks made facies transitions at different times; thus, regional generalizations about the stratigraphic position of the Cretaceous-Tertiary boundary are impossible. For example, Thomas and MacDonald (1976) report no pre-Eocene rocks in the northern part of the Guajira Peninsula. However, Block B of the Rancheria Basin, about 100 km to the south, preserves 1,000 m of Paleocene sediments in the Cerrejón and Manantial formations and uppermost Maastrichtian rocks in the Hato Nuevo Formation (Camacho, 1981). In the adjacent block to the south, the Hato Nuevo Formation includes lowermost Paleocene rocks (Cardozo and Sánchez, 1985). In El Departamento Cesar, the Maastrichtian-Paleocene transition occurs in the Hato Nuevo Formation (Van der Hammen pers. comm. 1992). Elsewhere in the

region, Doubinger (1973) tentatively placed the Cretaceous-Tertiary transition within the terrestrial facies of the Cerrejón formation based on the absence of typical and ubiquitous Paleocene palynomorphs (particularly *Proxaperites operculatus*).

Descriptive work conducted over the last 60 years (much of it unpublished), strongly suggests that the record of the Cretaceous-Tertiary boundary event remains to be discovered in this region. Furthermore, exploitation of El Cerrejón coal reserves and further resource exploration in the region have recently made available new surface outcrop and drill core in the Rancheria Basin. Thus, I believe sufficient data are finally available to locate the Cretaceous-Tertiary boundary in northeastern Colombia. A systematic search for the boundary in northeastern Colombia is, therefore, most timely.

In the first phase of this project, I will study available surface exposures and drill cores to locate the Cretaceous-Tertiary boundary biostratigraphically in as many sections as possible within the Guajira/Cesar region. I will start with systematic palynological sampling at 10 m intervals, beginning in confirmed Maastrichtian strata and continuing to definitively Paleocene sediments. Samples will be processed using standard palynological techniques and will be correlated with palynostratigraphy developed by Van der Hammen (1954a, 1954b, 1957). These pollen zones are well established and correlate throughout the Eastern Cordillera, Cauca and Magdalena valleys of Colombia. Once the Maastrichtian-Paleocene transition has been thus bracketed, the sequence can be resampled at finer stratigraphic resolution to locate the boundary precisely. The biostratigraphic boundary should then be checked radiometrically and paleomagnetically, if possible. Iridium analysis will correlate a biostratigraphic boundary with the global iridium anomaly and with the other sections in the region. These analyses will be performed in collaboration with experts in Dr. Walter Alvarez's group at the University of California, Berkeley, my proposed host laboratory. This phase will also include detailed analysis of environments of deposition within the boundary-crossing sections and description of the boundary-event sediments.

The Impact's Effects on Neotropical Plant Communities

Throughout western North America, terrestrial sediments immediately above the Cretaceous-Tertiary iridium anomaly are devoid of angiosperm pollen and enriched in fern spores (Nichols and Fleming, 1988). This "fern spike" represented the first pioneers into an ecosystem wiped clean of vegetation by the bolide impact. Evidence of milder vegetation disturbance at the boundary was reported from India (Rawat *et al.*, 1988), Tunisia (Méon, 1988), New Zealand (Raine, 1988), and Seymour Island, Antarctica (Askin, 1988). Spicer (1989) speculates that tropical plant communities suffered even less disruption, but this hypothesis remains untested.

In lowermost Paleocene sediments of Guajira, Doubinger (1973) reported a horizon enriched in the spores of cyathean ferns--the same family that dominated the "fern spike" in Montana (Hotten, 1988). Writing before the bolide impact was proposed, Doubinger interpreted this horizon as a brief period of increased precipitation. However, unlike ferns of the tropical Polypodeaceae that generally indicate moist conditions, modern cyatheans prefer disturbed sites. Van der Hammen (1957) reported an increase in ecologically "resistant" groups in the basal Paleocene sediments throughout the Eastern Cordillera of Colombia, and attributed this anomaly to a significant but unknown environmental event. Neither of these observations have yet been correlated with an iridium anomaly, but they suggest that neotropical vegetation was indeed disrupted during the Cretaceous-Tertiary catastrophe. But, was tropical vegetation completely destroyed like that in North America? This question can only be answered by detailed study of a confirmed tropical-latitude boundary section.

In the second phase of this project, I will use high-resolution stratigraphic sampling and palynological analysis to examine the changes in vegetation at and above the boundary. The Guajira/Cesar sections are particularly appropriate for this type of analysis because of inferred high rates of sedimentation during Late Cretaceous and Paleocene time (Van der Kaars, 1983). Each centimeter of clastic sediment may represent as little as 50 years (Van der Hammen pers. comm. 1992). During my doctoral research, I have successfully used high stratigraphic resolution

sampling techniques and multivariate statistical analysis to reconstruct the response of Pennsylvanian-age plant communities to wildfire disturbance. The ecological time-scale perspective that I have developed during my doctoral work will clearly enhance analyses of Cretaceous-Tertiary boundary vegetation.

The Alvarez group does not operate a palynological laboratory, however, Instituto Ingeominas in Bogotá, in collaboration with Universiteii van Amsterdam, Amsterdam, The Neatherlands, has invited me to work in their palynological laboratory. Dr. Thomas van der Hammen, former director of Amsterdam's Hugo de Vries palynological laboratory believes that my proposed project is extremely important and timely (Appendix I). Both I and the project can profit tremendously from interaction with Colombian geologists familiar with the region. Furthermore, contacts I establish may facilitate fruitful future collaboration between U.S. and Colombian Earth scientists.

In addition to evaluating damage to neotropical vegetation at the Cretaceous-Tertiary boundary, the detailed palynological sampling and vegetation reconstruction that I propose may shed light on several important ecological and evolutionary questions:

(1) Post-impact Wildfires. While the soot from major Cretaceous-Tertiary boundary wildfires has been reported globally (Wolbach *et al.*, 1985), macroscopic charcoal clasts have been discovered only in western North America (Tschudy *et al.*, 1984). Nonetheless, some have proposed that 30% of the world's above-ground biomass was burned following the impact (Ivany, 1991). Using charcoal analysis (*e.g.*, Clark, 1990) and techniques developed by Wolbach and her colleagues, I will evaluate high-resolution stratigraphic samples for evidence of post-impact wildfire. Results of this analysis may shed light on the true extent to post-impact conflagration.

(2) Global Climate Change. From leaf physiognomic data, Wolfe (1990) proposed a post-impact temperature increase of 10C that lasted from 500,000 to 1 million years. Van der Hammen (1957) also proposed an Early Paleocene warming in the Colombian Neotropics. Assuming that this warming did occur, high-resolution palynological analysis may shed light on how neotropical plant communities responded.

(3) Spasms of Extinction and Bursts of Evolution. Students of angiosperm evolution agree that the tropics, and particularly the Neotropics, were the birthplace of flowering plants and the source of many subsequent waves of evolutionary diversity. However, we know virtually nothing about how these important communities responded to the Cretaceous-Tertiary boundary event. Spicer (1989) speculated that the tropics suffered fewer plant extinctions than higher latitudes. Indeed, the Colombian Paleocene is marked not by the loss of key taxa but by additions of many new forms (Van der Hammen, 1957). Spicer (1989) further suggested that post-impact climate changes may have accelerate angiosperm evolution in tropical regions. Van der Hammen (1957) reports the origination of many new pollen taxa in the Early Paleocene, but detailed work such as I propose is necessary to establish the timing of these originations relative to the boundary event.

Constraining Sources of Post-Impact Atmospheric Carbon Dioxide

The concentration of atmospheric CO_2 at least tripled following the bolide impact (Gilmore *et al.*, 1989; Hildebrand *et al.*, 1991), however the source of this carbon is disputed. Furthermore, a negative carbon isotope anomaly in marine plankton above the boundary (Zachos and Arthur, 1986) suggests that the added carbon was isotopically light. One source of this isotopically light carbon is the combustion of a substantial portion of Earth's vegetation (Gilmore *et al.*, 1989; Ivany and Salawitch, manuscript). Hildebrand *et al.*, (1991) countered that a large bolide impact in the Yucatán would have vaporized huge amounts of the underlying carbonate bedrock, thus accounting for much of the added CO_2. However, carbon from a carbonate source would be substantially heavier than that resulting from biomass burning. The question remains, what was the carbon isotopic composition of Early Paleocene atmosphere?

Carbon fixed by land plants directly samples atmospheric CO_2 at established average and plant-organ specific fractionation ratios. Therefore, $\delta^{13}C$ analysis of plant material provides a direct link to the atmospheric carbon pool. $\delta^{13}C$ curves developed from samples of land plant biomass

isolated from high stratigraphic resolution samples could provide information about the isotopic composition of atmospheric CO_2 immediately after the bolide impact, and thus constrain speculation about the carbon source. In the third phase of my project, I plan to perform $\delta^{13}C$ analyses on samples of land-plant biomass isolated from high stratigraphic resolution samples. Where available, coal is the obvious first choice for such samples; cuticle and vascular tissue can also be isolated from clastic sediment by maceration. However, these techniques remain to be developed and tested. The Alvarez group offers me connection with light isotope laboratories where I can work with experts on this type of analysis.

Conclusion

Our concept of the terminal Cretaceous bolide's effects on terrestrial ecosystems comes largely from detailed work in western North America. This research has changed our image of the Cretaceous-Tertiary transition from one of slow climate deterioration to that of sudden devastation. The North American mid latitudes cannot, however, answer crucial questions about the bolide's effect on terrestrial flora. For example, were tropical forests also completely destroyed by the impact and its killing after-effects? If disruption was less severe in the tropics, which taxa were killed by the bolide and which survived? What plant groups were important in post-impact vegetation recovery? How severe were terminal Cretaceous extinctions among tropical angiosperms? How does tropical vegetation respond to the inferred climatic warming that followed the impact? Do we observe a post-impact burst of evolution? And if so, what groups participated? Thus, to unravel the bolide's influence on the composition of Tertiary plant communities, we must look to centers of angiosperm diversity and evolution--the Neotropics. The Guajira/Cesar region of Colombia may offer an unparalleled opportunity to do so.

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Figure 1: Los Departamentos de Guajira y de Cesar, Colombia

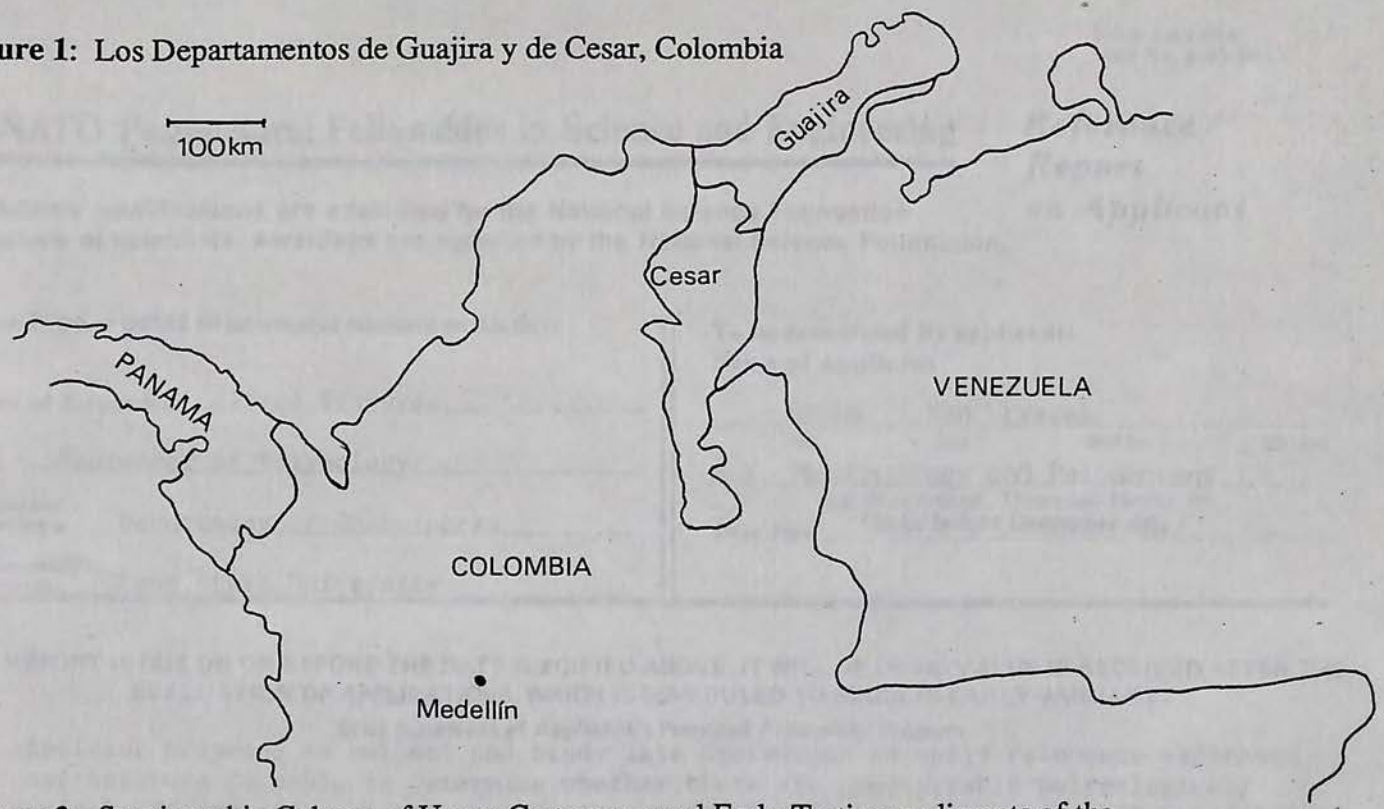
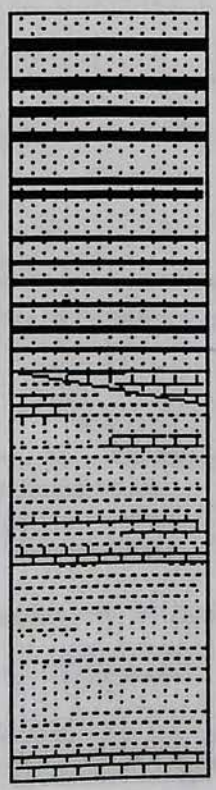


Figure 2: Stratigraphic Column of Upper Cretaceous and Early Tertiary sediments of the Rancheria Basin, Guajira, Colombia (Van der Hammen, 1958; Camacho, 1981; Cardozo and Sánchez, 1985).



Cerrejón Formation

Nonmarine sandstones and shales with interbedded coal. Sandstones and coals become thicker and more abundant up section.

Manatial Formation

Locally occurring limestone with thin shale interbeds.

Hato Nuevo Formation

Sandstone and sandy siltstone with locally interbedded sandy limestones.

Umir Formation

Siltstone, sandstone, shale with basal shallow marine limestones.

Form Approved
OMB No. 3145-0023

NSF-NATO Postdoctoral Fellowships in Science and Engineering

Reference Report on Applicant

Applicants' qualifications are evaluated for the National Science Foundation by panels of scientists. Awardees are selected by the National Science Foundation.

Please **type** or **print** all information requested on this form

Name of Respondent Alfred Traverse

Title Professor of Palynology

Respondent's Department Department of Geosciences

Respondent's Institution Penn State University

To be completed by applicant:
Name of Applicant

Arens Nan Crystal
last first middle maiden

Field Paleontology and Paleobotany
e.g., Microbiology, Theoretical Physics, etc.

Date Due **On or before December 4th**

THIS REPORT IS DUE ON OR BEFORE THE DATE SPECIFIED ABOVE. IT WILL BE OF NO VALUE IF RECEIVED AFTER THE EVALUATION OF APPLICATIONS, WHICH IS SCHEDULED TO BEGIN IN EARLY JANUARY.

Brief Statement of Applicant's Proposed Fellowship Program

The applicant proposes to collect and study late Cretaceous to early Paleocene sediments from northeastern Colombia to determine whether there are demonstrable palynological/ geochemical effects of a putative bolide impact in the general area at the K/T boundary. So far, most such studies have been made at relatively high latitudes, far from the suggested Caribbean impact area. The work should clarify the K/T event's effects on vegetation in the New World tropics and is a highly significant endeavor.

To be completed by reference respondent: Please Type or Print

1. I have known this person (check as many as apply)

X as an undergraduate	X as a research assistant	as a professional colleague
X as a graduate student	as a teaching assistant	by reputation only
as a fellow employee	as thesis adviser	other (specify)

2. I was acquainted with his / her professional work during the period from Fall of 1982 (month and year) to present (month and year)

3. His / her scientific field was palynology/paleobotany (name of scientific discipline or specialization)

4. His / her major function was research ✓ teaching administration of research
other (specify) undergraduate advisee, student in 5 courses

5. I had an excellent ✓ good fair poor opportunity to observe the quality of his / her scientific or technical work.

(over)

NSF Form 304 (7-92)

6. In comparison with other scientists of comparable experience, indicate by checks your judgment of the applicant with respect to the following SCIENTIFIC ACHIEVEMENTS and PERSONAL CHARACTERISTICS:

Note: A typical group of 100 scientists at his or her level might be expected to divide about like this

	BELOW AVERAGE	AVERAGE	ABOVE AVERAGE	GOOD	UNUSUAL	OUT-STAND-ING	TRULY EXCEP-TIONAL	INADEQUATE OPPORTUNITY TO OBSERVE
	Lowest 40	Middle 20	Next 15	Next highest 15	Highest 10			
Mastery of fundamental knowledge in his or her field						X		☐
Design of research projects						X		☐
Laboratory skill and technique							X	☐
Growth during total period observed							X	☐
Fertility of imagination; originality							X	☐
Self-reliance and independence							X	☐

7. Would you be willing to have this applicant as a faculty member in your institution? ☒ Yes ☐ No

Comments .....

8. In the space below, please add any descriptive comments which will assist in providing a complete picture of the applicant's abilities and potential as a scientist. Include, where appropriate, comments on such matters as versatility, emotional stability, competence to envision and plan sound significant research, ability to make mature sound scientific judgments, and other strengths and weaknesses.

Nan Crystal Arens is a very gifted woman, whom I have known since she first came to Penn State. She is a very well organized, very bright, very enthusiastic and committed young scientist. We have done several research projects together, including one on which we published a paper in Taxon. She is hard-working and productive, and always focused on the eventual result of her work. She gets on very well with all sorts of other people and knows how to organize both people and information. She has a very bright future ahead of her.

9. The primary objective of the NATO Postdoctoral Fellowships in Science program is to promote the progress of science and to foster closer collaboration among the scientists of various nations by assisting individuals who have demonstrated ability and special aptitude for advanced training to supplement their training. From past experience, it is anticipated that seven to ten times as many will apply in this program as can be given fellowships. Taking into consideration these facts, the applicant's proposed fellowship program, and the answers you have given to the above questions, to what extent do you recommend him or her for a NATO Post-doctoral Fellowship? You may answer by circling one or several consecutive numbers on the following scale.

Do not recommend [0 1 2 3 4 5 6 7 8 (9)] Recommend as strongly as possible

IMPORTANT—CONFIDENTIALITY: Before signing this report, you should check one of the two blocks at the right as applicable. If you wish to have your comments held in confidence so as not to reveal your identity as the author of these comments, you should check block A. If block A is checked, the Foundation will honor your request to the extent permitted by law. If you fail to check either block, the Foundation will treat your comments as confidential, but warns that your failure to check block A may result in a requirement to provide these comments to the applicant under the Privacy Act of 1974.

☐ A. My preparation of this Reference Report is conditioned on the promise of the Foundation to hold my identity as the author of these comments in confidence.

☒ B. My preparation of this Reference Report is not conditioned on the promise of the Foundation to hold my comments in confidence.

Signature of Respondent ..... Alfred Traverse ..... Date 11 Nov. 92

Alfred Traverse

This form is to be sent to the NATO Program Office, Division of Graduate Education and Research Development, Directorate for Education and Human Resources, National Science Foundation, Washington, D.C. 20550

The Effects of the Cretaceous-Tertiary Boundary Bolide Inpact On Tropical Plant Communities: A Palynological and Carbon Isotope Study, Guajira, Colombia

Nan Crystal Arens

Environmental Collapse at the Cretaceous-Tertiary Boundary

When Alvarez *et al.* (1980) proposed that a bolide impact caused the terminal Cretaceous extinctions, Earth scientists rushed to document the physical and biotic effects of the impact. In the decade that followed, a grim picture of global catastrophe emerged. Primary productivity in the oceans ceased (Zachos *et al.*, 1989). Dust obscured the sun and brought a killing freeze to mid and high latitudes (Wolfe, 1991). Global wildfires consumed vegetation (Wolbach *et al.*, 1985). The Earth was drenched in sulfuric acid rains (MaKinnan, 1992). Standing vegetation was destroyed (Nichols *et al.*, 1986; Nichols and Fleming, 1988) and the ensuing collapse of terrestrial ecosystems brought the mighty dinosaurs to their knees. Carbon dioxide added to the atmosphere triggered a greenhouse warming of up to 10C (O'Keefe and Ahrens, 1989; Wolfe, 1990) that completely disrupted climate patterns for thousands to a million years. Cretaceous biological communities were ripped apart and major extinctions resulted.

Our picture of global catastrophe in terrestrial ecosystems comes primarily from well-studied sections in western North America. The proximity of this region to a proposed secondary impact site (Manson Crater, Iowa) and its position in the mid to high latitudes raises questions about how globally generalizable these conclusions may be. More specifically, can we draw conclusions about the effects of the impact on centers of biodiversity and tropical cradles of Tertiary evolutionary radiations from North American sections? I believe that we cannot. Until now, however, few terrestrial sections in other parts of the world have been available for detailed study.

Cretaceous-Tertiary Sediments of Colombia

Chicxulub Crater in the Yucatán of Mexico has been proposed as the major Cretaceous-Tertiary impact site (Pope *et al.*, 1991; Hildebrand *et al.*, 1991; Swisher *et al.*, 1992). The crater's location has refocused attention on the Western Hemisphere. If we are curious about the impact's effects on the neotropical terrestrial biosphere, then we should look to South America for answers.

The Eastern Cordillera, Magdalena River Valley, and Guajira Peninsula of Colombia preserve impressive sections of Middle to Late Cretaceous and Early Tertiary age (Van der Hammen, 1958 and references therein). Most Cretaceous rocks are marine, consisting of mid- to shallow-shelf carbonates and organic-rich shales. Orogenic uplift began during the Late Cretaceous, thus many regions changed to marginal marine or fully terrestrial deposition during Maastrichtian and Paleocene time.

In the Guajira Peninsula of northeastern Colombia, the non-marine Cerrejón Formation is well-exposed by mining activities and exploration. The Cerrejón

Formation is underlain locally by the Manantial Formation and regionally by the Hato Nuevo Formation (Camacho, 1981; Cardozo and Sánchez, 1985). The Hato Nuevo is underlain regionally by the Usme Formation (Van der Hammen, 1958). The Manantial, Hato Nuevo, and Usme formations are near-shore carbonates and deltaic sequences with thin, lenticular coals occurring locally. The Cerrejón consists of terrestrial sandstone, siltstone, and black shale. Numerous coal seams occur throughout the formation. In the lower Cerrejón, coals are thin and lenticular, with seams becoming thicker and more continuous up section.

Is the Cretaceous-Tertiary Boundary Preserved in Guajira?

The age relations of most potential Cretaceous-Tertiary boundary sections in Colombia are poorly known. Two problems exist: (1) Most sections have not been studied in detail. While formations have been described and dated for geologic mapping and resource exploration, detailed stratigraphic study remains undone. Where biostratigraphic dating has been performed, it commonly consists of a few samples, with conclusions then applied to large regions. Since most formations are delimited by facies transitions and most transitions are time transgressive, only the broadest generalizations can be drawn. (2) Regional tectonic blocks behaved independently. Individual fault-bounded blocks made facies transitions at different times, thus regional generalizations about the stratigraphic position of the Cretaceous-Tertiary boundary are impossible. For example, Thomas and MacDonald (1976) report no pre-Eocene rocks in the northern part of the Guajira Peninsula. However, Block B of the Rancheria Basin, about 100 km to the south, preserves over 1,000 m of Paleocene sediments in the Cerrejón (Van der Kaars, 1983) and Manantial formations and the uppermost Maastrichtian in the Hato Nuevo Formation (Camacho, 1981). In the adjacent block to the south, the Hato Nuevo Formation includes the lowermost Paleocene rocks (Cardozo and Sánchez, 1985). From elsewhere in the region, Doubinger (1973) tentatively places the Cretaceous-Tertiary transition within the terrestrial facies of the Cerrejón formation based on the absence of typical and ubiquitous Paleocene palynomorphs (particularly *Proxaperites operculatus*).

No workers report evidence of major sedimentary hiatuses within the Guajira section, which strongly suggests that the Cretaceous-Tertiary boundary remains to be discovered in this region. Furthermore, exploitation of El Cerrejón coal reserves and further resource exploration in the region have recently made available new surface outcrop and drill core from the Rancheria Basin. Thus, I believe sufficient data is finally available to locate the Cretaceous-Tertiary boundary in northeastern Colombia. Thus, a dedicated hunt for the boundary in this region is most timely.

The first phase of the project I propose is a study of the available surface exposures and drill core to biostratigraphically locate the Cretaceous-Tertiary boundary in Guajira. The biostratigraphic boundary can then be confirmed and correlated both regionally and globally using iridium analysis. This phase will include detailed analysis of environments of deposition within the boundary sections.

The Impact's Effects on the Terrestrial Ecosystem

A Cretaceous-Tertiary boundary section in tropical South America allows us to address several major questions about the bolide impact's effects on this important terrestrial ecosystem.

• **Vegetation Destruction.** Nichols and Fleming (1988) reported that throughout western North America terrestrial sediments immediately above the Cretaceous-Tertiary iridium anomaly are devoid of angiosperm pollen and enriched in fern spores. This "fern spike" represented the first pioneers into an ecosystem wiped clean of vegetation by the bolide impact. Evidence of milder disturbance at boundary is reported from India (Rawat *et al.*, 1988), Tunisia (Méon, 1988), New Zealand (Raine, 1988), and Seymour Island, Antarctica (Askin, 1988). Spicer (1989) speculates that tropical plant communities suffered even less disruption, but this hypothesis remains untested.

In the lowermost Paleocene sediments of Guajira, Doubinger (1973) reports a horizon enriched in the sores of cyathean ferns--the same family that dominated the "fern spike" in Montana (Hotten, 1988). Writing before the bolide impact was proposed, Doubinger interpreted this horizon as a brief period of increased precipitation. However, unlike ferns of the tropical Polypodeaceae that generally indicate moist conditions, modern cyatheans prefer disturbed sites. Van der Hammen (1958) reported an increase in ecologically "resistant" groups in the basal Paleocene sediments throughout the Eastern Cordillera of Colombia, and attributed this anomoly to a significant but unknown environmental event. These observations suggest that neotropical vegetation was indeed disrupted during the Cretaceous-Tertiary catastrophe. But was this vegetation completely destroyed as seems to be the case in North America? This question can only be answered by detailed study of a confirmed boundary section.

In the second phase of the proposed project, I will use high-resolution stratigraphic sampling and palynological analysis to examine the changes in vegetation observed at and above the boundary.

• **Global Wildfire.** While the soot from major wildfires has been reported globally (Wolbach *et al.*, 1985), charcoal clasts have been discovered only in western North America (Tschudy *et al.*, 1984). Riding the Westerlies, smoke from North American fires could distribute soot throughout the Northern Hemisphere. However, soot from fires confined to North America would be less abundant in equatorial regions. Thus, the presence of soot and charcoal in the Colombian sections may shed light on the real extent of post-impact conflagration.

To more directly assess the extent of terrestrial biomass burning at the Cretaceous-Tertiary boundary, I can turn to carbon isotope analysis. Carbon fixed by land plants directly samples atmospheric CO_2 at established fractionation ratios, therefore d13C analysis of plant material at the boundary provides a direct link to the atmospheric carbon pool. Atmospheric CO_2 input from biomass burning would be strongly depleted (Ivany, 1991), whereas CO_2 from rock vaporized at the impact site or weathered from continents would be substantially heavier. Thus, information on the isotopic composition of terrestrial biomass will better constrain models that estimate the amount of biomass burned in post-impact wildfires. Such analyses, performed at high stratigraphic resolution, may also clarify the rate of CO_2 influx into the Paleocene atmosphere.

In the third phase of the proposed project I will perform d13C analyses on land plant biomass recovered from high-resolution stratigraphic samples around the Cretaceous-Tertiary boundary event horizon.

• **Greenhouse Warming**. From leaf physiognomy data, Wolfe (1990) proposed a post-impact temperature increase of 10C that lasted from 500,000 to 1 million years. Estimates of atmospheric CO_2 influx from global wildfires (Gilmore *et al.*, 1989) or impact shock (Hildebrand *et al.*, 1991) predict temperature increases of the same magnitude and duration. Van der Hammen (1958) proposed an Early Paleocene warming in the Colombian neotropics. Only detailed palynological analysis of post-impact and Early Paleocene tropical vegetation can assess the response of these plant communities to elevated CO_2 and corresponding climatic warming.

• **Spasms of Extinction--Bursts of Evolution**. Students of angiosperm evolution agree that the tropics, and particularly the neotropics, were the birthplace of flowering plants and the source of many subsequent waves of evolutionary diversity. However, we know virtually nothing about how these important communities responded to the Cretaceous-Tertiary event.

Tschudy and Tschudy (1986) conservatively estimated that 25 percent of angiosperm species in western North America became extinct following the Cretaceous-Tertiary boundary impact. However, they noted that many of these extinctions were regional and species may have survived elsewhere. Spicer (1989) speculated that tropical regions suffered even fewer extinctions than higher latitude zones. Indeed, the Colombian Paleocene is marked not by the loss of key taxa but by the additions of new many forms (Van der Hammen, 1958). The details, however, remain elusive.

Spicer (1989) further suggested that post-impact climate changes may have accelerate angiosperm evolution in tropical regions. Van der Hammen (1958) reports the origination of many new pollen taxa in the Early Paleocene, but more detailed work is necessary to establish the timing of these apparent originations relative to the boundary event and associated climatic changes. Detailed pollen analysis of a number of tropical Cretaceous-Tertiary boundary sections is necessary to address these important questions about the roots of modern angiosperm diversity.

Summary and Feasibility of Research Plan

Phase 1. This project must begin with a biostratigraphic survey to pinpoint the location of the Cretaceous-Tertiary boundary within the Guajira sedimentary sequence. I can obtain access to surface exposure in currently and formerly mined areas, as well as drill core libraries, and previously collected samples. Pollen zones for the Upper Cretaceous and Lower Tertiary (Van der Hammen, 1954a, 1954b, 1957) are well established and correlate throughout the Eastern Cordillera of Colombia. While I have seven years experience as a palynologist, this project offers me the opportunity to learn a challenging new flora and work with drill core material for the first time.

Once established, the biostratigraphic boundary should be checked with radiometric and paleomagnetic dates if possible. Iridium analysis will correlate a biostratigraphic boundary with global impact iridium signature. An important

component of my choice of Dr. Walter Alvarez's group at the University of California, Berkeley is the opportunity this laboratory offers me to learn these techniques and to interact with researchers who are working actively in many aspects of the Cretaceous-Tertiary boundary problem.

Finally, the stratigraphic analysis will include interpretations of depositional environment. I have research experience in marine carbonates (Ordovician), terrestrial clastics, and coal (Pennsylvanian). However, this project will expand my experience to Cretaceous-age sediments.

Phase 2. To evaluate the response of vegetation to the impact, I will perform high-resolution pollen analysis around the boundary to examine changes in flora. I will (1) look for evidence of vegetation disturbance like that reported from North America and elsewhere in the world, (2) document extinctions and originations in palynomorph taxa, and (3) evaluate changes in community composition following the impact. During my doctoral research I have successfully used such high-resolution techniques and multivariate statistical analysis to reconstruct Pennsylvanian-age plant communities and have developed a protocol for high-resolution sampling in coal. The Alvarez group does not operate a palynological laboratory, however, the palynological laboratory at Instituto Ingeominas in Bogotá, Colombia has invited me to work in their facilities. I believe that I and the project can profit tremendously from interaction with Colombian geologists familiar with the regional geology. Furthermore, contacts I establish can greatly facilitat fruitful collaboration between U.S. and Colombian Earth scientists.

I will also evaluate palynological samples for soot and charcoal. This project offers me the opportunity to learn some of the analytical techniques used by Wolbach and her colleagues as well as the chance to modify existing charcoal analysis techniques (*e.g.*, Clark, 1990) for use in ancient sediments.

Phase 3. To infer changes in the atmospheric carbon pool, I plan to perform d13C analyses on samples of land-plant biomass collected at high stratigraphic resolution around the Cretaceous-Tertiary boundary. Where available, coal is the obvious first choice for such samples; I believe it is also possible to develop a maceration protocol for isolating suitable organic material from terrestrial clastic sediments. However, these techniques remain to be developed and tested.

I believe that light isotope geochemistry offers powerful insight into many paleobiological questions and should be part of an interdisciplinary quest for answers. The Alvarez group offers me the opportunity to learn carbon isotope technique and interpretation, which is an important goal of my post-doctoral study.

APPENDIX IV

NATIONAL SCIENCE FOUNDATION

Recommendation for Postdoctoral Fellowship

Nan Crystal Arens has applied for a Earth Sciences Postdoctoral Research Fellowship, and has given your name as a reference. Along with this form, the applicant will have provided you with a statement of his or her proposed research. Please give your evaluation of the applicant, with reference to the following aspects of his or her development: (a) the significance of the applicant's research to date; (b) evidence of originality or imagination in the applicant's work to date; (c) the significance of the proposed research. Attach continuation sheets as necessary. **You should be aware that standard letters composed specifically for teaching positions may not be appropriate for this fellowship application.**

Previous panels have suggested that it would be useful to have comparisons of applicants with other individuals at the early stages of their careers.

Please see attached sheet

It is necessary that one of the two boxes below be checked.

A ☐ My identity and this report must be held in confidence.

B ☒ This report may be released on request.

If statement A is checked, the Foundation will honor this request to the extent permitted by law.

PLEASE PRINT

Professor of Palynology, Dept. of Geosciences, Penn State University

Title, Department and Institutional Affiliation

Traverse Alfred Alfred Traverse

Last Name, First Signature

Please return this form no later than November 9, 1992 to:

Division of Earth Sciences (E&HR)
National Science Foundation
1800 G Street, N.W., Room 602
Washington, D.C. 20550

NSF Form 1283B (6/90)

Attachment to Alfred Traverse's recommendation of Nan Crystal Arens for a NSF Postdoctoral Fellowship

Nan Crystal Arens was an undergraduate advisee of mine here at Penn State. She was an outstanding student, with many interests. She was, for example, editor-in-chief of our large daily campus newspaper. She also found time to pursue special research interests, including a study with me of the effect of microwaving on pollen, which she and I published in Taxon. She is a person whose interest in nature and natural phenomena is genuine and infectious. I would have been delighted to have her as my graduate student, but she had been at Penn State long enough, and I encouraged her to go to Harvard for her Ph.D. In my 26 years at PSU I have only had one other advisee who compares to Nan in total combination of ability, originality and commitment to science. Nan's work on wildfire and charcoal has been interesting and innovative. She is a keen observer. I have considerable interest in her proposed K/T boundary work in South America, as I had hoped to sponsor just such a low latitute project with my last Ph.D. candidate, but we had to settle for logistical reasons on sections in Texas. I think Nan's work can hardly help producing significant results. She already has a "leg up" from her knowledge of Columbia and the spanish language. I strongly recommend support for this very talented young woman.

BOTANICAL MUSEUM OF HARVARD UNIVERSITY

26 OXFORD STREET
CAMBRIDGE, MASSACHUSETTS 02138

25 October 1992

Dr. Alfred Traverse
Palynological Laboratories
Deike Building
State College, Pennsylvania

Dear Alfred:

Thank you for your letter of 12 October and for all of your help. You have no idea how valuable it is to me that I can count on your support. I particularly appreciate your efforts as I know your schedule is always very full.

I talked with both Walter Alvarez and Doug Nichols about my NSF post doc proposal. I have decided to go with the Alvarez group first because Alvarez has worked in Guajira (his PhD thesis was there but before the K-T boundary stuff emerged) and second because he can better hook me into the geochemical community that I will need to pull off parts of my project. I already have a good grounding in palynology and helpful colleagues both in the states and Colombia. DJN expressed interest in remaining in contact with me about the project and I'm sure I'll call on him for advice. However, I need to strengthen some other aspects of my background with respect to this project, so went that way with my institutional ties. If funded, I'm hoping to do a big chunk of the palynological work at Ingeominas in Bogotá where there are several people with a lot of local experience upon whom I can call.

I would appreciate letters of recommendation for both the NSF and NATO fellowships. I've enclosed a copy of a current draft of the NSF proposal, along with the necessary paperwork and instructions. I am applying to NATO (through the University of Amsterdam on the recommendation of Tomas van der Hammen) with the same project, but only the first phase of it. The NATO really isn't ideal because it's only six to 12 months and I obviously can't finish everything (or even get to the interesting biological questions) in a year. Consequently, I'm looking at NATO as a back up to get me started if the NSF isn't funded. I'm trying to keep as many options open as possible. A good strategy, I hope.

Finally, I'm also applying, with Bill DiMichele, for a Smithsonian post-doc fellowship, which will allow me to continue my work on the ecology and evolution of medullosans using the Smithsonian collections. This is "Plan C" if NSF and NATO fall through. If you are willing to write yet another letter on my behalf, I'll send more details as I pull this application together in December.

Whew. I'll be glad to have the applications in the mail and time to get back to work on my thesis. The thesis is coming together well, but I have a long way to go yet. My goal is to get two chapters (of five) done before I head south for Christmas and field work. Time will tell if I can pull it off, but I have a scuba diving trip to Cartagena as incentive!

Teaching is going very well and I seem to have adapted to my job as Head Teaching Fellow. I've discovered that 90 percent of this job is just figuring out how to keep everybody happy. Not easy with a staff of eight, but possible. Next semester I'll be teaching for Andy in paleobotany again. I'm hoping that he will let me lecture more than once this time--would be good practice for me.

My Spanish class is also going well, although I must admit to being rather fed up with midterm exams and the undergraduate obsession with grades. I'm just thrilled to be able to converse freely and read in Spanish, though. My writing is still a little tentative...but that will come in time, I suppose.

Again, thank you so much for all your help. Please give my warm regards to Betty and everyone in the lab, and congratulations to Celia.

Very best wishes,

Nan

Nan Crystal Arens

THE PENNSYLVANIA STATE UNIVERSITY
DEPARTMENT OF GEOSCIENCES
PALYNOLOGICAL LABORATORIES
435 DEIKE BUILDING
UNIVERSITY PARK, PA 16802
Phone: (814)863-3419; Fax: 814-863-7823

12 October, 1992

Nan Crystal Arens
Botanical Museum
Harvard University
26 Oxford St.
Cambridge, MA 02138

Dear Nan:

Thanks for yours of 6 October. In response to inquiry about "our Fall", we're very busy. I was just up to U. of Toronto to take part as external examiner in Pierre Zippi's Ph.D. defense. Remember him? Probably took 423 about when you did. Celia's wedding is in a little over a week--whole family, including Canadian cousins, coming. Etc. 17 students in 423 this Fall--good class. Etc. IRS-PA Dept. of Revenue after us because of extensions of taxes while we were in Germany. Contractors re-roofing house and discovering job is not simple, but major (50% over estimate!).

Yes to <u>all</u> of your questions about post-doc. Happy to sponsor application--need exact info about what to do. The proposed project is fascinating. Dale Beeson sought just such-a but gave up, daunted by thep olitical processes in Venezuela and other places we tried. Dale settled on K/T in Texas (Brazos River section) for his Ph.D. (good thesis, but he now works on non-palynological matters, and I wonder if he'll ever publish). Only negative about the DJN setup is that it's a non-university setting and not very deep in numbers. You might consider Geoff Norris' group at U. of Toronto (built-in Mesozoic interest) or Henk Visscher's group at Utrecht or Mary Dettmann at Brisbane. Happy to write letters of recommendation, of course! Also happy to write Doug--have sent letter off in same mail.

All the best.

Yours very truly,

Alfred Traverse

AT/et

BOTANICAL MUSEUM OF HARVARD UNIVERSITY

26 OXFORD STREET
CAMBRIDGE, MASSACHUSETTS 02138

6 October 1992

Dr. Alfred Traverse
Palynological Laboratories
Deike Building
State College, Pennsylvania

Dear Alfred:

I hope that you are all well and that your semester is going smoothly. Our semester is two and a half weeks old and I'm very busy. I'm teaching and head TA for E.O. Wilson's Evolutionary Biology course. I'm also taking the second year course in Spanish and trying hard to get work done on my thesis and get manuscripts finished up. Amid all this I'm trying to get some fellowship applications written. I'm planning to apply for the NSF Post Doctoral Fellowship in Earth Science. However, for this, I need an institutional/faculty sponsor within the U.S.

The project that I'm proposing is a palynological and light isotope study of a K-T boundary section in Northeastern Colombia that was suggested to me by Thomas van der Hammen when I talked with him this summer. The section encompasses, we believe, the uppermost Maastrichtian and most of the Paleocene, and consists primarily of bituminous and sub-bituminous coal, which has been productive for pollen and cuticle. Surface mines in this sequence are currently in operation by Carbocol, a Colombian mining company, and I've made good progress on both field and laboratory logistics through van der Hammen and contacts in Carbocol. I, however, lack funding that would support my research (and ideally living) expenses for this project. Hence, the fellowship applications.

I believe this project is important for several reasons. First, we understand well what happened to the vegetation in North America immediately after the terminal Cretaceous impact, but we know less about what happened in terrestrial ecosystems (particularly plant communities) in other parts of the world. If the proposed site of the major impact is now near Yucatán, then the geography of the Colombian section--approximately equidistant from well-studied terrestrial localities in North America and the impact crater, but to the south--becomes particularly interesting. Second, the section encompasses a tropical system in a biogeographic region suggested as a hotbed of angiosperm evolution during that period. Understanding the floral changes associated with the impact in this region may give better insights into the impact's role in angiosperm evolution than is possible from higher latitude floras. Third, as coal, this section records the carbon isotopic signature of the standing biomass. A variety of global catastrophes have been proposed in association with the impact. Several of them, including large-scale biomass burning, would have substantial effects on the isotopic composition of the atmospheric carbon reservoir that would be reflected in the carbon fixed by plants. Looking at such a terrestrial section, that preserves more directly and with known fractionation the isotopic composition of the atmosphere, might allow us to tease apart atmospheric changes from atmosphere-ocean interactions preserved in the marine record. In this way I might be able to independently test some of these global catastrophe hypotheses.

In any event, I am a potential post-doc in search of a sponsor. Since Doug Nichols did a lot of the pioneering work on the K-T palynology in the U.S., I was considering asking him to sponsor my application. I met him many years ago while still an undergraduate and taking your palynology course. However, I would be surprised if he still remembers me. Would you be willing to write a short note to him re-introducing me? I have enclosed a copy of the letter I will be sending to him, but I know that, as a busy person, he is more likely to respond to my inquiry if I come with an introduction by someone whose opinion he values. I know that you are busy too, and I would again be in your debt if you could write a short note on my behalf.

Would you be at all interested in sponsoring this application? I don't know what the current situation in your lab is, but it would certainly be a privilege for me to return to my scientific roots and work in your lab again. To be very honest, Penn State is not my first choice because I have already spent a significant amount of formative time there and NSF emphasizes that it favors applications that allow the researcher to go to new places and work in new intellectual environments. However, Penn State might be a viable contingency if other options fall through.

Finally, would you be willing to write letters of recommendation on my behalf as I look for something productive to do in the next few years? You have certainly known me longer than anyone that might recommend me, and you probably know me better than most, save, perhaps, Andy.

Thank you very much for all your help. I hope to hear from you soon. Please give my warm regards to Betty and everyone in the lab.

Very best wishes,

Nan

Nan Crystal Arens

BOTANICAL MUSEUM OF HARVARD UNIVERSITY

26 OXFORD STREET
CAMBRIDGE, MASSACHUSETTS 02138

6 October 1992

Dr. Douglas Nichols
U.S. Geological Survey
MS 919
Box 25046 Federal Center
Denver, Colorado

Dear Dr. Nichols:

I am a graduate student in the process of completing my Ph.D. with Andy Knoll in Harvard's Department of Organismic and Evolutionary Biology. My thesis research involves reconstructing forest ecological dynamics in the Carboniferous of Joggins, Nova Scotia, using fine-resolution palynological sampling of clastic floodplain deposits. I was trained in palynology while an undergraduate at Penn State with Alfred Traverse, and also received a masters in invertebrate paleontology with Roger Cuffey at Penn State.

I am applying for an NSF Post Doctoral Fellowship in Earth Science to support post-doctoral research that I will describe in a moment. This fellowship requires institutional/faculty sponsorship. I am writing to inquire whether you will consider sponsoring my application.

The project that I'm proposing is a palynological and light isotope study of a K-T boundary section in the Guajira Peninsula of northeastern Colombia. The section encompasses, we believe, the uppermost Maastrichtian and most of the Paleocene, and consists primarily of bituminous and sub-bituminous coal, which has been productive for pollen and cuticle. Surface mines in this sequence are currently in operation by Carbocol, a Colombian mining company, and I have made good progress on both field and laboratory logistics in Colombia through palynologist Thomas van der Hammen, Ingeominas, and contacts in Carbocol. However, I lack funding that would support my research (and ideally living) expenses for this project. Hence, the fellowship application.

I believe this project is important for several reasons. First, thanks in large part to your work, we understand well what happened to the vegetation in North America immediately after the terminal Cretaceous impact, but we know less about what happened in terrestrial ecosystems (particularly plant communities) in other parts of the world. If the site of the major impact is near Yucatán as now proposed, then the geography of the Colombian section--approximately equidistant from the impact crater and well-studied terrestrial localities in North America, but to the south of the impact--becomes particularly interesting. Second, the section encompasses a tropical system in a biogeographic region suggested as a hotbed of angiosperm evolution during that period. Understanding the regional floral changes associated with the impact may give better insights into the impact's role in angiosperm evolution than are possible from higher latitude floras. Third, as coal, this section records the carbon isotopic signature of the standing terrestrial biomass. A variety of global catastrophes have been proposed in association with the impact. Several of them, including large-scale biomass burning, would have substantial effects on the isotopic composition of the atmospheric carbon reservoir that would be reflected in the carbon fixed by plants. Looking

at such a terrestrial section, which preserves more directly and with known fractionation the isotopic composition of the atmosphere, might allow us to tease apart atmospheric changes from atmosphere-ocean interactions preserved in the marine record. In this way I might be able to independently test some of these global catastrophe hypotheses.

I am currently preparing my fellowship application for a submission deadline in early November. My application must include a statement from a host expressing willingness to work with me and comments on the scientific merit of my proposal. If you are interested in acting as my sponsor, we should talk soon so that we can discuss the project in more detail with you and so that I can provide you with a copy of my proposal and curriculum vitae. You can reach me at 617-495-7602 or FAX 617-495-5667.

I hope you will consider sponsoring me for this fellowship and I hope to hear from you soon.

Sincerely,

Nan Crystal Arens

BOTANICAL MUSEUM OF HARVARD UNIVERSITY

26 OXFORD STREET
CAMBRIDGE, MASSACHUSETTS 02138

4 September 1992

Dr. Alfred Traverse
Palynological Laboratories
435 Deike Building
University Park, Pennsylvania

Dear Alfred:

Thank you for your letter of 1 September and the books also arrived today.

I wouldn't attempt to compare PEI with Colombia--although I love both places. It's just that when I mention that I've been to Colombia (and it's obvious that I came back alive) everyone gives me strange looks. The customs agent in Miami was even a little suspicious. She asked me why I would possibly want to go to Colombia in the first place and what I could have done there (*legally*, was implied) for two months. I was traveling alone, too, which may also have seemed strange. Oh well. As for getting a motorcycle to avoid "going soft"...I would say that commuting anywhere in Boston will keep me in shape; since I'm now living at the University's field station in Bedford (finally escaped the city!), I've got no worries.

I'll have to look into a foreign exchange office here. They have an office of career development for the graduate school that would probably know of lots of resources like that. I've been trying unsuccessfully to talk with the Fulbright representative here, she seems to take a lot of vacations. I don't know anything about Rockefeller or Guggenheim, but thank you for the suggestions; I'll check into them. Of the mass of letters I sent requesting information, I've so far got two interesting replies: National Geographic, which only provides research money, but it would be fun to apply anyway; and the NSF/NATO Fellowships in Science. I have to confess that writing more applications is not high on my list of things I *want* to be doing right now, but I'm trying to stay sufficiently interested to write good proposals.

The idea of the GSA congressional fellow did cross my mind, but I have a fairly low tolerance for politicians. A disadvantage. Given my communications background, however, I might actually be a competitive candidate. Perhaps I should think some more about it.

I hope your semester is off to a good start. Our classes don't start until 21 September, which suits me because I have two big projects that I want to finish before the classes (I'm only taking two this semester!) and teaching close in on me. I also need to get an updated thesis outline ready as I want to have a committee meeting in later in the month. Never a dull moment, to be sure. Please give my best to everyone there, especially Betty.

Yours very truly,

Nan

Nan Crystal Arens

THE PENNSYLVANIA STATE UNIVERSITY
DEPARTMENT OF GEOSCIENCES
PALYNOLOGICAL LABORATORIES
435 DEIKE BUILDING
UNIVERSITY PARK, PA 16802
Phone: (814)863-3419; Fax: 814-863-7823

1 September, 1992

Nan Crystal Arens
Botanical Museum
Harvard University
26 Oxford St.
Cambridge, MA 02138

Dear Nan:

What a great letter! Despite your effort to make it sound like, say, Prince Edward Island, it is clear that your visit to Colombia was a trifle shy of a "day at the shore," as to nerve-quieting qualities. Yes, the travel-log would be fun. (Are you going to get a motorcycle now to keep from going soft?)

I'm afraid I didn't help much re the post-doc. I do believe you'd profit from a visit to Harvard's equivalent of our foreign-exchange office. There are dozens of granting outfits; for example, you'd clearly qualify for a Fulbright, a Rockefeller, a Guggenheim. I think you should attempt to exploit your Latin American expertise somehow. (If you were, for example, German-speaking, I can think of several places in Switzerland or Germany I could help get you in.) What sort of specific scientific slant do you see for the post-doc? Another, offbeat, idea--would you be interested in competing for the Geological Society of America congressional fellow (a source person for members of Congress for science advice)? Would you be interested in going to an Eastern Country (Russia?)? If so, contact National Science Foundation's foreign programs, Eastern European Section. (While National Science Foundation has fellowships for all countries, of course, your chances are better for Eastern countries.)

Thanks for the check. Forget about postage. Books are on their way.

Yours very truly,

Alfred Traverse

AT/et

BOTANICAL MUSEUM OF HARVARD UNIVERSITY

26 OXFORD STREET
CAMBRIDGE, MASSACHUSETTS 02138

25 August 1992

Prof. Alfred Traverse
Palynological Laboratories
435 Deike Building
University Park, Pennsylvania

Dear Alfred:

Thank you for your letter of 21 August. I've enclosed a personal check for $90 for three (3) hard-bound copies of *Paleopalynology*. I can send you a check for the postage as soon as you let me know how much it will be. I think I'll keep one for myself and send my well-loved soft-bound to the herbarium library in Pasto. I know they basically want it mostly for preparation schedules for palynological reference slides from herbarium materials. The other two are for students who got really turned on by palynology and wanted to read more about it. One of the students decided to change his whole thesis (limnology) approach after I talked with him about the various sorts of algae that make mineralized or resistant organic preservable structures.

Your comments about the violence in Colombia are fairly common. I'm afraid that Colombia gets really bad press. Also, things have calmed down considerably since the mid 1980s when there was a great deal of political and drug-related violence--and Colombia was in the news a lot. I have several Colombian friends who had friends and relatives assassinated during that period. Unfortunately, the culture has become so numbed by violence that the average person doesn't think too much about another personal or political assassination. That's changing now with the new and more liberal governments who are putting civil order at the top of their priority lists. There are still areas in Colombia that are basically in a state of civil war and others that aren't really safe for tourist traffic, but those tend to be away from the cities and in remote areas. The province where the field station is located (Nariño), for example, had been very quiet up until last (1991) Christmas. At that time a guerrilla organization moved into the area. Because of the uncertain situation, I was not able to go to the field station in January as I had planned. They didn't want to take any chances with foreigners; my companion, a Colombian, is from a politically active family, so we would both would have been targets for kidnapping by the guerrillas. There were also several bombings, including a police station, in January and then the situation calmed down. It turned out that this particular group was a sort of Robin Hood splinter group associated with one of the major guerrilla organizations. They had blown up the police station at night so that nobody would be hurt and sent a message immediately after that the police corruption was going to stop or else... The police roadblocks and bribe-taking stopped immediately. Everything was very quiet while we were there. The guerrillas visited the field station once during my stay;

they looked around, decided that they approved of what the field station was doing (education and conservation) and left. Certainly, there are areas of Colombia where I wouldn't go, but there are areas of Boston where I won't go either. However, the gringo image of Colombia is (in my opinion) badly distorted. As for being one big drug factory, since the new governments started cracking down, the business has slowed somewhat and is moving to other regions of South America. However, drugs are still big business. While I was there, the government burned about 1,000 hectars of poppies in Nariño and about as much marijuana near Santa Marta. Interestingly, I had trouble getting palynological chemicals in Bogotá because ascetic anhydride is used to process heroine and sulfuric acid is used to process cocaine! I didn't know that. I would agree with a Colombian friend who says (translated), "if you are looking for a reason to hate Colombia, there are 1,000; but if you are looking for a reason to love Colombia there are 10,000." After any trip like this I usually write up what amounts to a travel-log to send to my parents. If you'd like, I'll send you a copy so you can have another perspective on Colombia.

Thanks so much for your information on post-doc funding. I'm basically trying to gather as much information as I can right now. I've sent out a ton of letters to various foundations and the like (including NSF, who just turned down my dissertation improvement grant proposal) asking for information. I hope a few of them get answered. It's all such a chore--though necessary. It's getting frustrating, though, because I'm not getting any support or guidance from Andy and I'm at a bit of a loss myself.

Please give my best to everyone and I hope to hear from you soon.

Yours very truly,

Nan

Nan Crystal Arens

THE PENNSYLVANIA STATE UNIVERSITY
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PALYNOLOGICAL LABORATORIES
435 DEIKE BUILDING
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Phone: (814)863-3419; Fax: 814-863-7823

21 August, 1992

Nan Crystal Arens
Botanical Museum
Harvard University
26 Oxford St.
Cambridge, MA 02138

Dear Nan:

Lectures in Spanish! Wow! Your experiences were equally breathtaking--but it's astonishing from a typical (?) well-informed (?) American's point of view to read nothing (absolutely 0) about the fact that Colombia is one big drug factory with bullets whizzing everywhere--how about it?

I've never met van der Hammen--his decision decades ago to set up modern pollen as "types" for fossil taxa continues to provide fuel for papers for us all. The K-T projects in South America would be great. That's really what I wanted Dale Beeson to do, but the logistics were too daunting--so we picked Texas.

Re funding--I'm no expert. Beyond NSF I would only suggesat you look into foundations--Rockefeller, Ford, etc. The Office of International Programs at Penn State has a lady who specializes in such things and generates lists of potential grantors. If you ever visit PSU, we could pretend PSU is a possible beneficiary and get her to do her magic (PSU is now #10 in grants nationally!). Doesn't Harvard have such a person/office?

Yes, I still have hard-bound copies of Paleopalynology I bought at author's price and sell at $30, plus postage. (Paperbacks cost $45 in bookstores, and hardback was $90 but is now sold out.) Only request is that it somehow be handled by personal check. When it goes through an "official" office and involves my SS#, I have to include the cost, sales proceeds, etc., etc., in my IRS return. Pain!

You are a good friend and a success story for PSU and me! (Reminds me: I wrote S. Gould about one of his recent NH articles--it was about R. A. Fisher at Cambridge Univ. I was supposed to study with him in '46-'47, but found him impossible to understand and switched to paleobotany! However, his first lecture, in which he proved (?) statistically that Fr. Mendel (or his gardener) cheated to get the 3:1 (etc.) ratios was fascinating! One doesn't expect an answer from SJG, but I do hope he read it!.

All the best.

Yours very truly,

Alfred Traverse
Professor of Palynology

AT/et

BOTANICAL MUSEUM OF HARVARD UNIVERSITY

26 OXFORD STREET
CAMBRIDGE, MASSACHUSETTS 02138

16 August 1992

Prof. Alfred Traverse
Palynological Laboratories
435 Deike Building
University Park, Pennsylvania

Dear Alfred:

Thank you so much for your letter of 22 July. I'm glad to hear that you both had a wonderful and productive time in Germany. I was very happy to find your letter waiting for me upon my return from Colombia on 13 August.

As I mentioned in the card, I spent my first month and a bit at a cloud forest reserve (Reserva Natural La Planada) on the Pacific slope of the Andes in southwestern Colombia near the frontier of Equador. I was there for two purposes. First, I was teaching for a field course in tropical ecology. I was the "expert" on a variety of topics including geology, soils, ferns, and the Macintosh computer, but was focusing on showing the students--mostly biologists--some of the perspectives one gains when one looks into the past. I gave two hour-long lectures in Spanish and led two field projects. The course is set up much like the Organization for Tropical Studies course in Costa Rica where the students work on a variety of short group and individual projects. It was quite an experience because as the course was specifically for Latin American students, I was not permitted to speak to any of the students in English. Quite a challenge, but I learned a lot, both about the forest and the language. And the forest was breath-taking.

My fern project turned out well also. It is basically an actualistic study to help better interpret some foliar structures seen in fossils. In brief, I want to know if there are sun/shade leaf morphologies in pteridophytes. If this type of plasticity is present in ferns as well as broad-leaf gymnosperms then it is more comfortable to conclude that this strategy is one that plants in general can adopt. From there I hope to use this sort of morphology, when it appears in the fossil record, as a broad-brush indicator of habitat preference. The trick is sorting our influences of soil water and nutrient status. I think I've managed to untangle a little of that as well. Good stuff. It is, as you correctly observe, quite a leap from Joggins, but I'm hoping to pull it all together into a (relatively) tidy package in the thesis. It's basically coming at the question of reconstructing dynamic ecology from a variety of angles to get the best picture possible. I'm also trying to learn as much as I can about as many things as I can. My thesis was constructed for a diversity of approaches very purposefully. I hope to carve out a career in which I can productively combine the neobiology and ecology I've learned with the grounding in geology that I have. I'm hoping to finish up sometime within the next year but I have four courses on my plate for the upcoming academic year (Andy never gives up) and am teaching (demanding assignments, too) both semesters. We'll see; wish me luck!

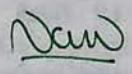
After La Planada I traveled to Cartagena on the Caribbean coast for a few days vacation with a good friend. Cartagena is the most interesting city I've yet visited. It has fascinating old forts and a monastery and the old, walled portion of the city retains a very ancient look combined with very modern vitality. We also went diving on some beautiful sponge, algae, coral reefs, which

were out of this world--my first time diving in the tropics. Even at 100 ft. you can see better than you can at 15 ft. here in temperate waters. We then returned to Bogotá for a few days during which I had meetings with various and sundry paleontologists and palynologists. I was able to meet and talk with Thomas van der Hammen on two occasions. Delightful gentleman. I've read a lot of his work in my interest in Colombian palynology and paleoecology, so it was a real treat to meet him. He was *very* helpful and suggested several projects that I might be interested in working on when I'm done with my thesis. One is more into the Pleistocene and would be an extension to another region the work he and his students have been doing for years. A second is in the Guajira region (northeastern peninsula) of Colombia where there are thick (hundreds of meters) coals of Paleocene age with a bit of Maastrichtian tacked on at the bottom and a bit of Eocene tacked on at the top. A third involves collaboration with a student who has six sections of Upper Cretaceous/ lowermost Paleocene measured and some palynology done. He also has many localities with megafossils, mostly leaf compressions/impressions. The latter two are particularly interesting now that the terminal Cretaceous impact may be in the Yucatan and considering that we know lots about fern spikes and such in North America but little about what was going on near the boundary in South America. I visited one of his sections in Boyacá--it's very impressive. My question to you is do you have any suggestions about where I might begin looking for funding for such projects. At the moment, I can get invitations into the various working groups (an important step as a foreigner), but funding is another matter. I'm thinking broadly: Research grants in conjunction with someone in the states, independent research grants, fellowships, just about anything. I would really appreciate any advice or suggestions you could offer.

Finally, is it still possible to purchase copies of *Paleopalynology* from you or should I order it elsewhere? As a result of the projects I led during the course, several of the students have become very interested in palynology. I would like to send them copies.

I hope you are enjoying your last few moments before the semester begins. Please give all my best to Betty and the lab folks. Take care and I look forward to hearing from you.

Sincerely,



Nan Crystal Arens

THE PENNSYLVANIA STATE UNIVERSITY
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Phone: (814)863-3419; Fax: 814-863-7823

22 July, 1992

Nan Crystal Arens
Botanical Museum
Harvard University
26 Oxford St.
Cambridge, MA 02138

Dear Nan:

This will, I suppose, be awaiting your return. Your card of 1 July from the cloud forest was most welcome. You sure get some neat trips! The project seems a tad remote from fusain....? But interesting!

You couldn't know it, but the day you wrote you were probably getting my vibes--that was an incredible day for me. It began at 4:00 a.m. in Stuttgart, where I had been collecting (5 days) Triassic samples with a professor friend at the university there. The owner of the little hotel gave me a cup of tea, and then she walked me to the U-Bahn station. Then train (Stuttgart-Frankfurt), walk to our apt. with my "Gepäckroller" and much luggage. Final pack-up at apt. and trip to P.O. with one last box to mail. Goodbye to neighbors and cleaning ladies who came to see me. Then truck from Senckenberg Museum with most of the paleobotanical staff (rest were waiting at airport). Big farewells there. Flight to Pittsburgh, then to State College, then drive home in my truck, arriving 1:00 a.m. on 2 July (Stuttgart time).

All went well at Senckenberg, except that Schaarschmidt was operated on for cancer in March (total surprise to all!) and never came back to his office during the rest of my stay. I visited him, of course. (He is making progress, and hoped to start working again, at least part time, soon after my departure for home.) Betty did very well with her studies. She should take comprehensives during Spring Semester.

All the best. We love hearing from you.

Yours very truly,

Alfred Traverse

AT/et

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17 October, 1991

Nan Crystal Arens
Botanical Museum
Harvard University
26 Oxford St.
Cambridge, MA 02138

Dear Nan:

Thanks so much for arranging my visit! It was a great, and until not long ago, an unimaginable experience.

Paul S. arrived at the Harvard Faculty Club on Wed., at exactly 7:30 a.m.. We had a nice breakfast over a discussion of the Saudi Llanvirnian tetrads, and he got me to the airport in plenty of time. I was back here correcting mid-semester exams at 2 p.m.

Say "hi" for me to Andrew and to Ms. Kah and your other near associates!

All the best, and thanks again.

Yours very truly,

Alfred Traverse

AT/et

BOTANICAL MUSEUM OF HARVARD UNIVERSITY

26 OXFORD STREET
CAMBRIDGE, MASSACHUSETTS 02138

25 July 1991

Dr. Alfred Traverse
Palynological Laboratories
Penn State University
University Park, Pennsylvania

Dear Alfred:

Your letter of 21 July arrived in this morning's mail. I can't express how much your words of encouragement mean to me. As you know, you are responsible for rescuing me out of journalism, pointing me toward geology, introducing me to paleobotany, prodding me in Andy's direction, and talking me into applying to Harvard. I shall always be grateful. Your past advice has been true, so I'll trust your confidence now. It has, however, been a difficult year for me both personally and professionally, and that has taken a large toll. Growing is always difficult, but I have to learn to have faith in myself.

I'll tuck your letter away in my desk drawer and re-read it the next time I'm feeling discouraged. Thank you again. I'm so looking forward to seeing you when you visit for the seminar. Please give my best to Betty and everyone in the lab.

With very best wishes,

Nan

Nan Crystal Arens

TO Alfred

DATE 7-12 TIME 11:15

WHILE YOU WERE OUT

M. Nan Arens

Of Harvard

Phone 617 495 7602

TELEPHONED	☑	PLEASE RETURN CALL	☑
CALLED TO SEE YOU	☐	WILL CALL AGAIN	☐
RETURNED YOUR CALL	☐	RUSH	☐

MESSAGE She tracked down a copy of your invitation to the seminar series and has put it into the mail today. If any questions, call her.

Signed Judith

The Standard Register Company

THE PENNSYLVANIA STATE UNIVERSITY
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21 July, 1991

Nan C. Arens
Botanical Museum
Harvard University
26 Oxford St.
Cambridge, MA 02138

Dear Nan:

Yours of 12 July came a few days ago. It's 41 and 42 years ago since I spent parts of two summers working in the Museum. It was already Cambridge 38, but the 021 part hadn't yet been invented.

You are at about the stage of the doctoral work now that I was during the aforementioned years. I recall that 42 years ago I was a little discouraged at times, but not 41 years ago because I had just discovered Betty, we were engaged, and I was sure I could finish so we could get married and get on with life. I was 24! So, yes, I can understand that one's personal situation has a lot to do with how one views life. However, you are doing so very well that I am VERY CONFIDENT that you will write a great thesis and even find a job, which is much more difficult!

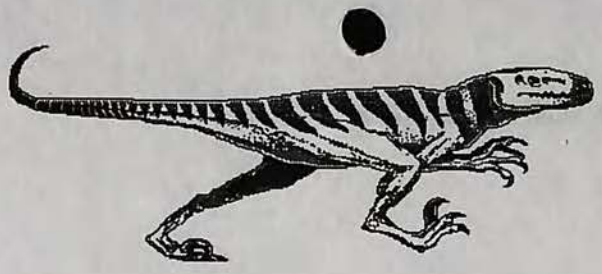
Just finished and sent off to Mo. Bot. Gard. a paper on my work on pollen content of the Trinity River, Texas, about which you have already heard a bit. I am also going to do another version of the story for my part of pollen sedimentation book that I am editing. That's the other big job for the summer. What with Betty doing intensive French, I have had to acquire a laptop and learn WP5.1. That's how I am doing this letter.

So now I'll respond re the seminar invitation. I have to prepare a special lecture for my acceptance speech for the 2-yr. International prize I am supposed to get at the Birbal Sahni Inst. in India in November. I believe that the only realistic thing is to give the same lecture, or some approximation of it at Harvard. We are going on sabbatical to Germany in late December, so the Fall is going to be pretty wild!

All the best to you. I am very proud to have played a small role in your development.

Yours very truly,

Alfred Traverse



12 July 1991
Cambridge, Massachusetts

Dr. Alfred Traverse
Palynological Laboratories
Department of Geosciences
Penn State University

Dear Alfred:

Susanne Jarnryd from the OEB office just phoned me to say that you had called to ask about your invitation to the 1991-92 EHAP seminar series. Since the folks you really should talk to are both out of town, I've tracked down your letter of invitation and am sending it along. If you have any other questions you should contact Linda Ivany (617-495-5007) or Loren Smith (617-495-7602) as they are coordinating the seminar this year. Linda will be in town *until* 1 August and Loren isn't expected *back* until after 1 September. If all else fails, please call me (617-495-7602), but as I have retired after two glorious years as coordinator, I can't do more than answer questions about format. I really don't know when they planned to schedule people. In the meantime, I will tell Linda that you called. I do hope you will be able to come speak to us as I would love to see you again.

I am well but trapped in Cambridge this summer doing lab, library, and computer work. I did get up to Nova Scotia for a bit of a geology vacation in early June, but the focus of my summer's work is in the wet lab and at the microscope. Frustratingly, however, my work is on hold. I'm waiting for a back order of chemicals before I can do any of the wet lab work I have backing up; I'm also waiting for a drill bit I need before I can do any more sampling. I'm, therefore, just working on the review chapter for my thesis and some statistics; both are on my list of things to do this summer, but farther down than all the lab work and data collecting. I did, however, get the labs cleaned up and restocked and some hardware and software upgrades running on our lab computer, so I guess the summer hasn't been a total loss. I am, however, simultaneously frustrated at not being able to get started on any of my research and suffering from an astonishing lack of motivation for anything related to academics. In the morass of self-doubt that followed the divorce and three years of course work with little time for research, I'm beginning to wonder if I have the drive and motivation to get through the PhD. I suppose these doubts are all very normal, but they are difficult and disturbing nonetheless.

I hope you are both well and having a very productive and pleasant summer. Please give my very best regards to everyone there. Take care and please give me a call if there is anything I can do.

Best wishes,

Dan

Agnes

BOTANICAL MUSEUM OF HARVARD UNIVERSITY

26 OXFORD STREET
CAMBRIDGE, MASSACHUSETTS 02138

19 March 1991

Dear Alfred:

Thank you for your letter of 25 February. I'm glad to hear that the Taxon page charges have been cleared up. I could have paid them, but I would prefer not to. Thanks for taking care of it.

Your comments about Steve Gould are interesting to me to say the least. As I'm sure you are aware, Roger Cuffey simply despises Steve even though he has never met or interacted with him at all. Consequently, I came to Harvard with a distrust for Steve to say the least. However, the interaction that I've had with Steve have been, by and large, quite positive. He doesn't believe that ecology is important to evolution so isn't particularly compelled by my research, but I think he will be in the end when I've gotten a little farther into it and can show some of the influence ecology has on my plants and their evolutionary histories. However, what has been a lot more beneficial is some of the philosophical breadth he has given me. When I left Penn State, I was greatly troubled that the type of paleontology I wanted to do didn't seem to be served well by the empirical scientific method (sensu physics and chemistry). My interactions with Steve have stimulated some alternative ways of thinking about historical sciences and that has helped me thresh out my scientific philosophy enough that I better understand what sort of questions I want to ask of my fossils and what I can expect them to give me for answers. He has also (quite unknowingly, I'm sure) given me a lot of food for thought on some of the logical and philosophical arguments I have to make in my thesis.

Everything that is said about the volume of his ego is correct, although he has mellowed a great deal even since I've been here. And you are correct that he has a rather phenomenal lack of botanical knowledge--even just basic vocabulary. However, to his credit, when something botanical catches his imagination and fits in with some current line in his thinking, he dives in with an energy and fervor that is truly amazing. For example, Andy and Steve run a graduate seminar every other fall. This year we looked at similarities and differences in patterns of plant and animal evolution. It was clear early on that he lacked a lot of botanical background, but he was truly interested in seeing what the plants had to say. I gave a little talk on "problematica" in the early evolution of land plants, focusing primarily on *Nematothallus*. He grilled me for over a half hour on every possible interpretation and the details of morphology. I was really surprised. After class he asked for a reference list and by the next meeting had read nearly everything written on the group. It's not that he has willfully ignored plants, he

just hasn't thought they had anything to tell him about the questions he's interested in. When someone demonstrates that he's wrong, he will sop up your reasoning. The catch here is that Steve really is *that* intelligent and chances are if he seems to be dismissing your ideas it's because he has already thought about it and convinced himself that you are incorrect. The flaw in his personality, is that he doesn't always take the time to explain why. Basically, once I learned how to deal with him, I've gotten a lot out of the interaction--but that's no different than any professor I've ever interacted with.

Congratulations on you Fulbright. I'm sure you both will have a wonderful time. I'm also glad to hear that paleobotany is going well. I had a great time teaching for Andy this fall and I'm looking forward to one more round of it before I leave (probably my last year here if all goes according to plan). I actually ended up winning a teaching award for the semester because my evaluations were good. Pretty neat. It makes a lot of difference when you are personally and intellectually excited about the subject matter. It' funny to hear you mention free-hand plant sections for paleobotany. I had my first large-scale experience with free-hand sectioning while in Venezuela studying tree ferns. I can't tell you how frustrating that can be without adequate equipment and time. Good exercise in patience.

I'm off to Costa Rica tomorrow for a week at the La Selva research station. It's mostly a vacation. My roommate is down there doing her thesis research and I'm going down to give her a hand for a little while. Secondarily, I want to get a look at a lowland ever-wet forest in the tropics. That is really the only habitat we missed on the Venezuela trip. Since that is so often invoked as the analogue for my Carboniferous forests, and I'm beginning to think that isn't correct, at least for Joggins and surrounds, that I want to spend some time in the habitat before I start writing about it. It should be fun.

Take care. Please give my best to everyone there, particularly Betty. Good luck with the remainder of the semester.

Best wishes,

Nan

Nan Crystal Arens

The Pennsylvania State University
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25 February, 1991

Nan Crystal Arens
Botanical Museum
Harvard University
26 Oxford St.
Cambridge, MA 02138

Dear Nan:

Apparently you're back from the great SA caper--what an experience!

Re page charges from Taxon. This catches me by surprise, too. I don't recall word-one ever being said about it. However, such charges are becoming the rule, not the exception. I'll call Dan Nicolson today to see whether there is a way out. If there isn't, there still will be no reason for despair! I do not have any grant funds for any purpose whatsoever. How about an $80 (AT)/$40 (NA) split, if we really do have to pay? In the meantime, you won't be extradited to the Netherlands.

Your teaching assignment interests me. I'm sort of a "love-hate" fan of Gould. I devour his Nat. Hist. articles, but often they irritate the h. out of me. Example: his recent one extolling Goethe's idiotic "Urpflanze" crap--SJG has the "advantage" of knowing, I suppose, very little botany. I wonder if Gould saw the exhibit at the Palmengarten in Frankfurt in 1988, about plant evolution. There was a lot about the "Urpflanze" and related things, such as Zimmermann's "telome" theory--I enclose a few xeroxed pages to titillate you. The show was fun--organized by a character named Leistikow. I got a private showing because of my Senckenberg Museum connections. (By the way, I have a Fulbright to work there Dec. 1991-July 1992, with Friedemann Schaarschmidt. Unwritten agenda--it gives Betty a half-year in Germany to work on her Ph.D. project.)

All the best.

Yours very truly,

Alfred Traverse

P.S. My paleobotany course is going well. This year I had the class make freehand sections of all sorts of plants, to learn basic plant anatomy. Hadn't done that since 1946. Last time I taught paleobotany labs was 1949, at Harvard. Jane Gray was in the class!

AT/et

BOTANICAL MUSEUM OF HARVARD UNIVERSITY

26 OXFORD STREET
CAMBRIDGE, MASSACHUSETTS 02138

11 February 1991

Dear Alfred:

I apologize for not writing you about this sooner. A letter to you has been on my "things to do" list for some time. Today I received this notice from *Taxon* requesting remittance for page charges for our 1989 microwaved pollen paper. Am I to pay this myself? Do you have available grant funds to cover this expense? Or is there some intermediate solution? As you can see, I received the original invoice in late October, hence my shame at tardiness and my desire to resolve this quickly.

Otherwise, I am quite well. I thank you for the Christmas greetings. It was nice, as always, to hear from you. I spent the first three weeks of the new year in Venezuela on a field course associated with the tropical ecology class I took last semester. I will eventually send along a copy of my travel notes, but for now I can say that in any three-week period I have never learned so much *or* had such a wonderful time. We had a superior group of students--a variety of disciplines so that we could get a many perspectives on each habitat we visited. In the end, even the three geologists (myself included) were valued for our interpretation of tectonic and geomorphological features that effected the biota. The teaching staff could, in many cases, step back and let us teach ourselves. That's really the way it should be in graduate courses. I also believe that I have found a useful analogue to my Westphalian environments in the seasonal lowland forests of the Orinoco basin. Neat stuff.

My plans for the spring semester are beginning to shape up. I am taking one final course in multivariate analysis from Jack Sepkoski, who is visiting Harvard for a year. It's quite detailed and a bit dry, but he's teaching many of the techniques that I plan to apply to my own data so it will certainly be useful. I am paying my rent this semester by teaching for Steve Gould's big undergraduate class. It's actually very interesting because each of the teaching fellows devises his or her own lab syllabus. I have, of course, chosen something botanical. I will be discussing how vegetation has shaped the landscape, atmosphere, and climate, and secondarily, how evolving plant lineages have influenced other lines of (mostly animal) evolution. It should be fun and a worthwhile learning experience for me as well as the students.

I hope you are both well and that your responsibilities have calmed to merely frantic. Much like me, I suspect that you would not be happy unless you had half again as many tasks as there is time to complete.

I hope to hear from you soon in regards to the *Taxon* page charges.

Best wishes,

Nan

Nan Crystal Arens

BOTANICAL MUSEUM OF HARVARD UNIVERSITY

26 OXFORD STREET
CAMBRIDGE, MASSACHUSETTS 02138

17 September 1990

Dr. Alfred Traverse
Palynological Laboratories
Penn State
435 Deike Building
University Park, PA

Dear Alfred:

Thank you so much for your help and the samples. Yours, coupled with those I've been able to dig up here should do the trick. Actually, I am fortunate you were able to supply a few as it looks like we may have a relatively large (15-20) class this time around.

All is going well here. We started our classes today. I'm very excited about teaching for paleobotany. Not only do I love the subject (always a plus), but I'm working on revising the labs to make them a little more functional and techniques based. It's a lot of work, but good experience. In addition to the teaching, I'm taking a class on tropical ecology, which culminates in a three-week field trip to Venezuala in January. I'm also taking Andy's and Steve Gould's seminar comparing patterns in plant and animal evolution. Both should be excellent additions to my background.

Again, thank you so much for your time and effort on my behalf. I truly appreciate it. I hope your semester goes well. Please give my best to Betty, Carmen and the rest of the lab.

Best wishes,

Nan Crystal Arens

THE PENNSYLVANIA STATE UNIVERSITY
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PALYNOLOGICAL LABORATORIES
435 Deike Building
University Park, PA 16802
phone: 814-863-3419; fax: 814-865-3191

11 September, 1990

Nan Crystal Arens
Botanical Museum
Harvard University
26 Oxford St.
Cambridge, MA 02138

Dear Nan:

I have just spent over an hour on your request--first by phone earlier--of 15.VIII.90. Now I have to get ready for my own class and for going out of town tomorrow and must stop searching and get this off to you.

It's not so easy. I have very good records of which samples in my archives have good floras, but the info doesn't include amount! I made a list of good samples for all your requests, but when I got to the drawers, I found some samples were too small to split--even a couple I'm sending were marginal--and all do have at least potential research importance. You only need 10 g. of a shale, 5 g. of a lignite--I've at least doubled that.

I am sending herewith:

1. T-820: Devonian (Frasnian/Givetian boundary), Pratterville, NY, Oneonta Fm. (spores need oxidation to lighten).
2. T-752: Devonian (Frasnian), Port Matilda, PA., Chemung Fm.
3. T-817: Devonian (Emsian), Battery Point Fm., near Ft. Peninsule, Gaspe Peninsula, Quebec (very nearly mid-Devonian).
4. T-713: Paleocene/Eocene boundary, lignite from Golden Valley Fm., near Golden Valley, ND.
5. T-625: Eocene, lignitic clay, Yegua Fm., San Miguel Creek, South TX.

All of these have been run and produced excellent floras.

Re Uppermost Pennsylvanian--I have a project going on this and have dozens of samples, no one of which is big enough to split. I suggest you contact Deb Willard at Smithsonian. She's working on P/P boundary stuff with good saccates and probably could let you have a chunk.

Re Middle Cretaceous--my notes say I've got a terrific sample, T-554, but EIT and I can't find it. I suggest you contact David Dilcher--a piece of his Dakota ss. shale worked on by him and M. Farley should be loaded (Cenomanian). Dave's now at U. Florida in Gainesville.

Re Upper Cretaceous--the samples I have that are proven are too small to split. Suggest you contact one of the upper K folk--e.g. Norm Frederiksen at USGS Reston. He has worked on such.

Sorry that I can't do better--and don't tell anybody I did even this! Regards to Andy.

Yours very truly,

Alfred Traverse

AT/et
encl

BOTANICAL MUSEUM OF HARVARD UNIVERSITY

26 Oxford Street
Cambridge, Massachusetts 02138

13 August 1990

Dear Alfred,

Thank you so much for your mother's Episcopal Shield charm. I am deeply touched and will treasure it always. My most precious possessions are those that have memories of significant people attached. Thank you.

All is well here. I am getting back into the swing of academic responsibilities after an enjoyable field season. I have a hectic fall ahead, with several manuscripts in the works, teaching paleobotany lab, two classes, grant and thesis proposals to write, and my orals. With the paleobotany lab, Andy is planning to take full advantage of my Penn State training by introducing much more technique practicum into the lab than has previously been the case. Should be fun, but lots of work for me.

Best wishes for your fall endeavors; give my regards to Betty and the rest of the lab. And please do keep in touch.

Dan

BOTANICAL MUSEUM OF HARVARD UNIVERSITY

26 OXFORD STREET
CAMBRIDGE, MASSACHUSETTS 02138

15 August 1990

Dr. Alfred Traverse
Palynological Laboratories
Department of Geosciences
Deike Building
University Park, Pennsylvania

Dear Alfred:

In response to our telephone conversation of 15 August, I am sending a list of particular stratigraphic intervals from which we could use supplimentary palynological samples for our paleobotany class.

Middle/Upper Devonian T-820 (need ex.), T-817, T-752

Uppermost Pennsylvanian (saccate and pseudosaccate flora) T-870 — not avail.

Middle Cretaceous T-554 - Cenomanian, VA

Upper Cretaceous (from different floral provinces if available) T-604 not sure T-615

Eocene T-713 T-625

Please send only material you have excess of and please don't spend a lot of time tracking this down for me. Also, if there are any other particularly interesting samples that you have, they would be appreciated.

Again, I'm looking for material that will be relatively easy to process and identify, as the palynological portion of the lab will be only one part of the total class. However, since palynomorphs are such important data for paleobotany (and there is no distinct palynology course here) Andy and I agreed that we should devote some substantial time in lab to pollen and spores.

Thank you so much for your help. Please give my best to everyone.

Best wishes,

Drew

Arons

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8 January, 1990

Nan Crystal Arens
Botanical Museum
Harvard University
26 Oxford St.
Cambridge, MA 02138

Dear Nan:

The box with the reprints just came (probably was somewhere in the PSU system earlier). I have a few requests too--will take care of. Enjoyed your news, as always. We are at the moment overwhelmed here with semester start-up--Geosc 002, 420, 526, etc.

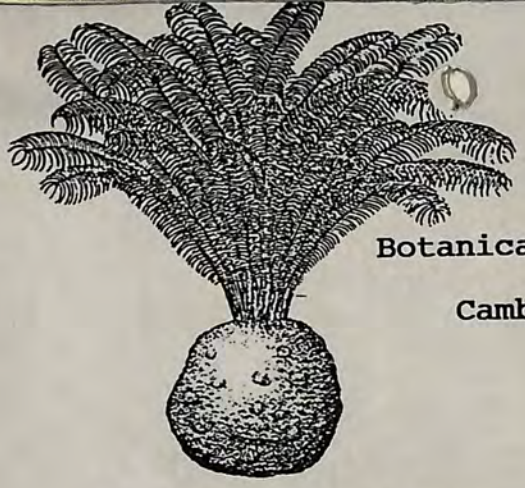
All the best!

Yours very truly,

Alfred Traverse

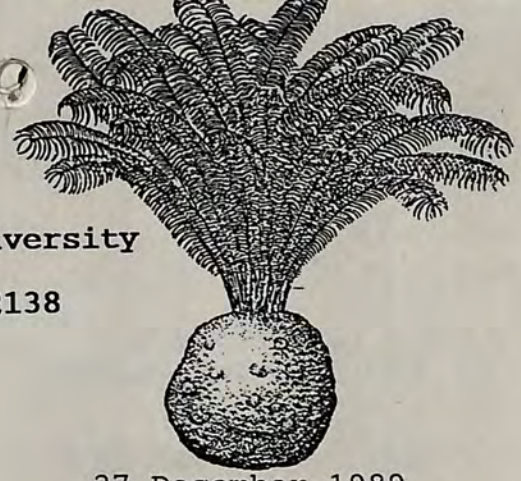
P.S. I get a lot of mileage out of the fact I'm "in the literature" on microwave ovens, but have never owned or used one! It's like the Bahamas for me.

AT/et



Nan Crystal Arens

Botanical Museum of Harvard University
26 Oxford Street
Cambridge, Massachusetts 02138



27 December 1989

Dear Alfred and Betty:

At last! The long-awaited reprints from the Taxon paper. They didn't arrive until mid-November, and have been sitting patiently on my desk ever since. Now that classes (and the holiday) are over, I finally have a moment to box them up and send them along.

I have received (and replied to) reprint requests from Tom Taylor and Jeffrey Osborn at Ohio State; Arron Sharp from the University of Tennessee; M. Harley from the Palynology Unit at Kew; W.A. Loneragan from the University of Western Australia; J.C. Audran á l'Université de Reims, France; S. Sabatier á l'Institut National de la Recherche Agronomique, France; Bruce Kirchoff from the University of North Carolina; Derek Focho from the University of Georgia; and Dr. Lim Ah Lan from the University of Malaya in Kuala Lumpur. I was surprised with the geographic coverage among the requests. Interesting.

Things continue well here. Classes finished on 19 December, and I am enjoying my new-found abundance of study time. I had a particularly heavy lab schedule this semester, which left little time for reading, writing, and problem sets associated with the courses, never mind my research. I will be taking another three or perhaps four courses next semester so things aren't likely to improve before May. After eight solid years of coursework, I'll be glad to be done with my last set of finals this spring.

Because of the heavy course load, we have decided to put off my comprehensives until December 1990. The idea is that I can spend two months in the field during the summer and spend the fall preparing for my exams and polishing up the thesis proposal. The alternative was taking the exams in September and missing most of the field season to prepare--not the best alternative.

Chris continues to enjoy his work. We have heard rumors of another trip to Alaska within the next few weeks. Chris rationalizes that at least it's WARM there. The Air Force folks in Alaska have been having all sorts of trouble with the volcano of late. Basically they can't move their planes and people around as they would like. One of the people from Chris' group has been stranded on Shemya (in the Aleutians) for about a week because the transport planes just can't get out to pick him up. Adventures all around.

We hope the New Year finds you and everyone in your lab well. Please give everyone our best. Keep warm!

Yours sincerely,

Nan

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5 October, 1989

Nan Crystal Arens
Botanical Museum
Harvard University
26 Oxford St.
Cambridge, MA 02138

Dear Nan:

You needn't have apologized to Hill. His paper was just a note and provided no information of value to our study. His comment about "spores" had to do with viability. Besides we did too know about it! I remember I had you go through my "info-cards" on microwaving, and I just checked--it's there all right. I read Taxon very thoroughly. His blurb to you could have been ignored, but you were very diplomatic.

Best.

Yours very truly,

Alfred Traverse

AT/et

BOTANICAL MUSEUM OF HARVARD UNIVERSITY

26 OXFORD STREET
CAMBRIDGE, MASSACHUSETTS 02138

25 September 1989

Dr. Alfred Traverse
Palynological Laboratories
Department of Geosciences
Deike Building
University Park, Pennsylvania

Dear Alfred:

Our Taxon paper seems to be attracting some interest. I have received two reprint requests to date. The enclosed reprint also arrived in today's mail. The reprint came with the attached note, nothing else--botanists certainly can be temperamental (just teasing)! I responded with the attached letter--mostly out of courtesy--what can I say? Oh well. I've concluded that if I waited for everything to be perfect, I would never publish anything. I have to take my best shot at perfection within the time allowed.

Hope things are going well for you. I'm into my second week of classes and am already very busy. Thank goodness this is my last year of classwork.

Give my best to everyone.

Yours,

Nan

Nan Crystal Arens

BOTANICAL MUSEUM OF HARVARD UNIVERSITY

26 OXFORD STREET
CAMBRIDGE, MASSACHUSETTS 02138

25 September 1989

file Arens

Dr. Steven R. Hill
Department of Biological Sciences
Clemson University
Clemson, South Carolina

Dear Dr. Hill:

Thank you for the copy of your reprint, "Microwave and the herbarium specimen: potential dangers." We had indeed overlooked the paper in our literature search.

However, I am reassured to see that our experimental results confirmed your suspicions with respect to spores and pollen.

Best wishes,

Nan

Nan Crystal Arens

THE PENNSYLVANIA STATE UNIVERSITY
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21 September, 1989

Nan Crystal Arens
Botanical Museum
Harvard University
26 Oxford St.
Cambridge, MA 02138

Dear Nan:

Thanks for yours of 15 Sept. I am also getting reprint requests.

Fr. Myles interests me. He doubtless knows of my two first cousins in NB who are/were (one just died) priests. One is still active, Rev. Canon George Akerley. I was born in the St. James Anglican rectory in Port Hill, P.E.I.

Your oxygen work is right down the line of ideas of Jenny Robinson here. She has tried some such experiments with Equisetum.

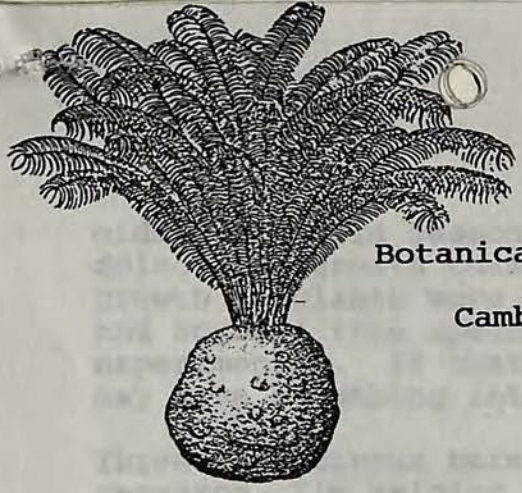
Today's excitement here: one of my students drove home fairly late night before last to find his house burned to the ground with all his worldly goods. Bad.

All the best.

Yours very truly,

Alfred Traverse
Professor of Palynology

AT/et



Nan Crystal Arens

Botanical Museum of Harvard University
26 Oxford Street
Cambridge, Massachusetts 02138

15 September 1989

Dr. Alfred Traverse
Elizabeth Traverse
Palynological Laboratories
435 Deike Building
University Park, PA

Dear Alfred:

Thank you for your letter of 12 September.

Yesterday I received my very first reprint request--from our Taxon paper (Derek Focho, U of Georgia). It was all very exciting. Now I just have to wait for the reprints to arrive!

Comparing Joggins today with the work of Dawson/Logan etc. from the 19th century is certainly very interesting. It amazes me how careful, detailed, and useful their observations are even though they lacked many of the guiding principles we use today. However, using Dawson's measured section can be a bit frustrating because 150 years of erosion combined with anastomosing facies makes for a tricky combination.

Yes, I plan to do a Phillips-DiMichele-Wnuk-type project, but there will be an "Arens" twist to it as well. Being in a biology department has given me a whole new outlook on the world and I would like to try a more sophisticated application of ecological theory and methodology to the paleobotanical record. This particular section offers the potential for such good time resolution that there are many questions I can ask about ecological processes that will be of interest to both botanical ecologists and paleobotanists. I will send you a copy of my project proposal when it takes shape (down the road a ways).

I think Fr. Myles is originally from New Brunswick--at least I think I remember him saying he went to seminary there. His first posting was in P.E.I. and then he went to Amherst. I'll ask next time I write to him and let you know.

My plans surrounding the oxygen conference are still tentative. I have planned my field season for June and July, but Andy has mentioned talking with the organizers at P.S. to ask about moving the conference date back into August so it won't fall right in the

middle of field seasons. We'll see. Andy and I have talked about doing some growth chamber experiments looking at oxygen's effect on growth in plants more analogous to those of the Paleozoic than maize and soybean (the species of choice for most photorespiration experiments). If that happens and I get some good wildfire data, I may have something interesting to talk about.

Three-ring circus here as well. In addition to classes and research, I'm helping to organize the joint seminar series Earth History and Paleobiology. It's a good chance to meet interesting people (the speakers), but it's a lot of running-around time. I'm also very busy at church: acolyte, lay reader, editor of the newsletter, Bible study leader. Also, our rector just left to accept a call in Connecticut, so on top of all the "normal" activities we have the search process to go through. I certainly won't be bored.

Hope you are all well. Best wishes with everything.

Yours very truly,

Nan Crystal Arens

THE PENNSYLVANIA STATE UNIVERSITY
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12 September, 1989

Nan Crystal Arens
Botanical Museum
Harvard University
26 Oxford St.
Cambridge, MA 02138

Dear Nan:

Thanks a lot for the "publishable" letter of 1 Sept. I recall Joggins with great pleasure too. I especially liked comparing what I saw with what _____ saw in the 1850s. The old photos of his "field party" are hilarious--servants lugged sawhorses, planks, linen tablecloths, wine, cold cuts, the works, to the outcrop.

I take it you're going to do a Tom Phillips-Chris Wnuk-etc. sort of ecological study. Good.

I wonder where Fr. Myles comes from. I have a slug of Myles cousins in New Brunswick.

Good to hear you'll be at the oxygen conference. I have been peripherally involved--helping get Bill Chaloner, for example.

The "accidental" omission of 423 from the course list as biology cost us 50% of our enrollment, but we have 6 hardy souls nevertheless.

Usual 3-ring circus here. That both of our daughters with babies but no spouses are now resident in the area complicates life, but is some fun, too.

Best.

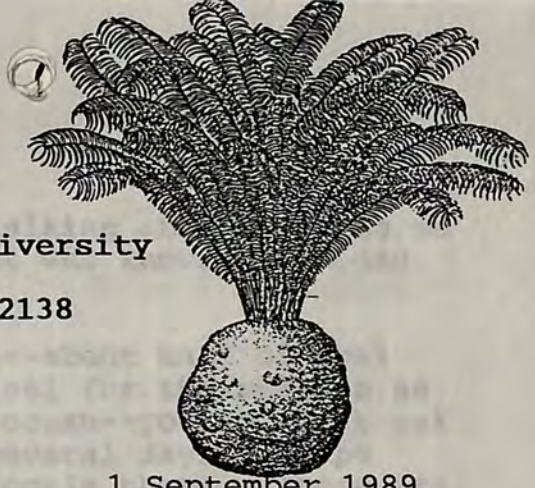
Yours very truly,

Alfred Traverse

AT/et

Nan Crystal Arens

Botanical Museum of Harvard University
26 Oxford Street
Cambridge, Massachusetts 02138



1 September 1989

Dear Alfred:

Thanks for your letter of 29 August. I was thinking I should write to you to tell you about my trip; your letter gave me an excuse to do it right away.

Joggins was really fantastic. The in situ trees and calamite groves are really impressive. The cliffs are constantly changing as the sea erodes them, so new material is always being exposed. In the time I was there, several new trees were uncovered. I spent part of my time with a geologist from the Nova Scotia Department of Mines who is finishing a PhD thesis on the Springhill coals--the inland, minable correlates of the coals at Joggins. He has been working in the Cumberland Basin for about ten years and finally decided to get the degree out of it. He is the individual Bill DiMichele suggested I contact about material for an ecological study.

Joggins (and the Cumberland Basin in general) is appealing as a thesis area because a lot of sedimentological work is going on right there now. Consequently, I'll have a good stratigraphic and sedimentological context to put my plants in. The only disadvantage with Joggins is that the compression flora is very sparse. As a result, I'll probably be relying quite heavily on palynology for my floral reconstructions. That's not bad, per se, but I would like to have a somewhat broader botanical background. The compression flora in Cape Breton is much better. I may do some work up there to compare it to trends at Joggins. Not quite sure yet--I don't want the thesis to get out of control.

At the moment, I am particularly interested in fire ecology and trying to develop some methods for looking at fire/disturbance-mediated ecological changes in the Paleozoic. The Cumberland Basin looks like a good place to start because there is abundant evidence for fire events in all of the major lithofacies: coals, mudstones, and sandstones. A careful cataloging of the section will (I hope) permit me to quantify a fire regime that I can compare throughout the section. It will be interesting to look at this section in light of the hypotheses surrounding climate and water table in the Westphalian B (Joggins Fm.) and Westphalian D (Syndey Mines Fm.) in Cape Breton. There are also issues like what ecological factors influence the genesis and demise of coal-forming horizons. From an anecdotal look at the sections, there may be more to it than just subsidence and sedimentation rates. Lots of interesting questions to be sure. I regret now not having taken more coal courses during

my tenure at Penn State. Oh well. Andy is talking about sending me away for a semester to study coaly things, but who knows where and when that might be.

I spent a total of about two weeks at Joggins--about half of that time just walking around and getting a good feel for the section as a whole (with occasional lapses to watch the ocean--you couldn't ask for a better field locality). I also spent several days in Cape Breton being toured around the Westphalian D coals there. There are a lot more lacustrine rocks in that sequence and the coals are generally thicker. Most of the extensive mining going on in the Province right now is in the Syndey Mines Fm. Despite the fact that the Westphalian D was supposed to be quite soggy, there was abundant fusain in the coals, perhaps even more than at Joggins. Curious. At the end of the trip I went to Halifax to spend a day in the Provincial Department of Mines library and to meet some folks at Dalhousie. Chris flew to Halifax to spend the weekend and drive back with me--the only vacation we'll have time for, unfortunately.

In addition to being a geological success, I also had a wonderful time. It was really nice to be by myself for a while. I also met lots of wonderful people, and really fell in love with the country. The Anglican priest I stayed with was indeed rector of Christ Church in Amherst, David Myles. I'll have to ask him about your cousin. They took me in after I was thoroughly soaked a couple of times and got a bad cold. I earned my keep by reading the lessons on Sunday and reassuring their daughter who was very nervous about starting her first semester at university. I feel like I have another whole family up there now.

The world is very small. Rev. Myles and his family lived in Arlington, MA (our home) about 16 years ago. They know several of the older women in our church in Arlington, and their son studies at New England Conservatory in Boston, where my aunt and uncle teach. Our current rector in Arlington also worked on a sheep farm in River Hebert before beginning the ordination process. I drove right by their old house on the way to the cliffs every morning.

My upcoming year is looking very busy. In addition to seven classes (as if that weren't enough), I will be attending the GSA national meeting to go to the symposia on coal-forming ecosystems. I'm excited about that as I've never been to a big meeting. I'll also be attending a conference on modern fire ecology in the spring; I'm going to try to convince them about fire in the Paleozoic. I want to hear the state-of-the-art in extant fire ecology and meet some of the people I've been reading, but since I have material for a paper, why not give it. There will be a published volume too so there is some extra incentive. I also have to get together some funding for next field season, get a thesis proposal together, and study for my comprehensives (WOW!). I'm planning on close to two months in N.S. next year depending on how funding works out. Chris will be in Alaska for June, July, and probably part of August, so it will be a good time for field work. I also learned today that I'm listed as a speaker for the conference on atmospheric oxygen that the Earth

System Science Center is putting on next summer. (Glad somebody told me.) As Andy put it: "You and Tom Phillips are representing the Paleozoic plants." I just about fainted. Life as an academic will never be boring!

Please give my best to everyone there, especially Betty. I miss you both a great deal. Please keep in touch.

Yours,

Nan

Nan Crystal Arens

THE PENNSYLVANIA STATE UNIVERSITY
DEPARTMENT OF GEOSCIENCES
PALYNOLOGICAL LABORATORIES
435 Deike Building
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(814)863-3419

29 August, 1989

Nan Crystal Arens
Botanical Museum
Harvard University
26 Oxford St.
Cambridge, MA 02138

Dear Nan:

Thanks for the beautiful postcard from Joggins. If your Anglican priest was in Amherst, he has a first cousin of mine in his parish (Esther Traverse McCaskill). Next time you go up I'd like to have you meet the botany people at Mt. Alison in Amherst's twin city, Sackville, NB.

Best wishes.

Yours very truly,

Alfred Traverse

AT/et

THE PENNSYLVANIA STATE UNIVERSITY
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11 July, 1989

Nan Crystal Arens
Botanical Museum
Harvard University
26 Oxford St.
Cambridge, MA 02138

Dear Nan:

Thanks for yours of 3 July. Don't know anything really new re Brandon lignite in the literature. However, Scott Stout (recent Ph.D. student of Spackman's), worked on Brandon materials (among other things) for his doctorate and maybe he is publishing it. His present address:

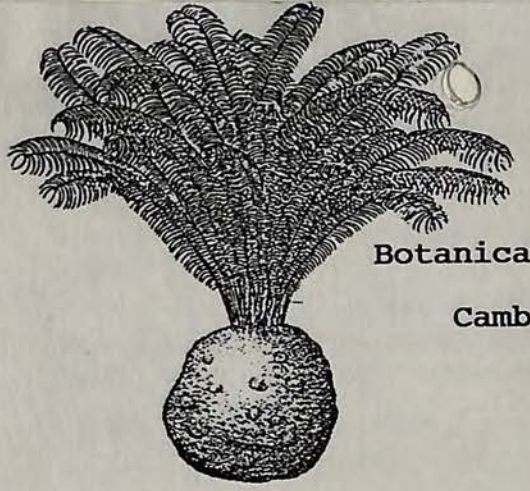
UNOCAL Corp.
Science & Technology Division
P.O. Box 76
Brea, CA 92621

Best wishes.

Yours very truly,

Alfred Traverse
Professor of Palynology

AT/et



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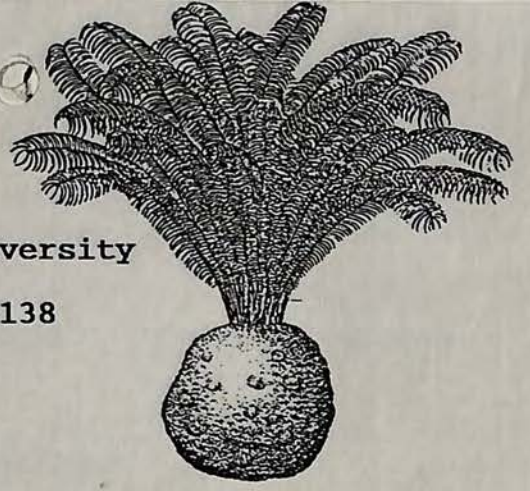


5 July 1989

Dear Alfred and Betty:

Your letter of 28 June arrived today. Thank you for the note and check. I will forward the reprints on to you when they arrive here.

Chris and I are sorry we missed you when we were in State College earlier this week. We had (more) trouble with our car and didn't make it in to town on Monday (3 July). Fortunately, we did get everything fixed and arrived home safely.

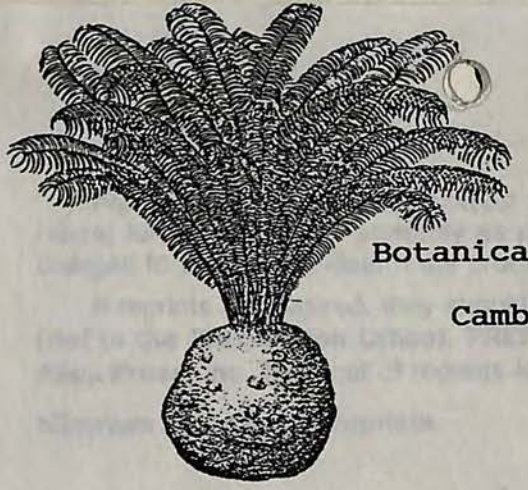
I hope all is well with you both. I am enjoying my month in the library---I'm discovering how many things I still have to learn. I suppose I'll be doing that for the rest of my life!

Best wishes.

Very truly yours,

Nan Crystal Arens

P.S. Do you know of anything that has been printed about the Brandon Lignite within the last three or four years? I didn't think there had been anything new, but there is a very interested amateur here who is researching the Brandon and thinks there might be something very recent floating around in the literature. Thanks. nca



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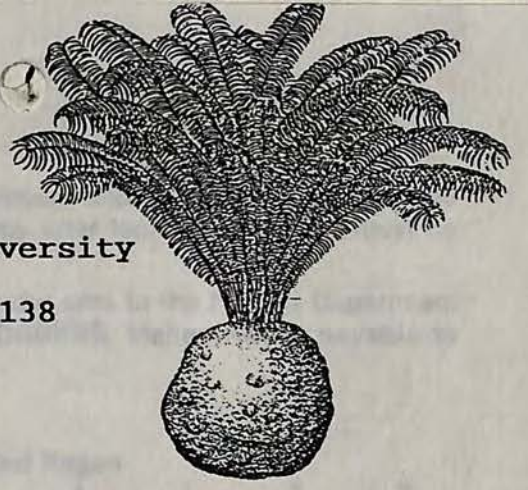

19 June 1989

Dr. Alfred Traverse
Palynological Laboratories
Penn State University
University Park, PA.

Dear AT:

Thank you for your letter of 13 June. I'm sending the reprint request out right away before it gets lost in my "to be done" pile. I've ordered 200 reprints--100 for you and 100 for me. The total cost for our ten-page paper will be $130.50. If we split the cost evenly, your contribution will be $65.25. I will send the request in immediately with payment in full, and you can pay me at your convenience. I will mail the reprints to you when they arrive.

I'm looking forward to my trip to the Atlantic Provinces. A thesis at Joggins is looking more promising the more I read. Perhaps you can join me for a field trip one of these years if the project pans out. I remember you saying that area was "home" for you. Interestingly, a woman who attends our church grew up not far from Joggins as well.

I hope you are well. Please give my best to Mrs. Traverse.

Yours very truly,

Nan

Nan Crystal Arens

enclosure: copy reprint order

P.S. Chris and I will be visiting State College over the weekend of 1 July. We will stop by Deike Bldg. to say "hello" if we have a chance.

Nan

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Nan Crystal Arens

(*Author's signature or, if institutional order, authorized representative.*)

Address: Nan Crystal Arens
Botanical Museum of Harvard University
26 Oxford Street
Cambridge, MA 02138

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THE PENNSYLVANIA STATE UNIVERSITY
DEPARTMENT OF GEOSCIENCES
PALYNOLOGICAL LABORATORIES
435 Deike Building
University Park, PA 16802
(814)863-3419

13 June, 1989

Nan Crystal Arens
Botanical Museum
Harvard University
26 Oxford St.
Cambridge, MA 02138

Dear Nan:

Thanks for copy of letter to "the rat" Luteyn (if he hadn't been so stiff about non-abutting pollen photos, we'd have had almost no trouble). Sounds to me as if you handled it all masterfully.

Re reprints: I would also like 100. But I don't recall how many printed pp. we're talking about. I'm returning the forms, asking you to order and let me know what my share is--I'll send a check. I have no grant money at the moment that could pick up the tab.

Your various activities sound marvellous. The Atlantic Provinces are of course "home" to me. I'd love to be tagging along. I have a bunch of cousins in the Joggins area (Amherst, N.S., etc.). My mother is the 2nd oldest alumnus(a) of Mt. Allison Univ., in nearby Sackville, N.B.

All the best.

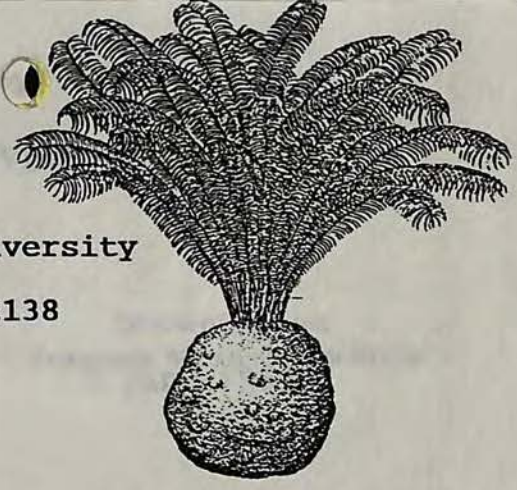
Yours very truly,

Alfred Traverse

AT/et
encl: forms

Nan Crystal Arens

Botanical Museum of Harvard University
26 Oxford Street
Cambridge, Massachusetts 02138



5 June 1989

Dear AT:

Well, it looks like we've finally put the Taxon paper "to bed," as they say.

I've enclosed a copy of the cover letter I sent with the galley proofs. Keep it for your files if nothing more. I've also enclosed the reprint request forms. I might suggest we order them together for discount sake, but that is entirely up to you. I was planning on ordering 100 reprints. I'll hold off on the order for a few weeks until I hear from you.

All else is going well. As I mentioned on the phone, I've just finished exams and have survived my first year in the program. Switching into biology at this late date means I have a lot of classes to take. That's not bad, though--broadens the perspective. The disadvantage is that I don't have time for a lot of paleobotanical reading I would like to be doing. I just have too much to learn, I guess.

Chris is enjoying his job. He's been doing a lot of traveling since the first of the year: Texas, Alaska, now Kwajalein in the equatorial Pacific. With me looking at about five weeks of field work this summer, it seems like we'll be apart more than we're together.

For the summer, I'll be spending two weeks this month in southern Indiana with Bill DeMichele helping out with a new project he's starting. It will be a good chance for me to learn some more field technique and brush up on my terrestrial sedimentology. I'm also planning three weeks in August scouting for thesis localities in Nova Scotia and Newfoundland. I've become interested in the Joggins section and its correlative units as a place to try out some of my ideas. Andy is also interested in having me check out some of the Mississippian material from western Newfoundland. Should keep me out of trouble--and I can't imagine a more beautiful place to work.

I hope you are beginning to recover from your misfortunes in New York. Please give my best to everyone there. Take care.

Best wishes,

Nan

Arens

BOTANICAL MUSEUM OF HARVARD UNIVERSITY

26 OXFORD STREET
CAMBRIDGE, MASSACHUSETTS 02138

5 June 1989

Dr. James L. Luteyn
Taxon
New York Botanical Garden
Bronx, New York

Dear Dr. Luteyn:

Enclosed please find the galley proofs and illustrations for the paper "The effect of microwave oven-drying on the integrity of spore and pollen exines in herbarium specimens" by Arens and Traverse. I was pleased to find few errors.

Several corrections may need further explanation:

1. Page 394: Our error in verb agreement.

2. Table 1, page 395: Typesetting error in spelling.

3. Page 396-397: Text reference to "left, right, and center" columns must be deleted due to the alterations made to the figures after the text was submitted and reviewed. Please remember that these changes in the figures were required by Taxon and we were not subsequently allowed to revise the text.

4. Figure 1 caption: Our error in figure lettering.

5. Page 398: Changes in style were made to our text references to particular photomicrographs. I was uncertain whether these were errors or style considerations. We defer to Taxon style, but I wanted to point out the apparent inconsistency.

6. Figure 2 caption: Changes necessitated by required changes to the figures. Please see #3 above.

7. Page 401: Typesetting error.

8. Page 403: A question of style for book titles.

If you have any further questions, please feel free to contact me at 617-495-7602. Thank you for your time and attention.

Sincerely,
Nan
Nan Crystal Arens

TO Alfred

DATE 6-5 89 TIME 10:45

WHILE YOU WERE OUT

M. Nan Arens

Of

Phone 617-495-7602

TELEPHONED	☑	PLEASE RETURN CALL	☑
CALLED TO SEE YOU	☐	WILL CALL AGAIN	☐
RETURNED YOUR CALL	☐	RUSH	☐

MESSAGE She has received the galleys for the Taylor paper. She will look through them. Would you like a copy also?

Signed Judith

The Standard Register Company

She will Fax proofs to me - if ✓ for errors late i done

BOTANICAL MUSEUM OF HARVARD UNIVERSITY

26 OXFORD STREET
CAMBRIDGE, MASSACHUSETTS 02138

7 April 1988

Dr. Alfred Traverse
Palynological Laboratories
Department of Geosciences
Deike Building
University Park, PA 16802

Dear AT:

Thanks for your letter of 6 February. Sorry for the delay in reply. I've been having "one of those semesters."

Glad to hear the Taxon paper is finally underway. Do you have any idea when it will actually "hit the newsstands" as they say? It will be nice to finally see it out. Hard to believe that I finished that work two years ago.

I finally got my hands on a copy of Paleopalynology. Andy was putting in an order for a copy and I tacked mine on. We went directly to the publisher. I probably should have done that to begin with. I'm now ordering another copy as a gift for our post-doc, who will be leaving in June. He was really impressed with how complete an approach to palynology it was.

Really wonderful book--my compliments. I'm having my first chance to look at it closely in conjunction with a paper on the biogeography of Normapolles that I'm writing for a class. I have been using it primarily as a reference to get me into related branches of the literature and answer specific little questions I have. Having a complete and detailed index really helps for those kinds of tasks. Knowing how much time and effort you put into the book, I wanted to share with you how useful it has been to me.

Chris and I are doing well. Chris has been traveling a lot with his job (he's working with a company that designs and maintains one of the surveillance systems that monitors Soviet missile launches for treaty verification purposes). He has spent two weeks in Texas and three in Alaska since the new year. He mentioned last evening that he will be heading for Alaska next week for another week. He is rapidly becoming indispensible to the company. He finds his job challenging and enjoyable, which is wonderful as well.

I am taking a heavy course load of biology this semester. It has been quite a long haul. I still have another month or so to go before the end of finals. Time goes by quickly, though, especially

when papers are due. I'm really looking forward to the summer for a chance to get caught up on reading for my research. I have a stack of books and papers that is approaching my own height to get through. It's fun though. I'm also planning my field endeavors for the summer. I'm hoping to spend a week or two in Indiana with Bill Dimichele working on some Pennsylvanian localities as a field assistant and consulting palynologist. That will be a good review of terrestrial depositional environments that I desperately need. After that I'm planning to head up to your homeland to check out some possible thesis localities: one in Nova Scotia, one in Newfoundland. That should be a lot of fun since I haven't been up that way since I was a tiny baby, and it is such beautiful country. I'm applying for a department grant for field study so with luck I'll be able to make the trips.

Must get to seminar now. Take care, give our best to BT, and please keep in touch.

Yours very truly,

Nan

Nan Crystal Arens

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University Park, PA 16802
(814)863-3419 or (814)865-6711

6 February, 1989

Nan Crystal Arens
Botanical Museum
Harvard University
26 Oxford St.
Cambridge, MA 02138

Dear Nan:

Betty has been complaining about prolixity of my letters, so will be brief. Thanks for yours of 31 Jan.

There was a huge flap about the plates for the paper. I redid them as you know, but the editor wanted them redone again, and I raised hell and eventually won. The paper is now truly in press in Taxon!

There's a post-doc from Santa Barbara (worked with Bruce Tiffney) officed here in Walker Bldg., Dr. Jenny Robinson. She is really excited about fire and its effect on vegetation--you should write her and ask for copies of what she's done (mostly not published).

Inasmuch as Paleopalynology is published in Boston in the US (see attachment), your inability to find it is disheartening! Nature had a very nice review a couple of weeks ago (by John Birks).

Enjoyed hearing.

Yours very truly,

Alfred Traverse

AT/et
encl: xerox of title pg. of textbook

BOTANICAL MUSEUM OF HARVARD UNIVERSITY

26 OXFORD STREET
CAMBRIDGE, MASSACHUSETTS 02138

31 January 1989

Dear A.T. and B.T.:

Thank you for your letter of 6 January. Does having one of the 423 students declare my Wyodak material barren give me absolution for less than picture perfect preparations?

So what's up with our microwave pollen paper? You've been sending along snatches of correspondence (which I appreciate) but it's been a bit difficult to piece together exactly what's going on. If you have a few minutes, I would really appreciate an update. Thanks.

Things are going well here. I've just finished my first set of exams and we start spring semester classes tomorrow. I am looking forward to a very busy spring with lots of classes, several little research projects (on which I am the palynology consultant--you must have trained me well!) and reading toward a thesis proposal, which Andy would like to see before field time rolls around.

At the moment, I'm connected in various capacities with several little projects. Two involve material brought over from South Africa by our visiting scholar, Dick Rayner. One is Cretaceous with what may be a flower compression in it, and the other is a Triassic paper coal. Both are ambiguously dated--part of our task. The other project I'm working on is a pollen analysis of a small forest hollow at Harvard Forest. I did most of that as a project for a class last semester, but there are a few things I would like to follow up. Since the hollow is small and isolated it offers some interesting potential for stand-level reconstruction.

Thinking ahead toward my PhD work, I've gotten very interested in looking for disturbance processes as they influence the ecology of past floras. During my forest ecology course, we talked at great length about how disturbance regimes shape the flora. When I nosed around in the literature, there wasn't much mention of this sort of thing. I'm looking at fire right at the moment, with an eye toward presenting some initial ideas at the Mid-Continent Paleobotanical Colloquium this spring. Should be interesting.

Chris is well. He is in Texas (Greenville, northeast of Dallas) this week installing some software he has spent the last month or so perfecting. He finds his job interesting and full of challenges, but these few months in industry have hardened his resolve to go back into academics. He has always wanted to be an astronomer and he still does.

I have been unable to find your textbook in town here. One of these days I'll get around to ordering one.

That's about all the news for now. I hope the letter finds you well. Please keep in touch.

Sincerely,

Dave

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University Park, PA 16802
(814)863-3419 or (814)865-6711

6 January, 1989

Nan Crystal Arens
Botanical Museum
Harvard University
26 Oxford St.
Cambridge, MA 02138

Dear Nan:

One of the 423 people last semester got your WyodaK sample as his first unknown. He wasn't the greatest lab processor, but I agreed with him after a while that the sample was almost 100% wood and effectively almost barren of palynomorphs. I gave him some Brandon Lignite as a backup, and he had fun. But that WyodaK stuff is terrible, huh?

Best.

Yours very truly,

Alfred Traverse
Professor of Palynology

AT/et

THE PENNSYLVANIA STATE UNIVERSITY
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435 Deike Building
University Park, PA 16802
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16 September, 1988

Nan Crystal Arens
Biological Laboratories
Harvard University
16 Divinity Ave.
Cambridge, MA 02138

Dear Nan:

Here's the stuff from Taxon. Most of what they say is a reflection on our not following their instructions-to-authors closely enough. I should have ridden herd on that more. For you it is a good learning experience for the future!

You need to look at all pp. carefully--the package includes everything they sent me, including some pp. with no comment. I have kept a xerox of everything. I also have the originals for the redone "plates" (Figs. 1-3), but I am sending you xeroxes for comparison. I made the approprite changes in the captions, but you should check that too, in case I blew it. I believe you can recognize my script and sort out what the editors/reviewers have said and my response thereto.

Send me the corrected MS back. I'll check it again, put in the figures and send off to Stafleu with appropriate letter. I've already writtem him about the inadvertent delay.

Best.

Yours very truly,

Alfred Traverse

AT/et
encl: MS