

Copy to Dr. Coggeshall

January 28, 1950

T. R. Hogness

Leo Szilard

Novick's salary

Enclosed is a memorandum which I sent today to Dr. Coggeshall and which raises the question of the possibility of an adjustment of my salary.

With this issue undecided, I find it difficult to give you a reasoned argument concerning Novick's salary, even though it is my view that, irrespective of the disposition of the other issue, it would be advisable to adequately adjust Novick's salary at this time.

The men of comparable training, age, and ability receive in the Physical Sciences Division a salary of \$6,000. per year and by this natural standard of comparison Novick ought to be given that salary in order to give him full satisfaction in respect of salary.

Lh.

cc: ✓ Mr. Szilard

# The University of Chicago

CHICAGO 37, ILLINOIS

Institute of Radiobiology and Biophysics

6200 Drexel Avenue

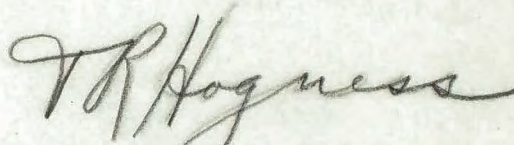
April 28, 1950

To the Office of Naval Research, United States Navy,  
Washington, D.C.

I am writing to endorse the application of Dr. Leo Szilard, Professor of Biophysics in the Institute of Radiobiology and Biophysics, for a grant in support of his research. Drs. Szilard and Novick have been working together in this Institute on the problem of microbial genetics and growth for the past three years or more. Dr. Szilard is a physicist and Dr. Novick a chemist. In the course of these few years they have become very well versed and expert in this new field. They constitute one of the relatively few good teams in the country that are studying this problem. (See enclosed reprint: Experiments on light-reactivation of ultra-violet inactivated bacteria, Proceedings of the National Academy of Sciences, 35: 591-600, 1949.)

During the past years this project has been supported by the University of Chicago, but because of restricted funds and a desire to expand this promising program the University feels that we should try to seek outside funds for support. You will note that the University will continue the salary of Dr. Szilard and will provide the many facilities not herein listed, such as machine shop and capital equipment.

I feel that the work which Szilard and Novick are doing is very important in the advancement of the new field of microbiology, and that a new insight will be found into the problem of growth, mutations, and adaptation of bacteria and viruses.



T. R. Hogness  
Director

## ENCLOSURE A

Research proposal submitted to the Office of Naval Research, United States Navy, by Leo Szilard, Professor of Biophysics in the Institute of Radiobiology and Biophysics of the University of Chicago, through and with the approval of Dr. Lowell T. Coggeshall, Dean of the Division of Biological Sciences.

Problem: Study of the growth, adaptation, and mutation of bacteria and bacterial viruses, carried out with new biophysical methods.

Background: Up to now, studies of growth, adaptation, and mutation of bacteria were invariably carried out in cultures which grew from a small inoculum up to a certain concentration of bacteria at which further growth was limited either by the exhaustion of the nutrient or by insufficient supply of oxygen. For a number of problems this conventional method of study is inadequate, and preliminary experiments which we carried out (unpublished) show that these problems are capable of a solution if a different method is adopted.

Significance: The new method permits us to study these phenomena while the bacteria are being kept indefinitely in the growth phase and to vary independently the growth rate and concentration of the bacteria. Thus a number of the previously unmanageable problems become open to experimental attack.

Plan: Several lines of investigation to be listed below will be carried out by means of an apparatus called the "Chemostat" which we have developed. This apparatus permits us to maintain a bacterial population in the growth phase over long periods of time (in excess of ten days). It permits varying the growth rate at constant temperature by automatically maintaining the concentration of one of the growth factors required by the bacterial strain at such a low level that the growth rate is depressed to any desired degree. In preliminary experiments carried out with a tryptophane requiring strain of coli, we found, for instance, that we could vary the growth rate between the normal growth rate and a growth rate about ten times lower by maintaining tryptophane concentrations ranging from  $3 \times 10^{-6}$  grams per cc. to  $3 \times 10^{-10}$  grams per cc. The following is a selection from the investigations which will be carried out with the chemostat:

- 1) The number of mutants (resistant to some bacterial virus) which establish themselves in the bacterial population will be determined for different growth rates. The results should show whether at a given temperature the mutation rate is determined by the number of cell divisions or rather the time that the bacteria spend in the growth phase.

2) The ratio of mutation rates for different mutations will be studied in order to determine whether this ratio depends, for one and the same organism, on the particular growth factor which is used for depressing the growth rate.

3) Bacterial metabolism will be studied:

a) It will be determined whether oxygen consumption varies at a given temperature with the growth rate; and

b) It will be determined whether, at depressed growth rates, the bacterial population pours out, at an increased rate, intermediate metabolites into the nutrient liquid.

4) The growth rate will be determined for bacterial strains requiring various growth factors as a function of the growth factor concentration. These functions will be determined for two temperatures differing by about ten degrees, in the hope of obtaining relevant information on the chemical kinetics of bacterial growth.

Requirements: Space, general laboratory facilities, and most of the necessary special apparatus are available in the new Institutes Building of the University of Chicago. I have had considerable experience with the methods that are to be used, and Dr. Aaron Novick is well qualified to apply those methods to the problems under consideration. The proposed program requires also substantial fractions of the time of a qualified Research Associate and a Technician, both of whom would be available from the candidates in sight. Though it seems wise to plan this program on a two year basis, it is believed that some significant results can be obtained within the first year.

Proposed budget for 1 July, 1950, through 30 June, 1951

Personnel

4/5 time of one Assistant Professor (Novick)	\$4,000	
3/4 time of one Research Assistant	2,600	
3/4 time of one technician	1,800	
	<u>8,400</u>	\$8,400

<u>Overhead</u> (45% of above)	3,780	3,780
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<u>Annuities</u> (5%, Novick)	200	200
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Equipment, etc.

Apparatus and installation	1,600	
Expendables (glassware, chemicals, etc.)	500	
	<u>2,100</u>	2,100

<u>Travel</u>	300	<u>300</u>
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Total for one year . . . . .		\$11,780
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Submitted by \_\_\_\_\_  
Professor of Biophysics

June 28, 1950

T. R. Hogness  
Leo Szilard

Institute of Radiobiology  
and Biophysics

As you know, it is my view that Dr. Novick's salary for the current budget year ought to have been fixed at \$6000, whereas, in fact, it has been fixed at \$5000. I am writing to say that if the failure to give Dr. Novick the salary which I recommended is due to shortage of funds in the Biology Division, I am prepared to supply these funds to the Biology Division through the following device:

I have received a letter from the Comptroller advising me that from July 1 on my salary will be raised from \$7000 to \$8000. Upon being advised by you that Dr. Novick's salary would be raised as of July 1 of the current year to \$6000, I would transmit to you the Comptroller's letter together with a statement to the effect that I shall not make use of that salary raise offered in that letter.

In explanation of the above, I might say the following: When I first approached Dr. Novick suggesting to him our present collaboration, the University offered him a salary of \$4200. Because this was insufficient, our work did not get started until six months later at which time the University raised her offer to \$4500 and Dr. Novick accepted this on the basis of my supplementing his salary from my own pocket by \$300 a year. We thus started in the late fall of 1947, almost three years ago, our present collaboration. At that time, Dr. Novick gave up a position at which he received \$5400.

A raise of about \$500 a year (which in view of his capabilities and his market value I regard as modest) would have brought his salary to just about \$6000 for the coming budget year.

It seems to me that until such time as I give up the hope of maintaining a small but effective working group in the Institute, my first consideration must be to maintain the stability and effectiveness of that group. Any considerations of my own income must therefore, for the time being, remain secondary.

I should appreciate your advising me whether the suggestion made in this letter is acceptable to your Institute as well as the Biology Division.

Leo Szilard

wv

cc: Dr. Coggeshall

June 29, 1950

T. R. Hogness, Director

Inst. Radiobiology and Biophysics

Leo Szilard

Inst. Radiobiology and Biophysics

This memorandum concerns the position to be offered to Howard Lee and represents the conclusions to which I have arrived after talking to Mr. Coulter and exploring the practices of the other Institutes with whom our Institute will be jointly housed when we move into the new building.

As you know, we have developed a new instrument called the chemostat, and intend to run continuously six to twelve of them at the same time. Some of these run for about three weeks; some run shorter. This research requires that each chemostat be adjusted every day, be assayed, and that a number of different mutants be scored each day. In order to take care of them, we had employed Mr. Shepherd as a technologist (biologist). We took him on the advice of Dr. Weiss in the Department of Zoology, who thought he would be particularly suited for this particular job outlined above. Dr. Weiss warned us, however, about certain of his shortcomings, and we told Shepherd when we employed him to consider himself for a while as being on trial.

About the time when we took on Shepherd, Lee, who had been working with us as a technician, told me of his general desire to go back to school for six months in order to get his M. A. degree, and I came to the conclusion that it would be to his best interest to return to school this fall, and so advised him.

Subsequently, when we decided to let Shepherd go (because, though he was doing his best and was conscientious and reliable, he was neither sufficiently flexible nor sufficiently fast for the job), I discussed the matter with you and we decided to offer Shepherd's job to Lee.

I thereupon talked to Lee and told him that we shall let Shepherd go and that while I still thought he should go back to school at the earliest



June 29, 1950

possible moment to get his M. A. and thus complete his formal education, I wondered whether he would be willing to change his plans and stay with us until we have carried through our present chemostat program. I told him that his salary would be \$3300 a year, the same as Shepherd's had been. Lee accepted this offer. Subsequently, when I discussed the matter with you, you told me that Lee would have to start August first, since Shepherd does not leave until August first, and I so informed Lee, and he agreed.

I ~~had~~ no reason to believe that there would be any difficulty in replacing Shepherd by Lee, and I feel that I am fully committed to Lee, so much so that if it should prove impossible to give him the appointment and if he should remain with us at a lower pay, I would have to pay him the difference out of my own salary, which if necessary I am prepared to do.

Looking after chemostats is a continuous job which does not permit weekly interruptions for 24 hours, and therefore no technician on bi-weekly employment can be entrusted with this job without violating Illinois State law.

Our Institute is in a rather different position from other Institutes and from other Departments who are heavily leaning on graduate students. Since we neither give degrees nor have particularly close overlapping of personnel with the other Departments, we cannot build up our research on the same basis that other Departments and Institutes can do. I was concerned about this point from the very first when I was offered a position in the Institute, and was at that time assured by Dr. Zirkle that we can get the required assistance by classifying certain employees as technologists so that they are not hourly rated, and free from <sup>certain</sup> ~~their~~ legal limitations.

In view of the above, I suggest that a formal request be made to the Dean's Office concerning the replacement of Shepherd by Lee, at the same salary, *and* as of the first of August, 1950.

cc: Dean M. C. Coulter

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THE UNIVERSITY OF CHICAGO

DATE July 5, 1950

TO Mr. T. R. Hogness DEPARTMENT Radiobiology and Biophysics  
FROM Merle C. Coulter DEPARTMENT BSD - Dean's Office  
IN RE: Professional appointment for Mr. Hook-Tan Lee

I believe that we should not process the proposed appointment until we possess somewhat clearer answers to the following questions:

Is it sound policy to appoint an employee under the generic title of "Technologist"? Mr. Mokstad has indicated to me that this is not sound policy, but that some more specific title such as "Chemist", "Electronics Engineer", or "Biologist" should be used.

Would we be justified in appointing Mr. Lee as "Chemist" or "Electronics Engineer"? If such an appointment were justified under the current standards of the other two Institutes, I believe it would be an appropriate type of appointment for Lee.

Does Lee measure up to the minimum standards necessary for appointment as "Biologist"? It has been suggested that one essential criterion should be: ability to comprehend the research project and to carry the project to completion in the absence of the responsible investigator. We have been assured that Lee measures up to this criterion. It has been suggested that a second essential criterion should be: possession of the M. S. in Biology plus one year's practical experience or the B. S. in Biology plus approximately five year's practical experience. It is not yet clear that Mr. Lee satisfies this second criterion. Furthermore, if we were to revise the second criterion to fit the case of Mr. Lee, we would probably find that a great many of our present L-6B and L-5 employees would then qualify for the "Biologist" appointment under both criteria.

Since policy on "Professional" appointments has inter-divisional implications, I believe we should seek clarity on that policy in a conference called by Dr. Harrison. When last I saw Dr. Szilard, it was his expressed expectation that the adjustment of the Lee appointment be deferred until such a conference could be held. In fact, when I suggested trying to arrange such a conference shortly after Dr. Harrison's return to Chicago, Dr. Szilard said we might as well let it go until autumn.

I myself will be away on a two-week vacation July 8 - 22, but will be back for other purposes on July twelfth only. It might be possible to arrange the conference with Dr. Harrison on July twelfth but probably would be easier to arrange it for July twenty-third or shortly thereafter.

MCC:gk

cc. Mr. R. W. Harrison  
Dr. Leo Szilard  
Mr. C. S. Mokstad

# The University of Chicago

CHICAGO 37, ILLINOIS

Institute of Radiobiology and Biophysics

1155 East 57th Street  
Chicago 37, Illinois  
July 11, 1950

Mr. T. R. Hogness  
Institute of Radiobiology and Biophysics  
6200 Drexel Avenue  
Chicago 37, Illinois

Dear Mr. Hogness:

You had sent through to the Office of the Dean of the Biological Sciences a requisition for the appointment of Mr. Lee as a technologist (biologist). Lee was to replace Shepherd who is leaving us the first of August.

Mr. Coulter sent me a copy of the memorandum which he sent to you on July 5. From this memorandum, it is my understanding that Lee's appointment will not be processed until a new policy concerning the appointment of technologists has been worked out and it appears to be uncertain whether at that time Lee will get the appointment which we had promised him.

Inasmuch as I had told Lee after a conversation with you that his salary will be \$275 a month, starting the first of August, if he agreed to shift his vacation and to stay with us so that he can see through our present series of experiments, I feel that I have no choice but to give Lee the assurance to which he is entitled at this time. Accordingly I wrote him on July 7 a letter of which I enclose a copy.

cc: Mr. R. W. Harrison  
Dr. L. T. Coggeshall  
Mr. M. C. Coulter  
Mr. C. S. Mokstad

Sincerely yours,



Leo Szilard

1155 East 57th Street  
Chicago 37, Illinois  
October 20, 1950

Mr. T. R. Hogness  
Institute of Radiobiology and Biophysics  
University of Chicago  
Chicago 37, Illinois


Dear Mr. Hogness:

We have prepared the final version of our big paper on the Chemostat, sent it on to Muller, and I have a note from him saying that he has submitted it to the Proceedings of the National Academy of Science. We have submitted to Science a "Description of the Chemostat" and it has been accepted for publication.

We also submitted to Science a paper entitled "Bacterial Viruses of Identical Phenotype but Different Genotype" and this paper has also been accepted. Dittoes of all these papers have been made and are available for advanced mailing to interested persons.

Enclosed are bills representing my out-of-pocket expenses for preparing these manuscripts as well as some other papers on biological subjects which have not as yet reached their final form for publication. These bills total \$135.23. I would appreciate a reimbursement at your early convenience.

Sincerely,

  
Leo Szilard

October 20, 1950

Out-of-pocket expenses according to bills enclosed  
incurred in preparing three manuscripts.

July 24, 1950	June R. Hansen	6.25
August 8, 1950	E. K. Packard for postage and dittoes	2.98
August 29, 1950	Eudocia Packard	36.00
August 4, 1950	Eudocia Packard	45.00
October 20, 1950	Wilma Podulka	45.00
		<hr/>
	Total	\$135.23

October 21, 1950

Dr. T. R. Hogness  
Institute of Radiobiology and Biophysics  
University of Chicago  
Chicago, Illinois

Dear Mr. Hogness:

This is a report on my contacts with foundations. Following a visit which you and Mr. Hutchins made to Mr. Howard Hirsch of the Solomon and Blanche DeJonge Foundation, I wrote Mr. Hirsch and he invited me to have lunch with him on September 13 in New York. We were joined for lunch by Mr. Norman Goetz, who Mr. Hirsch told me was an important member of the Board of the Foundation.

Mr. Hirsch has a good general understanding of biology and a passion for it derived from the fact that he started out to study biology and abandoned these studies for reasons beyond his control. Mr. Goetz, on the other hand, knows nothing about biology and this fact rather crimped the style of our conversation. Mr. Hirsch seemed to feel this also because he asked me after lunch to let him know when I am in New York again and perhaps we could have dinner together at his home and talk more about things of mutual interest.

On the basis of the information I have so far, I rather doubt that I would want to apply for funds to the DeJonge Foundation unless further contact with Mr. Hirsch provides me with some new evidence. I have the impression that this Foundation would not be interested in supporting a three to five year's program, at least that is what I must conclude from the precedents. Their temperament seems to incline them to pick up something that no one else might want to support, perhaps because it is too fantastic for some of the more conservative foundations, and to help to develop the subject to the point where other institutions might

2 - T. R. Hogness - October 21, 1950

be willing to take an interest. I rather doubt that my present work falls into this category. Also I would rather enter into a relationship with a foundation which will give a reasonable guarantee, say for the support of a technician for three years, rather than offer support for three technicians for one year; and the inclination of the DeJonge Foundation seems to be the other way around.

Subsequent to the luncheon with Mr. Hirsch, I paid a visit to the Rockefeller Foundation where I had lunch with Warren Weaver. I left there with the impression that Weaver is very much interested in what we are doing, and that he would welcome an application for continued support. He stated explicitly that this is the kind of work that comes well within the scope of what the Rockefeller Foundation is interested in supporting. A subsequent letter which I received from Warren Weaver indicates his continued interest, and we might consider submitting an application to the Rockefeller Foundation at an opportune time.

In the meantime, news reached me through the grape vine that our application for funds to the National Institute for Health has been granted for the full amount requested. I do not know, however, what priority has been assigned to the grant; i.e. how the grant will fare in case of a cut in the budget. Nor has the final formal action been taken.

As soon as we are formally notified, I suggest that you reopen the issues of regularizing Victorine's position as a technologist or research assistant and ~~that~~ of promoting Lee to technologist or research assistant. As you know, at present I am committed to paying part of Lee's salary because the dean's office held up the appointment which you sent through to them after we had already committed ourselves to employ him at a salary of \$3300 per year.

3 - T. R. Hogness - October 21, 1950

Enclosed you will find my expense account for the trip to New York undertaken for the purpose of visiting Mr. Hirsch and utilized also for a visit to the Rockefeller Foundation in the amount of \$150.38.

Sincerely yours,

Leo Szilard

WV



Trip to New York to Visit Mr. Hirsch

Telephone call from Denver to Dr. Hogness in Chicago (re DeJonge Foundation)	5.08
Chicago, taxi to airport	2.25
Plane to New York	50.72
New York, taxi from airport	2.50
Hotel in New York from 9/9 to 9/15	34.36
New York, taxi to airport	2.50
Plane to Chicago	50.72
Chicago, taxi from airport	2.25
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Total	\$150.38

October 21, 1950

Dr. T. R. Hogness  
Institute of Radiobiology and Biophysics  
University of Chicago  
Chicago 37, Illinois

Dear Mr. Hogness:

In the last days of August, I happened to meet Robert L. Stearns at Boulder, and he told me at that time that the University of Colorado would like to arrange some form of collaboration with me that would be compatible with my continuing my work at Chicago. Since then I had a letter from the Medical School of the University of Colorado dated September 12 and signed by T.T. Puck in his capacity as the head of the Department of Biophysics of that school. The <sup>relevant</sup> ~~important~~ passage of the letter is as follows:

"I have been authorized by the University to offer you a part-time appointment as Professor of Biophysics at a stipend of \$4,500.00 per year. It is the intention of the appointment that you would carry on research in the department, and take part in the training of graduate students. It is not necessary that you devote a period of six months full-time to the duties here, but rather that you feel free to space your visits to Colorado in accordance with the demands of your activities, both here and elsewhere."

I have the impression that the flexibility of the position they offer me <sup>would</sup> ~~will~~ make it possible for me to accept it without neglecting my work in the Institute. I am not certain, however, that I could be of much use to them until their Department of Biophysics moves into its new research building sometime next year and is able to take on a larger number of graduate students.

2 - T. R. Hogness - October 21, 1950

This aspect will require further investigation involving a trip to Denver which I will undertake if I am told that the University of Chicago would have no objection to my accepting the position offered. There are also certain details which would have to be clarified before discussing the matter further with the University of Colorado. In particular, I would have to know whether the University of Chicago would be agreeable

a) that I remain on the payroll of the University of Chicago throughout the year and turn over to it whatever the University of Colorado pays me and in turn charge to the University of Chicago (to 4-E) whatever extra expenses I incur by accepting the position in Colorado; or

b) that I go off the payroll of the University of Chicago for a certain number of months during which I would not charge to the University any expenses and during which I would retain whatever salary I receive from the University of Colorado pro rated for those months.

I would appreciate it if you would let me know your attitude to the questions raised.

Sincerely yours,

Leo Szilard

THE UNIVERSITY OF CHICAGO  
CHICAGO 37 · ILLINOIS  
INSTITUTE OF RADIOBIOLOGY AND BIOPHYSICS

October 31, 1950

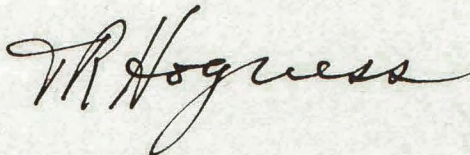
Professor Leo Szilard  
Institute of Radiobiology and Biophysics  
The University of Chicago

Dear Professor Szilard:

I have your letter of October 21, in which you ask about the possibility of affiliating yourself on a part time basis with the University of Colorado.

I have already discussed this possibility with Chancellor Hutchins, and it was his opinion that, if you felt that you could carry out your obligations to the Institute, the University would have no objection to your assuming this part time work on a 4E basis.

Yours very sincerely,

A handwritten signature in cursive script, reading "T. R. Hogness". The signature is written in dark ink and is positioned above the typed name and title.

T. R. Hogness  
Director

# The University of Chicago

CHICAGO 37, ILLINOIS

Institute of Radiobiology and Biophysics

December 6, 1950

Dr. Thorfin R. Hogness  
Institute of Radiobiology and Biophysics  
University of Chicago  
Chicago 37, Illinois

Dear Mr. Hogness:

I am enclosing for your convenience a copy of an exchange of letters which we had in regard to my proposed appointment on a part-time basis with the University of Colorado.

I am also enclosing a letter which I am writing today to the University of Colorado giving my acceptance subject to formal notification by the University of Chicago of their approval.

It is my understanding that under the 4-E contract, I will turn over to the University of Chicago such financial compensation as I receive from the University of Colorado and that I shall charge to the University of Chicago (to 4-E) the traveling expenses incurred in pursuance of the proposed affiliation.

I wish to draw your attention to the fact that according to the proposal received from the University of Colorado, my title there would be "Professor of Biophysics--part-time" and I presume I would be so listed in their directory.

I would appreciate if you could let me have as soon as possible the formal approval of the University to this arrangement.

Sincerely yours,

Leo Szilard

January 25, 1951

Dr. T. R. Hogness  
Institute of Radiobiology & Biophysics  
University of Chicago  
Chicago 37, Illinois

Dear Dr. Hogness:

Novick and I are scheduled to give an invited paper at the XVIth Cold Spring Harbor Symposium (June 8-15). I intend to attend the symposium and I assume that Novick will also be anxious to go. Demerec, the Director of the Carnegie Institute of Genetics, who is arranging the symposium, wrote me that they would take care of our expenses during our stay in Cold Spring Harbor, and they might contribute something to the traveling expenses. Since all we propose to give is one joint paper, we cannot expect them very well to pay the traveling expenses of both of us, and I am writing to ask whether the University would be willing to pay for Novick's traveling expenses, amounting to something of about \$110.

I am enclosing a copy of the program sent to me by Demerec from which you will see the general character of the meeting.

Sincerely yours,

Leo Szilard

COPY

THE ROCKEFELLER FOUNDATION  
49 WEST 49TH STREET  
NEW YORK 20, N. Y.

February 20, 1951

Dear Professor Hogness:

In Dr. Weaver's absence, I am sending you a copy of a letter which he wrote to you on February 5. Since we have not yet heard from the President's office, it is possible that Dr. Weaver's letter did not reach you.

Very truly yours,

Administrative Assistant  
to the Director

Professor T. R. Hogness, Director  
Institute of Radiobiology and Biophysics  
The University of Chicago  
Chicago 37, Illinois

AEB

cc - Professor Leo Szilard ✓

C O P Y

February 5, 1951

Dear Professor Hogness:

In connection with the application which Professor Szilard submitted to The Rockefeller Foundation on January 12, and which was approved by you, it is necessary, since such a grant would be made to the University of Chicago, for us to have a brief note from an administrative officer in the President's office stating that his office approves of the proposal and that such a grant, if made, would be acceptable to the University. We would appreciate it very much if you would ask that such a letter be sent to us.

Sincerely yours,

Warren Weaver

Professor T. R. Hogness, Director  
Institute of Radiobiology and Biophysics  
The University of Chicago  
Chicago 37, Illinois

WW:B