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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.

Der Tod eines geliebten Menschen ist wie das Zurückgeben einer Kostbarkeit, die uns Gott unverdient lange geliehen hat.
Dein Leben, voll Ideenreichtum und unerschöpflicher Energie war Pflichterfüllung in edelster Bedeutung.

Von Schmerz und tiefster Trauer erfüllt geben wir die Nachricht von dem unfaßbaren Heimgang dieses so bewundernswerten und herzensguten Menschen, den wir über alles liebten, Herrn

o. Univ.-Prof. Mag. rer. nat.

Dr. Wilhelm Klaus

Ordinarius an der Universität Wien,

der in der Nacht zum 13. November 1987 im 67. Lebensjahre, nach langem, schwerem, mit großer Geduld und Tapferkeit ertragenem Leiden, jäh aus unserer Mitte in die Ewigkeit abberufen wurde.

Die Erfüllung seines Lebens war Liebe, Treue und Opferbereitschaft für seine Angehörigen und hatte bis zur Todesstunde nimmermüdes Schaffen zum Inhalt.

Unser lieber Verstorbener wird Mittwoch, den 25. November 1987, um 14.30 Uhr, in der Pfarrkirche zu Payerbach, nach Zelebrierung des feierlichen Requiems eingesegnet und am Ortsfriedhof im Familiengrabe zur ewigen Ruhe gebettet.

1110 Wien, Herbortgasse 24/2/4, im November 1987

In tiefer Trauer:

OStR. Prof. Mag. EDITH MEYER
und Mutter

Dr. med. INGEBORG SCHWARZ
Dipl.-Ing. EDITH SCHWAIGER
Cousinen

Mag. BIRGIT WINKLER
Großnichte

Dr. NORBERT WINKLER
und LISA

Dr. Ing. OTTO MELNITZKY
Cousin

TRUDE MELNITZKY

BESTATTUNG FIALA, 2651 Reichenau, Gahnsstr. 14

Druck: Druckpunkt, 2640 Gloggnitz

Herrn
Prof. Dr. Wilhelm Klaus
Inst. für Paläontologie der Univ. Wien
Universitätsstraße 7/II
A-1010 Wien, Österreich

den 4. April 1985

Sehr geehrter Professor Dr. Klaus!

Vielen herzlichen Dank für die Kopie Ihrer Arbeit über die Sarmat-Mikroflora. Ich werde sie später sorgfältig lesen, aber im Augenblick möchte ich mich bedanken und Sie grüßen.

Obwohl wir keineswegs fehlerfreies Deutsch können, haben meine Frau und ich sehr fleißig studiert, und wir beherrschen jetzt ziemlich gut die Sprache. Ich habe sogar zweimal Vorträge auf Deutsch gehalten!

Es ist eine lange Zeit her, seitdem Sie uns besucht haben, aber wir erinnern uns sehr gut, daß Sie tatsächlich hier gewesen sind! Mein Maria-Theresa Taler, den Sie mir gegeben haben, sitzt noch auf meinem Schreibtisch zu Hause. Es hat sogar einen schweren Diebstahl überlebt.

Eines Jahres möchten wir ein paar Tage in Österreich verbringen. Dann werden wir zweifellos Sie besuchen.

Mit besten Grüßen,

Ihr

Alfred Traverse
Professor für Palynologie

AT/et

PALÄONTOLOGISCHES INSTITUT
DER UNIVERSITÄT
WIEN

A-1010 WIEN I., UNIVERSITÄTSSTRASSE 7

18.6.1980

Pb/956/K/B
Vorstand: o.Prof.Dr.W.Klaus

Dr.Bruce Cornet
Gulf Research & Development Company
Houston Technical Services Center
P.O.Box 36506
Houston, Texas, 77036

Dear colleague,

Many thanks for your very interesting letter from 15th May 1980. Our botanical magazine is still open at any time for your interesting manuscript about angiospermiah pollen grains of the Triassic. But of course publication in the American Journal of Palynology will be more desirable for you and will have preference. In case there are any difficulties my proposal is still open for you. No german translation will be necessary with the exception of the short abstract.
The new findings of San Miguel ja with flowers is of very much interest and importance. Immediately after receipt of your lines I contacted Prof.Ehrendorfer of the Botanical Institute of Vienna, who is very much interested in evolution of plants. He demonstrated the same enthusiasm as I did when I read your lines and we concluded to offer you a space for publication of these important findings in our journal in Austria.
During my next visit in the United States I might be able to stop in Houston to contact you in that matter.
I like to congratulate you personally to these excellent new findings

Yours sincerely

Copy to Prof.Dr.Al Traverse
Pen.State University
Deike Building, University Park,
College of Earth & Mineral Sciences
Pennsylvania 16802

Dear Prof. Traverse,
Congratulation to the new findings
of your student
Yours
V. Klaus

XXXX

7 January, 1980

Prof. Dr. W. Klaus
Palaontologisches Institut
Universitat Wien
A-1010 Wien 1,
Universitatsstrasse 7
Austria

Dear Colleague:

What a nice letter! I have contacted Cornet immediately about your suggestion. As I said in Dallas, the <u>results</u> of Bruce's investigation should certainly be in print regardless of varying interpretations of their significance.

I reciprocate your kind greetings for the New Year of 1980.

All the best.

Yours very truly,

Alfred Traverse
Professor of Palynology

AT/et
cc: B. Cornet

PALÄONTOLOGISCHES INSTITUT
DER UNIVERSITÄT
WIEN

Vorstand: o.Prof.Dr.W.Klaus

A-1010 WIEN I.,
UNIVERSITÄTSSTRASSE 7

18th December 1979

Pb/934/K/G1

Kenoyer S.C.

Prof.Dr. Alfred Traverse
Pennsylvanian State University
Deike Building
University Park
Pennsylvania 16802

Dear colleague,

After my recent return from Santo Domingo, I found your friendly letter. Many thanks.
I was delighted indeed to see you at Dallas, looking even younger then 10 years ago. My interest was mainly concerned on your paper and that of Mr. Cornet and I really do hope that it will be published as soon as possible.
In case there arrive difficulties for publication of Cornets work please let me know. I contacted already the redactional committee of a well known european botanical magasin and there appears no difficulties to accept Mr. Cornets paper in full length with the microphotograms and graphs. The text could be completely in English, or if desired in German and Englisch.
Furthermore I am looking for the slides of Maljawkina. I am busy to trace them in my tray and hope to be successfull, so that I can send them together with some literatur remarks.

I wish you and your family all the best for a Merry Cristmas and a successfull New Year.

Yours sincerely

Klaus

W.Klaus

XXXXX

8 November, 1979

Prof. Dr. Wilhelm Klaus
Paläontologisches Institut
Universität Wien
Universitätestrasse 7
1010 Wien, Austria

DearDDr. Klaus:

How good to see you in Dallas! I'm embarrassed that I didn't recognize you at first, but why should I expect to be seeing Dr. Klaus in Dallas, Texas!

That was interesting information you gave me about the Corallina-Classopollis problem. Could you send me the reference to a paper by Goczan to which you referred? Also, you mentioned to me that I might profitably remind you about the Malyavkina slide you said I could borrow.

Once again, it was great to see you. I'm sure Cornet appreciated your positive comments about his contribution. See you in Cambridge?

Yours very truly,

Alfred Traverse
Professor of Palynology

AT/et

INSTITUT FÜR PALÄONTOLOGIE
DER UNIVERSITÄT WIEN
LEHRKANZEL PALÄOBOTANIK
Prof. Dr. Wilhelm Klaus

1010 WIEN, 8.6.71.
Universitätsstraße 7 / AUSTRIA
Tel. 42 76 11 / 606

Pb 194/ K/Br

To
Prof.Dr. Alfred Traverse
The Pennsylvania State University
College of Mineral Industries
Coal Research Section
University Park
Pennsylvania 16802
USA

Dear Dr. Traverse,

Many thanks for your nice letters and my reprint which I received today. I am so sorry that I have not one print left. This is the only book which is still in existence. I really do hope that you could make use of it.

I wish you a good journey to the palynological congress in Siberia and would be glad seeing you any time in future.

Yours sincerely,

W. Klaus

(Prof.Dr.W.Klaus)

May 18, 1971

Univ. Prof. Dr. Wilhelm Klaus
Paläontologisches Institut
Universität Wien
1010 Wien, Universitätsstr.
Austria

Dear Dr. Klaus:

The enclosed letter will perhaps be self-explanatory.

It is extremely embarrassing to me to report that the copy of your paper, "Sporen aus dem südalpinen Perm," arrived a day before your letter of 6 May. As a result, I thought that the monograph was a gift. I unfortunately acted more efficiently than I usually do and began to process the publication for inclusion in my paleontological library. It is extremely embarrassing to me that I put my name on the monograph before your letter arrived in which it was clear that you intended the paper to be a loan. I have pasted white slips of paper over the places where my name was, and I only hope that you can take this as something of a joke, but I would not be surprised if you were quite disturbed. In any case, I have secured copies of the parts of the paper which were of critical importance to us and am sending the monograph back to you with my thanks and apologies.

Best wishes to you as ever.

Alfred Traverse
Professor of Geology & Biology

AT/mdw
Enclosure: letter

May 17, 1971

Univ. Prof. Dr. Wilhelm Klaus
Paläontologisches Institut Universität Wien
1010 Wien, Universitätsstr. 7/
Austria

Dear Dr. Klaus:

Thank you so much for the copy of "Sporen aus dem südalpinen Perm". This will of course be very useful to me and our work on the Catalog and in our research, and I much appreciate your getting it for me. I suppose you may have had to go to some trouble, and I certainly appreciate what you did to get it. We still remember your visit here with much pleasure and hope that you can repeat it one of these years before too long.

Best wishes to you for a pleasant summer.

Yours very truly.

Alfred Traverse
Professor of Geology & Biology

AT/kal

INSTITUT FÜR PALÄONTOLOGIE
DER UNIVERSITÄT WIEN
LEHRKANZEL PALÄOBOTANIK
Prof. Dr. Wilhelm Klaus

1010 WIEN, 6.5.71.
Universitätsstraße 7 / AUSTRIA
Tel. 42 76 11 / 606

Pb 181/ K/Br

To
Dr. Alfred Traverse
Professor of Geology & Biology
Catalog of Fossil Spores and Pollen
Deike Building
The Pennsylvania State University
University Park, Pennsylvania 16802

Dear Dr. Traverse,

Many thanks for your kind letter. I recall with much pleasure the wonderful days at Pennsylvania State. The whole journey across USA passed like a dream.

Sorry, the 1963 paper is out of print since a long time and there is no one copy left.

I like to help with my personal copy on loan for one or two months or so. I'll send it by air today.

I keep your nice hospitality in mind.

Yours sincerely,

W. Klaus

(Prof. Dr. W. Klaus)

April 21, 1971

Prof. Dr. Wilhelm Klaus
Paläontologisches Institut
Universität Wien
Universtitätes trasse 7
1010 Wien, Austria

Dear Dr. Klaus:

I wonder if there is a chance that after so many years you still have a reprint of your 1963 paper, "Sporen aus dem südalpinen Perm: Jahrb. Geol. Bundesanstalt. Wien, u.s.w."? We are using this paper in volume 36 of the Catalog of Fossil Spores and Pollen, as you probably know. I may have had a copy of it at one time but, if so, no longer have it. It would be very useful to me in my work if you could spare me a copy.

We are pushing ahead with our work on the Triassic, and doubtless it will produce some publications one of these years. It's about the time of year that you were here, and it reminds us of your pleasant visit. With best wishes

Yours very truly,

Alfred Traverse
Professor of Geology & Biology

AT/mdw

May 5, 1970

Professor Wilhelm Klaus
Institut für Paläontologie der Universität Wien
Universitätsstrasse 7
1010 Wien, Austria

Dear Professor Klaus:

Thank you for yours of 27 April. I guess that in my previous letter I must not have been explicit enough, probably assuming that Mr. Dunay would write you in detail personally. What has happened is that he has been awarded a Fulbright Fellowship, a considerable honor for him. The Fulbrights are administered by the country of the intended visit. In other words, the Austrian Fulbright Committee, whoever they may be, reviewed Mr. Dunay's request and granted him a fellowship. They determine the exact time in which the fellowship will be made available. In this case, it is for September, 1970 to sometime in early 1971. The terms of the fellowship require that he report in Vienna on 29 September, 1970. We have investigated the possibility that this could be postponed a year and find that it is impossible. I do hope that you will not be annoyed or inconvenienced, but it appears that Mr. Dunay and his wife will indeed be in Vienna and also in Innsbruck, for about equal stints of two or three months. I expect that if you can spend just a little time with Dunay his requirements will be met. We are looking forward greatly to the possibility that the things he may find out about the European Triassic will make his doctoral dissertation about the Texas Triassic that much better.

I am delighted to hear that you are indeed sending me the samples which I requested while you were here, and I'm sure from what you say they will get here in plenty of time for my next course in palynology, which will commence about Christmas time. Very best wishes to you as always.

Yours very truly,

Alfred Traverse
Associate Professor of
Geology and Biology

AT/mrw

THE PENNSYLVANIA STATE UNIVERSITY

UNIVERSITY PARK, PENNSYLVANIA 16802

College of Earth and Mineral Sciences
Department of Geology and Geophysics
Palynological Laboratories

Area Code 814
865-1404
865-2342

May 2, 1970

Prof. Dr. Wilhelm Klaus
Lehrkanzel Palaeobotanik
Institut fur Palaeontologie
Universitaet Wien
1010 Wien
Universitaetsstrasse 7, AUSTRIA

Dear Prof. Dr. Klaus;

Professor Traverse has just shown me your letter stating that it would be preferable for me to study in Austria in 1972. This is, unfortunately, impossible, as my grant is only applicable to the 1970-71 academic year. Money has been allocated, and irreversible arrangements have been made. Furthermore, the American government is unfortunately drastically de-emphasizing the entire Fulbright program. As a result, it would be highly improbable, if not impossible, to obtain another grant in the future.

As stated in my previous letter to you, however, my principal avocation is to collect palynological material of the alpine Triassic. The occurrence of some important sections in Italy is no problem, as I am permitted to spend a fairly large fraction of time outside Austria. Of course, I would like to process samples with you. However, if this is impossible due to the fact that your new laboratory is under construction, I am certain that it will not be a major setback for me.

I also emphasize that I will be of little trouble to you, and that I will greatly appreciate any time you can spare with me. I am fairly proficient in German; thus, I am eager, with your permission, to attend your lectures. I know they will be of great benefit to me.

As also stated in my previous letter, I will be arriving in Vienna this September. If there is any material that I can obtain for you here, please do not hesitate to notify me.

Awaiting your reply,

Sincerely,

Robert E. Dunay

INSTITUT FÜR PALÄONTOLOGIE
DER UNIVERSITÄT WIEN
LEHRKANZEL PALÄOBOTANIK
Prof. Dr. Wilhelm Klaus

1010 WIEN, April 27.4.197o
Universitätsstraße 7 / AUSTRIA
Tel. 42 76 11 / 606

Pb1o5/K/Co

Professor Dr. Alfred Traverse
Deike Building,
The Pennsylvania State University,
University Park,
Pennsylvania 168o2, U.S.A.

Dear Professor Traverse:

Many thanks for your nice letter. Of course, Mr Dunay will be welcome here next year. As soon as my laboratory will be in action, I'll drop him a line to plan his journey. I think it will be after October 1971. I think a better time will be summer 1972 because in Sept/October we have a conference here, which would make it a little difficult for me to make field trips with Dr. Dunay at the same time. I wrote him to think on the fact that the stratigraphical secured triassic sequences are located after the present political situation in Italy. I will be glad to give him a hand to find suitable samples.
I did not forget your samples and hope you will have them soon.

Yours sincerly

W. Klaus

(Prof. Dr. Wilhelm Klaus)

March 25, 1970

Prof. Dr. W. Klaus
Geol. Landesanstalt
Paläontologisches Institut
Universität Wien
Universitätestrasse 7
1010 Wien, Austria

Dear Dr. Klaus:

It was delightful news to hear today that my student, Robert Dunay, will be able to spend some time studying with you in Vienna and to do some other poking about in the Triassic of your area during the coming year. I do very much hope that the relationship will prove mutually beneficial and will lead to further contacts between our two palynological laboratories. This is a very great honor for Mr. Dunay, and one which I am sure he fully appreciates. He is slated to take his comprehensive examination for the doctorate here on Tuesday, 31 March and, presuming successful clearing of that hurdle, will then have only his dissertation to complete for his degree. It seems to me that the contact with you and your laboratory will be of invaluable assistance to him producing a first-class thesis.

With very best wishes and pleasant memories of your visit here, I am

Yours very truly,

Alfred Traverse
Associate Professor of Geology
and Biology

AT:kc

January 26, 1970

Prof. Dr. W. Klaus
Institute der Paläontologie
der Universität Wien
Universität strasse 7
Vienna, Austria

Dear Dr. Klaus:

Your recent letter to my student, Robert Dunay, with the kind expression of greetings to me reminds me that I am not sure I thanked you for the picture of me at my desk which you sent. My wife thought it was a very characteristic pose! I was very pleased to have it.

I am also reminded that I asked you when you were here if you could let me have some Triassic samples that would be rich in spore content so that they could be used for teaching purposes in our palynology course here. I seem to recall that you thought you could let me have some of the pollen rich salt samples for that purpose. I hope I will not seem to be too grasping if I renew the request!

I do hope that it proves possible for Dunay eventually to spend some time with you because, God knows, you are much more of an expert on the Triassic than I am, though I am getting quite interested in the subject!

Very best wishes to you for a prosperous and peaceful 1970.

Yours very truly,

Alfred Traverse
Associate Professor of Geology
and Biology

AT:vsi

INSTITUT FÜR PALÄONTOLOGIE
DER UNIVERSITÄT WIEN
LEHRKANZEL PALÄOBOTANIK
Prof. Dr. Wilhelm Klaus

1010 WIEN, Universitätsstraße 7 / AUSTRIA
Tel. 42 76 11 / 606

16/1/1970.

Pb 78/K/e Dr. Traverse

To
Mr. Robert E. Dunay
431 Deike Bldg.
The Pennsylvania State University
Organic Sediments Laboratories
University Park Pennsylvania 16802

file: Klaus W.

Dear Mr.Dunay ,

Many thanks for your kind letter. The efforts of you and your school to stimulate Americas Triassic Palynology are very much appreciated.On arrival in Europe, I certainly will do my best to make your sojourn a successful one.

Perhaps it was difficult to observe from my lectures that my stratigr. fixed locations for Permian and especially Triassic sampling are situated in the South Alps. It is a marvellous landscape with ideal and pretty clear geologic sections.The sampling requires sometimes a little "alpinistic" skill, but not too much.You will find descriptions of the locations in my paper 1963, also with a little map.This is the former Austrian South Tyrol, and in my lectures perhaps overlooked, that in a political sense, that is located today in ~~XXIXXX~~ ITALY ~~and~~, not Austria.To establish a Triassic reference collection, you will mainly walk within the Italian border.In the application for a grant I would advise you to ~~think on~~ remember that fact and insert ITALY instead of Austria.

The other places where I had spores fromTriassic is Eastern Germany. To travel there might be difficult, and I would not mention it in your case.

In the Triassic of the South Tyrol(Italy) I can guide you to the locations where I took my samples from.

On the other hand, my palynological laboratory at the salt mine is disposed off now, but my new laboratory at University is still in primary stage of construction and can not be worked yet.It will be finished approx. summer 1971.In the meantime no preparatory work can be done here.

As a result I would advise you to arrange your journey to Europe about middle or late 1971 and make precautions in your grant application tha you will do your work actually in Italy. (I'll send you an address of other Palyn. Labs)

I would be very glad to see you again

Yours sincerely W. Klaus

Bf. Brf. regarding Dr. Traverse

July 22, 1969

Prof. Dr. Wilhelm Klaus
Paläontologisches Institut
Universität Wien
1010 Wien
Universitätsstr. 7/Austria

Dear Dr. Klaus:

It was good to have your letter of 10 July, and the nice compliments in it. I have conveyed your good wishes to Sanders, Ames, and the others. Ames and his family are at the moment somewhere in Germany. For all I know they may have made it to Austria and seen you in person.

I look forward to getting the samples you indicated you would send in time. With regard to the photographs, indeed yes, copies would be most welcome for my archives. Thank you again for the "Maria Theresa".

Your comments about the scenes relating to our country's military operations are only too true. It is somewhat miraculous that you didn't see more of them. After all, we have already lost about 30,000 men killed, not to mention the wounded--that runs to six figures. As you know, I am completely opposed to the aggressive aspects of our foreign policy. But I must tell you that some of my more "hawkish" friends would claim that our willingness to fight, which is wellkknown, is what keeps the "free world" free. I suppose there is some truth to that, but it is hard for individual American parents to see why their children and grandchildren must be the sacrificial lambs on this particular altar.

Best wishes to you from all of us. We all enjoyed having you.

Yours very truly,

Alfred Traverse
Associate Professor of Geology & Biology

AT:kwc

Lehrkanzel PALÄOBOTANIK
Univ. Prof. Dr. Wilhelm KLAUS
Paläontologisches Institut
Universität Wien
1010 Wien, Universitätsstr. 7/Austria

Pb 47 / K/Pr

Wien, 10. 7. 69

Mr.
Professor Dr. Alfred Traverse
Associate Prof. of Geology & Biology
The Pennsylvania State University
University Park, Pennsylvania 16802
U. S. A.

Dear Dr. Traverse,

after my recent return from Mexico, I like to express my gratitude for the wonderful hospitality I was privileged to enjoy during my stay at Penn. State.

I admire indeed the high standard and efficency of your own research work and also that of your staff. Accomodation and living at University campus was a pleasant one and I'll never forget the nice party you gave during my stay. Please extend my most sincere thanks to Mrs. Traverse.

But on the airport, when leaving State College, I observed something which reminded me much of the sad days of wartime in Europe. A soldier, leaving his family to go to battlefield. A lot of tears because nowbody knows about the return. I saw a wounded soldier with a hurt leg returning to his wife. I forgot these soletearing happenings already, inspite of having passed myself all these cures 30 years ago. At that moment I realized how happy we can be in Middle-Europe today not to have any soldier involved in murdering. I am so sorry about that I observed during these few minutes on the airport.

I'll collect samples for you within the next weeks in our Alps. In the moment I am busy to work through the whole correspondence which was waiting on my desk after my return.

./.

July 22, 1969

Prof. Dr. Wilhelm Klaus
Paläontologisches Institut
Universität Wien
1010 Wien
Universitätsstr. 7/Austria

Dear Dr. Klaus:

It was good to have your letter of 10 July, and the nice compliments in it. I have conveyed your good wishes to Sanders, Ames, and the others. Ames and his family are at the moment somewhere in Germany. For all I know they may have made it to Austria and seen you in person.

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Best wishes to you from all of us. We all enjoyed having you.

Yours very truly,

Alfred Traverse
Associate Professor of Geology & Biology

AT:kwc

May 22, 1969

Prof. Dr. Wilhelm Klaus
Geol. Landesanstalt
Paläontologisches Institut
Universität Wien
Universitätestrasse 7
1010 Wien, Austria

Dear Dr. Klaus:

It was a pleasure to have you with us a couple of weeks ago. I keep hearing from mutual friends you visited on your tour how much your visits were enjoyed all over the country.

Please do not forget about sending me the samples that are rich in pollen and spores of Triassic and Permian age from your salt localities.

Thanks again for the splendid Maria Theresa Thaler. I treasure it as a reminder of your visit here.

Best wishes as ever.

Yours very truly,

Alfred Traverse
Associate Professor of Geology & Biology

AT:kwc

Univ. Prof. Dr. Wilhelm KLAUS
Paläontologisches Institut
Universität Wien
1010 Wien, Universitätsstr. 7/Austria

Pb 11 / K/Pr

Mr.
Prof. Dr. Alfred Traverse
Deike Building
The Pennsylvania State University

University Park, Pennsylvania 16802

28.3.69

Dear Dr. Traverse,

many thanks for your kind letter. I will be very glad to see you on the 30 april and fullfill the programm which you kindly indicated in your last letter. I thank you also very much for the reservation at the Nittany Lion Inn.

My travel bureau in Vienna is not able to find out, in which town the University Park is located, so it is a bit difficult to book here the air ticket. But as this is essential I have provisionally bought a ticket from New York Kennedy air port to Philadelphia. I hope that it is not too useless. Perhaps you could help me with a hint for that travel from New York as close as possible to your university (or hotel).

I like to extend my thanks to you and your department for the support during my stay at your university center. Hope to see you soon.

Yours very truly

W. Klaus

March 17, 1969

Professor Dr. Wilhelm Klaus
Paläontologisches Institut
Universität Wien
Universitätsstrasse 7
1010 Wien, Austria

Dear Dr. Klaus:

We are looking forward to your visit here, 30 April-3 May, per the arrangements made by Dr. Dellwig of the University of Kansas. You will be giving a public lecture for the department of geology on Thursday, 1 May, at 4:00 p.m., and I think a good subject for the lecture, among those you have suggested to Dellwig, would be something close to your Cleveland symposium paper--"Range of application of fossil spores in saline geology". The lectures are normally about 45-55 minutes long.

Thursday evening there will be a sort of "open-house" at our home, for you to meet with interested graduate students and faculty informally. If you have something in the way of plates, charts and whatnot that would be of interest to the graduate students, this would be the time to show them, because this group will consist primarily if not exclusively of people with some interest in palynology and/or stratigraphy.

Friday will be spent with the staffs of the Catalog of Fossil Spores and Pollen and our palynological data project.

I have made a reservation for you at the Nittany Lion Inn here.

The Department of Geology has agreed to pay you an honorarium of $100 for the public lecture and the consultations with students, etc.; the palynological data project will pay you also $100 for the good your advice may do us on Friday.

We are all looking forward to your visit!

Yours very truly,

Alfred Traverse
Associate Professor of Geology
Editor, Catalog of Fossil Spores and Pollen

cc: Dr. Lauren Wright

THE UNIVERSITY OF KANSAS · LAWRENCE, KANSAS · 66044

DEPARTMENT OF GEOLOGY 913-UN 4-3771

March 11, 1969

file: Klaus, W

Dr. Alfred Traverse
Associate Professor of Geology
The Pennsylvania State University
University Park, Pennsylvania 16802

Dear Dr. Traverse: al,

Attached is a revised schedule for Dr. Klaus which takes into consideration everyone's suggestions. I realize that he is being cramped a little in the west but this is the best that could be done with the 21 day plan. The layover in Washington is unavoidable because he cannot travel on the international portion of the trip on Saturday or Sunday and he must be back in Vienna by midnight of the 21st day. As soon as I get the OK from Dr. Klaus, I will send you arrival and departure times. Needless to say, if there are any changes along the way, you will notify the next host.

I assume that he will be met on arrival and returned to the airport, and also that you will make the necessary arrangements for rooms and subsistence while at your institution. The honorarium is to be given to him and he and I will make arrangements for my being reimbursed for the air fare.

I would also suggest that each of you contact him before his departure on the 15th concerning the program at your institution and the lectures in which you are interested. His address is:

Professor Dr. Wilhelm Klaus
Paläontologisches Institut
Universität Wien
1010 Wien
Universitätsstr. 7
Austria

My sincere thanks to each of you for your help in bringing Dr. Klaus to this country. His presentation will add a great deal to the appeal of the salt symposium and I am equally certain that you will find him to be a delightful speaker and guest.

Sincerely,

Louis F. Dellwig

LFD:ds

see you next week

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Dr. Wilhelm Klaus- Suggested lecture titles

1. Range of application of fossil spores in saline geology. (Cleveland symposium paper)
2. Palynology of salt rocks.
3. Age determination of salt rocks by means of spores.
4. Microspores as an aid to saline stratigraphy.
5. Palynology of salt rocks in Austrian Alps.

I see no reason why you could not suggest something else -

THE UNIVERSITY OF KANSAS · LAWRENCE, KANSAS · 66044

DEPARTMENT OF GEOLOGY 913-UN 4-3771

12 March 1969

REVISED SCHEDULE FOR DR. WILHELM KLAUS

April	15	Depart Vienna- Arrive Tucson, Arizona
	16	Univ. of Arizona. Host- Dr. Kremp
	17	Depart Tucson- Arrive Los Angeles, Calif.
	18	Chevron, La Habre. Host- Dr. Drugg
	19	Chevron
	20(Sun.)	Depart Los Angeles- Arrive Cleveland, Ohio
	21-24	Third Symposium on Salt
	24	Depart Cleveland-Arrive Kent State, Ohio
	25	Kent State Univ. Host- Dr. Graham
	26	Kent State Univ.
	27(Sun.)	Depart Cleveland-Arrive N. Y. C.
	28	Queens College. Host- Dr. Habib
	29	Queens College
	30	Depart N. Y. C.- Arrive University Park, Pa.
May	1	Pennsylvania State Univ. Host- Dr. Traverse
	2	Pennsylvania State
	3	Depart University Park- Arrive Washington, D. C.
	4(Sun.)	Washington, D. C.
	5	Depart Washington- Arrive N. Y. C.-Depart N. Y. C.
	6	Arrive Vienna

7:00p 9:04p ← new schedule

9:42a 1:15p via Pitts.

File! Klaus

Schedule for visit of Dr. Wilhelm Klaus

1 May, 1969:

9:00-10:00	Tour of palynological facilities, etc. A. Traverse
10:30-12:00	Tour of other geological facilities: G. Newton
12:00-2:00	Lunch--D. Nichols, R. Dunay, etc.
2:00-4:00	Conferences with students--Dunay, etc.
4:00-5:00	PUBLIC LECTURE
5:30-8:00	Dinner with R. Sanders and Mrs. Sanders
8:00--??	Evening session with students, etc., home of A. Traverse

2 May, 1969:

9:00-10:00	Conference with A. Traverse
10:00-12:00	Conference with R. B. Sanders
12:00-2:00	Lunch with Sanders, Ames, Traverse, Bostick, ?
2:00--5:00	Conference with Sanders and/or other interested.
5:00--??	Dinner, etc., with Traverses

3 May, 1969:

Depart by airport limousine from Nittany Lion Inn, to catch flight 601--check with hotel whether limousine leaves at usual time.

April 2, 1969

Prof. Dr. Wilhelm Klaus
Palaontologisches Institut
Universitat Wien
1010 Wien, Universitatsstr. 7
Austria

Dear Dr. Klaus:

Thanks for yours of 28 March. I can well imagine your difficulty in finding "University Park" on a map. There really is no such place -- it is only a post office in State College, which you will find on your map in the center of Pennsylvania. For your air travel you may buy a ticket to or from State College -- the airport is actually some 25 miles from here and is known as "Mid-State Airport," as it serves a number of other communities as well. The ticket, however, may be written to State College as such. The airline serving us is Allegheny Airlines. There are flights to State College (Mid-State Airport) from Pittsburgh, Philadelphia, and New York, so you can make your plans accordingly. With the information that the airline is Allegheny and the airport is State College/Mid-State, your agent should have no difficulty booking your tickets.

Looking forward to seeing you soon (Gluck ab! -- gibt es ein Sprichwort wie ~~des~~ fur Luftpassagiere?), I am

Yours very truly,

Alfred Traverse
Associate Professor of Geology

AT/kl

file Klaus

February 28, 1969

A. Traverse

Dr. Lauren Wright

Dear Lauren:

Per the letter enclosed, the visit of Dr. Klaus has been firmed up for 1-2 May. He will arrive on the night flight from N.Y. the evening of the 30th April and will depart on the morning flight the 3rd of May.

"Our" contribution toward Dr. Klaus's expenses was set at $200, plus living expenses while in State College. Bob Schmalz and I discussed this in your absence last fall, and I said that my paly-data project could pick up the tab for his room and board, and pay honorarium of $100. At that time Bob thought it likely that the department could come up with the other $100. Is that right? If not, could the department help at all?

Alfred Traverse

Enclosure: copy of letter to Dellwig

file: Klaus

February 28, 1969

AIR MAIL

Dr. Louis F. Dellwig
Director of Graduate Studies
Department of Geology
The University of Kansas
Lawrence, Kansas 66044

Dear Louis:

Thanks for the letter about Klaus's schedule. After consultation with the chairman of our department, I feel that we need to opt for the third of your suggested alternatives--i.e., for May 1 and May 2. I have a speaking engagement that will take me out of town the week of 7 April, and there is another distinguished visitor (Dr. Hsu of the Technical Institut in Zürich) coming the week of 14 April, and he and his wife will be house guests with us. I note that your schedule states that Dr. Klaus will depart the U.S. on 1 May, and I assume that if he comes here on 1-2 May, per your suggestion, changes in his reservations will be made accordingly. He could not leave the country until Saturday the 3rd under the new arrangement.

Looking forward to seeing you at the South Central Section meeting next month, I am

Yours very truly,

Alfred Traverse
Associate Professor of Geology

AT:kwc

cc: Dr. L. Wright

THE UNIVERSITY OF KANSAS · LAWRENCE, KANSAS · 66044

DEPARTMENT OF GEOLOGY 913-UN 4-3771

Fite

February 21, 1969

Dear Al,

Please excuse the form of this letter. This is the fourth schedule that I've worked up for the Salt Symposium. One speaker will be on the way next week and the time is rapidly approaching to put the other tours in final form. With the help of all of you, I now am assured of adequate support for Dr. Wilhelm Klaus and would like your comments on the two ~~attached~~ proposed schedules.

The No. 1 schedule is preferable for a variety of reasons. One major factor is the desire to start the return trip within twenty one days of arrival, thus cutting the air fare considerably. If I go over twenty one days, I must obtain additional support, at least three lecture stops not too far off the route. Pertinent comments will be found on each of your schedules. I am enclosing two copies of the schedule, one for your file and one for comments which can be returned. I would appreciate receiving an answer at your earliest possible convenience. I'll take care of the details. All that I need for now is an O.K. on the dates, either or both if possible.

Sincerely,

Louis

Louis F. Dellwig
Director of Graduate Studies

LFD/cm

PROPOSED SCHEDULE FOR DR. WILHELM KLAUS

	Date	Number One	Number Two
April	10	Arrive U. S. A.	
	11	Penn. State University University Park, Penn.	
	12 (Sat.)	"	
	13 (Sun.)	"	Arrive U. S. A.
	14	"	Queens College New York, New York
	15	Travel	"
	16	University of Arizona Tucson, Arizona	Travel
	17	Travel	Penn State University University Park, Penn.
	18	Chevron La Habra, California	"
	19 (Sat.)	Open	Open
	20 (Sun.)	Open	Open
	21	Travel	Travel
	22	Salt Symposium Cleveland, Ohio	Salt Symposium Cleveland, Ohio
	23	"	"
	24	"	"
	25	Kent State University Kent, Ohio	Kent State University Kent, Ohio
	26 (Sat.)	Open	Open
	27 (Sun.)	Open	Travel
	28	Travel	Chevron
	29	Queens College New York, N. Y.	Travel
	30	"	University of Arizona
May	1	Depart from U. S. A.	Depart from U. S. A.

This part has been approved — As a third possible schedule I could bring him to your one May 1 + 2 3 Could you please comment on all

February 19, 1969

AIR MAIL

Dr. Louis F. Dellwig
Professor of Geology
CRES
University of Kansas
Lawrence, Kansas 66044

Dear Dr. Dellwig:

On 23 October I had a letter from you stating, with regard to a possible visit of the Austrian palynologist, Wilhelm Klaus, "As soon as I have responses from all of my letters I will arrange a tentative schedule and submit it to you for your approval. You may be assured that you will be consulted before any final plans are made."

I have never heard anything further from you about all of this. Does this mean that the trip didn't materialize, or what?

Yours very truly,

Alfred Traverse
Associate Professor of Geology

AT:kwc

F. W. Klaus

CRES CENTER FOR RESEARCH, INC. · ENGINEERING SCIENCE DIVISION
THE UNIVERSITY OF KANSAS · LAWRENCE, KANSAS · 66044

October 23, 1968

Mr. Alfred Traverse
Department of Geology and Geophysics
Pennsylvania State University
University Park, Pennsylvania 16802

Dear Dr. Traverse:

Thank you for your letter of 11 October regarding a visit by Dr. Klaus to Penn. State. The response to Dr. Klaus's proposed visit to the United States has been quite favorable and there is no doubt about it materializing. As soon as I have responses from all of my letters I will arrange a tentative schedule and submit it to you for your approval. You may be assured that you will be consulted before any final plans are made.

Sincerely,

Louis F. Dellwig
Professor of Geology

LFD/jw

File

October 11, 1968

Dr. Louis F. Dellwig
CRES
Engineering Science Division
University of Kansas
Lawrence, Kansas 66044

Dear Dr. Dellwig:

Your proposition re Dr. Klaus is most interesting. I have never met him but know his work well. We would be interested in having Dr. Klaus with us for, say, two days, and I believe we can arrange to pay him $200 for the time involved. I suppose we'll get more details later as to dates and so forth. Thank you very much for writing.

Yours very truly,

Alfred Traverse
Associate Professor of Geology

AT:kwc

cc: Dr. Robert F. Schmalz

File W. Klaus

CRES CENTER FOR RESEARCH, INC. · ENGINEERING SCIENCE DIVISION
THE UNIVERSITY OF KANSAS · LAWRENCE, KANSAS · 66044

October 3, 1968

Dr. Alfred F. Traverse
Department of Geology and Geophysics
Pennsylvania State University
University Park, Pennsylvania 16802

Dear Dr. Traverse:

On April 21-24 the Third Symposium on Salt, sponsored by the Northern Ohio Geological Society, will be held in Cleveland, Ohio. Don Richner, general chairman of the meeting has asked me to organize the two day geology session, and maintaining the quality of the first two symposia will be a difficult task.

Fortunately, I participated in the symposium in Hannover, Germany in May of this year and had the opportunity to hear a number of distinguished speakers whose presentations covered a wide range of subjects directly, or indirectly related to evaporite studies. Some of the speakers were outstanding insofar as content, presentation and English were concerned. Some of those whom I have invited to participate in the Cleveland symposium will be able to attend without financial support, but others are associated with surveys or universities which are unable to supply the necessary funds for travel.

One of the speakers in whom I am interested is Dr. Wilhelm Klaus of the University of Vienna. His presentation at Hannover was excellent, the subject matter concerning spores in evaporites. Except for comments which I heard at the meeting and a few since I have returned, I know little about his work. However, I must confess that I know little about the work of most palynologists. A summary of his career and a comment on his work by A. A. Manten which is in press in Earth Science Reviews is attached.

I am writing to you because of your interest in palynology and with the hope that, if you have knowledge of and are impressed with his work, you might be interested in having Dr. Klaus at Pennsylvania State University for one or two days. I would like to work out a schedule for speaking or conducting seminars in several universities prior to the meeting at Cleveland. If I can arrange a suitable program, an honorarium of approximately $100.00 per day plus expenses while at the institution should cover the cost of transportation for the entire trip. He would also be available after the meeting, but I realize that this is approaching the end of the school year in many institutions.

If you are at all interested I would appreciate hearing from you. I will try to arrange any schedule of visits requested as long as it does not involve several trips back and forth across the country. I am certain that you would find Dr. Klaus an extremely interesting and exciting visitor.

Sincerely,

Louis F. Dellwig
Professor of Geology

LFD/jw

Enclosure

Dr. Wilhelm Klaus

Since 1950 Dr. Klaus has been the paleobotanist at the Geological Survey of Austria and was later appointed Chief Geologist. He has been especially involved with Alpine salt stratigraphy. In 1967 he was appointed to the chair of Paleobotany at the University of Vienna. His special interest is spore research of coal, oil and salt.

PALYNOLOGY OF SALT DEPOSITS (A.A. Manten)

Although H. Lueck, in 1913, made mention in his thesis that he had observed winged pollen grains in salt clays in the German Zechstein, it lasted until 1950 before salt palynology began to develop. Pioneering work has been done by the Austrian W. Klaus. In 1950, he noted that microspores can be found in quantity and well-preserved in both the clays and the pure salts within a salt-bearing deposit. The very pure salts contain, on the average about 10 pollen and spores/cm^3 whereas the clays may contain up to 50,000 pollen and spores/cm^3.

Klaus's discovery was of great scientific and economic importance. The determination of age and correlation of the stratigraphy for use in the salt-mining industry presented great problems, because the absence of animal fossils in these rocks made it impossible to solve these questions by means of zoomicropalaeontological methods.

Most of the work done on salt-bearing deposits thus far concerned the description and identification of the pollen and spores that were found, but some stratigraphic studies have also been published already.

It is interesting to see that the palynological studies of salt-bearing sediments confirm the discovery that in a large part of Europe the Upper Permian deposits contain rather similar palynological assemblages. Apart from local differences the microfloras occurring in the German Basin and in the Alpine regions are identical. The same phenomenon has been established for the Lower Triassic. However, the taxonomic composition of the Triassic microflora is thoroughly different from that of the Upper Permian. The extensive geographical similarities in the European microfloras during the Permian and

Triassic indicate the existence of an important palaeo-phytogeographic unit.

Contributions to salt palynology have thus far been made by, among others, Klaus (1953a, b, 1954, 1955, 1958, 1960, --

9 October

Al:

This looks interesting and feasible. Both because of his interest in palynology and in evaporites, it would appear that it would be interesting and beneficial to have him come here.

Because of the present freeze on NSF funds and the coming travel funds for GSA-Mexico, however, I am a little reluctant to commit us to more than about $100. A meaningful visit might involve more than one day, and I wonder whether the Botany Department might be willing to join with us in sponsoring a visit to the campus? This way we could offer a joint colloquium, and might be able to have him here for 1-2 days to everyone's benefit.

Would you be willing to contact someone in Botany about this if you think it a reasonable suggestion? If this does not work, do you think a one-day visit would be useful?

We could perhaps discuss it at the meeting tomorrow.

Bob

7 Oct. 1968

Bob -

Klaus *is* a good man. Is there ever a possibility of the department sponsoring such a visit? Or perhaps share the expenses? (I owed perhaps pay him something for "consulting".) He would [illegible]

October 10, 1968

Dr. Robert Kosanke
U.S.G.S.
Paleontology & Stratigraphy Branch
Federal Center
Denver, Colorado 80225

Dear Bob:

Under separate cover we have mailed to you your review copy of Vol. 30 of the Catalog. Inasmuch as we are now in the basis of putting the volumes out for printing only after all review is complete, I am hoping that you can complete your study of the volumes as promptly as possible. Let's try to shoot for 1 November.

As I have previously explained, there is no reason to return the review copy. However, if you wish to tear certain pages out on which you have red penciled comments and mail those pages to us, that would be quite acceptable.

I need hardly say how much we appreciate your efforts in carefully reviewing the volumes--the quality of the Catalog depends to a large extent on this sort of assistance from the members of the Editorial Committee.

Best wishes.

Yours very truly,

Alfred Traverse
Editor
Catalog of Fossil Spores and Pollen

AT:kwc

NEW MEXICO INSTITUTE OF MINING AND TECHNOLOGY

STATE BUREAU OF MINES AND MINERAL RESOURCES | SOCORRO, NEW MEXICO 87801

April 18, 1968

Dr. Alfred Traverse
Secretary-Treasurer
The American Association of Stratigraphic Palynologists
Dept. of Geology & Geophysics
The Pennsylvania State University
University Park, Pennsylvania 16802

Dear Al:

I am sorry that AASP will not hold your first technological session with the GSA Coal Geology Divisions Sessions in Mexico City. I can see that you may have more people in attendance at a meeting in Baton Rouge. Perhaps we can get together in the future.

Looking forward to meeting you at the meeting in Mexico City.
Best regards.

Sincerely yours,

Frank E. Kottlowski
Assistant Director

FEK:cl

January 29, 1962

Dr. Wilhelm Klaus
Rasumofskygasse 23
Wien III
Austria

Dear Dr. Klaus:

Thank you very much for the reprints, which I am very glad to have and am reading with much interest.

With best regards I am

Very truly yours,

Alfred Traverse

AT:pjh

Shell Development Company
Exploration and Production Research Division

bc: Dr. Higgs
Dr. Traverse ✓

April 25, 1956

Dr. W. Klaus
Geologische Rundesanstalt
Wien III/40
Rasumofskygasse 23
Austria

Dear Dr. Klaus:

Many thanks for your nice letter of March 20. I am very glad that my paper will be of some use to you. Incidentally, if you or some of your colleagues should require extra copies, they may be obtained free from the Publications Distribution Section, U. S. Bureau of Mines, 4800 Forbes St., Pittsburgh, Pennsylvania, U.S.A.

I have sent you under separate cover three copies of the plates for my monograph. You will note that these are photographs of the original plates, not the original photographs themselves. Despite this fact, you will doubtless agree that the difference in quality between the photographs and the reproduction in the monograph is striking. It is a pity that some better means of publication could not have been found. Adequate publication of longer papers in paleontology is not easy in this country. If what I have sent does not suffice, please let me know.

As you may have heard, I recently had a short trip to Europe and was able to visit Prof. Potonié, Prof. Faegri, Prof. Iversen, and Prof. Erdtman - a very valuable experience. I had originally hoped to be able to visit you in Vienna if time permitted, but it did not, as I had to curtail my visit due to family circumstances at home. Perhaps I shall be able to do so on some future European tour.

Please note that I am now no longer a professional coal petrographer and amateur palynologist, as I am now employed in the latter capacity by Shell, and my address is noted below. I should no longer be addressed in care of the Bureau of Mines.

I have also received from you a packet of reprints, for which I am very grateful, as it is important that I keep informed about the progress of your work. I hope we shall be able to remain in scientific correspondence. Perhaps I should also say that I read German easily so you need not write in English, unless you prefer to do so.

Very truly yours,

Alfred Traverse

AT:hmp

Shell Development Company
Exploration and Production Research Division
3737 Bellaire Blvd.
Houston 25, Texas

Dr. KLAUS
GEOLOGISCHE BUNDESANSTALT
WIEN III/40
RASUMOFSKYGASSE 23

Wien, am 20. III. 1956
TEL. U 16-5-65

Nr.....

To
Dr. A. Traverse
D e n v e r ? Colo.
Bureau of Mines
Coal, Technology

Please send me new address!

Dear Colleague,

I thankfully acknowledge the receipt of your reprint: "Pollen Analysis of the Brandon Lignite of Vermont."

In spite of having only a short glance at your paper up to now, I see that it is of upmost interest also for our european brown-coal studies and it seems to me, that you have also touched some points of questions of nomenclature, which are handled here with very much caution and which are always, specially with respect to the German authors a - I should say - a bit a slippery road.

It is now my task to file up your excellent spore pictures. And for that job, I'd be glad if you could get me a help. I need of each spore photo three pieces for catalogisation. So, could you perhaps either let me have the Negative (Film) so that i could reproduce myself or have you perhaps three copies of each spore in spare? (Perhaps the proof or so) Please, be so kind and let me know, if you could help me in the mentioned way, otherwise, I am compelled to reproduce your tables.

Many thanks in advance

Yours truly

W. Klaus

Region V
Box LL, University Station
Grand Forks, North Dakota

February 23, 1954

Dr. Wilhelm Klaus
Geologische Landesanstalt
Rasumafskygasse 23
Wien III
Austria

Dear Dr. Klaus:

On a reprint of a paper you recently sent me, there is a note, "How do you distinguish the pollen grains of Glyptostrobus from Taxodium and the other Taxodiaceae?" Presumably, you are referring to my identification of Glyptostrobus in the Brandon lignite. Attached is a photograph of this microfossil, x about 400.

In my reference collection I have pollen of the genera Cunninghamia, Cryptomeria, Glyptostrobus, Metasequoia, Sciadopitys, Sequoia, Taiwania, and Taxodium. In my opinion, these genera can all be separated from each other on pollen characters. (Assuming that my reference material is typical!)

The pollen of Cunninghamia, Sciadopitys, and Taiwania is distinct from the others in not having the characteristic prominent taxodiaceous papilla that the Brandon microfossil has. Cryptomeria has a very prominent papilla, but it extends straight out from the grain, or nearly so. Taxodium pollen is typically rather thin walled, and many of the grains in acetylated preparations are split. A papilla is present but is not as sharply curved as in the microfossil in question. Metasequoia pollen has a conspicuous papilla, but the grains narrow gradually into the papilla, giving the grains something of a "raindrop" appearance.

That leaves Sequoia and Glyptostrobus. Many Sequoia grains have sharply recurved papillae, but the shape of the microfossil is, in my opinion, more suggestive of Glyptostrobus (which also has a recurved papilla). There is a possibility that this microfossil is Sequoia but in my opinion a strong probability that it is Glyptostrobus.

Your work is of great interest to me, and I hope you will keep me informed of your progress. I was especially pleased to have your very clear and useful description of the single grain technique that you use.

Very truly yours,

AT

Alfred Traverse
Coal Technologist

ATraverse:dm
Enclosure cc: Region V, Lankford, Traverse, File 625.1, C File

SONDERABDRUCK AUS DER „MONTAN-ZEITUNG"
Oktober 1950, Heft 10
Urban-Verlag, Wien, I., Universitätsstraße 11

Entwicklung und Bedeutung der Präquartär-Palynologie in Österreich

(Pollen- und Sporenanalyse)

Von Wilhelm KLAUS, Wien

Die Entwicklung und der gegenwärtige Forschungsstand der Präquartär-Palynologie in Österreich soll nach einer kurzen, einleitenden Darstellung des Wesens und der praktischen Bedeutung dieses Wissenszweiges im allgemeinen in knapper Form aufgezeigt werden. Diejenigen Forschungsergebnisse, welche zur Klärung verschiedener Fragen der Kohlen-, Erdöl- und Salzlagerstätten mit Vorteil herangezogen werden können, stehen im Vordergrund der Betrachtungen.

Alljährlich produzieren die Bäume des Waldes, Sträucher und Kräuter eine ungeheure Menge von Blütenstaub. Der Pollen windblütiger Pflanzen, insbesondere der Baumpollen, wird von der Luftströmung erfaßt, dank seines geringen Gewichtes und seiner Bauart lange Zeit schwebend erhalten und über weite Strecken transportiert. Die Verbreitung des Kräuterpollens besorgen vorwiegend Insekten. Die Blütenstaubkörner weisen Membranen auf, sogenannte Exinen, welche im Vergleich zu anderen pflanzlichen Substanzen außerordentlich widerstandsfähig sind. Darauf ist es zurückzuführen, daß sie unter geeigneten Sedimentationsbedingungen Jahrmillionen hindurch ihrer Gestalt nach unverändert erhalten bleiben können. Jede Pflanzenfamilie, -gattung (mitunter auch Art) prägt dem von ihr produzierten Blütenstaub eine ganz bestimmte Gestalt auf, so daß es möglich ist, auf Grund der Pollenform die Herkunftspflanze zu diagnostizieren.

Die Analyse des Blütenstaubes hat zahlreiche Anwendungsgebiete gefunden. In das Gebiet der Palynologie — so wird in neuerer Zeit die Wissenschaft von der Erforschung rezenter und fossiler Sporen und Pollen bezeichnet — fällt u. a. die Honigherkunftsbestimmung, die Diagnostizierung von Bienenvergiftungen, in der Medizin die Erforschung der Heufieberallergie, die Untersuchung der Moore und Torflagerstätten und in den letzten Jahren konnte VARESCHI zur Klärung von Bau und Bewegung der alpinen Gletscher auf pollenanalytischer Grundlage beitragen. In der Quartärstratigraphie hat die Pollenanalyse auf so schöne Erfolge hinzuweisen, daß man ohne sie kaum mehr auskommen kann. Heute kennen wir fossile Sporen und Pollen aus Sedimenten aller geologischen Zeitabschnitte, angefangen von den alluvialen Torflagern bis zu den Phylliten des Algonkiums (REISSINGER 1940).

How do you distinguish the pollen-grains of Glyptostrobus from Taxodium and the other Taxodiaceae?

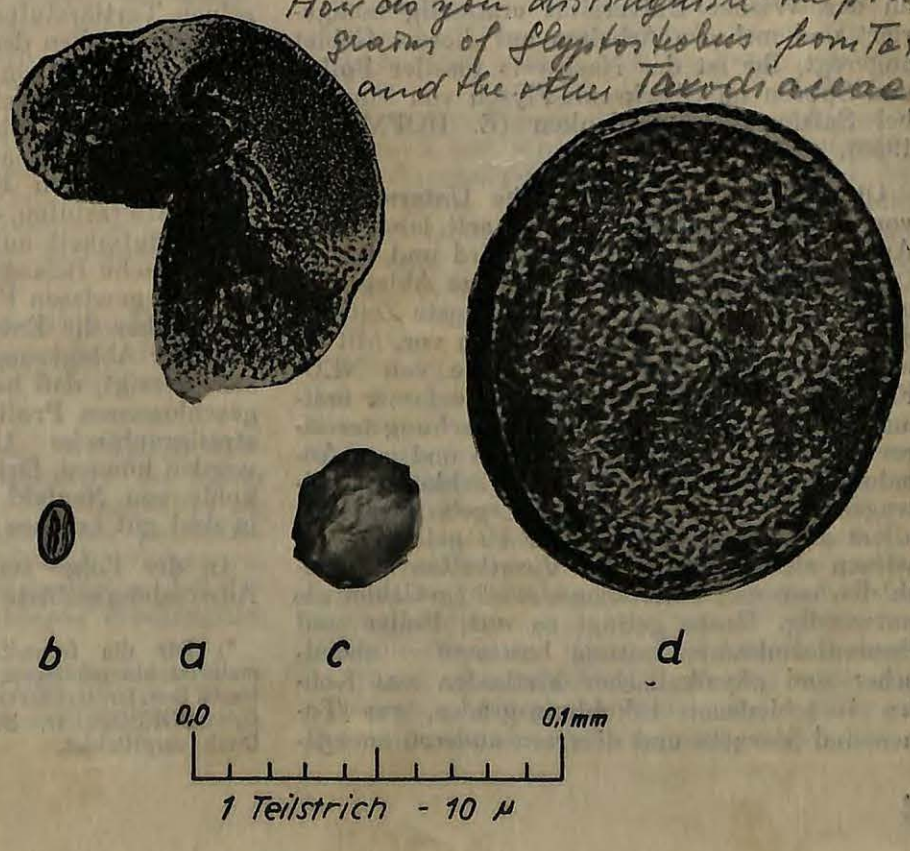

Abb. 1

Fig. a: Fossiler Tannenpollen (Abies-pollenites absolutus THIERGART).

Fig. b: Fossiler Pollen der Edelkastanien-Form (Castaneoidites exactus R. POT.).

Fig. c: Fossiler Pollen der Flügelnuß (Pterocarya-pollenites stellatus R. POT.).

Fig. d: Fossile Sporenform (Corrugonapites magnaecoccus n. spm.).

Vergr. 540fach. (Aus „Palynologische [Pollenanalytischel Untersuchung an der oberpannonen Braunkohle von Neufeld a. d. L.", KLAUS, Diss. 1950).

Es war naheliegend, die stratigraphische Brauchbarkeit der Pollenanalyse auch im Tertiär zu untersuchen, jenem geologischen Zeitabschnitt, welcher uns die meisten und ausgedehntesten Braunkohlenlager überlieferte. Im Wesentlichen wurde diese Arbeitsrichtung von R. POTONIÉ in Deutschland in die Wege geleitet.

In jenen längst vergangenen Zeiten, in welchen dort Moore, Seen und flache Meeresarme waren, wo wir heute unsere Kohlen- und Tongruben, Erdöl- und Salzlagerstätten vorfinden, trieb der Wind genau so wie heute ungeheure Mengen des Blütenstaubes der umliegenden Wälder in die dort sich bildenden Ablagerungen. Dieser Pollen blieb bis auf den heutigen Tag dort erhalten. Im Laufe der Jahrmillionen veränderte sich stetig das Vegetationsbild rings um die Ablagerungsstätten. Neue Baumarten traten auf, begannen mit ihrer Vorherrschaft dem Landschaftsbild einen entscheidenden Charakter aufzuprägen, alte wichen zurück, starben aus. Das Waldbild erlebte im Laufe des Tertiärs eine bunte Geschichte. Neue Sümpfe Moore, Seen entstanden, in welche sich der neue, in seiner anteilmäßigen Zusammensetzung andersartige Blütenstaubregen ablagerte. Jede Schicht trägt ihren erdgeschichtlichen Geburtsschein in Form des spezifischen Pollenbildes in sich und es ist die Aufgabe des Palynologen, mit Chemikalien und Mikroskop die feinen Schriftzeichen der Natur zu enträtseln (Vgl. KREMP 1950).

In Österreich ist die palynologische Untersuchung präquartärer Sedimente verhältnismäßig jungen Datums. Die moderne Arbeitsrichtung wurde von Prof. Dr. E. HOFMANN an der Wiener Universität erstmalig inauguriert und mehrere Arbeiten auf diesem Gebiet angeregt. Ihr ist der Nachweis fossiler Pollen und Sporen im Oberkreide-Flysch von Muntigl bei Salzburg zu verdanken (E. HOFMANN 1948).

Obwohl die pollenanalytische Untersuchung von tertiären Braunkohlen seit langem im Ausland mit Erfolg betrieben wird und wir in Österreich über zahlreiche derartige Ablagerungen verfügen, lagen bis in die jüngste Zeit auf diesem Gebiet keinerlei Arbeiten vor. Mit einer Untersuchung der Braunkohle von NEUFELD a. d. L. (1950) konnte der Verfasser erstmals die pollenanalytische Untersuchung tertiärer Sedimente in Angriff nehmen und zur Anbahnung stratigraphischer Möglichkeiten beitragen. Um zu brauchbaren Ergebnissen, vor allem stratigraphischer Natur zu gelangen, erwiesen sich umfangreiche Vorarbeiten auf methodischem und pollendiagnostischem Gebiet als notwendig. Heute gelingt es uns, Pollen und Sporenmembranen mittels bestimmter chemischer und physikalischer Methoden aus Kohlen verschiedenen Inkohlungsgrades, aus Tonen und Mergeln und diversen anderen anorganischen Sedimenten schonungsvoll herauszupräparieren und in ausreichender Konzentration der mikroskopischen Untersuchung zuzuführen. Allmählich lernte man auch, die mannigfaltigen fossilen Sporen- und Pollenformen z. T. auf bestimmte Gattungen, auch Arten, zurückzuführen. Um den Bestimmungsschwierigkeiten der Tertiärpalynologie — sie unterscheidet sich von der des Quartärs grundsätzlich durch die große Zahl der Gestalt nach erkennbarer, in ihrer systematischen Stellung jedoch zum Teil noch unbekannten Pollen- und Sporenformen — erfolgreich zu begegnen, wurde die Aufstellung einer Sammlung von Vergleichspräparaten rezenter Pollen und Sporen zum Großteil außereuropäischer Pflanzen in Angriff genommen *). Bei zunächst unbestimmbaren Formen wurde die allerdings mühevollere botanische Untersuchung einer größeren Zahl rezenter Pollenexinen einer raschen Typisierung vorgezogen. Auf die beschränkte stratigraphische Brauchbarkeit von Pollen-Typen unbestimmter botanischer Zugehörigkeit konnte ich besonders für den Fall der Taxodieae, Taxineae und Cupressineae eingehender hinweisen (1950). Ein Bild von der Gestalt und Größenordnung fossiler Pollen- und Sporenformen soll Abb. 1, Figur a bis d vermitteln.

Im Laufe der Untersuchungen verschiedener österreichischer Tertiärablagerungen lernte man die Sporen- und Pollenvergesellschaftungen der verschiedenen Altersstufen, vorerst des Neogens kennen und es war möglich, sie dort stratigraphisch zu fixieren, wo das Alter bereits nach geologischen und paläontologischen Gesichtspunkten festgelegt ist. Es kann hier vorweggenommen werden, daß die charakteristischen Pollenvergesellschaftungen der einzelnen Tertiärstufen im alpinen Gebiet wesentlich von solchen deutscher gleichaltriger Braunkohlenablagerungen abweichen. Die Erfahrung lehrte, Formen von regional-stratigraphischer Bedeutung von solchen, die nur in einer bestimmten Fazies auftreten, zu unterscheiden. Weiters wurden Formen erkannt, welche in allen Altersstufen des Jungtertiärs mit ähnlicher Häufigkeit auftreten und somit für stratigraphische Belange von geringerer Bedeutung sind. In gewissen Fällen sind heute schon Aussagen über die Entstehungszeit einzelner jungtertiärer Ablagerungen möglich. Allmählich hat sich gezeigt, daß bei der Durcharbeitung eines geschlossenen Profiles sehr wohl auch feinere stratigraphische Unterscheidungen getroffen werden können. Der Schichtkomplex der Braunkohle von Neufeld ließ sich auf diese Weise in drei gut faßbare Zonen gliedern.

In der Folge sei kurz auf die praktischen Anwendungsgebiete der Methode, soweit sie

*) Für die freundliche Überlassung von Herbarmaterial bin ich Herrn Prof. Dr. F. WIDDER (Graz), Herrn Doz. Dr. G. CUFODONTIS (Wien) und Mrs. Isabel C. COOKSON, D. Sc. (Melbourne) zu besonderem Dank verpflichtet.

sich heute schon erkennen lassen, eingegangen.

Zur Beurteilung des geologischen Alters einer Schicht behalten die sogenannten Makrofossilien von Tieren und Pflanzen, als auch die Mikrofossilien tierischer Herkunft nach wie vor ihre Bedeutung. Wo solche jedoch fehlen, oder bei Bohrungen*), wo Makrofossilien wegen des geringen Durchmessers des Bohrkernes nicht genügend erfaßt werden können, stellt die stratigraphische Einstufung mit den bisherigen Mitteln ein zumeist unlösbares Problem dar. In solchen Fällen kann die Sporen- und Pollenanalyse mit gutem Erfolg zur Stratiphizierung herangezogen werden.

Wir kennen Gebiete, in welchen Kohlenflöze und Bergemittel auf kurze Entfernungen stark in ihrer Mächtigkeit schwanken und oft mehrfach auskeilen. Die Parallelisierung der einzelnen Flöze auf Grund von Bohrprofilen ist dann besonders schwierig und äußerst unsicher. Hier ist die Pollenanalyse geeignet, mit Erfolg zur Flözgleichstellung herangezogen zu werden, da der prozentuelle Pollenanteil bestimmter Flöze und Flözabschnitte auf weite Strekken konstant bleibt.

Werden Bohrungen in Gebieten niedergebracht, wo die Flöze nicht anhaltend sind, mehrfach auskeilen, um sich an anderen Stellen wieder anzusetzen, wie es nach PETRASCHEK (1922/24) gerade für die pannonischen Braunkohlenflöze zutrifft, so können diese in taubem Gestein erfolglos verlaufen, da eine genaue Feststellung, ob das Flözniveau bereits durchsunken wurde, nicht getroffen werden kann. Würde man in solchen Fällen die Bohrkerne der kohlenhöffigen Horizonte einer pollenanalytischen Untersuchung zuführen, so könnte vielleicht mancher vergebliche Bohrmeter eingespart werden. Es hat sich nämlich gezeigt, daß in der Pollen- und Sporenvergesellschaftung von Braunkohlenschichten ganz bestimmte Formen mit größerer Häufigkeit hervortreten und im gleichen Horizont auch dort zu finden sind, wo die Flöze aussetzen. Daraus können sich bei der Untersuchung von Bohrproben Anhaltspunkte für die Feststellung flözführender Horizonte gewinnen lassen.

Die palynologische Untersuchung von Kohlenbriketts eröffnet die Möglichkeit, festzustellen, welche Kohlensorte zur Brikettierung verwendet wurde.

Bei Strukturbohrungen der Erdölgeologie werden oft Zonen durchörtert, die bisher auf Grund ihres geringen Fossiliengehaltes als „fossilleer" bezeichnet werden. Die pollenanalytische Untersuchung einzelner Bohrkerne aus solchen Horizonten hat aber bewiesen, daß diese Zonen überaus große Mengen fossilen Blütenstaubes enthalten, dessen prozentuelle Anteile infolge einstiger Klimaschwankungen und Veränderungen der Bodenbeschaffenheit bestimmten Schwankungen unterworfen sind, welche stratigraphische Schlußfolgerungen zulassen können. Auf die Gliederungsmöglichkeit gewisser Abschnitte des Oberpannons konnte bereits hingewiesen werden (KLAUS, Diss. 1950).

*) Mit Freude benütze ich die Gelegenheit, Herrn Doz. Dr. A. PAPP (Universität Wien), sowie Herrn Dr. SALZER (Wien) für die bereitwillige Überlassung von Probenmaterial zu danken. —

Es ist seit langem bekannt, daß auch ältere Ablagerungen, besonders die des Karbons, große Mengen von Makro- und Mikrosporen enthalten. Es kann daher nicht überraschen, daß PETRASCHEK (1947) im Lösungsrückstand des Haselgebirges sporenähnliche Gebilde bemerken konnte. ZERNDT (1940) hat auf die stratigraphische Anwendungsmöglichkeit der Sporenanalyse hingewiesen (Saarkarbon, Oberschlesien). Die Untersuchung des österreichischen Steinsalzes und Haselgebirgstones auf seinen Sporengehalt ist in Aussicht genommen. Sind erst einmal reichere Erfahrungen auf diesem Gebiet gesammelt, so wird auch an die stratigraphische Auswertung der Ergebnisse gedacht werden können.

Überschauen wir die bisherigen Analysenergebnisse der Braunkohle von Neufeld, der Kohlenbegleitschichten von St. Kathrein, Köflach, Parschlug, aus dem Lavantal, von Häring, einiger oberösterreichischer Ablagerungen und verschiedener Bohrkerne aus dem Wiener Bekken, so kommen wir zu der Feststellung, daß sich alle untersuchten Sedimente als sporen- und pollenführend erwiesen. Bei vorsichtiger Aufbereitung gestattet der Erhaltungszustand in der Regel eine sichere Bestimmung der Formen. Dies ermöglicht Schlüsse auf die Zusammensetzung der einstigen Flora, der Klimaschwankungen und damit der Klärung stratigraphischer Fragen. Natürlich ist es ein Anfangsstadium, in dem sich die Präquartär-Palynologie in Österreich zur Zeit befindet. Bei weiterer Verfolgung dieser Arbeitsrichtung ist aber noch mit sehr viel weiteren stratigraphischen Ergebnissen zu rechnen. Es wird dies einzig davon abhängen, ob man in Hinkunft diesem modernen Arbeitsgebiet ausreichende praktische Unterstützung gewähren wird, damit die Arbeiten planmäßig und in größerem Umfang durchgeführt werden können.

Mit besonderem Dank möchte ich erwähnen, daß mir bei der Inangriffnahme und dem Ausbau der Arbeitsrichtung in hervorragendem Maße die freundliche Förderung und fachwissenschaftliche Erfahrung von Frau Prof. Dr. E. HOFMANN zuteil wurde. Ebenso sei Herrn Doz. Dr. A. PAPP, mit dem ich in vielen Einzelbesprechungen meine Beobachtungen und Erkenntnisse, besonders auf stratigraphischem Gebiet, diskutieren konnte, für die zahlreichen Hinweise gedankt. Herrn F. ZABUSCH danke ich für die freundliche Überlassung wertvoller technischer Hilfsmittel, welche wesentlich zur Durchführung der Arbeiten beigetragen haben.

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August 6, 1953

Dr. Wilhelm Klaus
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Dear Dr. Klaus:

Thank you very much for the reprints of your papers, which arrived today. I shall find "Zur Einzelpräparation fossiler Sporomorphen" especially helpful in my work here. I very much hope that we can remain in correspondence.

I am sending to Dr. Barghoorn the reprints you sent for him.

Very truly yours,

AT

Alfred Traverse
Coal Technologist

AT:dm

cc: Traverse
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