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About the Institute

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

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

AGREEMENT AND RELEASE

THIS AGREEMENT AND RELEASE entered into this 31st
day of May, 1973, by and between Askill Löve, hereinafter
referred to as "Löve" and the University of Colorado,
hereinafter referred to as "the University."

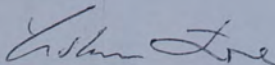
Löve herewith tenders his unqualified resignation as
Professor of Biology and Associate Curator Phanerogams,
University of Colorado Museum, effective upon the signing
of this Agreement. It is mutually agreed that this resigna-
tion has been agreed upon by the parties at the request of
Löve, which request was necessitated by personal reasons.

The University agrees to provide Löve with all employ-
ment benefits now due and owing as a result of his employment
service and tendered resignation.

Upon satisfaction and execution of this Agreement
and Release the parties hereto each agree to release and
forever discharge the other from all and all manner of,
action and actions, cause and causes of action, suit, debts,
dues, sums of money, contracts, damages, judgments, claims
and demands of whatsoever kind and nature arising from Löve's
resignation and financial grant obligations.

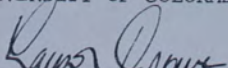
The parties to this Agreement and Release mutually
covenant and agree that no public notoriety shall be given
by either party to this Agreement and that the contents
hereof are a matter of mutual confidence and are not to be
made public by either of said parties.

IN WITNESS WHEREOF, the parties hereto have set their
hands and seals this ____ day of May, 1973.



Askill Löve

UNIVERSITY OF COLORADO

By 

Provost

Dear Ashell
 I came across this
 while getting my hair cut
 I thought you would find it
 interesting. I am presently
 very busy working for a
 very large company
 on a proposal for a
 three culture
 laboratory
 company.

FORTUNE

September, 1977

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I really think we will
 begin to make great strides
 in plant selection
 production this year
 other exciting possibilities
 are my

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Fortune, September, 1977, Vol. 10, No. 3, issues
 monthly through December, 1977, and bi-monthly thereafter
 after by Time Inc., 541 North Dearborn Street, Chicago,
 Illinois 60611. Second-class postage paid at Chicago,
 Illinois, and at additional mailing offices. Subscriptions:
 one year \$20; two years \$35; three years \$50. Single copies \$2.
 Address all correspondence and subscription orders to:
 FORTUNE, Time & Life Bldg., New York, N.Y. 10020.
 James R. Cannon, President; Patrick Lonsden,
 Treasurer; Charles B. Bear, Secretary. Authorized as
 second-class mail by the Post Office Department, Ot-
 tawa, Canada, and for payment of postage in cash
 at the point of sale. Circulation in 1977: 1,000,000.
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to write more
 news articles
 (Boettlinger)

Cold-Shower Time

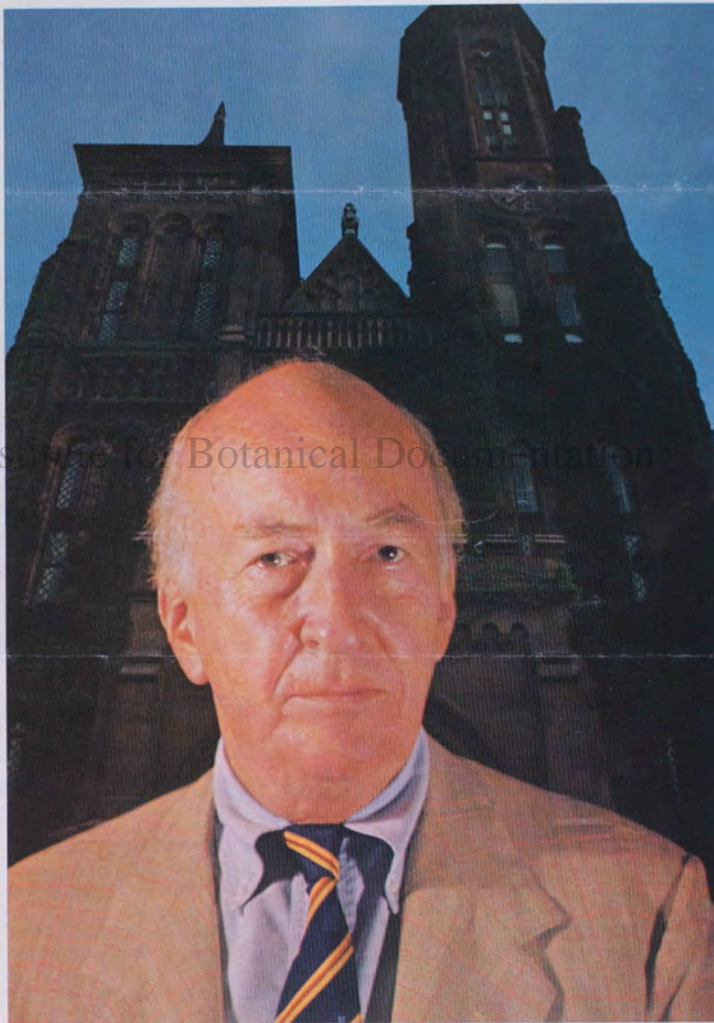
by Irwin Ross

It is one of the glories of the American democracy that no institution is immune from critical assault. Still, admirers of the Smithsonian Institution are appalled these days by the variety of offenses charged to that venerable body by Congress, the General Accounting Office, the *Washington Post*, and a claque of lesser critics.

The Smithsonian, after all, has long been regarded as a national treasure, ranking with the Washington Monument and the Lincoln Memorial. It has been extraordinarily popular both with museum-goers (over 20.4 million visits last year) and donors, who have bestowed on it everything from the *Spirit of St. Louis* to the Hope diamond. It is unrivaled as a museum complex, with ten museums and galleries in Washington alone, offering everything from Oriental art to a space capsule. It is also a scientific institution of considerable renown, especially in the fields of theoretical astrophysics and evolutionary biology.

And yet, within the last eighteen months, the Smithsonian and its long-time chief executive, S. Dillon Ripley, have been taken to task by members of the House and Senate Appropriations committees, who curbed some of his activities. It has been the subject of an exhaustive inquiry by the General Accounting Office, which turned in a negative report on certain of its fiscal practices. It currently faces three more inquiries—by investigators of the House Appropriations Committee, by a House Administration subcommittee, which is planning a round of public hearings next

S. Dillon Ripley, the eighth Secretary of the Smithsonian Institution, is, like his predecessors, a scientist of distinction. Ripley has presided over the greatest expansion of the institution since its first building, that many-towered "castle" designed by James Renwick Jr., opened its doors to the public in 1855.



UNIVERSITY OF COLORADO

BOULDER, COLORADO 80302

DEPARTMENT OF BIOLOGY
DIVISION OF POPULATION STUDIES

Boulder, January 28, 1971.

Mr. Kennedy B. Schmertz, Director,
Foreign Currency Program,
Office of International activities,
Smithsonian Institution,
Washington, D. C. 20560.

Dear Mr. Schmertz:

Let me first thank you for the much too short time we had together on the airport in Washington on December 28. Your advice helped me much, and I appreciate your friendliness in coming out there yourself when you certainly were busy with important matters at the office.

I returned almost two weeks ago from the Yugoslavian trip, but the fact that I was run down after a too long stay in a difficult winter weather resulted in that I caught a severe cold on my way back and it has kept me from serious work since then. I think I can say that the visit was favorable in every respect, though its real success depends upon the reaction of your office to the requests that have to be made on basis of my discussions with the Yugoslav scientists and officials.

I arrived in Belgrad on January 5 just after a snowstorm which made the streets difficult for any kind of traffic. Selecting the B-class Hotel Kasina, I discovered that this clean but not luxurious institution preferred to rent its double rooms before filling its single rooms, a practice I formerly knew from Spain. But this extra expense could be counteracted by eating in an excellent cafeteria on the same premises, where good Serbian food was available for very reasonable prices.

It was a great pleasure to meet the scientific attaché Mr. Wilfred F. Declercq at the American Embassy. In addition to his help in handing over to me the dinars needed for my stay, he gave me a lot of advice for the future. Of interest to you ought to be his recommendation that funds be directed through the consulate in Zagreb, since that city is close to Ljubljana and can be reached by only a fraction of the costs for a visit to Belgrad. Although he was of the opinion that a contact with Mr. Rajačić of the FAITC would not be necessary this time, because his office is entirely political,

he helped me to try to get in touch with him or his associates per telephone during my stay at the Embassy, but in vain. I tried several times during the day to get contact with him or Mr. Sutlović in the FAITC office, but received no contacts with them, and when I came in person to ask for either one of them, both seemed to be unavailable, though it is possible that the limited knowledge of English and German by those whom I contacted, and my inability to speak Serbian or Russian, which they tried to use, may have caused some misunderstanding. In Ljubljana I was later informed that the present director of FAITC is actually Ing. T. Nedog, a Slovenian, who is very much interested in our project; I am sorry that my ignorance of his existence prevented me from asking for him, though my Ljubljana colleagues assured me that such a meeting would only have been a polite formality that can be corrected later.

Mr. Declercq also advised me not to return to Belgrad for the trip back but to fly either from Ljubljana or Zagreb, since he saw no reason for spending time and funds for a visit only to report how I had spent my limited travel funds.

My Ljubljana contacts, at all levels, told me that after the recent reorganization, Yugoslavian arrangements would go through the AITC offices in the republic concerned and the last contacts with the Federal AITC office in Belgrad has become only a formality; they also emphasized that it would be wise to let all future contacts with these offices go through the Yugoslavian scientists concerned and leave direct diplomatic formalities and political contacts between the FAITC and the Smithsonian or the Embassy to the very last stage. It was my feeling, also, that the Yugoslav scientists felt that the screening methods of your office had caused an unnecessary delay through the use of a committee apparently ignorant of the scientific methods and problems in question - apparently referring to the first application - and that their own screening ought to have been sufficient; I tried to explain to them your situation and that you would not be able to alter that kind of bureaucracy despite a strong will to do so, and that we only have to hope that the mistake in selecting people who do not admit their lack of special knowledge in the fields concerned can be avoided for other projects. But a stronger reliance upon the Yugoslav specialists could be recommended.

As originally planned, almost all my stay in Yugoslavia was in Ljubljana, with trips to the mountains and to the marine station in Portoroz at the Adriatic Sea. Although my colleagues, Professors Sušnik and Mayer, were busy with their ordinary duties, they spent much time with me, but they had also arranged visits to officials and institutions so that I was kept busy every day from early in the morning to late in the evening. Whereas during the weekend, Professor Sušnik drove with me to Portoroz to show me the new and impressive facilities to tackle the many botanical and zoological evolutionary problems in and at the Mediterranean.

Naturally, I met with all kinds of scientists and students, and my personal interest in general culture and in the literary and creative arts helped me to get contacts with numerous artists and humanists through visits to the many cultural institutions of this city, that still lives under the influence of old Austria, which created the greatest cultural heritage of Central Europe during the past two centuries. However, closer to the field

of our cooperative project, I had enjoyable and profitable discussions with Dr. Ernest Petrič, who is the Minister of Science and Education for the Republic of Slovenia and the Vice-President of the Federal Committee of International Activities; Dr. Pavle Rozman, who is the Director of the Administration for International Technical Cooperation (AITC) in Slovenia; Professor Dr. Mirjan Gruden, who is the present Chancellor of the University of Ljubljana and a physicist of a wide and deep learning; and Professor Dr. Stane Valentinčič, the Dean of the Biotechnical Faculty of the University of Ljubljana. All these gentlemen were well acquainted with even the details of our project, and they all expressed great interest in this and other cooperation in biological research between America and Yugoslavia. They also seemed to agree with my cooperators that no other projects ought to be commenced before this first one has been clearly initiated and given time to demonstrate its first results. Some of these gentlemen also expressed some concern as to the slowness with which this first project has been treated in Washington, and the lack of consultation with the Yugoslavs when the first budget was hurriedly reduced and later cut further. Although this apparently had reduced somewhat their belief in American sincerity, I hope I succeeded in building up again their confidence in the good intentions of your office, when I told them that I had your word for that the budget would be adjusted as the American and Yugoslav teams felt was needed for a successful beginning.

I could write much more about the part of the discussions that indicated some discontent, and considerably more about that which was filled with enthusiasm and optimistic anticipation of future cooperation, but hope you will allow me to save this for oral discussions. Then I could also repeat some of the stories told by all these gentlemen, the minister not excluded, because the Yugoslavs apparently have the same keen sense of humor as their relatives, the Czechoslovaks, and their conversation is interspersed with citations and humorous remarks even when they speak a foreign language.

In addition to these officials, I visited colleagues at the Academy and was much with those at the eight laboratories of the Biological Institute of the University of Ljubljana and discussed various matters with the heads of these laboratories, the professors, students and technicians. I also spent time in the neat Botanical Garden, although most of its material was covered with more than one meter of snow. I was impressed by the fine herbarium and by the good facilities for classical biology in all these fields, though I found the botanical laboratories to be somewhat deficient in some modern approaches as, e.g., cytotaxonomy, chemotaxonomy, and computer techniques. The University Library is considerably better than its counterpart in Colorado as to classical botanical literature, whereas funds seem to have been insufficient for buying some newer works and journals of importance to evolutionary biology. In Ljubljana I found it easy to converse with the older generations in German and the younger generation in English, but some would have found Russian easier had I only known more than the alphabet, though even a rudimentary knowledge of their own Slovenian tongue would have been preferable to any foreign language. We will see what we can do about that in the years to come, although Slovenian apparently is a difficult language.

When we met on the airport in Washington, you asked me to find out if the scientists from the other republics might feel hurt if the cooperation is concentrated to the University of Ljubljana. I met colleagues from Belgrad and Zagreb with whom I could discuss this point. Naturally, they were disappointed when they heard last year that the Smithsonian had forced us to reduce our project so drastically that all work planned in their parts of the country was cut out, since they certainly are better aware of the botanical problems in their part of Europe than any of those who accepted to advise you on the first proposal, and also better than any botanists in America, we not excluded. However, they hoped that this would change in future years, when the project has become firmly established. When I asked them directly if they felt that the Ljubljana botanists were the right ones to represent Yugoslavia as a whole, they wondered if I were not aware of the fact that in the sciences in general and the life sciences in particular this University is far ahead of all other institutions of higher learning in their country. I think I may interpret this as to mean, that at least biologists from other parts of Yugoslavia do not feel disappointed if we cooperate mainly with Ljubljana, though they hope that our methods will also be allowed to reach their parts of the country, where many of the greatest botanical problems actually are situated.

As could be expected, most of our discussions centered around our plans for this year, and around the very drastic cuts made in the budget, first when Mr. Whitehead made his suggestions to me on the telephone and gave me only a week to submit a new, rather than revised, proposal, without any possibility to consult our Yugoslavian colleagues. Their suggestions in a direct letter to your office were apparently not observed, and so they were still more disturbed when they saw that the budget had been cut still more by your office, though they did not know that that was done without consulting us. I got the feeling that they were not only disappointed but also had thought that this might have been a device to get us out of the project or to make it impossible for either us or them to do what was originally planned. First when I had assured them, on basis of our short discussion in Washington, that nothing of this was intentional, that the drastic reductions in the budget were preliminary rather than final, and that the Smithsonian Institution was as sincere as we were in pursuing this project, did they show readiness to discuss the pertinent details.

On basis of their expert knowledge of the situation and of my newly gained experience, we agreed to propose the following changes in the budget, since if these small alterations are not made well before the project starts on July 1 this year, its success will be in jeopardy, and with it all later biological cooperation. The revised new budget is enclosed. The revisions from the last budget are based on the following considerations:

- 1) It was emphasized that instead of a laboratory technician and a graduate student from America, it would be advisable to bring three assistants, or one less than originally planned, thus making it possible for two to help in collecting when one would work in the laboratory in Ljubljana. After the delay last summer, it may not be possible to find these students except with longer search time than is available, but since both our Yugoslav colleagues emphasized the need for this, it would be unwise not to heed their advice.

- 2) Referring to page 9 in our proposal and the fact that American scientists are as unlikely to be ready to work without a salary as are diplomats and employees of the Smithsonian Institution, full salaries for the principal investigators must be restored in the budget, because our 9-month employment at the University of Colorado leaves us without salary for three summer months. This is, naturally, not a duplication of salary, as explained in the original and apparently unread explanation on p. 9. Because the project seems to be activated only July 1, two months instead of three are included this time.
- 3) When making the original plans, we based our estimations of daily costs on the assumption that we could live in camps like in Colorado. I have now seen that this is as impossible in Yugoslavia as in Italy, where we worked during the summer of 1963, and that it will be necessary to live and eat in hotels, which are expensive during summer time, and transport our shelters and field equipment between the daily stations selected, but work with the collected samples in the laboratory in Ljubljana. This makes it necessary and more reasonable to request per diems, and I am sure that all the American participants and especially the assistants would feel mistreated if in this matter they would be looked upon differently from employees of American institutions given per diem when working less strenuously abroad. As a matter of fact, travels by the Yugoslavian participants will also be based on per diems, though a lot is being saved because they can live at home when in Ljubljana. The sum given under II,3 is too low for this, and so it must be increased as in the new budget. Also, the reduction of mileage costs certainly was unwise and so has to be restored.
- 4) In the last budget, the number of trips from and to America was reduced. Although I still feel that this may be in order, our colleagues overseas would feel more confident if we still calculated with ten such trips for the summer and winter of the first year. This would make possible visits either way for consulting and writing also during other times of the year. It might also make it possible to invite one or two other colleagues for consultation during the summer, a matter mentioned by my Yugoslav collaborators, who seem to regard at least such a possibility as a highly recommendable one, though it is by no means certain that it will be utilized the first summer. But too high an estimate is certainly wiser than a too low one, and it is better to be able to save than to have to beg for an addition at an inappropriate time, or to have to cut short work because of lack of funds. I have not added per diems for this purpose, though your office may feel it wiser to do so now. The sum for transportation of books, etc., also must be restored to the original \$500, since the lower sum of \$100 is utterly meaningless.
- 5) We had reduced the participation of Professor Mayer from 3 to 2 months in the last budget. This is not acceptable to him, so I propose we reinstate the original figure.

- 6) The reduction of all Yugoslavian technical assistance down to only three months was very shocking to our colleagues, who are used to plenty of technical assistance rather than the utilization of the musclepower of experienced brainworkers as is characteristic of America. However, for the first year, they felt that one technical assistant for six months might suffice, and that is the time I include in my new budget. It would certainly be a gesture that the Yugoslavs would appreciate, if you changed this back to twelve months, though they did not request this.
- 7) We had estimated that the Zeiss camera microscope would cost \$5000, which is about half of the price in America. This was a close guess, missing only 10%, so I change the sum to \$5500 in the budget. This microscope must be ordered long ahead of time, but since that has been done, backed by guarantees from the University that trusts that the funds will become available through this grant, the microscope will be in the newly equipped laboratory before the beginning of July.
- 8) We had reduced laboratory and office rent to \$1000 without consulting the University authorities. This reduction is not acceptable to them, so I have doubled the sum. Also, we had reduced administrative costs, or overhead, to \$1000. They request \$2500 for this, though they are used to 20-30%, which is considerably lower than that of American Universities.
- 9) Since the indicated (and hopefully correct) starting date of July 1 is much too late for studies of many of the most interesting species of spring plants, which in these regions flower 2 - 3 months earlier, our Yugoslav colleagues agreed to begin their collections earlier in the summer and before we will arrive. I promised, however, to try to get your help so that we could arrive earlier, for instance by asking the PAA or TWA about the possibility to make out tickets even a month earlier than they can expect payment in Belgrad. In case the work the following year also has to be based on a budget starting July 1, I was asked to investigate the possibility that the cost of the first month, June 1972, be budgeted together with the cost for the summer 1971. In the hope that this is judged feasible by your committee, I have roughly estimated that cost to \$17,500 - \$20,000, without mentioning details, though I expect that at least some part of this sum may be saved from our present budget because I hope it is rather ~~then~~wide than too narrow. If this sum were granted this year with the understanding that it could only be used if a continuation of the grant is approved for the year 1972-1973, I know that my Yugoslav colleagues and the officials I met will be very satisfied, but it could also wait until later this year when we know more exactly the sum that might be needed after savings this summer.
- 10) It was agreed that every collection be made in duplicates, the original staying at the Herbarium in Ljubljana and the other specimen given to the Smithsonian Institution Herbarium.

- 11) The Institute of Biology of the University of Ljubljana will take care of the accounting for the Yugoslavian and joint part of the budget and help us also with the American part if needed. I am assured that the account will be kept separate and that it will be open to us for inspection at any time.
- 12) Cost of insurance or pension is not included in the budget because of our ignorance as to what may be involved and what the cost would be. Since at least insurance must be included, according to your explanations of the administration of foreign currency grants of July 1, 1969, we hope we are allowed to reserve our rights to bill this to your office in due time, in addition to what is in the present budget.

Two other matters that were discussed in Ljubljana ought to be mentioned here, because they indicate the great interest in this approach in Europe. Both Professor Sušnik and I myself have received requests from young scientists from both capitalist and socialist parts of Europe asking for the possibility of taking part in this project in order to learn about our methods and philosophy. On basis of this, the idea was born that we might build around this project a kind of a summerschool for modern taxonomy, including not only cytotaxonomy but also chemotaxonomy and taxometrics. Before my arrival, this had been mentioned to the four officials, Dr. Petrič, Dr. Rozman, Professor Guden, and Professor Valentičič, who all were extremely enthusiastic. More mature European scientists have long been looking for a possibility of setting up a series of advanced summer institutes or symposia in evolutionary biology, somewhat similar to the classical Cold Spring Harbor Symposia in the United States, where outstanding scientists from various countries could meet to discuss their ideas on evolution and prepare them for publication in an annual series. I know of no more appropriate place for such meetings than Yugoslavia, which keeps its feet in both major political ideologies and has fine facilities for such meetings in an ideal climate. I promised to mention this to you in the hope that you might give it the same enthusiastic support as did Dr. Petrič, the Minister of Science and Education, who even volunteered to give a lecture at such a symposium to explain the Yugoslavian way of life.

I am aware of that ours is the first biological project to be accepted by the Yugoslavs and that delays and misunderstandings had greatly reduced their belief in American sincerity, especially since much more expensive projects of less Yugoslavian interest had been mentioned during the time when funds were said to be too limited for this important work. I think I succeeded in convincing all those concerned, at governmental as well as university levels, that these mistakes were unintentional and caused by factors beyond your control, and I saw their enthusiasm increase with every new day of my visit. Therefore, it is extremely important that everything possible is done to secure the greatest possible success of this project, because on it may rest the possibilities for cooperation also in other fields. In this connection I would like to mention one of the preliminary projects that were mentioned during my visit, the one on marine biology. The Yugoslavs, as some other small nations, feel that this field and also oceanography have been strongly supported by the navies of those nations that spend much of their funds for defence; therefore, they are afraid

that if the Americans are allowed to study marine biology in the Adriatic Sea, the Russians soon will have to be given the same permission. However, my colleagues, who are aware of the scientific and practical merit of such investigations, are very likely to be willing to widen the scope of the present project with some kind of a rider that would allow exactly the same kind of work to be carried out, so that the studies of the cytotaxonomy of the Yugoslavian flora could include basic investigations of the taxonomy and distribution of the living beings of the Adriatic Sea. Scientific diplomacy might, thus, help to avoid political suspicion and make possible research for research's sake in the critical field mentioned.

I hope that when you study the enclosed budget you will agree that the increase is small and reasonable and likely to ensure the success of our project already during its first year. I realize that you may not be able to formally accept its changes at once, but hope that all such formalities that are needed before we can even begin to look for our new assistants can be completed so early during the winter months that all our plans can be started promptly and without too much delay. And that there will be nothing preventing that the work start for full power not later than July 1, 1971, as planned. If you need further explanations of any details, I hope you will not hesitate to contact me, either by letter or by telephone, or both.

I am sending a copy of this letter to Professor Sušnik, since all the details and also the budget were discussed with him in Ljubljana. I am sure he will show it to the others concerned.

I enclose the travel voucher for my recent trip, and hope you will find it to be in order.

With the very best regards,

Yours sincerely,

Åskell Löve



EMBASSY OF THE SOCIALIST FEDERAL REPUBLIC OF YUGOSLAVIA
2410 CALIFORNIA STREET, N. W. WASHINGTON, D. C. 20008 462-6566

17. mart 1972.

Dr. Franc Sušnik
Direktor
Institut za biologiju
Aškerčeva 12

Ljubljana

Poštovani dr. Sušnik,

Dr. Schmerz, koji vodi spoljne poslove u Smithsonianu, zamolio me je da Vam prenesem jednu informaciju delikatne prirode.

Radi se o projektu "Cytotaxonomy of Yugoslav Flora". Jednogodišnji rad dr. Asker Lövea na tom projektu dobio je lošu, neprolaznu ocenu. Zbog toga će Smithsonian ovu drugu godinu da finansira u visini prve (40. - 50.000 dolara). To je, takodje, poslednja godina za dr. Lövea, jer se neće saglasiti da on i dalje nastavi da radi na tome. Pošto dr. Lövea smatraju upornim, očekuju da njegovo uklanjanje neće proći bez trenja.

Na Vaš rad nemaju primedbi. Smatraju da je problema - tika interesantna i željeli bi da je nastave sa nekim drugim, boljim američkim naučnikom. Vi možete razmišljati ko bi mogao drugi da dodje u obzir, pa kad se stvar raščisti sa Lovéom, nastaviti sa drugim.

Sa drugarskim poštovanjem,

M. Mladjenović

dr. Milorad Mladjenović
Savetnik za nauku

St.: *JR Milorad Mladjenović*
Scientific Attache

Dear Dr. Sušnik

Dr. Schmertz, Director of Office of International Activities in Smithsonian asked me to transmit to you an information of a very delicate nature.

The matter in question is the project "Cytotaxonomy of Yugoslave Flora". One year's work of Dr. Löve on this project has been evaluated with a bad, insufficient recommendation. Therefore the Smithsonian has decided to finance this second year in the same amount as he did it the first one /40.-50.000 dollars/. This would be also the last year for Dr. Löve, because they will not agree with Dr. Löve continuing this work. But Dr. Löve is known as a very persistent man, so they expect that his removal will not pass without any difficulty.

They have no remarks on your work. Considering that the problems are interesting, they would like to continue this work with another, a better american scientist. You can think over about another american scientist, who would be capable for this work, and then, after the problem with Dr. Löve has been solved, continue the work with him.

REF.:

Ljubljana, July 31, 1971.

Express

Mrs. Betty J. Wingfield,
Foreign Currency Program,
Office of International Activities,
Smithsonian Institution,
Washington, D. C. 20560, U.S.A.

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Dear Mrs. Wingfield:

When I spoke to you on the phone about two months ago, you told me that I ought to write to you and ask for that the \$250 that were left for excess baggage after you had authorized the Pan Am to make the first \$250 worth available to us should be authorized, so that we could use the sum when we return late in August. I do still not know exactly how much our excess weight will be, and not if we will be able to send some of it by freight, but when I discussed this matter with the JAT office here yesterday, they advised me to ask for authorization for excess baggage, which they then would be able to change into freight, if advisable, though they doubted that our herbarium material and books would be as safe that way. Therefore, I would appreciate if you could send this authorization as soon as possible through the channels that are appropriate, so that everything will be in order before we leave.

The University authorities here are somewhat astonished to hear from me that I have not yet heard from Mr. Schmertz regarding my letter to him from July 12, but I hope I am right in blaming summer heat and vacation time for the delay.

All the best regards to you all,
Sincerely,

An Interim Report and Proposal to the
Smithsonian Institution
for

RESEARCH SUPPORT IN YUGOSLAVIA UNDER THE FOREIGN CURRENCY PROGRAM

Name and Address of Institution: The Regents of the
University of Colorado
Boulder, Colorado 80302

Title of Research: Cooperative Studies on the Cytotaxonomy of the
Yugoslavian Flora

American Principal Investigators: Áskell Löve, Professor
Doris Löve, Research Associate
Department of Environmental, Population
and Organismic Biology
University of Colorado
Boulder, Colorado 80302, U.S.A.

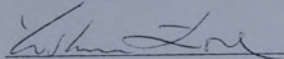
Yugoslavian Principal Investigators: Franc Sušnik, Professor
Ernest Mayer, Professor
Institute of Biology
University of Ljubljana
Ljubljana, Yugoslavia

Starting Date: June 1, 1972

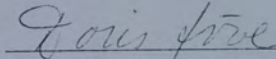
Estimated Duration of Project: Five years

Amount Requested for the Second Year: \$108,370

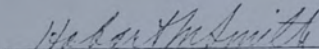
Amount for Three Following Years: Approximately \$300,000

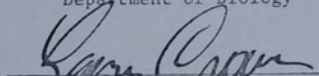


Áskell Löve
Principal Investigator



Doris Löve
Principal Investigator


Hobart Smith, Chairman
Department of Biology


Lawson Crowe, Provost and
Vice President for Research

If a Smithsonian Foreign Currency Program grant is awarded for the conduct of the research described in the attached proposal, it is hereby requested that an advance payment, as set forth in the project budget, also be authorized to begin carrying out the work, since this institution is a non-profit institution without working capital to initiate research. Moreover, to employ dollar funds to begin this work would be contrary to the President's directives to avoid expenditures abroad which might contribute to the U.S. balance of payments deficit.

A. Report of Activities for the First Season: Summer 1971

As the first step in the study of the cytotaxonomy of the remarkable flora of Yugoslavia, it was proposed that extensive studies be made towards an evolutionary-ecological synthesis of the history of the alpine vegetation of this region, beginning with cytotaxonomical studies of as many as possible of the species of higher plants in the Julian Alps. Our Yugoslavian colleagues were, however, of the opinion that such a review of the entire flora of Slovenia as a whole would be more appropriate. The flora of this part of Europe, and especially the alpine regions, is known to be rich in endemic species, whereas it seems to be typical of various regions of Slovenia that related taxa integrate or mix in zones where the nemoral flora of western Europe meets the Mediterranean vegetation. The work was planned as a cooperative effort between a team of cytotaxonomists from the University of Colorado and a group of cytologists, taxonomists, ecologists, and technicians from the University of Ljubljana, centering at the Institute of Biology and the Botanical Garden.

Due to various circumstances, the American team could not be in the field for more than two months this first summer (1971), but during that time extensive work on orientation, collecting, and microscoping, as well as library and writing work, was carried on every day, including weekends. Although the work could be grouped in various other ways, we find it easiest to report about it under the following headings:

1. A Review of the Flora of Slovenia and the Alps

In order to acquaint the five members of the American team with the details of and problems in the Slovenian flora, the Yugoslavian team had planned travel to areas of various kinds during the first four weeks of our stay, combined and interspersed with extensive collection of living material for further study in the Botanical Garden. These travels took the group all over Slovenia, though they concentrated mainly on the alpine regions. Material brought to the Botanical Garden in Ljubljana and the Juliana Botanical Garden in the Julian Alps included all the endemic species of the eastern Alps in the widest sense. Also, a good proportion of the non-endemic alpine flora of the Julian Alps, Kamnian Alps, the Karavanken, and Trnovski Gozd was brought under cultivation for further study, in addition to selected material from other regions for comparison. The American team became thoroughly acquainted with the about eighty endemic species of this area,

and also with the numerous endemic subspecies, varieties, forms, and demes, and with the flora as a whole, which the two American Principal Investigators knew previously as belonging to the western European nemoral flora.

During our travels, numerous problems to be studied through this cooperative effort were discussed in detail with the Yugoslavian botanists. Based on these discussions, the four senior scientists, Áskell Löve, Doris Löve, Ernest Mayer, and Franc Sušnik, compiled a report which reviews the problems from various points of view and describes the evolutionary background for the planned work. It is hoped that this paper will be printed this winter in a Yugoslavian journal.

For the latter part of the summer, the team was joined by the Norwegian cytotaxonomist and specialist on alpine flora, Dr. Gunvor Knaben of Oslo, who has studied similar problems in Scandinavia and Alaska for many years. She spent considerable time in the Julian Alps together with her Norwegian assistant and one of the skilled Slovenian students, concentrating mainly on studies of critical groups of the large genus Saxifraga. All the cost for her stay and travels and those of her assistant were paid by a special grant from the Norwegian Research Council, but she shared our laboratory without compensation.

In connection with the survey of the flora, the American Principal Investigators and one of their assistants compiled a critical checklist of the entire Slovenian flora, which comprises about 2,900 species, and prepared it for computerization. This list also includes information on previously determined chromosome numbers and the distribution of each taxon within Slovenia. The list is being circulated within the entire group of researchers in the cooperative team as a computer printout, will be made available to others as soon as it has been completed, and will serve the group as a basis for selection of critical groups for study during the years to come. Our Yugoslav colleagues feel that its publication would be useful for several other groups of scientists inside and outside Yugoslavia, so we plan to print it in some Slovenian publication series during the winter or next summer. Although about 60-70 percent of the species seem to have been cytologically studied from elsewhere in Europe, less than 5 percent of the taxa have been determined from Slovenia itself, and most of the critical groups remain cytologically unknown.

2. Cytotaxonomical Work

As mentioned above, considerable collections were brought to the Botanical Gardens during the summer, both from the trips of the entire group and from

numerous individual trips when both teams split up into smaller expeditions. All this material was potted in the Gardens and much of it has already been fixed for cytological study, at the same time that duplicate vouchers were carefully produced for more detailed identification later. Considerable numbers of cytological preparations had already been studied before the American team returned home at the end of August, and the rest will be worked out during the winter months. The numbers for 115 species, representing eighty genera and 38 families, have already been submitted for printing in November in the journal Taxon. These include some of the more remarkable endemics, whereas most of the endemics of the Julian Alps, the Karavanken, the Kamnian Alps, and Trnovski Gozd will be studied more closely during the winter, together with some selected taxa of special interest.

3. The Endemics

In addition to field observations of the endemics and studies of their chromosome numbers, we tried to make a complete taxonomical review of all the Slovenian endemics, and studied them morphologically and chorologically in great detail. A thorough study of their distribution, including mapping, is being made by Ernest Mayer. These studies are being coordinated with similar studies in the central and western Alps by Professor Cl. Favarger and his students in Neuchatel in Switzerland, the foremost specialist on the cytotaxonomy of the Alpine flora, and with studies of endemics and alpine plants from Spain and Italy performed but not yet published by Áskell and Doris Löve and on alpine plants from the arctic regions of Atlantic Europe by the American Principal Investigators and Dr. Gunvor Knaben. Although all the Slovenian endemics were under study already this first season, special attention was given the following complexes and taxa, which may serve as examples.

a. Iris cengialti Ambr. and I. illyrica Tommas. These are taxa of the eastern Alps and of the coastal mountains of the northern Adriatic. Although morphologically and geographically distinct, these species have been known to cross and give rise to apparently fertile hybrids, and on the basis of morphology some botanists in the past have regarded them as races only of the much more widespread southeast European Iris pallida Lam. Our chromosome studies do not contradict this conclusion, since all these taxa are characterized by the same number ($2n = 24$) and at least very similar morphology of chromosomes. However, a more detailed study of

already available artificial hybrids will be performed before a final conclusion is reached, although the present evidence seems to be in favor of regarding them only as minor geographical races, or varieties, of a single species.

b. Aconitum angustifolium Bernh. This taxon of the eastern Alps has recently (by Tutin in the Flora Europaea) been regarded as a doubtful variation, which some others have even thought of as a possible hybrid between A. variegatum L. and A. compactum Rchb. Our studies showed it to be a hexaploid, which is possibly derived from the diploid and tetraploid species just mentioned. No further investigation is needed for its acceptance as a good endemic species, although more work has to be done before its mode of evolution can be ascertained.

c. Papaver julicum Mayer and Merxmüller. Our studies of the cytology of this taxon have confirmed that it is a diploid belonging to the diploid complex P. alpinum L., most closely related to its ssp. sendtneri (Kerner) Schinz and Keller. Our preliminary observations seem to indicate that its correct evolutionary status may be as a variety of this major race, but hybridization experiments may be required before that question can be definitely settled.

d. Pastinaca fleischmannii Hladnik. This taxon was discovered on the slopes of Castle Mountain in Ljubljana more than 150 years ago and brought into the Botanical Garden. There it survives thanks to help from the gardeners, but it is extinct on the mountain. We have found it to be cytologically identical with P. sativa, of which it is apparently a one-gene mutation, so it is most correctly regarded as a genetically deviating deme or local population of interest mainly as the lowest observable level of endemism.

e. Hladnikia pastinacifolia Rchb. This umbelliferous genus is one of the most distinct endemics in Europe, met with only near the eastern and western borders of the Trnovski Gozd, which is the southernmost part of the Slovenian Alps in the karst region. We studied it from various points of view with Professor Sušnik and are working on a comprehensive report of the cytotaxonomical, chemotaxonomical, morphological, ecological, and chorological characteristics of this monotypic genus. These studies seem to confirm earlier opinions that this is a relic paleoendemic of such a distinction that even our detailed methods are not able to reveal its relationship to any other genus of the family anywhere in the world.

f. Gentiana froelichii Jan. The American Principal Investigators have long been working on the reclassification of the collective genus Gentiana, a work in which they have cooperated with Swedish and Japanese specialists. Ernest Mayer of the Slovenian team has also been interested in the subdivision of this taxon into more natural genera, on morphological and chorological grounds. Through his help and that of our other Yugoslav colleagues we became well acquainted with several of the groups represented in Yugoslavia. Our attention was especially directed towards the beautiful high-alpine species which were thought to be related to taxa in the Himalayas and other southern mountains. Of these species we became especially interested in G. froelichii, which is known only from two small areas in the easternmost Alps and in the eastern Italian Alps. Although it remains somewhat like the small species of the Frigida group of southern Eurasiatic mountains, it differs from all its species in several respects, so specialists have been inclined to distinguish it in a section of its own. We were already acquainted with many of the other species, but the distinction of this taxon struck us at once, and when we could add the observation that it is a hexaploid with distinct chromosome morphology and the basic number $x = 7$, which is rare in the Gentianaceae, we drew the conclusion that it would be more correctly treated as a genus of its own, monotypic and endemic without closer relatives, perhaps the most distinct genus ever separated from Gentiana s. lat. We are still working on this problem, but expect to be able to publish the description of the new genus later this winter in a paper by Á. Löve and E. Mayer.

We hope to collect considerably more material on these and all the other endemics for further investigation next summer, although it may require several years to find a satisfactory solution of the complex cytotaxonomical problems of this interesting group. It is our hope that these studies may carry us one step closer to an understanding of the evolutionary problems of endemism. It is evident already at this stage, however, that polyploidy is no more a factor in the evolution of such plants than it is in that of other species in the same flora, since we find its frequency to be the same within this group and in the entire flora of the eastern Alps, an observation also made by us within other regions which we have had an opportunity to investigate. However, we found some indications that special pollination mechanisms may play a role in the evolution of these alpine endemics, though some other factors are apparently also effective in their isolation and survival, and we are in no doubt that the solution

may be different for more recent endemics within the species and the old and very distinct paleoendemics of the type of, for example, Hladnikia and Gentiana froelichii.

4. Polyploidy

The ecological composition of the alpine flora of Slovenia is well known, and detailed phytosociological levies are available from various areas of climatical and ecological variability, especially in the Julian Alps and the caves and deep grooves or "dolinas" of the karst region. Combining such studies with investigations on the frequency of polyploids with the aid of computer techniques may be expected to result in the detection of stress areas which may be of some importance for the understanding of phenomena of selection that could have affected the evolution of endemics, at the same time as this may perhaps help the understanding of several other ecological phenomena. One of our researchers, William Reid, did considerable work in this field during the summer, together with Slovenian colleagues. He has already started to work out a computer program for this material, which he wants to complement next summer, and we expect that he will be able to present the results as his Ph.D. thesis during the winter of 1972-73.

The chromosome checklist mentioned above is composed in such a way that it will be easy to use it, with the aid of the computer, to compare the frequency of polyploids within the phytogeographic areas into which the Slovenian botanists have divided their country. This may be preliminarily completed during this winter, although it will hardly be ripe for publication until later, when still more material becomes available. Also, the checklist will be useful as a basis for other studies on the frequency of polyploids, including studies at different altitudes, in order to check some hypotheses and discrepancies between northern and southern regions previously studied from these points of view.

We started studies on some polyploid complexes, especially within the fern genera Ceterach and Pteridium, but also from other groups, like Acetosella, Dactylis, Dactylorhiza (of which our group discovered a new species for Slovenia), Leucanthemum, and several others, all of which are represented by at least two ploidy levels in this area. Some of these studies are already so close to completion that we have drafted papers describing the results, whereas others will be studied more closely during the following seasons, and still others are planned for use by Slovenian students for their thesis work.

5. Scopolia

It is the very legitimate wish of the Yugoslavian team that the results obtained be published in Yugoslavian journals as far as possible, and for this purpose \$1,000 were budgeted for the first year. The only Slovenian publication available for such a purpose is Bioloski Vestnik, which at irregular intervals publishes papers on various biological subjects but has a very small circulation in botanical fields and outside Yugoslavia. The same is true for other Yugoslavian local journals, which we nevertheless plan to use for printing some of our results. After considerable discussion, the conclusion was reached that a national botanical journal with international scope specializing in evolutionary botany, including taxonomy and phytogeography, would be highly desirable. It was decided by University of Ljubljana authorities to start such a journal early in 1972, mainly with the aid of funds from the University and from other available Yugoslavian sources. The name chosen for this journal is Scopolia, in honor of the classical Slovenian botanist Scopoli, who in 1772 published the very important and still classic Flora Carniolica, the first manual of the plants of any part of present Yugoslavia. Editors from Ljubljana have already been selected and a list made of five foreign and five Yugoslavian members of an editorial board, and twenty-five foreign collaborators, to insure the quality of the journal from the beginning. This coming year, instead of supporting directly the printing of individual papers from our program with the certainly insufficient sum of \$1,000 budgeted, it is our opinion that it would be more appropriate to use this sum as direct support for the journal, properly acknowledged on the title page of each volume, and then print most of the papers there without direct individual support. The approval of the Smithsonian Institution Foreign Currency Program is hereby sought for this use of the funds set aside for publication costs.

6. Summary

The first summer of the cooperative study of the cytotaxonomy of the Yugoslavian flora was, by necessity, used mainly for orientation on the problems to be investigated, and then almost exclusively within Slovenia and primarily in the Slovenian mountains, which are the easternmost parts of the Alps. On the basis of this review, it was decided that although the first objective of this cooperative effort still must remain the study of the Yugoslavian flora as a whole, with the main concentration during the first five years on the well-known flora of Slovenia, this opportunity should also

be used for a concerted attack on the evolutionary problem of endemism, because nowhere else are there so many endemic taxa at all levels. In addition to this orientation, the following results were obtained during the first summer:

a. A critical checklist of the Slovenian flora, including detailed information on chromosome numbers and distribution of all the taxa, was compiled by Á. and D. Löve and L. Kaersvang. It will be completed and computerized during the fall and, hopefully, printed in the spring or summer.

b. Numerous samples of several hundred species were collected and transplanted to the Botanical Gardens for further cytological and taxonomical study. Among these were living and herbarium material of all the endemic species of the Julian Alps, Trnovski Gozd, Kamnian Alps, and the Karavanken. Some of these studies are already nearing completion, and papers reporting the results will probably be completed this winter.

c. In connection with the compilation of the chromosome checklist, detailed studies are being made on the frequency of polyploids within the flora of Slovenia as a whole and also within each of its distinct phyto-geographical regions. In addition, one of the American researchers has selected as his thesis subject a computer study of environmental stress as observable from combined studies of phytosociological levies and polyploidy from the alpine regions to the lowlands and from karst caves and deep grooves.

d. As an indirect result of the cooperative effort, the University of Ljubljana has decided to start a new national botanical journal of international scope, named Scopolia after the first author of a Slovenian flora. This journal will be an appropriate place for publication of most of the papers that derive from this cooperative study.

e. The members of the cooperative group spent some time during the summer in preparing several papers, which will hopefully be completed during the winter. The following are the preliminary titles of these:

Chromosome atlas of Slovenian plant species (Á. and D. Löve, L. Kaersvang).

A new genus of Gentianaceae (Á. Löve and E. Mayer).

Chromosome numbers of 115 Yugoslavian plant species (M. Lovka, F. Sušnik, Á. and D. Löve, to be published in IOPB Chromosome Number Reports 34, Taxon, November, 1971).

Cytotaxonomy of Yugoslavian plants. I. Introductory remarks
(Á. and D. Löve, E. Mayer, and F. Sušnik).

Polyploidy in the Slovenian flora (Á. and D. Löve).

Cytotaxonomy and chemotaxonomy of the paleoendemit Hladnikia
pastinacifolia (F. Sušnik and Á. Löve).

Cytotaxonomy and distribution of diploid and tetraploid Ceterach.
(M. Lovka, F. Sušnik, and Á. Löve).

Some chromosome numbers of eastern Alpine endemics (Á. and D. Löve,
M. Lovka, and F. Sušnik).

The significance of Pastinaca fleischmannii (F. Sušnik and Á. Löve).

Five to eight papers in the series: Cytotaxonomy of Yugoslavian plants
(Á. and D. Löve, M. Lovka, and F. Sušnik).

Naturally, support from the Smithsonian Institution will be appropriately
acknowledged in these papers, reprints of which will be sent to the Office
of International Activities as soon as available.

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B. Plan for the Second Year (1972-1973)

Based on our experience during the first summer, we would like to propose the following plan for the second summer and academic year:

1) Intensified and organized collection of Slovenian plants with an emphasis on the alpine species, the endemics, and species not previously counted from elsewhere. These collections ought to be made by smaller groups rather than by the entire cooperative team, concentrating on the flora of preselected areas, and they must be connected with observations of various environmental factors that may be of importance for the understanding of cytotaxonomical observations. Whenever a collection is being made, at least two identical voucher specimens must be collected for the herbaria, and several individuals will be transplanted to pots in the Botanical Garden in Ljubljana and to the Juliana Botanical Garden in the Julian Alps. As far as possible, chromosome studies will be performed on this material during the summer, but other specimens will be fixed for later observation.

2) Special attention should be given the alpine endemics, of which much more material must be collected from various parts of their limited ranges.

It is important that these populations be evaluated exactly from the point of view of their possible evolution, and for that purpose different approaches and methods will have to be employed. For the morphological and chorological part of this study, Professor E. Mayer's taxonomical skill and knowledge of the distribution of the Slovenian plants will be extremely important, and so will the ecological knowledge of the ecologists Micevski and Sopova. As far as possible, observations on pollination mechanisms will be made both in the field and in the garden, and crossing experiments performed whenever feasible.

3) Material should be collected from some critical species from the lowland and coastland which either seem to hybridize easily or have been observed to pass successively into each other within ecological and geographical transition zones in this region. Although cytological examinations of the original collections may sometimes give a clue to an explanation of such observations, it is expected that combined morphological and cytological observations employing some of Anderson's hybrid index methods may be better for this study, as are probably also cultivation experiments and hybridization studies in the garden.

4) We still believe that our work should be concentrated upon the Slovenian flora, with a special emphasis on its endemics. However, our

colleagues in Ljubljana are of the opinion, which we share, that it is important for the understanding of many of the Slovenian problems to have a thorough knowledge not only of the nemoral European flora, but also of the flora of other parts of Yugoslavia, thus remembering Kipling's words: "What should they know of England, who only England know?" Therefore, our colleagues want to make a botanical orientation excursion with us throughout Yugoslavia for two to three weeks of the early summer, during which extensive collections will be sent back to Ljubljana for later study. The excursion, which is being planned in detail by Professor E. Mayer, will also bring the group in direct contact with the botanists of other republics of Yugoslavia, many of whom have expressed their wish to be allowed to take an active part in the work and to learn our techniques during this second season, in the hope that such an approach can be shared also by them when our Slovenian review has advanced further.

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BUDGET FOR SECOND YEAR

I. International travel and transportation

1. Airfare, 9 round trips Denver-Ljubljana @ \$1,100	\$ 9,900
2. Airfare, one round trip for Danish consultant Copenhagen-Ljubljana @ \$300	300
3. Excess baggage or air-freight for books, equipment, etc.	<u>500</u>
Subtotal (I)	\$10,700

II. Expenditures in Yugoslavia

A. For American participants

1. Salaries and wages	
a. Áskell Løve, Principal Investigator, 3 mos. @ \$2,060	6,180
b. Doris Løve, Research Associate 3 mos. @ \$1,800	5,400
c. Four Research Biologists, 3 mos. each, @ \$900 per month	10,800
d. Danish Consultant, one month @ \$2,200	<u>2,200</u>
2. Per diem, 570 man-days @ \$17	9,690
3. Mileage and car rental	5,000
4. Office rent for two American investigators 3 months	1,000
5. Books, xeroxing, reprints, etc.	<u>800</u>
Subtotal (II-A)	\$41,070

6. Medical and other insurance required by the University authorities: Sum and conditions unknown to Principal Investigators, but authorization requested for the American Embassy in Belgrad for negotiation.

B. For Yugoslavian participants

1. Salaries and wages	
a. Franc Sušnik, Principal Investigator, 5 mos. @ \$600	3,000
b. Ernest Mayer, Principal Investigator, 3 months @ \$600	1,800
c. K. Micevski, ecologist-taxonomist, 1 month @ \$600	600

d.	M. Sopova, ecologist-taxonomist, 1 month @ \$600	600
e.	Two other botanists, 2 months each @ \$500	2,000
f.	Special assistant, 12 months, @ \$300	3,600
g.	Technical assistant, 12 months @ \$300	3,600
h.	Gardener, 12 mos. @ \$400	4,800
i.	Local labor	3,000
2.	Local travel (mileage and car-rental)	4,000
3.	Field maintenance and per diem	<u>4,000</u>
	Subtotal (II-B)	\$31,000
C. For cooperative efforts		
1.	Orientation excursion through Yugoslavia	1,000
2.	Non-expendable equipment	
a.	Stereomicroscope	800
b.	Zeiss camera microscope (Total cost, \$6,000; 50% to be borne by Univ. of Ljubljana.)	3,000
c.	Combi or Landrover (Total cost, \$5,000; 50% to be borne by Univ. of Ljubljana.)	2,500
d.	Experimental garden in Mediterranean area	1,500
e.	Experimental garden in Alpine area	1,000
f.	Greenhouse with growth-chamber (Total cost, \$5,000; 50% to be borne by Univ. of Ljubljana.)	2,500
g.	Photo equipment	1,000
h.	Gardening and herbarium equipment	1,000
3.	Expendable supplies	
a.	Laboratory supplies	1,300
b.	Photographic and other supplies	500
4.	Laboratory and office rent	4,000
5.	Publication costs	2,000
6.	Administrative costs	<u>3,500</u>
	Subtotal (II-C)	\$25,600

Second Year Total: \$108,370

BUDGET NOTES

The budget for the second year is based upon our experience during the summer of 1971, with slight increases caused by the devaluation of the dollar and expected inflation in Yugoslavia. If these two changes become substantially greater during the winter and spring, we trust that the officers of the Smithsonian Foreign Currency Program and the American Embassy in Belgrad will be able and willing to make an appropriate correction of the budget before the final dollar sum is fixed. The budget is calculated as carefully and exactly as possible, and is based on what we believe are minimum needs for maximum efficiency, so we hope it will not be drastically reduced without proper consultation, since we believe that such action curtailed our activities last summer and forced us and our assistants to supplement our per diem and travel costs unduly much out of our salaries.

Most of the increase as compared with last year's budget is caused by a one-third increase in time to be spent in the field, a necessary increase in participation by senior scientists and assistants, and by slight but normal salary increases. Also, by the beginning of the project the cost of international travel had already increased from the budgeted \$820 per person to \$930 per person, thus eliminating the possibility of overseas travel for one American investigator this winter for consultation during the writing up of our results, or for one Yugoslav coming to America for the same purpose. This time our estimate of the possible increase in airfare is hopefully not too low, but the correct price will not be exactly known until next winter.

We would like especially to explain the following items:

I,2; II,A, 1 and 2: Danish consultant. These items include the cost of bringing Professor Tyge W. Böcher from Copenhagen to Yugoslavia as a consultant on various problems and on techniques which he has employed for many years in investigations that include numerous Mediterranean and arctic and alpine plants. Such consultation is highly recommended also by our Yugoslav colleagues, and it is likely to be of great help in organizing our cultivation experiments and in the discussion of the results obtained.

II,A, 2: Per diem. In our revised budget of January 28, 1971, which was based on discussions a few weeks earlier with the authorities in Ljubljana, we calculated per diem on the basis of \$17 per day as given in the information packet on Yugoslavia. Although we had mentioned that even this might be too low for Slovenia, this was reduced to \$12 per day, with the explanation (by telephone) that this had to be done, partly because of lack of funds

but mainly because Slovenia was said to be less expensive than Belgrad and Serbia. We had no way of protesting this, but during the summer we confirmed the fact that, since Slovenia is considerably more developed than other parts of the country, it is also more expensive for travelling and living. The reduction in per diem forced us and our assistants to pay out of our own pockets whenever we needed accommodations outside our base in Ljubljana, and it also made it mandatory that we make our own meals almost every day, thus spending valuable time that otherwise could have been used for research work. This year we are again calculating per diem at the rate of \$17 per day, and trust it will not be reduced, though we would expect it to be more realistic, after the devaluation of the dollar and the 15-20 percent annual inflation in Yugoslavia, if the per diem were raised to \$20-25, especially for cases that require both a base station and wide travels to other regions.

II,A,3: Mileage and car rental. After a visit to Ljubljana in January 1971, Á. Löve was aware of that even the estimated sum of \$3,000 for mileage and car rental would be insufficient for efficient work by two Principal Investigators and three other researchers, since the car rental in Yugoslavia is fully as expensive as it is elsewhere. However, this already low estimate was cut to \$1,800, thus jeopardizing the collecting work which is the most basic part of our project, since this sum would have been sufficient only for the hiring of a small car for only part of the time. Fortunately, the University of Ljubljana lent our team two cars from its limited carpool, at a considerable sacrifice, in order to make our collecting trips possible, but we were expressly told when we left that this could not be done another year.

Our plans for a slightly larger group next summer make it necessary to increase the sum available for mileage and car rental. If our estimate of \$5,000 for this purpose proves to be too low, we will be able to switch parts of our efforts to other parts of the program, and, if it is too high, the remaining sum will, naturally, revert to Embassy funds. The lower sum for the Yugoslav participants is possible and reasonable because they are able to use their own cars for part of the time, without paying exorbitant sums for car rental, sums that include daily mileage requirements that are almost sufficient to carry one throughout Yugoslavia.

II,A,4: Office rent for two American Principal Investigators. The laboratory space rented from the University of Ljubljana for this project is sufficient for the laboratory work and as a place for the assistants we

had last summer, but it is not sufficient for the work of the Principal Investigators. We know of available and appropriate office space not far from the Botanical Garden that could be rented last summer for 4,500 ND per month, so we expect it to be available for three months next summer for the equivalent of \$1,000. If rented for this purpose, it will greatly facilitate the investigations, calculations, and writing by the two Principal Investigators, who otherwise will have to be crowded into space not appropriate for this kind of work.

II,A,6: Insurance coverage. When we arrived in Ljubljana last June, the University authorities told us that it would be desirable that all the American participants be insured under the national medical plan, in order to prevent hardship to the University in case of sickness or injury. Professor Susnik contacted the American Embassy personally for information about this, and was told that the American Principal Investigators ought to write to Mr. Schmertz to ask for such an authorization for the Embassy. This was done, but the letter was probably lost in the mail, since no answer ever arrived; the same happened to another letter written later about another need and mentioning the former letter. We could not get information about the sum involved, but we understand the concern of the University, because one accidental death and one case of serious illness hit other foreign colleagues in this area last summer. Therefore, we urge that this matter be taken up specially with the Embassy and solved to the satisfaction of the University before the beginning of the next season.

II,B,1: Salaries and wages of Yugoslav participants. Adjustment of the salaries of the two Yugoslav Principal Investigators is self-explanatory.

After the success of the restricted beginning, the Yugoslavs want to increase their participation to a degree more comparable to what was originally planned in the proposal of 1969. Therefore, we ask that two senior scientists, the ecologist-taxonomists K. Micevski and M. Sopova, be added to the team for one month. Their qualifications are beyond dispute, although we have not been able to get copies of their vitae so far.

The Slovenian Principal Investigators also find it highly commendable that we include two other botanists from Slovenia to participate actively in the work for two months. Since the selection of the most appropriate persons apparently takes longer than expected and has to be left to local botanists and the Yugoslav Principal Investigators, we propose that the inclusion of this item in the budget be accepted, in the belief that only well-qualified botanists will be proposed and agreed upon by the team.

One special assistant on a whole-year salary has been added to the Yugoslav group. This is our most qualified assistant, whom we want to employ as a full-time microscopist-cytotaxonomist. In addition to local labor, which we found to be insufficient in itself for taking care of the plants, we ask for a full-time gardener (a position included in the original proposal), in the hope that he will be able to keep the death of the transplanted plants at a minimum and their growth and flowering at a maximum.

II,C,1: Orientation excursion. A new item is added for an orientation excursion through Yugoslavia for the principal participants, during which other centers of botanical activities will be visited and studies and collections made of critical species from other regions of interest. This trip is being organized and planned by Ernest Mayer, who is an outstanding specialist on the taxonomy and distribution of the flora of the entire country.

II,C,2: Non-expendable equipment. Last year a stereomicroscope, valued at \$600, was left out of the budget. This influenced negatively some of our identification work this last summer, so the item is again included in the present budget, but at a higher price for inevitable reasons.

The Zeiss camera microscope will be needed to meet the requirements of so large a research group.

The Combi or Landrover was requested in the original proposal by the Yugoslavian team. We are requesting this auto again because of our need for a vehicle to be used exclusively by our research group.

Since Ljubljana is a warm city during the summer months, it is difficult to keep alive and growing some of the delicate alpine plants that we could not study at the Juliana Botanical Garden in the Julian Alps. Therefore, we feel it is necessary to add a greenhouse with a growth-chamber to the facilities at the Botanical Garden in Ljubljana. We have seen such chambers that were built in Yugoslavia and feel confident that the sum of \$5,000 will be sufficient for appropriate growth-chambers for our needs.

The University of Ljubljana will contribute one-half of the total costs of the above three items. Therefore, only the amounts shown are requested here.

The experimental gardens are needed to complement the experimental gardens in Ljubljana, where the climate is not always suitable for the comparative experiments planned.

II,C,4: Laboratory and office rent. This item must be increased because more space is needed for the junior researchers during the summer and coming winter because of their increased number. Other members of the team also use the laboratories, but the Yugoslav senior members use their own offices and the herbarium for much of their laboratory work on the project.

II,C,5: Publication costs. This amount is double that requested last year, because we expect that considerably more results will need to be printed the second year, if all goes as well as it has hitherto. This cost will likely be used as direct support for the journal Scopolia in its second year, since most of our papers will be printed in its pages.

September 25, 1972.

An Interim Report to the Smithsonian Institution

for

RESEARCH SUPPORT IN YUGOSLAVIA UNDER THE FOREIGN CURRENCY PROGRAM

Name and Address of Institution: The Regents of the
University of Colorado
Boulder, Colorado 80302

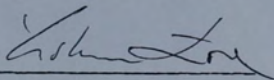
Title of Research: Cooperative Studies on the Cytotaxonomy of the
Yugoslavian Flora

American Principal Investigators: Askill Löve, Professor
Doris Löve, Research Associate
Department of Environmental, Population
and Organismic Biology
University of Colorado
Boulder, Colorado 80302, U.S.A.

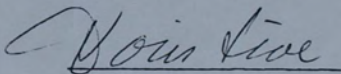
Yugoslavian Principal Investigators: Franc Sušnik, Professor
Ernest Mayer, Professor
Institute of Biology
University of Ljubljana
Ljubljana, Yugoslavia

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Report for the second summer and the first winter.



Askill Löve
Principal Investigator



Doris Löve
Principal Investigator

Report of Activities for the Second Session: Summer 1972.

The project on Cooperative studies on the cytotaxonomy of the Yugoslavian flora is based on the radically new approach to taxonomical botany that has emerged from the interaction of cytogenetics and the classical approaches to the classification of plants into an evolutionary system. It concerns a field of study which is in the process of a revolutionary conceptual reorganization by a limited international elite the majority of which is located in Europe, where the approach arose. Its effect on Central and North European botany has been considerable during the last few decades. It was because the Yugoslav botanists had observed the benefits this approach has had and is having on the botany of the neighboring countries that Dr. Sušnik originally proposed to the principal American investigators in this study that they and he should seek assistance from the Smithsonian Foreign Currency Fund for such an investigation in his country, the flora of which still remains less known than that of other parts of Europe. Dr. Sušnik had then spent some time on Boulder as an exchange scholar of the NRC to learn some of the newest techniques in this field.

We refer to the description of plans in our first proposal, presented in 1969. We were later forced to revise this well conceived proposal under threat of no-support, without acceptable reasons and apparently without proper knowledge by those who gave the advice about the European flora and its problems or about the philosophy behind the proposal. Our Yugoslav cooperators could not understand this restriction in their plans by people who apparently were not specialists in the field. They realized, however,

that the flora of the Julian Alps has very few problems of the kind that such an approach would be needed to solve, whereas the flora of Yugoslavia as a whole is an ideal field for concerted cytotaxonomical investigations into its evolutionary classification and history of the kind that the American cooperators has previously performed with great success in Iceland, Scandinavia, Central Europe, Spain, Italy, Canada, the White Mountains of New Hampshire, and the Rocky Mountains, and stimulated strongly in all these countries and also in Bulgaria, Czechoslovakia, Italy, Poland, France, Switzerland, Japan and even in the Soviet Union and elsewhere. Therefore, they preferred to ignore the limitations on these activities put up by the Smithsonian "specialists", whereas we concentrated the first summer on the Julian Alps and Slovenia and then on Slovenia as a whole, with introductory studies only in other parts of the country.

As shown in the report of activities for the two months of the summer 1971, which we were required to compose without warning during the first two weeks after our return in the fall, our Slovenian colleagues cooperated with us in collections and studies of Slovenian plants that summer and during the three months of the summer 1972, whereas during other months they continued their collections elsewhere in Yugoslavia and we worked out the results for publication. It should be emphasized, that the work during the summers is by necessity that of collection of material for further cytological and morphological study, although some cytological work has also been performed during that period. Because of drastic cuts in our original budget, however, only a single microscope is available for these studies in Ljubljana, for ten or more cytologists eager to use it at the same time, so only a fraction of that part of the work can be done during the time when both teams are together. And the American team is not being paid for its work for more than the short summers. The material

collected is being cultivated mainly at the Botanical Garden of the University of Ljubljana, but also partly at the Juliana Botanical Garden in the Alps, but facilities at both places are very limited and both lack any gardener assistance specially for this project, because such help has constantly been taken out from our budget estimates by those who thought they understood better the needs of cytotaxonomists. When the material is collected and cultivated, voucher specimens have been made for the Herbarium of the University of Ljubljana, with duplicates available for an American herbarium when the work has been completed. Because of the lack of an adequate library for this kind of botany at Ljubljana, almost all the important bibliographical work has been performed at Boulder by the two principal American investigators during times of the year when they have no benefit of the grant in Yugoslavian dinars, and all computer work has been paid out of funds they have for other research purposes, or out of their own pocket.

Some of the highlights of the work and observations during this summer are the following:

- 1) As mentioned in the first report, we realized already the first summer the dire need for the compilation of a critical and computerized checklist of the Slovenian flora, with a complete atlas of chromosome numbers determined elsewhere for the taxa involved and a complete bibliography. The basic checklist, which required considerable bibliographic and systematic study to ascertain the correct nomenclature for the strictly defined taxa, had been partially completed as a card-index before the first report was sent in, but computerized only for the ferns and fern-allies. In our report we optimistically expressed the hope that this list would be completely computerized during the fall of 1971 and then printed during the spring, innocently unaware of the fact that it might involve the punching of over 100,000 cards before it could be finally printed out or put on tape.

Naturally, the work was considerably greater than we had anticipated, and although Åskell Löve used almost all his research time for his part of the work from October to May, and Doris Löve worked on it, keypunching, programming and printing it out, for at least 10 to 12 hours a day, Sundays not excluded, during the entire winter, without pay, time was too short to complete the taxonomic checklist and to include all the chromosome references to the last one-third of it before we returned to Yugoslavia in the spring. Nevertheless, the atlas contained basic chromosome information for all the taxa but only two-thirds included complete references to all chromosome number determinations for each taxon. The printout is over 600 pages, whereas we expect that the final and completed printout, which then will be ready for publication, is supposed to become well over 1000 pages, so this will become the largest and most complete regional chromosome atlas ever compiled. We are already working on the continuation of this list in the hope to get it completed during the winter, despite the fact that no funds have ever been available for this work in Boulder.

Because of the lack of funds, we have only been able to make a few printouts of it so far, by aid of limited funds for computer work given to us by the University of Colorado. We have shown these printouts and sent them around to selected colleagues with a thorough knowledge of the European flora and of cytotaxonomy, and it has also been demonstrated to specialists from many lands belonging to the Flora Europaea Organization. The enthusiasm with which it has been met everywhere by these experts cannot be described, and several of them have expressed the opinion that this work alone has increased the knowledge and understanding of the Slovenian flora up to the high level of the Scandinavian and Czechoslovakian floras, which in this respect are better known than any other areas in the world.

When our Yugoslavian colleagues got an opportunity to study the chromosome atlas, they at once decided that this substantial work should be printed in one of the special series of their Academy as soon as possible after its completion, so that the atlas could become available not only to our small group but also to all others interested in a modern treatment of the Slovenian flora or in the floras of the surrounding countries.

Unfortunately, the price of each printout is \$40 or more, and since no funds have been given for this, we are unable to furnish the Smithsonian Institution with more than a single printout of the list as far as it is completed. We emphasize that this is an incomplete copy because the chromosome number references are missing in its last one-third part and there are no bibliographic references yet attached to it. It is a manuscript copy to which we reserve all rights and we trust that it will be treated as a confidential manuscript, although permission is hereby given for xeroxing of it all or parts thereof for legitimate purposes of review by trustworthy and competent scientists.

We have built into the atlas detailed information of various kinds in order to make it possible to use it for various purposes other than simple retrieval of taxonomical and cytological information. Thus, we will be able to extract from it information about levels of polyploidy within different regions of Slovenia, the coverage of thorough taxonomical, geographical and cytological knowledge within each region of the country and the eastern Alps, frequency and distribution and occurrence of hybrids and apomicts, etc., etc. The most practical results, for the present program, that we have been able to retrieve from the atlas already is the information, that although only a few species of the Slovenian flora have been cytotaxonomically studied from indigenous material, over 90% of the

more than 3000 species of the flora of higher plants are so well known in this respect from the neighboring countries that it would be a waste of time to repeat most of these studies for Slovenia. It has also been possible to pick out groups that remain entirely unknown cytologically (about 200 species) and even those that are critical in some respect or another or have been reported to have more than a single chromosome number elsewhere (about 300 species). The list has also been helpful in selecting out endemics of two kinds, at or above the species level and below that category, and to list species in which apomixis is known or suspected, etc.

It must be mentioned that the Yugoslavian botanists as a whole are eager to get such a computerized and critical checklist and chromosome atlas compiled for the flora of the entire country, with possibilities to pull out from it complete checklists for the different republics and smaller areas. As a matter of fact, we have been able to almost complete a card-index of the species of the entire flora already by aid of the main literature, but much work is still needed before all the smaller publications have been extracted and also before all the chromosome information has been added and the taxa at various levels evaluated in the light of the evidence available, since this list will include at least about 11,000 species or over 15,000 taxa. Computerization of this material will require longer time and it ought also to be supported in such a way that we could have appropriate assistance to keypunch the cards which certainly will run into several hundred thousands.

The Yugoslavs want to emphasize that such a compilation for the entire Balken flora seems to be a possibility if this good team will be allowed to continue its cooperation and widen it to include also botanists from Bulgaria, Greece, Albania and Romania, since botanists from these lands have expressed great interest in giving all the assistance available for

making such an atlas for the entire region and its remarkable but critical flora. If that could be accomplished as a kind of a sideline from the American-Yugoslavian cooperative work, this would be the first time in history that a peaceful and scientific cooperation between all the Balkan countries had been established - and that based on influence from the outside and encouragement from America.

2) Although we concentrated this summer upon the work with the Slovenian flora and then especially the species which are either unknown cytologically (ca. 200 taxa) or confused (ca. 300 taxa), other groups have also been collected and cultivated from Slovenia but especially from other regions of Yugoslavia. More than 700 of these species have already been cytologically determined by members of the cooperative team. This must be regarded as a considerable achievement in the light of the fact that we have found that behind every single determination lies at least one week of intensive work, plus an average of four to five days for processing it for publication even when this is done summarily in the IOPB chromosome number reports in Taxon, where numbers without a problem are printed most effectively and without much delay. We have already printed three such lists in the IOPB reports reporting the numbers for 218 species, but expect or hope to be able to process more than 500 additional numbers during 1972-73. These results from two short summers compare nicely with about 300 numbers counted by a well-equipped team of ten specialists in Sofija in Bulgaria during the past four years, of about 1000 numbers counted by a much larger group in Czechoslovakia during the past 8-10 years, and of a little over 100 numbers reported by a team of twenty or more Italians the past two years. In addition, we have in press the first report in a series of more detailed studies of 25 species each that comprises mainly critical taxa requiring more detailed information.

3) In addition to these general studies, the team has found some time to concentrate upon several more special problems of evolution and classification of some selected groups, although most detailed investigations of such problems observed during the basic work must wait until later. The American team has completed its part of several papers which were mentioned in the first report, but some of these have not yet gone to press, either because our Slovenian colleagues have not had time to complete their part of the work, or simply because the publishing in Yugoslavia is no faster than is printing of scientific reports in the United States. These incomplete papers are also listed in the summarized review at the end of this report.

Several other papers mentioned in the first report as in preparation have progressed, and a few have been completed or almost so. Material for several reports in the series on chromosome numbers of Yugoslavian plants is also being progressed for the second and following fascicles of *Scopelia*, the new botanical journal that has grown out of this work, and also at least three more papers in the series on nomenclatural changes in the Slovenian flora. The complete or preliminary titles of these papers are also listed in the summarized review.

4) We have a complete information from the chromosome atlas on the frequency of polyploids within each of the floristic regions of Slovenia and also within each of the different mountain complexes of the eastern Alps. Since some additional calculations are being worked out by W. Reid in connection with preparation of his Ph. D. thesis, we wait with the completion of a report on this subject. However, we can reveal at this time that the computer work seems to indicate that polyploids also here show a selective superiority in areas of stress, especially correlated with the length of the vegetative period or with the risk of occasional frosts in the summer, as, e.g., in certain of the alpine areas and in the dolinas of the karst region.

5) In addition to the work on some endemics mentioned in the first report, we have initiated cooperation with Ernest Mayer on a detailed investigation of the evolutionary processes that lead to the development or survival of endemic taxa as reflected in the immense regions of serpentine soils in central Serbia. These studies will require several years, but from the preliminary observations it seems evident that the endemics of these regions fall mainly into two categories. They are frequently only local races of more or less recent origin selected from the surrounding populations and, therefore, apparently too high classified when named as species. Whereas sometimes they have no closer relatives in the Balkans and seem to be of a relict nature. Our preliminary observations furnish us with reasons to doubt that polyploidy has been an important factor in the development of these endemics or even in their survival. However, these observations may change substantially when we have had an opportunity to study all the about 1000 taxa involved.

6) We want to emphasize at this point that it is unusual that any collection work of this magnitude results in even a single paper published within two years of initiation, and that the majority of the results to be expected will not become properly processed for printing within the next five to ten years. With the same speed of work, however, there is a reason to hope that the flora of Yugoslavia can become satisfactorily known from the cytotaxonomical point of view within the next decade, and that with proper support and less irritations of bureaucratic nature such a cooperation for five more years will be sufficient to make this still too little known flora quite comparable to those of the best known areas in Europe.

Summarized Review.

1) The collection of cytotaxonomical material of the Yugoslavian flora has proceeded satisfactorily for two summers, and over 700 species have so far been exactly identified taxonomically and determined as to their chromosome number. The processing of this material for publication is either completed or in progress.

2) A critical and computerized checklist of the Slovenian flora is being compiled. Added into this list is an atlas of chromosome numbers published for these species from elsewhere and from within Yugoslavia, and various other informations are added for easy retrieval. The atlas is only 2/3 completed but will hopefully be finished during this winter, including its very extensive and hopefully complete bibliography.

A basic taxonomical checklist for the entire Yugoslavian flora has already been put on cards by the American team but not yet computerized. And the need for enlarging it to include all the Balkan flora has been pointed out.

3) Although most of the results from these studies cannot be completed for publication until at a later date, because their complete processing requires considerable time in addition to the two summers of collection work and a single winter of microscope and bibliographical work, we classify the results obtained as follows:

a) Results already published and printed:

LOVKA, M., SUŠNIK, F., LÖVE, A. & LÖVE, D. 1971: IOPB chromosome number reports XXXIV. - Taxon 20: 788 - 791. (114 species).

LOVKA, M., SUŠNIK, F., LÖVE, A. & LÖVE, D. 1972: IOPB chromosome number reports XXXVI. - Taxon 21: 337 - 339. (75 species).

SUŠNIK, F., DRUSKOVIC, B., LÖVE, A. & LÖVE, D. 1972: IOPB chromosome number reports XXXVI. - Taxon 21: 345. (29 species).

LÖVE, A. & LÖVE, D. 1972: Vermeulenia - a new genus of orchids. - Acta Botanica Neerlandica 21: 553 - 554. (October, no reprints yet).

b) Papers in press, accepted for publication:

- LÖVE, A. & LÖVE, D. 1972: Favargera and Gentianodes, two new genera of Gentianaceae. - Botaniska Notiser 125: 000 - 000.
- LÖVE, A., LÖVE, D., ~~MAYER, F.~~ & SUŠNIK, F. 1972: Cytotaxonomy of Yugoslavian plants: Introductory remarks. - Scopolia 1: 000 - 000.
- LÖVE, A. & SUŠNIK, F. 1972: Chromosome numbers of Yugoslavian plants. I. - Scopolia 1: 000 - 000.
- LÖVE, A., LÖVE, D. & SUŠNIK, F. 1972: Nomenclatural adjustments in the Yugoslavian flora. I. Some monocotyledons from Slovenia. - Scopolia 1: 000 - 000.

c) Papers in preparation. Single or joint authorship undecided, and some may need a few more years for completion.

Cytotaxonomy and chemotaxonomy of the paleoendemit Hladnikia pastinacifolia.

The significance of Pestinnaca fleischmannii.

Cytotaxonomy and chorology of diploid and tetraploid Ceterach.

Hybrids and endemics of Yugoslavian Iris.

Chromosome numbers of Yugoslavian plants. II, III, etc.

Nomenclatural adjustments in the Yugoslavian flora. II - IV.

Reports for IOPB chromosome number reports XXXIX - XLII.

Balkan endemics of Apiceae.

Autoploidy and allopolyploidy in Phyllitis and continental drift.

Polyploidy in the Slovenian flora.

Polyploidy and environmental stress in Yugoslavia.

Serpentine endemics in Serbia.

d) Computerized results, to be constantly updated until printed:

- LÖVE, A. & LÖVE, D. 1972 etc.: Chromosome atlas of the Slovenian flora. - Incomplete at reporting time, but over 600 pages of printout.

SMITHSONIAN INSTITUTION
FOREIGN CURRENCY GRANT FINANCIAL REPORT

From (Name & address of grantee) University of Colorado, Boulder, Colorado 80302 (Princ. inv.: Prof. Åskell Löve)	Grant No. SFG-2-7626	Amount of Grant \$57,936.00 (\$26,420.00)			
	Report: Interim <u>x</u> Final _____	Report Period From May 16, To Sept. 1, 1972			
Project Title Cooperative studies on the cytotaxonomy of the Yugoslavian flora					
SUMMARY STATUS OF FUNDS		Amount (U.S. Dollars)			
Total Grant Funds Received by U.S. team: 449,140.00 ND		\$26,420.00			
Total Grant Funds Spent Including This Report Period		\$26,420.00			
Balance Grant Funds on Hand End of This Report Period		0			
State Estimated Expenses Payable from Grant Funds for Next Period		0			
(Do not include US Embassy GRANT FUNDS SPENT payments)					
Expense Classification	Sch.	This Reporting Period		Cumulative U.S. Dols.	Budget U.S. Dols.
		Local Curr	U.S. Dollars		
Salaries and Wages	A	240,890 ND	\$14,170.00	\$14,170.00	\$14,170.00
Living Allowance	B	130,050 ND	\$ 7,650.00	\$ 7,650.00	\$ 7,650.00
Travel, Host Ctry.	C	See E. below			
Travel, Interntl *	C-1				
Transp. of Things, Host Country	D				
Transp. of Things, International *	D-1				
Rents, Comm., Utils	E	78,200 ND	\$4,600.00	\$4,600.00	\$4,600.00
Supplies & Matrls	F				
Equipment	G				
Other	H				
TOTAL		449,140 ND	\$26,420.00	\$26,420.00	\$26,420.00
Interest earned on grant fund deposits, if any, from start of grant <u>0</u>					
We certify that the amounts reported spent from grant funds are in accordance with the provisions applicable to the above identified grant.					
Title Professor Åskell Löve	Signature of Principal Investigator <i>Åskell Löve</i>			Date Sept. 12, 1972	
Title Chief, Research Accounting Division	Signature of Official Authorized to Sign for Grantee <i>Dick R. Halliday</i>			Date 10/2/72	

* Show payments made by Principal Investigator only.

FINANCIAL REPORT
Schedule "A"

Expenditures for Salaries and Wages. (Itemize) (1972)

Name	Position	Dates Employed	Salary & Wages	Maintenance	Total
1. Askeff Löve	Principal investig.	May 22, 1972 to end	\$ 4180.00	\$	\$ 4180.00
2. Doris Löve	Co-princ. investig.	of project May 22 to end of project.	\$3600.00		\$3600.00
3. Lón Keersvang	Res. assistant	May 22 - August 24	\$2130.00		\$2130.00
4. Gerald K. Arp	Res. assistant	May 26 - August 10	\$1775.00		\$1775.00
5. Mary F. Kirk	Res. assistant	May 26 - August 10	\$1775.00		\$1775.00
6. Michael Fisher	Res. assistant	June 29 - July 29	\$ 710.00		\$ 710.00
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
Total.....			\$ 14170.00	\$	\$ 14170.00

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FINANCIAL REPORT
Schedule "B"

Expenditures for Living Allowances. (Itemize) (1972)

Name	Position	Dates Employed	Salary & Wages	Maintenance	Total
1. Askell Löve	Princ. investig.	May 22 to end of proj.	\$	\$1530.00	\$ 1530.00
2. Doris Löve	Co-princ. investig.	May 22 to end of proj.		\$1530.00	\$1530.00
3. Lóa Keersvang	Res. assistant	May 22 - August 24		\$1530.00	\$1530.00
4. Gerald K. Arp	Res. assistant	May 26 - August 10		\$1275.00	\$1275.00
5. Mary F. Kirk	Res. assistant	May 26 - August 10		\$1275.00	\$1275.00
6. Michael Fisher	Res. assistant	June 29 - July 29		\$ 510.00	\$ 510.00
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
Total.....			\$	\$7650.00	\$ 7650.00

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FINANCIAL REPORT

Schedule "E" (1972)

Expenditures for Rents, Communications, and Utilities; Printing and Reproduction; and other expenditures (specify).

	Vendor	Description	Amount
1	S. Lozer	Rent for laboratory and office space, 3 months @ \$360 per month	\$ 1080.00
2			
3	Univ. car pool	Rent for three cars, 75 days each, no milage limit, free gasoline,	
4		3500 per month each	\$3750.00
5			
6			
7	U.S. Immigration Service,	Re-entry permits for A. Löve, D. Löve & L. Kaersvang required	\$ 30.00
8	Denver	for return from Yugoslavia	
9		Same in 1971, not reported then	\$ 30.00
10		Pictures for same (3 for each)	\$ 15.00
11	Bank of Belgrade, Ljubljana	Fee for cashing a cheque from American Embassy	\$ 10.00
		TOTAL	\$4915.00

Excess over \$4600 paid by A. Löve from his per diem and dollar funds

Schedule "F"

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Expenditures for Supplies and Materials (Itemize all invoices over \$50 equivalent).

	Vendor	Description	Amount
1			\$
2			
3			
4			
5			
6			
7			
8			
9			
10			
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12			
13			
14			

Arrived March 10, 1972



SMITHSONIAN INSTITUTION
Washington, D.C. 20560
U.S.A.

February 10, 1972.

Mr. Lawson Crowe
Provost and Vice President for
Research
The University of Colorado
Boulder, Colorado 80302

Dear Mr. Crowe:

I refer to CU Proposal No. 71.7.383, Dr. Askeff Löve's proposal to continue his "Cooperative Studies on the Cytotaxonomy of the Yugoslavian Flora." I regret that, after careful review of the results of Dr. Löve's first year of work in Yugoslavia, as outlined in his renewal proposal, the Smithsonian has reached the conclusion that the project cannot be supported as a continuing project. Our review included consultation with scientists particularly qualified to comment on the subject matter of the proposal; after that the proposal was reviewed by the regular Smithsonian Foreign Currency Program Advisory Council in Biology which has a rotating membership drawn from established American biologists. The conclusion of the Advisory Council was that the results of the first year's work do not warrant continued support for the project. However, since both the American and Yugoslav teams engaged in the project were proceeding on the expectation of continued support, the Advisory Council voted to award the sum of \$40,000 equivalent in "excess" Yugoslav Dinars for a terminal season of work in order to allow the data obtained in the first year to be consolidated and the project to be closed out in the most orderly possible manner.

The Smithsonian's decision not to support this project on a continuing basis, even though support for the first year was awarded on the basis of Dr. Löve's original application, is based on our Foreign Currency Program policy as outlined in our regular Program Announcement (latest edition dated July 1, 1971): "SFCP grants normally provide support for only one year's research even though the original proposal anticipates several years' work. To secure funds for each succeeding year, a renewal proposal is required."

KDWhitehead:pbk

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If the University decides to accept the award of \$40,000 equivalent in Yugoslav Dinars for an orderly close-out of the project during a terminal season of work, Dr. Löve should be requested to forward a detailed budget for work at this reduced level to the Smithsonian for approval and incorporation into a subsequent grant contract. No payments designated "salary" for any of the American participants should be included in this budget.

Sincerely yours,

Kennedy B. Schmertz
Director
Foreign Currency Program
Office of International Activities

September 25, 1972.

An Interim Report to the Smithsonian Institution
for
RESEARCH SUPPORT IN YUGOSLAVIA UNDER THE FOREIGN CURRENCY PROGRAM

Name and Address of Institution: The Regents of the
University of Colorado
Boulder, Colorado 80302

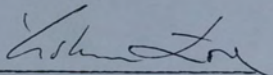
Title of Research: Cooperative Studies on the Cytotaxonomy of the
Yugoslavian Flora

American Principal Investigators: Åskell Löve, Professor
Doris Löve, Research Associate
Department of Environmental, Population
and Organismic Biology
University of Colorado
Boulder, Colorado 80302, U.S.A.

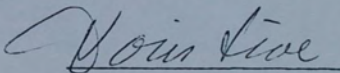
Yugoslavian Principal Investigators: Franc Sušnik, Professor
Ernest Mayer, Professor
Institute of Biology
University of Ljubljana
Ljubljana, Yugoslavia

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Report for the second summer and the first winter.



Åskell Löve
Principal Investigator



Doris Löve
Principal Investigator

Report of Activities for the Second Session: Summer 1972.

The project on Cooperative studies on the cytotaxonomy of the Yugoslavian flora is based on the radically new approach to taxonomical botany that has emerged from the interaction of cytogenetics and the classical approaches to the classification of plants into an evolutionary system. It concerns a field of study which is in the process of a revolutionary conceptual reorganization by a limited international elite the majority of which is located in Europe, where the approach arose. Its effect on Central and North European botany has been considerable during the last few decades. It was because the Yugoslav botanists had observed the benefits this approach has had and is having on the botany of the neighboring countries that Dr. Sušnik originally proposed to the principal American investigators in this study that they and he should seek assistance from the Smithsonian Foreign Currency Fund for such an investigation in his country, the flora of which still remains less known than that of other parts of Europe. Dr. Sušnik had then spent some time on Boulder as an exchange scholar of the NRC to learn some of the newest techniques in this field.

We refer to the description of plans in our first proposal, presented in 1969. We were later forced to revise this well conceived proposal under threat of no-support, without acceptable reasons and apparently without proper knowledge by those who gave the advice about the European flora and its problems or about the philosophy behind the proposal. Our Yugoslav cooperators could not understand this restriction in their plans by people who apparently were not specialists in the field. They realized, however,

that the flora of the Julian Alps has very few problems of the kind that such an approach would be needed to solve, whereas the flora of Yugoslavia as a whole is an ideal field for concerted cytotaxonomical investigations into its evolutionary classification and history of the kind that the American cooperators has previously performed with great success in Iceland, Scandinavia, Central Europe, Spain, Italy, Canada, the White Mountains of New Hampshire, and the Rocky Mountains, and stimulated strongly in all these countries and also in Bulgaria, Czechoslovakia, Italy, Poland, France, Switzerland, Japan and even in the Soviet Union and elsewhere. Therefore, they preferred to ignore the limitations on these activities put up by the Smithsonian "specialists", whereas we concentrated the first summer on the Julian Alps and Slovenia and then on Slovenia as a whole, with introductory studies only in other parts of the country.

As shown in the report of activities for the two months of the summer 1971, which we were required to compose without warning during the first two weeks after our return in the fall, our Slovenian colleagues cooperated with us in collections and studies of Slovenian plants that summer and during the three months of the summer 1972, whereas during other months they continued their collections elsewhere in Yugoslavia and we worked out the results for publication. It should be emphasized, that the work during the summers is by necessity that of collection of material for further cytological and morphological study, although some cytological work has also been performed during that period. Because of drastic cuts in our original budget, however, only a single microscope is available for these studies in Ljubljana, for ten or more cytologists eager to use it at the same time, so only a fraction of that part of the work can be done during the time when both teams are together. And the American team is not being paid for its work for more than the short summers. The material

collected is being cultivated mainly at the Botanical Garden of the University of Ljubljana, but also partly at the Juliana Botanical Garden in the Alps, but facilities at both places are very limited and both lack any gardener assistance specially for this project, because such help has constantly been taken out from our budget estimates by those who thought they understood better the needs of cytotaxonomists. When the material is collected and cultivated, voucher specimens have been made for the Herbarium of the University of Ljubljana, with duplicates available for an American herbarium when the work has been completed. Because of the lack of an adequate library for this kind of botany at Ljubljana, almost all the important bibliographical work has been performed at Boulder by the two principal American investigators during times of the year when they have no benefit of the grant in Yugoslavian dinars, and all computer work has been paid out of funds they have for other research purposes, or out of their own pocket.

Some of the highlights of the work and observations during this summer are the following:

- 1) As mentioned in the first report, we realized already the first summer the dire need for the compilation of a critical and computerized checklist of the Slovenian flora, with a complete atlas of chromosome numbers determined elsewhere for the taxa involved and a complete bibliography. The basic checklist, which required considerable bibliographic and systematic study to ascertain the correct nomenclature for the strictly defined taxa, had been partially completed as a card-index before the first report was sent in, but computerized only for the ferns and fern-allies. In our report we optimistically expressed the hope that this list would be completely computerized during the fall of 1971 and then printed during the spring, innocently unaware of the fact that it might involve the punching of over 100,000 cards before it could be finally printed out or put on tape.

Naturally, the work was considerably greater than we had anticipated, and although Askell Löve used almost all his research time for his part of the work from October to May, and Doris Löve worked on it, keypunching, programming and printing it out, for at least 10 to 12 hours a day, Sundays not excluded, during the entire winter, without pay, time was too short to complete the taxonomic checklist and to include all the chromosome references to the last one-third of it before we returned to Yugoslavia in the spring. Nevertheless, the atlas contained basic chromosome information for all the taxa but only two-thirds included complete references to all chromosome number determinations for each taxon. The printout is over 600 pages, whereas we expect that the final and completed printout, which then will be ready for publication, is supposed to become well over 1000 pages, so this will become the largest and most complete regional chromosome atlas ever compiled. We are already working on the continuation of this list in the hope to get it completed during the winter, despite the fact that no funds have ever been available for this work in Boulder.

Because of the lack of funds, we have only been able to make a few printouts of it so far, by aid of limited funds for computer work given to us by the University of Colorado. We have shown these printouts and sent them around to selected colleagues with a thorough knowledge of the European flora and of cytotaxonomy, and it has also been demonstrated to specialists from many lands belonging to the Flora Europaea Organization. The enthusiasm with which it has been met everywhere by these experts cannot be described, and several of them have expressed the opinion that this work alone has increased the knowledge and understanding of the Slovenian flora up to the high level of the Scandinavian and Czechoslovakian floras, which in this respect are better known than any other areas in the world.

When our Yugoslavian colleagues got an opportunity to study the chromosome atlas, they at once decided that this substantial work should be printed in one of the special series of their Academy as soon as possible after its completion, so that the atlas could become available not only to our small group but also to all others interested in a modern treatment of the Slovenian flora or in the floras of the surrounding countries.

Unfortunately, the price of each printout is \$40 or more, and since no funds have been given for this, we are unable to furnish the Smithsonian Institution with more than a single printout of the list as far as it is completed. We emphasize that this is an incomplete copy because the chromosome number references are missing in its last one-third part and there are no bibliographic references yet attached to it. It is a manuscript copy to which we reserve all rights and we trust that it will be treated as a confidential manuscript, although permission is hereby given for xeroxing of it all or parts thereof for legitimate purposes of review by trustworthy and competent scientists.

We have built into the atlas detailed information of various kinds in order to make it possible to use it for various purposes other than simple retrieval of taxonomical and cytological information. Thus, we will be able to extract from it information about levels of polyploidy within different regions of Slovenia, the coverage of thorough taxonomical, geographical and cytological knowledge within each region of the country and the eastern Alps, frequency and distribution and occurrence of hybrids and apomicts, etc., etc. The most practical results, for the present program, that we have been able to retrieve from the atlas already is the information, that although only a few species of the Slovenian flora have been cytotaxonomically studied from indigenous material, over 90% of the

more than 3000 species of the flora of higher plants are so well known in this respect from the neighboring countries that it would be a waste of time to repeat most of these studies for Slovenia. It has also been possible to pick out groups that remain entirely unknown cytologically (about 200 species) and even those that are critical in some respect or another or have been reported to have more than a single chromosome number elsewhere (about 300 species). The list has also been helpful in selecting out endemics of two kinds, at or above the species level and below that category, and to list species in which apomixis is known or suspected, etc.

It must be mentioned that the Yugoslavian botanists as a whole are eager to get such a computerized and critical checklist and chromosome atlas compiled for the flora of the entire country, with possibilities to pull out from it complete checklists for the different republics and smaller areas. As a matter of fact, we have been able to almost complete a card-index of the species of the entire flora already by aid of the main literature, but much work is still needed before all the smaller publications have been extracted and also before all the chromosome information has been added and the taxa at various levels evaluated in the light of the evidence available, since this list will include at least about 11,000 species or over 15,000 taxa. Computerization of this material will require longer time and it ought also to be supported in such a way that we could have appropriate assistance to keypunch the cards which certainly will run into several hundred thousands.

The Yugoslavs want to emphasize that such a compilation for the entire Balkan flora seems to be a possibility if this good team will be allowed to continue its cooperation and widen it to include also botanists from Bulgaria, Greece, Albania and Romania, since botanists from these lands have expressed great interest in giving all the assistance available for

making such an atlas for the entire region and its remarkable but critical flora. If that could be accomplished as a kind of a sideline from the American-Yugoslavian cooperative work, this would be the first time in history that a peaceful and scientific cooperation between all the Balkan countries had been established - and that based on influence from the outside and encouragement from America.

2) Although we concentrated this summer upon the work with the Slovenian flora and then especially the species which are either unknown cytologically (ca. 200 taxa) or confused (ca. 300 taxa), other groups have also been collected and cultivated from Slovenia but especially from other regions of Yugoslavia. More than 700 of these species have already been cytologically determined by members of the cooperative team. This must be regarded as a considerable achievement in the light of the fact that we have found that behind every single determination lies at least one week of intensive work, plus an average of four to five days for processing it for publication even when this is done summarily in the IOPB chromosome number reports in Taxon, where numbers without a problem are printed most effectively and without much delay. We have already printed three such lists in the IOPB reports reporting the numbers for 218 species, but expect or hope to be able to process more than 500 additional numbers during 1972-73. These results from two short summers compare nicely with about 300 numbers counted by a well-equipped team of ten specialists in Sofija in Bulgaria during the past four years, of about 1000 numbers counted by a much larger group in Czechoslovakia during the past 8-10 years, and of a little over 100 numbers reported by a team of twenty or more Italians the past two years. In addition, we have in press the first report in a series of more detailed studies of 25 species each that comprises mainly critical taxa requiring more detailed information.

3) In addition to these general studies, the team has found some time to concentrate upon several more special problems of evolution and classification of some selected groups, although most detailed investigations of such problems observed during the basic work must wait until later. The American team has completed its part of several papers which were mentioned in the first report, but some of these have not yet gone to press, either because our Slovenian colleagues have not had time to complete their part of the work, or simply because the publishing in Yugoslavia is no faster than is printing of scientific reports in the United States. These incomplete papers are also listed in the summarized review at the end of this report.

Several other papers mentioned in the first report as in preparation have progressed, and a few have been completed or almost so. Material for several reports in the series on chromosome numbers of Yugoslavian plants is also being progressed for the second and following fascicles of *Scopelia*, the new botanical journal that has grown out of this work, and also at least three more papers in the series on nomenclatural changes in the Slovenian flora. The complete or preliminary titles of these papers are also listed in the summarized review.

4) We have a complete information from the chromosome atlas on the frequency of polyploids within each of the floristic regions of Slovenia and also within each of the different mountain complexes of the eastern Alps. Since some additional calculations are being worked out by W. Reid in connection with preparation of his Ph. D. thesis, we wait with the completion of a report on this subject. However, we can reveal at this time that the computer work seems to indicate that polyploids also here show a selective superiority in areas of stress, especially correlated with the length of the vegetative period or with the risk of occasional frosts in the summer, as, e.g., in certain of the alpine areas and in the dolinas of the karst region.

5) In addition to the work on some endemics mentioned in the first report, we have initiated cooperation with Ernest Mayer on a detailed investigation of the evolutionary processes that lead to the development or survival of endemic taxa as reflected in the immense regions of serpentine soils in central Serbia. These studies will require several years, but from the preliminary observations it seems evident that the endemics of these regions fall mainly into two categories. They are frequently only local races of more or less recent origin selected from the surrounding populations and, therefore, apparently too high classified when named as species. Whereas sometimes they have no closer relatives in the Balkans and seem to be of a relict nature. Our preliminary observations furnish us with reasons to doubt that polyploidy has been an important factor in the development of these endemics or even in their survival. However, these observations may change substantially when we have had an opportunity to study all the about 1000 taxa involved.

6) We want to emphasize at this point that it is unusual that any collection work of this magnitude results in even a single paper published within two years of initiation, and that the majority of the results to be expected will not become properly processed for printing within the next five to ten years. With the same speed of work, however, there is a reason to hope that the flora of Yugoslavia can become satisfactorily known from the cytotaxonomical point of view within the next decade, and that with proper support and less irritations of bureaucratic nature such a cooperation for five more years will be sufficient to make this still too little known flora quite comparable to those of the best known areas in Europe.

Summarized Review.

1) The collection of cytotaxonomical material of the Yugoslavian flora has proceeded satisfactorily for two summers, and over 700 species have so far been exactly identified taxonomically and determined as to their chromosome number. The processing of this material for publication is either completed or in progress.

2) A critical and computerized checklist of the Slovenian flora is being compiled. Added into this list is an atlas of chromosome numbers published for these species from elsewhere and from within Yugoslavia, and various other informations are added for easy retrieval. The atlas is only 2/3 completed but will hopefully be finished during this winter, including its very extensive and hopefully complete bibliography.

A basic taxonomical checklist for the entire Yugoslavian flora has already been put on cards by the American team but not yet computerized. And the need for enlarging it to include all the Balkan flora has been pointed out.

3) Although most of the results from these studies cannot be completed for publication until at a later date, because their complete processing requires considerable time in addition to the two summers of collection work and a single winter of microscope and bibliographical work, we classify the results obtained as follows:

a) Results already published and printed:

LOVKA, M., SUŠNIK, F., LÖVE, A. & LÖVE, D. 1971: IOPB chromosome number reports XXXIV. - Taxon 20: 788 - 791. (114 species).

LOVKA, M., SUŠNIK, F., LÖVE, A. & LÖVE, D. 1972: IOPB chromosome number reports XXXVI. - Taxon 21: 337 - 339. (75 species).

SUŠNIK, F., DRUSKOVIC, B., LÖVE, A. & LÖVE, D. 1972: IOPB chromosome number reports XXXVI. - Taxon 21: 345. (29 species).

LÖVE, A. & LÖVE, D. 1972: Vermeulenie - a new genus of orchids. - Acta Botanica Neerlandica 21: 553 - 554. (October, no reprints yet).

b) Papers in press, accepted for publication:

- LÖVE, A. & LÖVE, D. 1972: Favargera and Gentianodes, two new genera of Gentianaceae. - Botaniska Notiser 125: 000 - 000.
- LÖVE, A., LÖVE, D., MAYER, E. & SUŠNIK, F. 1972: Cytotaxonomy of Yugoslavian plants: Introductory remarks. - Scopelia 1: 000 - 000.
- LÖVE, A. & SUŠNIK, F. 1972: Chromosome numbers of Yugoslavian plants. I. - Scopelia 1: 000 - 000.
- LÖVE, A., LÖVE, D. & SUŠNIK, F. 1972: Nomenclatural adjustments in the Yugoslavian flora. I. Some monocotyledons from Slovenia. - Scopelia 1: 000 - 000.

c) Papers in preparation. Single or joint authorship undecided, and some may need a few more years for completion.

Cytotaxonomy and chemotaxonomy of the paleoendemit Hladnikia pastinacifolia.

The significance of Pastinaca fleischmannii.

Cytotaxonomy and chorology of diploid and tetraploid Ceterach.

Hybrids and endemics of Yugoslavian Iris.

Chromosome numbers of Yugoslavian plants. II, III, etc.

Nomenclatural adjustments in the Yugoslavian flora. II - IV.

Reports for IOPB chromosome number reports XXXIX - XLII.

Balkan endemics of Apiaceae.

Autoploidy and alloploidy in Phyllitis and continental drift.

Polyploidy in the Slovenian flora.

Polyploidy and environmental stress in Yugoslavia.

Serpentine endemics in Serbia.

d) Computerized results, to be constantly updated until printed:

- LÖVE, A. & LÖVE, D. 1972 etc.: Chromosome atlas of the Slovenian flora. - Incomplete at reporting time, but over 600 pages of printout.