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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.



Thesiphanes Lee-Wee near Jamaica. Palm. Photo 1941.

Hawaii, December 16, 1955.

Dear Lister Scott,

my very best wishes to you for a
merry X-mas and a happy, prosperous
and healthy New Year! I hope you
have had a very good time last summer
in "Old Europe"! - I'm here still waiting
for the installation of my laboratory.
But next month I hope to make yet
a longer trip into the American interior.
With my best greetings I am

very sincerely yours
Harold Hill.

Dr. Harald Sioli

Manáus, October 11, 1956.

Besten Dank für freundliche Sendung von Sonderdruck :
Please accept my grateful thanks for 1 reprint just received;
Je vous exprime ma vive gratitude pour m'envoyer publication :
Sinceros agradecimentos pela remessa de publicaç :

Notes on Indonesian Freshwater Algae - I
Staurastrum wildemani Gutw. (Desmidiaceae)

Dr. Harald Sioli

Instituto Nacional de Pesquisas de Amazonia

Caixa postal 478

MANAUS — AMAZONAS — BRASIL

Harald Sioli

Jan 28 1956

Dear Dr. Sioli,

Many thanks for your Christmas card and the expression of your good wishes. The photo of the Jauari palms is a very beautiful one, and I wish I could visit your country to see some of the wonderful sights. But I am afraid that this will never happen. Last year I spent more money on our European trip than I should have done, and since my retirement the money is all going out and not much coming in. So I think my days for long-distance travelling are over.

Your letter arrived only yesterday, having taken nearly seven weeks. I believe that it must have come by sea mail instead of air mail, for as you will see from the enclosed envelope, somebody had removed the stamps by wetting them. Since there is no sign of a cancellation mark on the front of the envelope I assume that this must have been done in Manaus, though why anyone should go to this trouble for the equivalent of 10 or 15 cents is more than I can imagine. In all the thousands of letters that I have received such a thing has never happened before.

Yes, my wife and I had a wonderful time in Europe, but we found that touring in one of these conducted parties is very hard work, particularly for persons of our age, and if I had to do it over again I would travel in a different way. We saw so many palaces, castles, museums, art galleries, churches and cathedrals that it is quite impossible to mention them all, but I made more than 500 35-mm. colorized photographs most of which turned out very well, and they will bring back the memories in the years to come. Germany was not included in our tour, but my plane stopped at Hamburg on the way from Finland to London, and later in the tour we went by motor coach through a small corner of Austria and Germany at the eastern end of the Bodensee near Friedrichshafen, and then crossed the lake by ferry in returning to Switzerland.

My 3-week stay with Dr. Grönblad in Finland was a very pleasant one, but I should not like to live there permanently, both because of the climate and the food, which is vastly different from the highly seasoned food that we are accustomed to in New Orleans. But we accomplished a lot of work, making determinations of the desmids in more than 3000 drawings from my USA collections, some 500 or so from the Sudan, and about 400 drawings from your Brazilian material made by both Grönblad and myself.

Our study of your collections is not yet complete; there still remain a lot more desmids to be recorded and drawn. But we have had to put this work aside temporarily in order to get out a paper on my USA material, which dates back as far as 1939. This paper is now well under way, most of the descriptions are written, and then I have to draw about 12 plates of illustrations for it. After that I can go back to your stuff and finish it up. Our Brazilian paper will be a good one, equal in importance, I should say, to the excellent ones written by Borge 25 to 40 years ago.

I am very sorry to hear that you are experiencing similar difficulties and delays to those you encountered in Belo Horizonte. It seems incredible that Government authorities should engage a man to do important scientific work and then not provide him with the equipment with which to work. Such a situation must be frustrating in the extreme, and I can only express my hope that it will soon improve.

With my best regards and good wishes,

Yours sincerely,

H. Sioli,
a/c INPA,
Caixa postal 478,
Manáus-Amazonas, Brazil.

Manáus, April 18, 1955.

Dear Mr. Scott,

I thank you very, very much for your kind letter from March 14, with your good wishes for my new position in my old Amazon region and with the two nice and interesting fotos of the sudanese desmids! Your letter was indeed one of the first ones I received here in Manáus.

Certainly you are right that governmental red tape and lethargy are much the same in all countries, and everywhere one needs strong nerves to stand the dilatory tactics and not to get crazy or indolent by the dictatorship of "paciência", "manana" and the different words in many other languages for the same thing. What I hear from Europe, from Germany west and east, is also not much encouraging...-

In spite of this I should like to go with you to Europe! But it is not possible yet, and so I wish to you and to Mrs. Scott all the best I can for your trip to the Old World! I hope that this year nothing will happen which might delay your trip for another year - as it was last year! I wish you too, that you shall enjoy the nice springtime and the clear summer with the long days in the northern countries you go. Last year, when I arrived in Germany in mid-June, it was one of the strangest things to me that at 9 o'clock in the night it was still clear day! And I hope that you also will have a very interesting time with your desmids.

With the same mail I send to you a paper about some waters of the upper Rio Negro region. It is interesting that you found practically no desmids in the samples from those regions of extremely acid waters.

How the working possibilities will be here in the new institute in Manáus, I do not know yet. Till now, the laboratory of the whole institute consists of the empty 10th floor of the only skyscraper of Manáus. With some difficulty I got a micro-writing-table which is thought to be a microscope-table. When the lab-equipment will be bought, nobody knows, for till now, the institute which belongs to the Brazilian Federal Research Council, has no money this year so ~~that~~ it couldn't even pay the salary of the scientists, helpers etc. for February and March... The Research Council in Rio had a nice little scandal a few months ago; in consequence of that the President of it had to change. He had certainly not stolen the lacking money, but also after the change of the President the money didn't appear again...

In spite of this all, I hope that from June or July on I shall be able to make new trips into the Interior of Amazonia. If I remain without any hydrochemical lab-equipment, I can still make the water analyses in the Instituto Agronômico in Belém. And so I think that I can do something in other geological regions of Amazonia which I do not know yet. On my planned new trips in this year, I shall not forget to collect desmids too!

From Dr. Hustedt I knew that he had published the greater part of Braum's and my ~~diatoms~~ in his paper on *Neue und wenig bekannte Diatomeen III*. He had sent me that paper too, but I never received it. Now he has no reprints more from it. You were so kind many times, to offer to me your help. May I ask you now a great favour again? ~~xxxxx~~ Dr. Hustedt wrote me that you have a reprint of that paper by him, would it be possible for you to lend me that reprint that I can let make a photo-copy? Or even, since the Brazilian post service is dangerous and the paper could easily be lost, wouldn't it be to much trouble to you to let make for me a micro-film-reproduction? I should be very grateful for your kind help!

Once again, my very best wishes for your trip to Europe! And with cordial regards,

Yours very truly

Harald Sioli

April 29 1955

Dear Dr. Sioli,

Just received your letter of the 18th, and the reprint of your paper on the waters of the Upper Rio Negro region. Many thanks for both of them.

We leave in two days from now, and there is still so much to be done that I have not the time to get a microfilm of Hustedt's paper for you, so I am sending herewith the copy that he gave me. If you can have a photo-copy made you may return the original to me; but it is not too important, and you may keep the paper if you wish. I do not know much about diatoms, though I am naturally interested in those that appear in your Brazilian material.

Hustedt has another paper, Neue u. wen. bek. Diatomeen IV, in Botaniska Notiser 1952(4): 366-410, with many more of your diatoms, and several species named for you in other genera. If you do not have this paper I can get a microfilm for you after we return.

I should like to meet Dr. Hustedt, but I am not going to Germany, for I do not know anyone else there since Dr. Krieger's death last year.

I am taking about 150 drawings of the Brazilian desmids to Dr. Grönblad, and we shall make determinations of them while I am with him. However, the study is not completed; there are a number of species that I have not yet drawn for one reason or another. However, in the cool weather next fall and winter I expect to get back on them.

Sorry to hear that you are encountering conditions in Manaus similar to those in Belo Horizonte. But if they are going to buy new laboratory equipment you will have good instruments to work with when you get them. It is very difficult for anyone in the USA to comprehend such conditions.

Well, I must close now, and get back to packing up my valuable instruments, which I am going to leave with a friend for safekeeping, since my house will be closed.

Thanks for your good wishes for our trip. Good luck to you also! I will write again after our return.

Sincerely yours,

Mch 14 1955

Dr. Harald Sioli,
§ Instituto Nacional de Pesquisas da Amazonia,
Caixa Postal 478. Manaus, Brazil.

Dear Dr. Sioli,

I hope that this is one of the first letters to reach you in your new home, and to wish you all possible good luck in your new position. I hope very sincerely that it will prove to be much better than the last one, which turned out so disappointingly. Almost all that I read about Brazil in the USA papers and magazines concerns the wonderful new buildings, avenues, bridges, hydroelectric developments, that are being constructed in Rio and Sao Paulo, so that it is hard to understand the reason for the lack of progressive thinking and action that you encountered in Belo Horizonte. But I suppose that governmental red tape and lethargy are pretty much the same in all countries. More than two years ago I sent to Australia the Ms of a long paper by Prescott and myself on the freshwater algae collected on an expedition to Arnhem Land, and I just had a letter from the editor, who is a scientist and leader of the expedition, saying in a disgusted tone that he has met with so much red tape, dilatory tactics, and lack of appropriations that he does not know when the botanical volume of the report will be published!

The reprint of your last paper on the limnology of the Amazon region arrived a couple of weeks ago, and I have read through most of it, with some trouble for as I have told you my German vocabulary is quite small, and I have to look up so many words in the dictionary. Your report appears to be exceptionally thorough and complete, and I am sure it will be of great value to other workers in this field. Unfortunately I do not know enough about limnology and water chemistry to appreciate it fully, but I have enjoyed reading it, and have acquired a better idea of the conditions on the Amazon river system. Your internment during the war must have been very unpleasant, but perhaps it is fortunate that you were in Brazil instead of Germany when the war broke out.

I wrote to Dr. Hustedt asking for a reprint of his paper on Neue und wen. bek. Diatomeen IV, which he has kindly sent me together with a very cordial letter, and has promised that he will send me his larger paper on Brazilian diatoms when it is completed. In return I have sent him 28 samples of algal material from various parts of Australia, including a number of places from which I am pretty sure no algae have ever before been collected. I am glad to see that he has given your name to several new diatoms, and Grönblad and I shall do the same with some of the new desmid species.

My wife and I are going to England in May, and from there I shall go in June to Sweden and Finland, to spend about three weeks with Grönblad, going over the desmids in my own collections from the USA, and your material from Amazonia. After my return in September I hope to be able to start drawing the plates of illustrations and get some papers started.

With my best wishes and regards,
Yours sincerely,

Jan 13 1955

Dear Dr. Sioli,

Certainly you have my permission to use the list and comments in my letter of Dec 6 1953. But you should state that it is the result of only a preliminary and superficial examination, and that it includes only such desmids as could be identified off-hand by me. Also you should say that a complete study of these and your other Brazilian collections is being made by Dr. Rolf Grönblad and Mr. A. M. Scott (put his name first), and that we shall publish our report at a later date.

I am afraid that I forgot to thank you for the very complete information that you gave regarding the best ways and means for a possible traveller to visit the Lago da Boca do Ig. Mental. I made a copy of that part of your letter and sent it to Grönblad, who in turn passed it on to Dr. Kallio. But I have heard nothing more on the subject from either of them, so I suppose that Kallio's statement that he might visit Amazonia was merely a rash promise.

I am extremely sorry to hear that your expectations about the position in Belo Horizonte turned out to be such a disappointment, and I hope very sincerely that your new post in Manaus will prove to be very much better.

With my best regards and good wishes,

Sincerely yours,

Harald Sicli,
Caixa postal 1814,
Belo Horizonte (Minas Gerais),
Brazil.

Belo Horizonte, January 7th, 1955.

Dear Mister Scott!

Today only a short letter. I'm writing now about the waters of the so called Zona Bragantina, east of Belém-Pará, which I had twice visited in 1953. You had been so kind to determine the desmids of some samples from that region and to communicate the result of your preliminary investigation of those samples in your letter from December 6, 1953.

I should like to complete the limnological description of the Zona Bragantina with ^{some} biological data, enclosing therefore your preliminary investigation (the list in your letter with your comments) in the publication to be made, naturally with your name etc. And therefore I allow me to ask you if you permit me to do so. Or do you want to make a publication about that material (perhaps together with other desmid-material from the Amazon region) by yourself, so that I might only say that the desmids are studied by you and the results published by you later? I don't know if the material is worth a special publication by you. I should be very glad about a short answer from you with your idea about the matter. My best thanks for it!

From here, there is nothing new to tell. I don't know yet the date of our move to Manaus. Brazilian bureaucracy is extremely slow... When the date is fixed, I shall communicate it to you in time.

With all good wishes and cordial greetings

very sincerely Your

Digitized by Hunt Institute for Botanical Documentation *Harald Sicli*

Dr. Harald Sioli,
Caixa postal 1814,
Belo Horizonte (Minas Gerais),
Brazil.

Belo Horizonte, December 27, 1954.

Dear Mr. Scott,

I thank you very, very much for your kind letter from Dec. 21 and the reprint of Dres. Grönblad & Kallio's article about our strange *Desmid* from the Arapiuns, together with your interesting sketches of the other new dichotypical *Desmids* from Africa!

I am very happy to hear from you, specially such good news that you have made a big vacation trip. I take it as a sign that your foot is completely well again! You have seen even snow - that is a thing I do not know for already 17 years. I hope you had a good and nice X-mas time, too, and wish you all the best I can for the New Year!

The article about the new *desmid* Amscottia (I am glad to read that it is named in your honour) mira is very interesting. The part written by Dr. Kallio doesn't explain the strange phenomenon of the dichotopy, but I think it explains the problems which arise by it, and it calls for more study - that means for an excursion to bring living material for cultivation and experimentation. But, unfortunately, who is willing to give the money for such a purely theoretical study??? In different letters in the last time from Americans and Germans I heard scientists deplore, that the humanity is, now, more interesting in destroying life by physical and chemical means than to study it for its conservation! The situation, in fact, seems to be like that, but I hope and wish that this might be only a short and soon passing psychic crisis and that then some scientists may be able to dedicate themselves plainly and with full understanding and help from the majority of men to such important problems as -- the polarity of plasma! I think, really, that the new *desmid* touches one of the few basic problems of life, of biology, namely the problem of the form ("Formproblem") and that in a manner which promises a relatively easy experimentation-possibility (compared with the much more complicated situation in multicellular plants or animals or even in asymmetric unicellular organisms). - It is really strange that you and Dr. Grönblad found in only one year 4 such strange *desmids*. Perhaps: the time is ripe now to attack the "Formproblem" with modern techniques through those *desmids*?

One thing, perhaps, should be good to be corrected in Dr. Grönblad's article: the date of the collection he mentions is not right (Sept 15, 53) but it is Nov. 14th, 1952. Dr. Grönblad apparently took the date of your drawing for the date of the collection. I think the year should not make any difference but perhaps the month for eventual future collectors & (highest highwater in November and never in September!).

My trip to the Amazon in this year was very short. I went only to the Colonias of Monte Alegre (northern side of the lower Amazon, below Santarém) with there more or less neutral waters, partly flowing over pure limestone, in the northern carboniferous strip of the lower Amazon. With this study I finished my studies about the lower amazonian carboniferous regions, i.e. about the waters of those regions. Then I made still a short trip from Monte Alegre via Santarém up the Tapajós to Fordlandia to look for the Schistosomiasis-situation. The Braz. Serviço de Malaria had tried to combat the snail-vectors of the disease a few months ago - but when I came the creeks were as full of snails as before any treatment I had to make the whole trip in 3 weeks because the Serviço Especial de Saúde Pública (SESP) here in Belo Horizonte, for which I work, made unexpected difficulties in the payment of the money necessary for the trip! Unfortunately, I couldn't go to the Solimões this time.

But I think that my time in Belo Horizonte will be over soon. What I

found here in the SESP was, in spite of all nice promises before, one of the greatest professional deceptions I had in my life. My laboratory for the installation of which I had been invited, is not ready yet and will never be so by reasons which only a man can understand who knows Brazil and her peculiar Saint Burocratus! The chemical analyses of the wyter samples I brought from the Monte Alegre region I had to make under much more primitive and improvised conditions than in Belém. So I cannot produce here any new work and am living from my amazonian stock. Besides this, still other disagreeabilities arose here, and I tried to get another field of activity.

My plans to return definitely to Europe have till now no positive results. Western Germany is more than overfilled with people, and in my 16 brazilian years, naturally, the younger generation has grown up and occupies soon every position which becomes free. Of the communist zone of Germany, where scientists have really great privileges etc., I am a bit afraid because of non-scientific reasons... But I continue still with all my force to try to return to Germany one day or to find a position in another Kulturland - outside South-America.

In the meantime I looked for another place also here in Brazil, and I got an invitation to go to Manaus to a new Amazonian Research-Institute with annexed Faculty of Sciences, of the Brazilian National Research Council. I have already accepted that invitation, and only the date of the beginning in Manaus and, therefore, of our move again to the north of this country, is not yet fixed. But I think that I have to stay here in Belo Horizonte for only some two months more! I am very glad to go back to my beloved Amazon which is for me the only part of Brazil worth to live in, while the rest of this country, at least its so called civilized parts more to the south, are extremely uninteresting because of the destroyed nature and the complete lack of any human or cultural originality.

If all goes well, I can make new trips from Manaus into the interior of Amazonia, and I want to concentrate more to the upper parts of Amazonia (Rio Solimões and affluents) which I do not know yet. There are also very promising hunting grounds for desmids! - Manaus, naturally, will be a sacrifice for my family because of the very hot and wet climate, worse than Belém, but I hope that Manaus will be the last step and only a short one on the way back to european culture! When I know the date of our move to Manaus I shall write you my new address.

Once again, I thank you for all your kindness, and with my best wishes to you and your family for a happy 1955, I am

very sincerely Your

Karstedt A.H.

Dr. Harald Sioli,
Caixa postal 1814,
Belo Horizonte (Minas Gerais),
Brazil.

Z

Belo Horizonte, August 13, 1954.

Exmo Sr.
Arthur M. Scott,
2824 Dante Street,
New Orleans 18, La., USA.

Dear Mister Scott!

Thank you very much for your kind letters from June 9 (with the copy of your letter from February 21, which had not arrived here) and from June 20! They came when I was already in Germany, but my wife sent them to me there. Your last letter made me very, very sorry, not only because we couldn't meet personally somewhere in Europe, but still more for you that you and Mrs. Scott had to abandon your trip to Old-young Europe for which you had been looking for many years! I can only hope that your bad accident had no worse consequences for your health, that you had not to suffer great aches by breaking that bone, and that all will heal soon and well. My wife and I, we wish you all the best we can, also that you can make your trip to Europe next year in calm and peace and that nothing will happen in these 12 months to make your trip impossible another time! Perhaps we can meet there then...-

To me, the impression of Europe was wonderful. I was more than astonished to see again that strong, flourishing life, materially as well as still more spiritually. It did not seem as if a terrible war had passed over the country with all its destruction. Well, I saw the ruins in the cities too, but they didn't impress me very much; the life itself was much stronger! The most time I spent in Heidelberg, but I have travelled much, from Munich to Plön, Kiel and Hamburg, and all the Rhine. My greatest wish is now, to go back to Europe, inspite of the uncertain future. What may come there, is destiny which we cannot avoid; it can catch us there as here. But after seeing the life in Europe, I feel more than ever the spiritual desert which dominates in this country here and in which I do not want to let my son (and I hope some more children) grow up. Naturally, the USA are not only safer but also spiritually richer than Europe as also a good friend of mine, Dr. Franz Moewus, formerly in Heidelberg, then two years in Sydney, and now at Columbia University, New York, wrote to me. But I think it to be very difficult for me to get a job there in my profession.

During my years in Belém and Belterra on the Amazon, I knew a lot of Americans whom I liked very much. Now it was interesting to me to see the American occupation in Heidelberg, and I can only say that a very harmonic "symbiose" has established itself between the Americans and the German population! That bit more of internationalization brought by the Americans has been of a very good influence for the originally narrow horizon of the German Binnenländer. I have not been in the communist zone of Germany by certain, also Brazilian reasons. And there is the great problem not only of Germany but of whole Europe. The question is, if a pacific solution of it will be possible...-

But enough about Europe. And now to our Desmids. It is nice that the new genus that you discovered among the material from the Lago da Boca do Mantal caused some excitement in Finland. I should like if Dr. Paavo Kallio could really go there to collect some material alive for further study. Here some informations

about Santarém:

The IAN has no branch or department in Santarém, but Belterra is only 40 km away (4 hours by motorboat) and belongs to the IAN. There are certainly all facilities in the well installed hospital, with microscopes etc. which probably could be lent also for using in the extremely agreeable guest house. Arrangement about working or even visiting Belterra, however, should be made with the IAN in Belém during passing through Belém. I know that the IAN welcomes all foreign scientists who want to visit Belterra. A very good and helpful person in Belterra is Mr. Charles Townsend, American, who belongs to the US Department of Agriculture. He is in Belterra since the Ford time. Perhaps, but that is not sure!, it could be arranged with the IAN in Belém that Belterra should put a motorboat at the disposal of Dr. Kallio to bring him up the Rio Arapiuns to the Lago da Boca do Mentai. But the motorboats of Belterra are sometimes occupied. It must be treated before in Belém with the Director of the IAN. The new director there is now Rubens Lima, a bit hyper-nationalistic and therefore xenophobic, but he is sick, probably still for some months. His substitute, Edgar Corfeiro, is more agreeable to treat with. Perhaps Dr. Kallio could write, before going to Brazil, either to the director of the IAN (it should be done in Portuguese if possible because Dr. Rubens Lima does not speak any other language) or to Dr. Felisberto C. de Camargo, Ministério de Agricultura, Serviço Nacional de Pesquisas Agronômicas (S.N.P.A.), Rio de Janeiro D.F., who is director of all federal Institutes Agronômicos and speaks English perfectly. If Dr. Kallio could not get help and motorboat from Belterra he can charter a motorboat in Santarém for the trip up the Arapiuns which would need one day going up and one day back. But that would not be very cheap, at least in Brazilian money, probably + 4 000 Cruzeiros = + 80 US Dollars or more. The trip by motorboat up the Arapiuns is difficult during the driest season of the year, September to November, because in that time the Arapiuns gets very shallow just below the mouth of the Igarapé Mentai, and bigger motorboats, such as are necessary for crossing the extremely wide lower Tapajós which sometimes has very heavy waves and is dangerous for small canoes. In Santarém Dr. Kallio could find laboratory facilities probably in the Hospital of the Serviço Especial de Saúde Pública (SESP). In Santarém he should direct himself to Herrn Albert Meschede and/or Herrn Carlos Liebold; both are Germans and speak also English. Address of Meschede: Santarém, Bar Mascote. Every boy on the street can inform him where this is, directly on the shore of the Tapajós. Both are very helpful to any foreign scientist. Best time for the trip should be June to August or September: the water is still high enough and there not so many rains as in the first half of the year. The trip from Belém to Santarém is best made by airplane, in 3-4 hours, while a river steamer needs 5-8 days, back only + 3 days. Having enough time it is more interesting going up the Amazon by plane and back by river steamer. There is an airplane almost every day, steamer connection irregular. - From Europe he could go by airplane via Recife, or by ship (Booth Line, Liverpool, British) directly Liverpool-Belém-Santarém (goes up to Manaus). The price for the passage I do not know, but travel-bureaus could certainly inform. -

Here in Belo Horizonte my laboratory is not yet ready. I received to now not more than perhaps half of the necessary equipment - and therefore my work in this region cannot start yet.

At the end of this month, however, I shall go again to the Amazon, for 4-5 weeks. But probably I shall not come near to the Lago da Boca do Mental for my program is to work first in the carboniferous strip behind Monte Alegre and then go up to the Rio Solimões and from there either to the Yapurá or the Purús river. In every case I shall collect again Desmids for you and also try to send some living material to Dr. Kallio in the way you described for me. Perhaps it may contain some likely interesting Desmids???

Enough for today. Once again I wish you soon and complete recovery from your accident and all the best!

With my best regards I am

very truly

Your

Harald Givi.

Dec 21 1954

Dear Dr. Sioli,

Thanks for your Christmas card and the copy of your paper on waterchemistry of the Amazon region. My knowledge of chemistry is not sufficient to enable me to appreciate this fully; nevertheless I am always glad to pick up some additional information about this most interesting region.

A month ago my wife and I returned from our vacation trip, which took us as far as Montreal, Canada, a total distance of some 4200 miles. We had a very enjoyable time, though the weather was none too good, and towards the end it became quite cold, with plenty of rain and even some snow, - quite strange to us, for in New Orleans we get only a few flakes of snow every ten years or so. I visited several algologists, and spent a week with my friend Prof. Prescott at Michigan State College, talking desmids, and using his extensive library and iconograph.

I hope that your visit to the Amazon or Sillimoes River has a pleasant and profitable one; I should be glad to hear where you went, when you write again.

Enclosed is a reprint of Dr. Rolf Grönblad's paper describing the strange new desmid genus from the Igarape Mental, together with a cytological discussion by Dr. Paavo Kailio, which, however, does not seem to me to present much in the way of explanation of the strange phenomenon. I suppose that is all that can be said about it at present, until it is possible to get such dichotypical cells into cultivation and experiment with them.

But more of these strange desmids are coming to light, and it is a very singular occurrence that four of them have been found in little more than a year, and by only two men, Grönblad and myself. I have a new genus from Sumatra, somewhat similar to *Ichthyocercus*, of which the first 24 specimens found were all dichotypical, i.e. having different semicells. But then I found just one specimen each of what may be called the basic types, with both semicells alike, so we have to wait until we can get more material before it can be published; it still remains a new genus. And just ten days ago Dr. Grönblad sent me some material from the Sudan, in which he has found two new species of *Micrasterias*, of which all the specimens seen so far possess differing semicells. One of them is a very graceful plant, but the other is absolutely the wierdest desmid that I have ever heard of, totally unlike anything heretofore known. I am enclosing sketches of them.

Please write again when you get a chance and tell me about your trip, and whether you have made any progress with your plans to return to Europe.

With my best regards,

Sincerely,

Dr. Harald Sioli,
Caixa postal 1814,
Belo Horizonte (Minas Gerais),
Brazil.

February 22, 1954.

Exmo Sr. Arthur M. Scott,
2824 Dante Street,
New Orleans 18, La., USA.

Dear Mister Scott!

My very best thanks for your kind letter from January 6 which I received only a few days ago because it was re-sent to me from Belém!

It is very kind from you that you forwarded the manuscript copies to Dr. Rolf Grönbald; perhaps the background informations may be useful for him for his papers on that new desid. I hope that you have received in the meantime my latest letter with the map of the Arapiuns region.

You are probably right in your comparing the Caatinga-soil of the upper Rio Negro region with the soils in the savannahs in your country. Only the vegetation in the Caatingas of the upper Rio Negro are real forest, but not so high and dense as the high-forest of the terra firme. That there in the caatingas of the upper rio Negro is really forest and not "savannah" (= Campo or Steppe), I think is only due to the high and constant humidity with less water, such soils in the Amazon region are covered with "campo", an open "Baumsteppe", very dry in the dry season. The water in some terrain depressions there is always black-water. It seems to me that the soils in those campos are all more or less podsolic (with a territic as the soils of the terra firme), but that is still only a hypothesis. On my next trips to the Amazon region, I hope in the second half of this year, I shall give especial attention to the water-soil relation in campo regions. And then I shall collect more desmids in eventual stagnant black waters in those campos.

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About the adaptation of palms and other trees to those extreme conditions of submergence, I think nothing is known in regard to the physiology of such plants. Sr. Joao Murça Pires has more taxonomic interests, and there is no plant-physiologist in the whole Amazon region. The whole physiology of Amazonian plants is still a vast field of work for future generations! Thank you also for your indication of of the book "Itinéraires Botaniques dans l'île de Cuba". I shall communicate that title to murça in my next letter to him. I'm not sure if he knows already the existence of that book.

My phytoplankton-net I could make only from common rayon from which I selected the densest tissue I could find. I had asked several times in the Inst. Agr. do Norte for swiss Müller-Gase of the finest mesh, but the institute was unable to arrange it. I hope that I can get it now through my new institution, the SESF. For zooplankton-nets I had still a bit of Müller-Gase with a bit wider meshes. In the next weeks I hope to begin my work in the waters of Minas Gerais and then to be able to send you

February 23, 1964

Harold Siker
1000 ...
...

samples for desmids of this part of Brazil. About the relative (and absolute) dearth of phytoplankton in amazonian black-waters, one has to think probably, too, on the light conditions in those brown waters. The photosynthetically active rays probably do not penetrate deeply into the water so that the trophogenic layer in those waters must be very thin. Also that condition, besides the chemical composition and acidity of the brown "black" waters, may cause the poor development of phytoplankton. But the question of the relative richness (sometimes even absolute richness!) of zooplankton still remains open! How about nanoplankton, bacteria, eventually even dissolved organic matters, nobody knows! That would be very interesting problems for special studies - also only for future generations. Last year, Prof. Gessner of the Botanical Institute of the University of München studied the light conditions in waters in Venezuela. E.g. in the muddy water of the Orinoco, no phytoplankton develops because of the very short penetration of light through that muddy water. The resources of organic alimentation substances (phytoplankton) of that river are the clearwater shore-lagoons where phytoplankton develops and comes with the water into the river itself. I think the same conditions are true also for the muddy Amazon which has also much more zoo- than phytoplankton whereas in the green clearwater of the lower Tapajós the phytoplankton is abundant. To study those questions, one should have the apparatus to determine the light intensity and the spectral range of the penetrating light in different depths, but it would be difficult to arrange such submergeable spectro-photometer here in Brazil.

Once again, I thank you very much for all your interest, and with my best wishes for you and cordial greetings, I am

very sincerely

Your

Harold Siker

Digitized by the University of Michigan

Dr. Harald Sioli,
Caixa postal 1814,
Belo Horizonte (Mins Gerais),
Brazil.

Belo Horizonte, June 2nd, 1954.

Mr. Arthur M. Scott,
Civil Engineer,
2824 Dante Street,
New Orleans 18, La., USA.

Dear Mr. Scott!

My very best thanks for your kind sending of your interesting paper about Australian desmids which I received already a longer time ago, and for your box with the plankton vials which arrived three days ago!

It is a long time since I wrote to you the last time. Do you have gotten my letter from January 26th? Here in Belo Horizonte I have made the worst experiences with the Brazilian post service of all my long years in this country! Therefore my question.

I am now already more than 5 months here in Belo Horizonte. The climate is marvellous, an eternal springtime. My family and I enjoy it very much as well as we do in regard to the greater material facilities this new city offers. The rest, however, is nothing better than the Institute in Belém. When I arrived, the house of the new laboratory, i.e. the adaption of an old house in the centre of the city to laboratory needs, was not yet ready. That happened only near the end of February. The room of my lab is extremely small, just enough for the usual water analyses and a writing table. In October last year, I had asked, at special demand, already the most necessary material for the internal installation of my lab, e.g. drugs, colorimeter, some literature etc. When I came I was told to wait till the already existing laboratory equipment, which was till that time in another small town here, would arrive so that I could verify my needs. That material came at the end of February, and naturally practically nothing for my use existed. I had to renew my order, and had to renew it again and again; and now, after 5 months, I have + half of the things I need! But with half of the necessary things I cannot even start with the most simple water analyses!! In regard to my work possibilities, my move to Belo Horizonte was a deception. But what I learned here is, that my time in Brazil has to be over. As a foreigner, I have reached here the endpoint of the existing development-possibilities. It is not possible, in the whole of this country, to enlarge the work program if one is backed only by his scientific production and not by special good friends.

In the next weeks I hope to make a short trip to Germany, by airplane. My father there who is 76 years old invited me to that visit after I have not seen him since almost 16 years. I hope to use my visit to Germany, too, to look for possibilities for me to get a job there in some university or research institute. I fear it will be difficult as certainly will be, too, an eventual readaptation to the harder and narrower life conditions in "Old-Europe". If I achieve nothing in Europe, I shall look to the USA which me seem to be the last country in the world where people still can live more or less normally by his work and have also a cultural environment! I have already started to extend my tentacles to the USA by some good American friends I have in Belém.

By those special working conditions here in Belo Horizonte I have not been able to collect some plankton or other desmids for you in this region of Brazil. But after my return from

Europe, July to August this year, I think that all may have developed in my laboratory in Belém. I shall not forget the desmids for you will! In August-September I hope to make also a new trip to the USA.

Thanking you again very kindly, I am with my best wishes very sincerely Yours Harald Sioli.

June 9 1954

Ex^{mo}. Sr.
Dr. Harald Sioli,
Caixa postal 1814,
Belo Horizonte (Minas Gerais), Brazil.

Dear Dr. Sioli,

Just received yours of the 2nd. inst., from which it appears that you cannot have received my letter of Feb. 21, which was in reply to yours of Jan 26, and this probably was the result of the poor postal service in Brazil which you mention. However, my last letter was addressed in care of SESP, Caixa 1191, the address that you gave me. I am enclosing a carbon copy of mine of ~~Feb. 21~~ because there are a number of questions that I would like you to answer when you get a chance.

I had hoped that your move to Belo Horizonte would be a big improvement over the conditions in Belem, and am truly sorry to hear that it has turned out disappointingly. As to your future prospects, it seems to me that going back to Germany would not be a wise move, for other reasons besides the harder and narrower life that you mention. The USA would be far better, though the salaries paid are not commensurate with the greatly higher cost of living here. Unfortunately, I could be of no assistance in this connection, for I have no acquaintances in your line of work; the only people I know in the biological line are the few desmid specialists.

My wife and I are going to fly to Europe from New York on July 5th, and though Germany is not on our itinerary I wonder if there is any possibility of my meeting you somewhere over there. I shall be in London from July 7th to 14th inclusive; then I shall go to my sisters in Paignton, Devonshire until July 24th; return to London July 25th and on July 26th I shall fly from London to Helsingfors (Helsinki) in Finland to spend two weeks with my friend Dr. Grönblad. About Aug 9th I shall go to Sweden for a few days with another friend, and then back to England, where I shall remain until Sept 8th. Then there will be a week in Paris, and our return trip will be way of Nice-Lisbon-Azores-Bermuda-Nassau (Bahamas) -Miami-N.O.

I suppose that you will go by way of Rio-Recife-Dakar-Lisbon-Paris-Germany. Now you could go from Paris to Germany by way of London at a small extra cost (which I should gladly pay if you would permit me), and if your dates would allow you to be in London any time between July 7th and 26th, I should be really delighted to meet you there for a day or so. At present I do not know the name of the hotel in London where I shall stay, that is being arranged by the American Express Co., but I am expecting to get the confirmation any day now. However, I shall register with the Am. Express Co's main office, Haymarket, London, as soon as I get there, and they will know my address.

There is another possibility. I could stop in Hamburg for one day on the flight from London to Helsingfors, but that could be on only one certain day, July 25th, a Sunday. Perhaps you could meet me there.

I note that you hope to make another trip to Amazonia in August or September, and that brings up the question of the possibility of getting some living material from the Ig. Mental. I don't know how close you will be going to this place, but if it could be done for an expenditure of say \$200 US, I should gladly pay it.

In case you see a chance to visit the Ig. Mental, I can give you some simplified directions for preparation and shipping. It appears that the sterile culture solution that I mentioned before is not necessary. The water from the natural habitat can be used, and I have recently sent some living desmid material from New Orleans to Finland, which arrived in good condition and my friend was able to place in culture nine species of Micrasterias. Ordinary test-tubes of 12x100 mm or 15 x 125mm can be used, and the corks (not rubber) must be well impregnated with paraffin, for there is some substance in cork that may be poisonous to desmids, which are very delicate. The corks must be secured against internal air pressure with string, as you did on the last lot of bottles that you sent me, or with adhesive tape. Your plankton collection can be made in the usual way, but I would like also to get some squeezings from submerged vegetation at the head of the Lago, where the Igarape enters. The tubes should be two-thirds filled with the clear water from the habitat and then a small quantity, say a few mm³ of the plankton sediment, or squeezings, added. The tubes should then be packed with plenty of cotton in wooden boxes, and shipped by air mail to the following address:

Dr. Paavo Kallio,
Dept. of Botany,
University of Turku,
Turku, Finland.

Because of the rare opportunity of getting such living material, and the expense, and the possibility of breakage, I would suggest not less than eight tubes, to be shipped in two boxes, each box containing two tubes of plankton stuff, and two of squeezings. The plankton catch will undoubtedly contain a lot of crustacea, and if some of these could be eliminated it would be helpful, for they might die from lack of oxygen and that would be fatal to the desmids. On the other hand, if there were only a few crustacea, the CO₂ which they exhale would be beneficial to the desmids. The balance of the material could be preserved with formalin (not more than 4 or 5%) and sent to me in New Orleans. And if you could get some collections from other places in the same neighbourhood, they would be appreciated also.

I am going to see Dr. Kallio while I am in Finland, and shall find out from him whether he was serious in his suggestion of going himself to Brazil. I hardly think he was.

To make sure that you get this letter I am sending it by registered mail, and I hope that you will have an opportunity of replying before you leave for Europe.

With my best regards,

Sincerely yours,

New address: Dr. Harald Sioli,
Serviço Especial de Saúde Pública (SESP),
Caixa postal 1191,
Belo Horizonte (Minas Gerais), Brazil.

Belo Horizonte, January 26th, 1954.

Exmo Sr.
Arthur M. Scott, Civil Engineer,
2824 Dante Street,
New Orleans 18, La., USA.

Dear Mr. Scott!

It is already a very long time ago since I wrote you my last letter, and I had not even the time to answer your two kind and very interesting letters from November 21 and December 6 which I received in the meantime, still in Belém. At first, I wish to thank you very heartily for your letters and especially, too, for all your excellent work you did with the desmids! And then, even late, my best wishes to you for this new year which has already begun!

The reason that I couldn't write to you was my move from Belém to Belo Horizonte, the capital of the state of Minas Gerais in middle Brazil. At the end of October I got sudden- and unexpectedly an offer from the Serviço Especial de Saúde Pública (SESP) (= Special Service of Public Health, of the Brazilian Federal Government) to instal a new hydrochemical and hydrobiological laboratory of that SESP in Belo Horizonte where SESP is establishing now a new Central Laboratory for the zones of the Rio Doce and the upper Rio São Francisco. In the beginning of November I accepted that offer. At December 19th I moved to Belo Horizonte, and 1st of January my new work here began. You probably can imagine how short my time in Belém was in the few weeks which remained there for finishing my obligations with the Instituto Agronômico for packing our baggage, etc. Besides of all other things I had to make yet another trip of two weeks to the region east of Belém.

In Belo Horizonte my family and I feel very well now. The climate in an altitude of 800 to 1000 m is excellent, the city of ± 400 000 inhabitants in such a good order, not to compare with degenerating Belém, that we didn't believe to be possible in Brazil. And my work seems to become very interesting too. What is very important for me is that I had not to abandon completely my beloved Amazonian Region. It was combined that I shall furtheron continue with my amazonian program in the old fashion and in regard to the same problems, and besides of that I shall work here on some more special problems of greater interest for SESP in relation to the environmental factors of Planorbid snails, the vectors of the schistosomiasis which is extremely widespread in this region here among the population, in some districts up to more than 90% of the people. So the move to Belo Horizonte did not mean to me a change of my activity or of my "battlefield", but only a greater extension of work and area. In the first half of this year I want to do some work here, in the Rio Doce and upper São Francisco zones, to know first the region and to make some limnological investigations about the planorbids and the general aquatic conditions (collecting also desmids again), and in the second half I plan one or two greater trips to the interior of Amazonia. The real work itself here has not started yet because the house of the laboratory, formerly a living house in the city, is still in construction. Paciência! But in a few days it seems to be ready, and then I can instal my laboratory. The working conditions seem to become quite good ones, and so we are very content with our move, which we hope to be the first step of re-acustimation to civilization and on the way back to Old Dear Europe. You probably can understand my desire for my son

to grow up there; later if he wants to do he, as a born Brazilian, may come back here. But I think only a person who has passed through real civilization and has accumulated in his youth a good stock of culture for the rest of his life, is able to appreciate the beauties and the width of a country like Brazil and to use rightly the great possibilities it offers. -

Now to your letters. I thank you very much for your fine work with the material, for your design of that new genus of desmids with its strange polarity, and for all your very interesting comments. That the waters of the upper Rio Negro, with their low pH, are so poor in desmids is probably because I collected mainly in running waters I always hoped to go back once to that region, but I think it will be difficult because I have to know some other parts of Amazonia for my problems regarding the relations between water-chemistry and soils. In the Arapiuns region I worked more in stagnant waters. The lower parts of practically all creeks and rivers there are best characterized as "river-lakes" ("Fluß-Seen"), typical for that part of Lower Amazonia. About their origin I think as follows: The creeks and rivers had carved, in the relatively soft sediments of the underground, their more or less deep valleys in which they flow. Then, by some vertical movement of the earth crust, some parts of the terrain sank down, the rivers filled now the valley drowning it. As the result we see now the lower courses of the creeks and rivers as big lakes, "river-lakes", unproportionedly great to the small upper course with running water. That is the case, too, in the Lago da Boca do Igarapé Mentai. The Igarapé Mentai itself is a small river, in the dry season + 10-15 m wide and + 1 m deep, with a current of perhaps + 1 m/second. But suddenly it enters its lower course or "mouth-lake" ("Mündungs-See") of + 2 km length, + 500 m width and + 5.50 m depth in the dry season. Naturally, the quantity of water coming in from the upper course is not enough to maintain a current in that mouth-lake; the water here is practically stagnant, and in it a rich plankton (especially zooplankton) develops, which did not exist in the running upper course. That there is mainly zooplankton and much less phytoplankton, I think is due to the brown colour of the water where the photosynthetically active sunrays do not penetrate deep enough to produce a thick trophogenic layer. (But that is only a vague hypothesis of mine; nobody has yet studied the light-conditions in the different amazonian waters.) The difference in the plankton of the running water of the upper Ig. Mentai and that of the stagnant water of the Lago da Boca do Ig. Mentai you see comparing the samples 9.) and 10.) + 11.); sample 9.) was collected only a few hundred meters above the entrance of the Igarapé into the Lago da Boca (mouth-lake)! The Lago da Boca do Ig. Mentai has practically no flood plain on its shores; on almost all sides, the "terra firme" rises directly from the lake-shore so that the lake is practically not greater in the highwater-season than it is in the dry season. - That there may be some influence of the water-colour and therewith of the light-conditions in the water about the development of the phytoplankton, you can see perhaps by comparing the plankton of sample 19.) with that of 18.). In 19.), mouth-lake of the Igarapé-assú, the water is not brown but green; in 18.) the river-lake of the lower course of the Arapiuns itself, the water is much browner. But, on the contrary, the water of 11.) is as brown as that of 18.), and the planktons are quite different! But in the cases of sample 20.) compared with sample 18.), there may also be some influence of the light conditions, not only the differences in the chemical compositions of the waters, for 18.) is brown water, and 20.) is clear green water. The environmental factors in their rôle in the ecology of organisms are still too complex for being understood by some few single examinations and samples!

I should like very much to make also some determinations of the light-conditions (intensity as well as spectral composition in different depths) in the different amazonian waters (turbid, clear and brown), but I have no apparatus for it and one cannot do all things about amazonian limnology, attacking in the same time all appearing problems. The amazonian region should have a whole good limnological institute with a complete staff of limnologists as exist in the USA, England (Windermere), Germany (Pöhn), Sweden etc. But the time is not ripe yet for that in the Amazon and in whole Brazil! The only thing what one man can do here is to make some preliminary investigation to get a first impression of the waters and to see the problems; their elaboration must be left for future generations.

Your question about the word "Igarapé": Igarapé, a typical amazonian, old indian (tupí) word, is used only in the Amazon region, in no other part of Brazil. Litterally translated it means "boat-way" and is any small stream, creek or small river even if in Europe it would be already a quite good "Rio"! The riverlike connection between the shorlakes of some amazonian rivers, e.g. in the floodplain of the Amazon itself, and the rivers themselves are in Amazonia generally called "Furo". And the sidearms of the rivers, especially the Amazon itself, have the name of "Paraná" or "Paraná-mirim". But sometimes they are called in the popular language also "Igarapés".

It is very kind from you that you have sent material also to Dr. Grünblad. In my last time in Belém I received from him his already classical work about the amazonian algae (De algisbrasiliensibus). Unfortunately I had no time more to answer him; it shall be done in the next days. I don't remember, in the moment, if I have sent already to him the separata. If not, I shall send them when my complete baggage will arrive here from Belém. It is now still under way by boat and will need still till the end of this month, if not later, till its arrival.

It would be really interesting to get some more and living material from the new genus of the Lago da Boca do Jg. Mentai. But I am sorry, I think that I probably never more shall visit that region. Amazonia is still so big and I have to go still to many other parts of it. And travelling there takes always a lot of time so that it would be impossible to make a short side-trip to the Arapiuns system, not considering the difficulties of maintaining the material alive till the arrival in the USA or in Paris. You yourself already mentioned these difficulties. So I fear that also the problem of polarity and cell-division etc. must be left to a future generation of limnologists on the Amazon. But thank you very much for your suggestion!

Have I sent to you the manuscripts of the two papers about the Arapiuns and the upper rio Negro? And do not remember more; my leave from Belém was in to great a hurry! If not, I can send them to you after the arrival of my baggage.

From the Arapiuns-system I have here a (bad) photocopy of a map. I shall enclose it in this letter. In the publication about the Arapiuns which is now in press, in Portuguese in the Boletim Técnico do I.A.N. and in German in the Archiv für Hydrobiologie, there will be a good map of the region with all details.

The address of Dr. Fr. Hustedt I have at home; I shall put it under this letter.

That the second collection was very poor in desmids, I can imagine because I collected especially in running, small creeks. In the Rio Guamá there is influence of brackish water, coming in with the tides from the estuary near Belém. I am now writing together the results of my last trips to the region east of Belém for some paper. In part, that region has limestone underground and not so acid waters.

...- In the meantime I have been at home and verified that I had sent already the copies to Dr. Grönblad. Only the letter is still lacking. - The address you wanted is: Prof. Dr. Friedrich Hustedt, Ingelheimerstraße 7, Bremen 4, Germany BRD.

If you would be so kind and it makes no trouble to you, I should be very glad in receiving again some of those practical screw top vials. But you must not send them by air mail, there is sufficient time for common ship mail till I can start my trips here in middle Brazil. The lid of the box had been broken evidently by the Brazilian customs officials before it arrived in my hands in Belém. They certainly were curious enough to look for the content of the box, but "had no time" to use a screw driver!

From my next trips into middle Brazil you probably must not await many desmids because the waters here, as I have heard, are in general rich in calcium and in their chemistry not comparable to Amazonian waters which in their greatest ^{part} are only like "slightly dirty distilled water".

Once again, I thank you very much for all your kindness, and please my bad English. I only hope you can read and understand it, i.e. understand what I mean.

With all my best wishes and greetings, I am

very sincerely Your

Harald Sioli



Dr. Harald Sioli
Instituto Agronômico do Norte
Belem - Pará - Brasil

teilt neue Adresse ab 1. Januar 1954 mit:
comunica novo endereço a partir de 1ª de Janeiro de 1954:
communicates new address from January 1, 1954:

a/c Serviço Especial da Saúde Pública
Caixa Postal, 1191
Belo Horizonte (Minas Gerais)

Brasil

Lista de material hidrobiológico colheitado na Amazônia em 1952 por
Dr. Harald Sioli.

Phytoplankton, Algas etc. continuação.

15. 20.11.1952. Igarapé Curí, Phytoplankton (pH 4.5).
 16. 20.11.1952. Igarapé Curí, Mündungsbucht. Schlickufer mit kurzem
Gras, 0.40 m tief. Bodenbelag, abgesaugt. (pH 4.5).
 17. 20.11.1952. Igarapé Curí, Mündungsbucht. Heißer aber windiger
Sonnentag. 16^h15^{min}. Oberflächen-Phytoplankton. -
(pH 4.5).
 18. 23.11.1952. Rio Arapians vor Enseada de Urubá. 16^h30^{min}. Ober-
flächen-Phytoplankton. - (pH 4.5 bis - 4.6).
 19. 25.11.1952. Igarapé-Assú, Mündungsee des Igarapé Curuí. Ober-
flächen-Phytoplankton, 8^h. - (pH 4.6).
 20. 27.11.1952. Rio Arapians, Bucht oberhalb der Ponta Iouá. Ein-
fluß von Tapajós-Wasser. 15^h. Oberflächen-Phyts-
plankton. -(pH 5.6!! Schon nahe an der Mündung des
Rio Arapians in den Rio Tapajós, daher bereits Mi-
schung mit Wasser aus dem Tapajós, demzufolge bedeu-
tend höheres pH und ganz anderes Plankton!).

Digitized by Hunt Institute for Botanical Documentation

One bottle was not listed by Dr. Sioli, and this note is added by A. M. Scott,
Sept 13 1953

52. 8. 5. 1953. Vigia. Aus Mulden im überschatteten Campo.
Brauneswasser. pH 4.3. Leg. Prof. Dr. Paul Ledoux.
Für Desmidiaceen.

Belém-Pará, November 4, 1953.

M. A. - C. N. E. P. A. - S. N. P. A. - INSTITUTO AGRONÔMICO DO NORTE

Exmo Sr.
Arthur M. Scott,
2824 Dante Str.,
New Orleans 18, La., USA.

Dear Mr. Scott,

I thank you very heartily for your kind letter from September 13 and in the same way for your fine box with the 24 screw-top vials which arrived a little later than your letter, but also by airmail!

I am really glad that the 3 boxes with the desmid material arrived well in your hands and that you find the material interesting. At least, many of the samples are from new or little known regions. But I am sorry that I have put too much formalin into the samples; please excuse it. I thought too much were better than too less ("safety first") and did not know that too much formalin destroys the cell-content. I am now taking more care in adding the formalin to the samples. In a few weeks I hope to be able to send you new samples from a completely different region of Amazonia. I am now working in the region northeast and east of Belém, between Belém in the west, the Atlantic coast in the north, the Rio Guamá in the south, and Bragança in the east. This is an agriculturally "colonized" zone, that means the original forest is destroyed and burned and the soil so exhausted that 90 % of the area is abandoned and covered with a poor "capoeira" (secondary forest) which is being burned again every 10 years. But the waters in that region may be still interesting because the region consists of three geologically different strips: in the west the freshwater sediments from the older quaternary, with ~~rather acidic~~ very acid creeks (pH \pm 4.5); in the middle marine deposits from the miocene, partially with limestone and with water up to pH \approx 7.6; in the east argean granites which part I do not know yet but where I hope to go in the next days. It may be interesting to compare the desmid floras of the waters of those different zones, with different pH's. I thin to finish the work in that regions in the next 2 weeks, and then I shall send you the samples as soon as possible, with less formalin and in your vials!

That the bottle of the Rio Negro in Içana was broken, I think makes no great harm. I have still another bottlê with the same material because before shipping I ~~was~~ divided all the plankton etc. samples into two parts, one for you, the other one for Prof. Dr. Fr. Hustedt, Bremen, who works on the diatoms. So I can divide his part again and send you another portion of the material. I shall include it then in my next shipping. - Where I have left the sample from 25.9.1952, Rio Negro in Içana, Ufernähe, ~~das~~ ruhiges Wasser, zwischen Wasserpflanzen und Algenwatten, which was not in the boxes, I do not know, unfortunately. I have looked for it, but I cannot find it any more; also the part for Prof. Hustedt I cannot find. So I cannot substitute this sample. - The sample from 17.11.1952, Cachoeira do Arua, Tümpel im versumpften Tal mit Patauasal des Ig. Fonseca, I cannot find here, too. But this sample I can substitute also by the half of Prof. Hustedt's part. "Patauasal" is a GROVE of Patauá-palmtreees (Cenocarpus patauá)

which grow especially on swampy terrain.

Your other question: Vigia, where Prof. Ledoux collected the material on natural sandy "campos", flooded during the rainy season with very acid darkbrown "black"-water, is on the coast north-northeast from Belém and some 70 km distant in straight line.

About the chemical conditions etc. of the waters of the upper Rio Negro region and of the Rio Arapiuns system, a few weeks ago I sent two manuscripts for publication to the Archiv für Hydrobiologie, Germany. The articles will appear also in portuguese in the Boletim of our institute. But it will surely need more than one year before the articles in either of the two languages will appear. If you are interested in knowing soon something more about the environment conditions of the desmids of those regions, I can send you a copy of the manuscripts. Therein you would find the results of the chemical water analyses, among other things. If I have still time, before going on my trip, I think it is better to send you those manuscripts already now, by shipmail. Any, also the best, taxonomic study is more interesting with some ecological background.

The plankton of the mouth of the Rio Arapiuns, Bucht oberhalb der Ponta Icuí, I have found interesting, too. There is mixed water from the Arapiuns and the Rio Tapajós, with an enormous development of phytoplankton. The tides, here still 20-40 cm high, drive Tapajós-water in and out of the Arapiuns. The pure Arapiuns water is very acid (pH + 4,5) and has predominantly zoo-plankton; about the plankton from the lower Tapajós, there is the special study by your friend Grönblad (*De algis brasiliensibus*) and also some indication in the publication of my friend Dr. Rudolf Braun. It may be interesting to know if in the zone of mixed water a special plankton develops, or if there is only predominantly Tapajós plankton. I found the difference in the plankton from the Arapiuns and that from the Bucht oberhalb der Ponta Icuí so interesting that I made microphotos for the publication. I shall enclose two copies from the microphotos in this letter.

And now, I thank you very much also for your kind offer to send me some photographic paper. But you don't need to do so, for three weeks ago I got 200 13x18 cm sheets from a friend in Germany. That is enough for me for some months, and I think that till then there may be again photographic paper here in Belém, or that then I shall not be more in Belém. For I have the plan to move to southern Brasil if a possibility which is showing up now, will become reality. I am now over 13 year in the Amazon region, without any interruption, and it is necessary for me to go to a better climate. My greatest desire, yet, were to go back to Europe, but western Germany is more than overcrowded. Perhaps in some future the situation there may become better, and then I hope to be able to educate our little son in Europe. The Amazon region is very attractive and interesting, but only for adult people who before have passed through a real civilization and culture, and not for a boy to be educated here!

Once again, I thank you very, very much for your letter and your kind sending of the vials, and with my best regards I am

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very sincerely yours
 Harold Pitt.

Nov 21 1953

Ex^{mo}. 3^r.
Dr. Harald Sioli,
Belem-Para. Brazil.

Dear Dr. Sioli,

Many thanks for your long and very interesting letter of Nov. 4th. I think I can understand your desire to leave the Amazon region, after living there for 13 years, and I should think that in Southern Brazil, Rio or Sao Paulo, you would find a better environment as well as a better climate. Also, since I was born and educated in England I can appreciate your wish to have your son educated in Europe. I have not had much experience in Spanish-American countries, just a few short trips to Cuba, Mexico, Central America, Panama and Colombia, but what I have seen has not impressed me very much.

Now I can give you a preliminary report on the desmid content of your samples, and I am enclosing a photostat of your list, on which I have assigned numbers to the various collections, for identification.

1. Poor. A few filaments of *Hyalotheca*.
2. Poor. One *Cosmarium*.
3. Few desmids. Some filamentous ones of the *Hyalotheca* type. One *Xanthidium* similar to *X. trilobum*. One cell of *Gymnozyga armata*.
4. Poor. One filamentous desmid, *Hyalotheca* or *Bambusina*.
5. Apparently no desmids.
6. Poor. One or two filamentous species, probably *Hyalotheca*.
7. Few desmids. One 5-radiate *Staurastrum*, which also occurs in #20.
8. Pretty good, if I can get rid of the sand. A new *Micrasterias*, probably a variety of *M. incisa*.
9. No desmids, except a stray cell of *Pleurotaenium coronatum* var. *fluctuatum*, and one filament of *Gymnozyga moniliforme*.
10. Few desmids, but good ones. A new *Euastrum* similar to *E. divaricatum*. Two large species of *Xanthidium*. One specimen of the new genus from #11.
11. A very good collection, with some beautiful and rare desmids. *Spondylosium rectangulare*, 50% larger than previously reported from Brazil, and twice as large as my specimens from USA. *Gymnozyga armata*, a very rare desmid reported only two or three times before. A new 5-radiate variety of *Staurastrum elongatum*. And the NEW GENUS of desmid on which I comment further on.
12. Few desmids. An apparently new variety of *Euastrum obesum*. Some handsome diatoms, *Actinella* sp. A few other green algae.
13. Missing.
14. A very nice collection with numerous desmids, including the very rare *Spondylosium desmidiforme*. A new variety, or perhaps a new species of *Xanthidium*.
- 15.)
- 16.) Few desmids, but good ones, though all that I have seen are well-known.
17. Not many desmids, but some interesting species.
18. Few desmids. *Micrasterias arcuata*. A very large *Gymnozyga*. An unusual *Desmidium*. Several species of *Staurastrum*.
19. Good. Many desmids. Several *Staurastrum*. *Xanthidium regulare*.
20. An extremely rich collection; one of the best that I have ever seen. It contains many of the long-radiate plankton desmids described and figured by Grönblad in his work "De Algid Brasiliensibus", and in addition there are a number of other species, a few of which may be new.

21. Apparently no desmids.
22. Few desmids. An unusual *Staurostrum* similar to *St. octangulare*. A few small species of *Cosmarium*.
23. Poor. One *Cosmarium* species.
24. Poor. One *Euastrum* similar to *E. binale*.
25. Apparently no desmids.
26. Poor. One filament of *Bambusina attenuata*.
27. Poor. A few cells of *Closterium libellula*.
28. Apparently no desmids.
29. Do. Do. Do.
30. Missing.
31. Few desmids.
32. A very nice collection, containing many species of small desmids. There is a new pygmy *Micrasterias*; a new species of *Euastrum*; *Dicidium hexagonum*; *Spondylosium desmidiiforme*; *Gymmozyga armata*.

It is curious that all of the collections from the upper Rio Negro region contain so few desmids, despite the low pH, and also some of those from the Rio Arapiuns system. However, it is a fact that the running water of rivers usually is poor in desmids, though the same water when it stands on the flood-plain (Überschwemmungsgebiet) may be quite rich in desmids. I have found this to be the case in two instances, the Pearl River in southern Mississippi, and the Apalachicola River in northwest Florida. But we still have much to learn about the physico-chemical conditions that are necessary for desmids; about all we can say at present is that calcium and magnesium are unfavorable for them, and of course these elements are usually present in considerable proportions in hard waters with a high pH, where few desmids are found.

Concerning your speculations about a possible special plankton in the mixed waters at the mouth of the Rio Arapiuns, I can only say, at present, that such does not seem to be the case. Your sample #20 (Bucht oberhalb der Ponta Loui) contains so many species of the curious long-armed and long-spined *Staurostrum*, *Arthrodeamus* and *Xanthidium* found by Grönblad in samples from the Fazenda Taperinha and also in the samples from the Rio Tapajos, that I think the phytoplankton must be considered as typically "Tapajosian", although I have found several desmids that did not appear in Grönblad's material, and some of them apparently are new.

The most exciting discovery in your material is the strange new desmid that I mentioned in my last letter, and of which I enclose a sketch herewith. I sent copies of this sketch, together with small quantities of the material, to Prof. Prescott at Michigan State College, to Dr. Grönblad in Finland, and to Dr. W. Krieger in Berlin, and asked them to give me their opinions on my proposal that a new genus would be required for this extraordinary plant. I have now heard from all three of them, and they all agree that a new genus is necessary, so accordingly it will be written up and published by Grönblad. The plant is nearest to *Staurostrum*, though its structure is much more elaborate than any *Staurostrum* previously known. The extraordinary feature, and one that heretofore has been absolutely unknown in the Desmidiaceae, is that the two semicells are not alike. As you will see from the sketch, the upper semicell has a crown of eight (sometimes nine) small lobules, which is absent from the lower semicell; also the processes on the lower semicell are curved in the "wrong" direction, i.e. upward instead of downward as they would be in a normal desmid. This difference between the two semicells brings up questions of polarity in the physiology and vegetative reproduction process that have not previously arisen, and that I am unable to discuss for lack of knowledge of biology.

Both Prescott and Grönblad stress the desirability of getting additional material containing this plant, and preferably in a living state, so that perhaps the process of cell-division, and sexual reproduction by zygospores, could be observed. So I hope that if you ever have another opportunity of revisiting this place (Lago da Boca do Igarape Mental, your bottle #11), you will try to get some more material, and perhaps a larger quantity. Or possibly you may hear of somebody else travelling

Just how you could get living material to this country or to Europe I do not know. Grönblad suggests a small quantity of the material in a large amount of sterile culture medium, which of course is obvious. But desmids, and especially such a large and fragile form, are notoriously difficult to cultivate, and even if I received living specimens I don't think I could do any more than keep them alive for a few weeks. One of the few places where desmids are being cultivated successfully is the Laboratoire de Cryptogamie du Museum d'Histoire Naturelle, 12 rue de Buffon, Paris, and if you should wish to attempt to get living material I can send you one of their publications with directions and a formula for the culture medium. Such living material would of course have to be shipped by air, and in the cabin of the plane, otherwise it would be subjected to freezing temperatures at high altitudes. Containers made of Pyrex or similar resistant glass would have to be used, because ordinary glass contains a large amount of calcium which is slightly soluble, and would kill the delicate desmids quickly. To sum it up, I think the chance of getting living specimens to any place where they could be successfully cultivated is so near to zero, that it would not be worth your while to undertake the elaborate procedure that would be necessary.

I shall be very much interested in reading the manuscripts of your two new papers. If you have copies available of your papers on the Rio Cupari and the three papers in Boletim No. 24, ^{please send them} to Dr. Rolf Grönblad, Centralgatan 86, Karis, Finland.

When you write again, please give me the definition of the word "Igarape". Does it mean anything more than a small stream? Perhaps it is like the word "Bayou" used in Louisiana to denote a small, sluggish, meandering stream, frequently in marshy or swampy country.

Please give the exact location of the Igarape Mentai, with the approximate latitude and longitude. A rough sketch map would help, showing its relation to the Rios Arapjuns and Tapajos. Would it be possible for you to send me a fairly large scale map of this region?

Also I should like to know the complete address of Dr. Fr. Hustedt in Bremen. I wish to write and ask if he would be interested in examining, for diatoms, some interesting collections from Australia and Indonesia.

If you need any more vials, I can easily send you one or more boxes of them. I make the boxes myself, so they cost nothing, and the vials are quite inexpensive, only three or four cents each. Also if there is anything that you need from this country please do not hesitate to ask for it. I shall be only too happy to reciprocate your great kindness.

With my best regards and renewed thanks,

Sincerely yours,

Sept 13 1953

Ex^{MO}. Sr.
Dr. Harald Sioli,
Instituto Agronomica do Norte,
Belém-Para, Brazil.

Dear Dr. Sioli,

Yesterday (Saturday) I had expected to write some long letters to Australia, Germany and Finland which were overdue. But as I was about to start, the postman arrived with your three boxes, so all letter-writing was off, for yesterday and today too. Last night I stayed up until 1.30 am, just browsing through a few of your bottles, and making sketches of some of the more striking forms.

I wish to thank you most sincerely and enthusiastically for this wonderful lot of material, not only for the great pleasure it will give me for many months, but also for its great scientific value. It is certain that no algae have ever been reported on from the upper Rio Negro region, and though some samples have been studied from the vicinity of the lower Rio Tapajos (as at Santarém), it is highly probable that the small streams and igarapés that you have visited have never been collected from before. And in any one of them, even the tiniest pool, a new desmid may be found. Last night I found a new one, and got the greatest thrill in all my 15 years of desmid study. If it really is a desmid (and I cannot see how it can be anything else), I think it will require the creation of a new genus to receive it, because its structure is the most elaborate that I have ever seen or imagined, and also remarkable still, the architecture of the two semicells is different, something unheard of in desmid morphology. It occurred in the collection from the Lago da Boca do Igarapé Mente. I made a couple of sketches last night, but conditions were not very favorable for drawing, and I want to make some better ones. It will have to be referred to Dr. Rolf Grönblad in Finland for an opinion, but I think he will agree with me.

Will you please convey my thanks to Dr. Paul Ledoux for the collection that he made at Vigia. (by the way, where is Vigia?). Tell him, please, that the gathering contains at least two very rare desmids that I have never seen before, but which I can recognize from their peculiar characteristics (*Spondylosium desmidiforme* (Borge) West), and *Gymnozopsis armata* Lütken-Küller. Also there are a number of small *Euastrum* and *Cosmaria* that I cannot name immediately, some of which may be new.

Of your own material, so far I have taken only one drop from each of nine bottles in the first box that I opened. The first few that I looked at contained few desmids, though each had something of interest that was unfamiliar to me. But then I struck one that is enormously rich, from Rio Arapiuns, Bucht oberhalb der Ponta Icuri. This is one of the richest that I have ever seen; I have very few that can compare with it. It contains many of the strange and beautiful long-armed *Staurostrum* that were illustrated by Dr. Grönblad in his work "De Algis Brasiliensibus", many of which came from the Fazenda Taperinha near Santarém. The single drop of water and sediment that I placed on the slide contained such a large number of desmids that they were literally entangled with one another. Next time I shall shake the bottle to dilute the sediment. If there are any more collections like this in the other two boxes I shall be almost overwhelmed.

I am sorry to say that one of the bottles was broken and the contents lost, in spite of your very careful packing which should have been more than ample to prevent damage. Probably the bottle was defective; perhaps internal strains in the glass from insufficient annealing. This one was from the Rio Negro in Icana, and by a strange

coincidence a companion collection from the same vicinity, 25.9.1952, Rio Negro in Icana, Ufer, ruhiges Wasser, zwischen Wasserpflanzen und Algenwatten, was missing. Also another one was missing; 17.11.1952. Cachceira do Arua, Tümpel in versumpften Tal mit Patauasal des Ig. do Fonseca. (What is Patauasal?). Perhaps you had to omit these two bottles because of insufficient room in the boxes.

The waters that you have collected from are indeed highly acid, in some cases perhaps even lower than pH 4.1, which I suppose was the lower limit of your testing outfit. The lowest I have ever recorded in USA was 5.1, and the majority of my hunting grounds (or waters) run from 5.8 to 6.5, which however is quite favorable for desmids. I have some rich collections from North Australia with a pH of 7.0 to 7.5, but this is unusual.

The bottles that you sent are unnecessarily large, and I am going to send you by ordinary mail a box containing 24 small screw-top vials in which I have shipped algal material to many distant parts of the world. A quantity of sediment equal to about one-half of the volume of one of these vials is ample for my purpose, and will even ~~me~~ enable me to share it with friends. The vials bear a numbered label, and if you number your typewritten list to correspond, it saves the trouble of putting a label inside the bottle, though I know that this is the standard method.

Judging by the smell, it seems to me that perhaps you have used too much formalin; 4% to 5% is enough to preserve the desmids indefinitely. Too much formalin seems to work deleteriously on the cell-content, changing the chlorophyll-green to a pale greyish-green amorphous mass that fills the cell and makes it difficult to observe the wall markings. In this respect Dr. Ledoux's collection was better than yours. Please do not feel offended at this small criticism; I offer it solely with the idea of getting material that is easier to work on.

With renewed thanks, and my best regards,

Yours sincerely,

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Belém-Pará, Brazil, August 1st, 1953.

M. A. - C. N. E. P. A. - S. N. P. A. - INSTITUTO AGRONÓMICO DO NORTE

Exmo Sr.
A. M. Scott, Civil Engineer,
2824 Dante Street,
New Orleans 18, La., USA.

Dear Mr. Scott!

To my great surprise I received two days ago your highly interesting book about the Meandering of Alluvial Rivers for which I thank you very, very heartily! The book is of extreme value for me and should be so for the whole Lower Amazon, too. I think I had written to you already about the artificial channels which our ancient director, Dr. Felisberto de Camargo (now he is since end of last year on a higher post in the Ministry of Agriculture in Rio, but he is likely to return to the Amazon Region in a key-position in a government valorisation-program for this part of Brazil), has constructed in the floodplain of the lower Amazon. The channels connect the Amazon River with the big shallow Várzea-lakes, filled with clear water, and conduct now the yellow Amazon water from the river into the lakes. The intention of Dr. Camargo in his construction of those channels is that the lakes shall be filled up with the sediment brought in, through the channels, with the Amazon water. To some extent the channel-program is working well, but it seems to me that sometimes other difficulties arise. But I am not well aware of the situation now. When Dr. Camargo started his channel-program, I wished to warn him about eventual erosion etc., but he didn't like to hear. Last year he told me that the Amazon is eroding the banks on some parts, just at the Experimental Station of our institute on the lower Amazon on the northern side (Várzea) above Monte Alegre. Now Dr. Camargo developed ideas of caving new channels to draw off the main current of the Amazon from the endangered bank parts. I remembered him that by those measure other parts on the opposite river bank could possibly become endangered. The situation here is that nobody has any real knowledge of the dynamics of flowing water (I myself do not have either), but everybody likes to play with the amazonian nature, which is far from being known or understood, before really studying it! Improvisation is a good old latin custom! And so I hope that your book may become very helpful also for the channel-program here, avoiding eventual disaster by precipitated action. For my special work it is an inestimable source of information for understandig amazonian rivers. Once again, my very best thanks for your kind present!

Since long I hoped to be able to write you, announcing the despatch of the Desmid samples. But half a year I had to struggle with "Saint Bureaucratius" of our institute to get stoppers for the vials! Finally I could overcome his almighty power only by looking myself for the stoppers in the cityas, desregarding the institute's organization. And now I can pack the samples and send them to you in the next days, before starting for new work in the region northeast of Belém. The whole time in the last months I have been very busy in writing some publications (in portuguese and in german) which are going now to press. They took so much time because I have to do everything by myself, even the tipping of the manuscripts, loosing days and days for arranging the

ampliations of the photographs (there is almost no photographic paper more neither in Belém nor in southern Brazil!), and overcoming any sort of bureaucratic difficulties. For research work I have almost no time more, and the output is becoming always less. I am really despaired by the situation here which offers no future at all, and I should like to leave this country to day rather than tomorrow.

The Desmids I want to send you are in part from the river-system of the Rio Arapiuns (Tributary to the lower Rio Tapajós on the left side), in part from the upper Rio Negro region. All the waters in both regions are extremely acid. On the list of the samples which will accompany the sending, I shall indicate always the pH of the water.

In my work in the next weeks and months in the zone northeast of Belém (between Belém and Bragança) I hope to collect more samples of Desmids for you. I shall take special care to squeeze out waterplants too (what I forgot on my last trips!). That region comprises different geological formations (see my short study in Boletim 24) with partly acid, partly more or less neutral waters. I think, the Desmids populations in the different waters may be interesting not only for systematics but also for the Cecology and as indicators for the chemistry of the waters. The work in that region will end in December, and then I hope it will not take again such a long time until sending to you the material!

Thanking you again for your the very nice and useful surprise you have made me with the book, I am with my best wishes and greetings

very sincerely

Your

Harald B. W.

Dr. Harald Lohli
Instituto Agronômico do Norte
Belém-Pará-Brasil

M. A. - C. N. E. P. A. - S. N. P. A. - INSTITUTO AGRONÔMICO DO NORTE

Belém-Pará, Brazil, 3rd March, 1953.

Exmo Sr.
Arthur M. Scott,
2824 Dante St.,
New Orleans 18, LA.
EE, UU. da América.

Dear Mr. Scott,

I thank you very, very much for your great kindness to send me the book about the Lower Mississippi River Delta which I received a short time ago! It is a most valuable present you have made to me. The book is extremely interesting for me as a comparison to the situation in the Amazon and as an introduction into general river-morphology too. But it makes me also a little bit sad when I read it and think on the Amazon: how much has been and is being done in your country for studies about the Mississippi, and how ^{little} is the general interest here for studies about the Amazon, the mightiest river of the world! On every travel into the interior of Amazonia one sees here so many problems which should and could be solved, but no scientist is here who could do such work, and the competent authorities have no interest in starting general investigations which do not promise an immediate monetary profit. The only man here of influence, the Director of our institute, Dr. Felisberto de Camargo, who has complete understanding for the value of pure, not only directly applied research, left our institute and, with it, the Amazon region for getting a higher post in Rio. I am now sceptical about the future of scientific research in Amazonia which Camargo had started in our institute; the "políticos" will try to take the institute over, and then all serious work will be finished.

In the meantime, yet, I try to make the best I can about the Amazonian waters. I am writing now on a publication about the Rio Arapiuns, the lowest left-side tributary to the Rio Tapajós, as an example of waters from the tertiary zone of Lower Amazonia. The Mississippi-book, you sent me, is very helpful to me in that work, too. It gives me many ideas about formation of rivers, especially about subsidence and submergence by sediment-load. -

In the next weeks I hope to be able to send you my plankton-etc.-samples which may contain Desmids. Excuse please that I didn't do it earlier. Last year, I made, in September, a short but very interesting trip to the upper Rio Negro. In November, I went again to the Arapiuns which I had visited already once in May/June. In the weeks after the trips I was fully occupied but elaboration of the material I brought from the trips. It is all so difficult here! In the last month I had to struggle to get some small common glass-bottles, for I had to divide the plankton-samples for you and for Prof. Hustedt, Germany, who works about the diatoms. Finally I got the bottles, but without stoppers! Now I am struggling to get cork or rubber stoppers... When I get them, I finally can bring the desmid-samples on the way to you. - They are only few samples, but perhaps they may be worth to be looked at.

Once again, I thank you very heartily for your valuable present, and with my best regards I am very sincerely

Your

Harald Lohli

pleasure we will collect these seeds for you by
the methods indicated by you. - I thank you very
much that you are willing to
work on our behalf here. -



For today, I want to send
you my best wishes for
a very Merry X-mas and a very
Happy New Year!

With best regards,
very sincerely
Yours

Harald R. G. S.

*Victoria regia on the banks
of the Amazon near
Santarem.*

Belém-Pará, Dec. 12, 1952.

Dear Mr. Scott,

I thank you very much for your kind letter from November 9 which I received only recently when I came back from a new trip into the Interior, the Rio Arapiuns, tributary to the lower Rio Tapajós. And accept, please, my cordial thanks for sending me the book on the Mississippi. It isn't here yet, but certainly it must arrive in the next time. It will be very interesting for me. About the resemblance between the Mississippi and the Amazon I heard already by the Brazilian Geographer, Prof. Sternberg.

I am very occupied now with the chemical analyses of the water samples from my last trip, but I hope to be able to send you in the beginning of next year some plankton samples for the Desmids. My friend Dr. Braun, now on a new institute in Germany, has no time more to work on them. I spoke also with one of our botanists, Prof. Dr. Paul Ledoux, formerly in Brussels who many times travels in Marajó Island. with great

Nov 9 1952

Dr. Harald Sioli,
Instituto Agronomico do Norte,
Belem, Para, Brazil.

Dear Dr. Sioli,

Please accept my thanks for sending me the reprint containing your three latest papers, two of them dealing with the Amazon River, and the third on the geology and limnology of the region lying between Belem and Braganca.

It was thoughtful of you to give resumes of your papers in English, French and German, and I wish other authors would do this. For instance I receive occasional papers written in Polish, Czech, and Japanese, which are quite unknown to me, and all I can do is to look at the illustrations. A few years ago Dr. Joaquim Sampaio, of the Universidade do Porto, sent me some of his works on desmids, and I found, somewhat to my surprise, that I could read Portuguese, although it was slow work and required much assistance from the dictionary. So after reading your resumes, I read through your entire work, and found much information that was of interest to me.

There seems to be a considerable resemblance between the Mississippi River and the Amazon in many respects, though I do not know enough of limnology or "riverology" to carry the comparison any further. The Mississippi at New Orleans rises more than 20 feet between low and high stages, but it is confined to its channel by embankments ("levees") which extend along both sides of the river for hundreds of miles. But these levees seem to cause the flood stage of the river to become higher and higher, so that it has now become necessary for the Government to spend many millions of dollars on floor relief work. For instance, about 30 miles above New Orleans there is a spillway about 1 mile long, with hundreds of steel gates that are normally closed, but which can be ~~raised~~ raised when the river gets very high, and allow part of the river water to escape through an artificial channel into Lake Pontchartrain and thence to the Gulf of Mexico. This is for the protection of the City of New Orleans, where it is not possible to raise the levees much higher than they are now. I have sent you by ordinary mail a book on the Mississippi River delta that may be of some use to you, and it contains an extensive bibliography.

The part of your work that was of most interest to me is the third paper. The differences in the geological formations, and the accompanying variation in the pH of the surface waters, from 4.6 near Belem to 7.2 near Capanema, are very curious, and worthy of a more extended investigation. I think I have mentioned in one of my former letters that there is a very close correlation between the phytoplankton, and particularly the desmid-flora, of a given aquatic habitat, and its physico-chemical condition. This phenomenon is so noteworthy, in fact, that the ratio of the number of desmids to the other microflora and certain of the microfauna, has been used as an index to the classification of surface waters such as lakes and ponds. Now desmids grow best in acid waters of a pH from 4.5 to 7.0, so they ought to be abundant in the waters on the "Para formation", and particularly since you have noted that extensive beds of Mlaeocharis are to be found there. Where Mlaeocharis grows there is almost certainly to be found other aquatic plants such as Myriophyllum, Cabomba, Utricularia, etc., whose finely divided leaves form the resting places for numerous desmids which can be collected very easily by squeezing a handful of such plants into a jar and then preserving the sediment with 4% formalin. You can get a much greater number of desmids and a greater variety of species in this way than by the slow method of collecting them with a plankton net. I feel sure that it would add considerably to the interest and value of Dr. Rudolf Braun's studies of the microbiota of Amazonian waters if you were to send him some algal collections made as I have suggested.

With my best regards and wishes, sincerely yours,

2824 Sante St., New Orleans 18, La.
May 24 1952

Dr. Harold Sioli,
Instituto Agronomico do Norte,
Belem. Para. Brazil.

Dear Dr. Sioli,

Many thanks for your nice letter, which I enjoyed reading very much.

You are quite correct about the locality from which were collected the desmids described in the paper by my friend Dr. Rolf Grönblad. Since you may not have been able to obtain the paper, I am quoting his description:

"Die Planktonproben wurden den Gewässern der Umgebung der Fazenda Taperinha entnommen. Die Farm ist ungefähr 600 km (Luftlinie) von der Mündung des Amazonas entfernt und liegt etwa 40 km unterhalb des Städtchens Santarem am Ayaya (= Maica), einem rechtsufrigen Seitenarm des Amazonas, am Fusse des Nordabfalles des zentralbrazilianischen Hochlandes. Vor der Fazenda Taperinha liegt eine Bucht, die zum Überschwemmungsgebiet des Ayaya gehört. Diese Bucht ist von einer dichten Schwampfpflanzendecke überzogen, die zum grossen Teil von einer Salvinia-art gebildet wird. Durch den täglichen Bootsverkehr zum Ayaya wurde die Pflanzendecke längs einer geraden Linie dauernd auseinandergeschoben, sodass ein offener Wasserweg entstand. Dieser "Kanal" war an einer Stelle, die in dieser Arbeit als "Tumpels" bezeichnet wird, etwas erweitert".

The name of the owner of the fazenda is not mentioned, but the collections were obtained by Prof. Dr. August Ginzberger, of Wien, in 1927, during a visit to Brazil with his wife, Agathe.

Some time ago I read a book about the Ilha de Marajo, on which it appears that there are numerous lagoons and swamps, which ought to be a very favorable place for desmids. If you, or any of your botanist colleagues, visit this island, perhaps you might be able to make some collections. The easiest way of collecting desmids is to take a handful of any of the aquatic plants like Salvinia, Myriophyllum, Ceratophyllum, or Utricularia, and squeeze the water from them into a wide-mouth jar. After standing for a few hours a sediment will form in the bottom of the jar, and the sediment contains the desmids, and many other algae, of course. It is preserved by adding enough formal to make a 5% solution, in which it will keep indefinitely.

I shall be very glad to hear again from you, and perhaps also from Dr. Braun, after you have had a chance to communicate with him.

Sincerely yours,

Feb 8 1952

Exmo. Sr.
Dr. Harald Sioli,
Instituto Agronomico do Norte,
Belem. Para. Brazil.

Dear Dr. Sioli,

The paper on the Rio Cupari, which you were kind enough to send by airmail, arrived yesterday, and it is the first that I have received in response to the chain letter. Please accept my best thanks for it, and the hope that when your name gets to the top of the list, you will receive many books in return. When the chain letter was sent to me I thought it quite surprising that serious scientists could lend their names to such a scheme, but it seems to work!

I can read just sufficient Portuguese to understand the general sense of your paper, but not all of the details. So I was quite interested to learn something about the chemical and physical conditions of the water and soils in your part of Brazil. As you will note from the enclosed papers, I have specialized on the Desmidiaceae, and have been collecting, studying, and illustrating them for the last fourteen years. Desmids are found most abundantly in soft waters, with a high value for the ratio $\frac{K \text{ plus } Na}{Ca \text{ plus } Mg}$, so your waters with their low pH, and low total

hardness, ought to be very favorable for my favorite algae. If Sr. Braun has published the results of his studies of the microflora in the waters of the Rio Cupari, I should like very much to have a reprint of it, and perhaps my papers may be of more interest to him than to you. Desmids, however, are rather scarce in running waters, and I get most of my material from small lakes, ponds, swamps and roadside ditches.

I have on hand more than 500 collections containing desmids from the southeastern part of the United States, many of which are very rich in desmids. If Sr. Rudolf Braun is interested in these beautiful little plants, it would please me very much to arrange an exchange of my collections for some from your country. Or I would be willing to purchase some Brazilian desmid collections at a price to be mutually agreed upon.

One of the most important papers on Brazilian desmids was published a few years ago by my friend Dr. Rolf Grönblad, of Finland, who found something like 340 different desmids in a small lot of samples collected in and near the Rio Ayaya about 40 km east of Santarem, which is not very far from the Rio Cupari. He wrote me that the richness of these collections was amazing, and in fact his paper shows a remarkable assortment of strange and beautiful forms.

If you care to reply to this letter, please write, if possible, in English, French or German, because my knowledge of Portuguese is rather scanty.

With renewed thanks, and my best regards,

Sincerely yours,

January 6 1954

Dear Dr. Sioli,

Please accept my best thanks for the reprints of your papers in English and German on Schizosomiasis, and also for the manuscript copies of the two papers that you have sent to Arkiv für Hydrobiologie.

The two latter papers I found extremely interesting and instructive, and I have forwarded them to Rolf Grönblad in Finland so that he may obtain some background information and data for the paper that he is preparing on the new desmid from the Lago da Boca do Ig. Mental. I hope to receive reprints of the papers when they are published, so that I may keep them permanently for reference.

Much of the information is quite new to me, and upsets some of the ideas that I had formed from reading about various tropical countries. It is surprising to find that the soil in the primeval tropical forests (Mato da Terra Firme) is so poor, instead of very rich as is popularly supposed, and as is the case (I believe) in most of the hardwood forests of the temperate Zone. On the other hand, I get the idea from your statements, that the Caatingas, with their even poorer and siliceous soil and sparse, stunted, vegetation, may correspond more or less with the "savannahs" of this country. I am acquainted with many savannah regions in southeastern USA, particularly in southern Mississippi and in many parts of Florida; in fact they are some of my favourite hunting grounds for desmids. In these savannahs the soil is a sandy loam, usually underlain by an impervious layer of clay; the water-table is close to the surface, and since the terrain is nearly level, there are numerous swampy places in the shallow depressions, which are permanently or semi-permanently filled with water and an abundant aquatic vegetation. If there are such swamps and ponds in the Caatingas, I should expect to get rich hauls of desmids from them, much better than from the running waters of the streams. Of course, I realize that exploration of such remote regions is both difficult and expensive, and would not be possible for a party travelling by boat, as no doubt you did on your visit to the upper Rio Negro. But perhaps some of the botanists of the IAN may have occasion to visit these regions, and if they do I hope you will ask them to make collections of the aquatic plants and algae.

Another astonishing fact is the partial or even total submersion of the vegetation on the flood-plains of the rivers for considerably more than half the year. I had read, of course, of the annual floods on the lower Amazon, but it never occurred to me to wonder how the vegetation could survive. The fact that palms, of all trees, have been able to adapt to such extreme conditions of submergence is really marvellous, and I should like very much to see a botanist's explanation of it. Perhaps the head of the botanical section of the IAN, Sr. Joao Murca Pires may write something about it at a future date. Last night I read an interesting article by Dobzhansky & Murca Pires, in the January issue of the Scientific American, on "Strangler Trees". I have a very enjoyable book in two volumes, "Itinéraires Botaniques dans l'Isle de Cuba", by Frere Marie-Victorin and Frere Leon, which contains numerous references to strangler trees of the genera Clusia and Ficus, with excellent photographs not only of the stranglers but also of hundreds of other Cuban plants. If Sr. Murca Pires has not seen this book I am sure he would enjoy reading it.

Before I received your last papers I had already noticed, in your collections, the relative dearth of phytoplankton as compared with the zooplankton. This is a puzzling problem, because obviously the animals' food must be microscopic plants, either or indirectly. No doubt your ascription of the phenomenon to the

high acidity of the water, and its low content of nutrient salts, has a great deal to do with it. Another partial explanation may lie in the fact that many microscopic algae, - the nannoplankton - are too small to be caught in a plankton net, especially if the nets that you use are not of the smallest mesh.

I hope to hear from you again soon, with answers to the questions that I asked in my last letter, namely, the latitude and longitude of the Lago da Boca do Igarape Mental, and if possible a rough sketch map of the vicinity, showing the relations between the Ig. Mental and the Rios Arapiuns, Tápaçoz and Amazon. If you could show the City of Santarem on the map it would give an excellent reference point.

With my kind regards, and best wishes for the success of your projects in the New Year,

Sincerely yours,

Dec 6 1953

Dear Dr. Sioli,

The small box of samples arrived this week; everything was in good order except that somebody, probably the customs officials, had made an unsuccessful attempt to pry off the lid of the box by using a chisel. For that reason it is best to leave the screw-heads exposed, so that everybody can see how the box is to be opened. Also, if you will use a little more packing over the bottles, the lid when screwed down will exert a small pressure on the bottles, and keep them from rattling. The desmids are in much better condition than your first lot, because you used less formalin.

So far I have examined only one drop from each of the vials, but this is sufficient to give me a general idea of their contents. Naturally, a more detailed examination will bring to light more desmids and more species. Here is the result of my preliminary investigation:

49. Apparently no desmids. Some nice diatoms (Centrales).
50. Do. Do. Do.
51. Very few desmids. 1 specimen each of *Euastrum*, *Closterium*, *Cosmarium*, *Penium*.
52. Fairly good; some common desmids and *Micrasterias abrupta* var. *Borgei*.
53. Some desmids, including *Micrasterias fimbriata* var. *spinosa*, and *Desmidiium Greivillii*.
54. Many genera of marine or brackish-water diatoms, including *Coscinodiscus*, *Aulocodiscus*, *Actinocyclus*, *Triceratium fetus*, *Hiddulphia mobilienais*. One small 3-radiate *Staurastrum*, possibly new; and one specimen of *Closterium Kuetzingii*. These two desmids certainly did not grow in brackish water, and no doubt were carried down the Rio Guama from some acid-water habitat.
55. The same diatoms and desmids as in #54, also *Coelastrum cambricum* - not a desmid but coming from a fresh-water habitat. There seems to be no essential difference between #54 and #55.
56. The same diatoms and desmids; also a blue-green filamentous alga, and much zooplankton.
57. The same diatoms, but no desmids seen.
58. Sterile filaments of *Spirogyra*, and 1 specimen of a small *Cosmarium* that is unfamiliar to me.
59. A fairly good assortment of desmids, including *Micrasterias radians*, *M. pinnatifida*, and several small species of *Cosmarium*, *Euastrum* and *Staurastrum*.
60. Five cells of *Spondylosium pulchrum*, that's all. Probably more desmids will show up, because it would be highly unusual for *Sp. pulchrum* to grow by itself.
61. Mostly blue-green filamentous algae (*Cyanophyceae*); some *Spirogyra*, and two *Cosmarium*. Numerous diatoms, including *Terpsinoe musica* (?).
62. A few desmids, but very scarce. 2 *Cosmaria*, 1 *Closterium*, 1 *Euastrum* similar to *E. Johnsonii*, and 2 empty semicells of *Micrasterias mahabuleshwarensis* var. *dichotoma*.
63. Desmids very scarce. 1 small 3-spined *Staurastrum*, and 2 filaments of *Gymnozyga delicatissima*.
64. No desmids. An abundance of diatoms.

So you see that these collections are by no means rich in desmids, and evidently the water conditions were not favourable for their growth. The reason for this I do not know, except in the case of #54 - 57, where the abundance of marine diatoms indicates that in all four of these collections the water was at least brackish, and that is fatal to desmids.

All of these gatherings, except #64, came from rivers or streams,

and as I have written before, running water is seldom favourable for desmids, though where the river spreads out into shallows where ~~there~~^{there} is little or no current, or on the flood-plain, good collections can frequently be made. I imagine that the Lago da Boca do Igarape Mental is one of these ponds on the flood-plain. Can you confirm this?

Many of my best collections have been made from roadside ditches and ponds, where the water ~~is~~ sometimes evaporates completely during a drought. But after they are filled again by rain, it requires only a short time for the desmids to appear again, and since under the right conditions they multiply by cell-division every few days, they rapidly become an important feature of the aquatic flora. Other favourite hunting places of mine are fresh-water swamps and marshes, where there may be anywhere from a few inches to two or three feet of water. I should think that similar habitats must exist in Para during the rainy season; in fact this is indicated by what you told me of the flooded "campos" where Prof. Ledoux made his one collection near Vigia.

I wish to thank you very heartily for your trouble and courtesy in sending me these samples, and to assure you that they will receive the most careful attention from myself and Rolf Grönblad. Shall I send you another box of the screw-top vials?

With my kindest regards and best wishes,

Yours sincerely,

Lista de material hydrobiológico coleccionado na Amazônia em 1952 por
Dr. Harald Sielä.

Phytoplankton, Algas etc.

Parte de Santarém - Bei Santarém - Near Santarém.

31. 22.5.1952. Igarapé Irará bei Santarém. Brauner Schlick von zwischen
grünen Algenmatten an Rande der Strömung. (pH 4.6). 47

Sistema fluvial do Rio Arapiúns - Fluviosystem des Rio Arapiúns -

Riversystem of the Rio Arapiúns.

1. 30.5.1952. Rio Arará, unterhalb Cachoeira. Phytoplankton. (pH 4.5).
2. 30.5.1952. Quelle bei Cachoeira do Rio Arará. Brauner Eisenkieselsäure-
schlag. (pH 4.5).
3. 31.5.1952. Lago da Cachoeira do Arará. Phytoplankton. (pH 4.4).
4. 2.6.1952. Rio Maré, \pm 3 km unterhalb der Cachoeira. Phyto-
plankton. (pH 4.4).
5. 3.6.1952. Lago da Boca de Igarapé Montai. Phytoplankton, 0.50 -
1.00 m Tiefe, 19^h. (pH 4.5).
6. 4.6.1952. Rio Arapiúns, Mündungsbucht des Igarapé Curá. Phyto-
plankton, 15^h30^{min}, 0.50 - 1.00 m Tiefe. - (pH 4.5).
7. 7.6.1952. Rio Arapiúns, unterhalb Ponta Gurupá (= vor Enseada
de Urubá). Phytoplankton, \pm 1 m Tiefe, 15^h30^{min}. -
(pH 4.5).
8. 8.6.1952. Rio Arapiúns, Kl. Bucht unterhalb Ponta Gurupá (= En-
seada de Urubá). Ufernahe. Abgesaugt von Holz mit
Algenbewuchs. (pH 4.5.)
9. 11.11.1952. Igarapé Montai. Phytoplankton, 17^h. - (pH 4.5).
10. 12.11.1952. Lago da Boca de Igarapé Montai. Nach Regennacht, ganz
trüber Tag. \pm 9^h. Oberflächchen-Phytoplankton. (pH 4.6).
11. 14.11.1952. Lago da Boca de Igarapé Montai. Sonniger Tag, 16^h15^{min}.
Oberflächchen-Phytoplankton. (pH 4.6, in Tiefenwasser
pH 4.5).
12. 16.11.1952. Rio Arará an Fude der Cachoeira. Regentag, 15^h30^{min}.
Phytoplankton. (pH 4.5).
13. 17.11.1952. Cachoeira do Arará, Tümpel in versumpften Tal ohne
Synchronisationspunkt mit Patanaal des Ig. de Fomeca.
Bodenbelag, abgeschöpft. (pH 4.4).
14. 18.11.1952. Rio Maré nahe Mündung. Sonntag, 15^h30^{min}. Phyto-
plankton. - (pH 4.4).

Lista de material hydrobiológico colacionado em Amazônia em 1952 por
Dr. Harald Sieli.

Phytoplankton, Algas etc.

Região do Alto Rio Negro. - Região das cabeças Rio Negro. -

Upper Rio Negro Region.

21. 15.9.1952. Rio Uaupés, Mündung. Phytoplankton, Oberflüche, 16^{h₃₀min}
(pH 4.5.)
22. 15.9.1952. Rio Uaupés, Mündung. Von Ufersteinen abgesaugt, 0-10 cm
tief. - (pH 4.5).
23. 16.9.1952. Jararaca-Igarapé, Schwarzwasser-Quellbach. Belag auf
Sand und Blättern an Ufer. - (pH \approx 4.1).
24. 18.9.1952. Jararaca-Igarapé. Platz wie am 16.9., in ruhigen
Wasser von Boden und Blättern abgesaugt. - ~~16.9.1952~~
(Klarwasser-Quellbach!! Nicht wie die obige Probe!!
pH 4.8).
25. 18.9.1952. Jararaca-Igarapé, Schwarzwasser-Quellbach. In ruhigen
Wasser von Boden und Blättern abgesaugt. - (pH \approx 4.1).
26. 19.9.1952. Jandiá-Igarapé, Schwarzwasser-Quellbach. Von Blättern
etc. an Ufer angesaugt. - (pH \approx 4.1).
27. 19.9.1952. Jandiá-Igarapé, Klarwasser-Quellbach. Von Blättern,
belegten Uferwurzeln, Steinen etc. abgesaugt. -
(pH 5.2). *This bottle was broken and contents lost.*
28. 22.9.1952. Rio Negro in Içana, Ufernahe. Phytoplankton. (pH 4.2 -
4.3). (Içana ist der Ort, der früher den Namen "São
Felippe" hatte.)
29. 24.9.1952. Caburis-Igarapé. Klarwasser. Von toten Blättern an
Ufer usw. abgesaugt. (pH 4.8).
29. 24.9.1952. Iaitim-Igarapé. Schwarzwasser. Von toten Blättern
an Ufer usw. abgesaugt. (pH 4.4).

Rio Uaupés: - Rio Caiari-Uaupés; Ort der Probenentnahme an
der unteren, südlichen, seiner beiden Mündungen in den
Rio Negro, bei Sitio Tatá, sodaß schon etwas Rio Negro-
Wasser beige mischt ist.

Jararaca-Igarapé und Jandiá-Igarapé: Kleine Bäche wenige km
landsinnwärts von Sitio Tatá (siehe oben). Die untersuch-
ten Quellbäche dieser Bäche haben teils schwarzes, sehr
saurer, teils kristallklares, weniger saures Wasser.

Caburis-Igarapé und Iaitim-Igarapé: Kleine Bäche wenige km
landsinnwärts auf dem linken Ufer des Rio Negro gegen-
über dem Orte Içana (dem früheren São Felippe).

25.9.1952. Rio Negro in Içana. Ufer. ruhiges Wasser, unteren
Massenflaumen und Algenmassen, 10-30 cm tief.