

THE UNIVERSITY OF CHICAGO

DATE October 1, 1951

TO Mr. T. M. Switz

DEPARTMENT Development Office

FROM Leo Szilard

DEPARTMENT Institute of Radiobiology and Biophysics

IN RE: Short Reference to the Work of Drs. Aaron Novick and Leo Szilard,  
October 1, 1951.

Drs. Aaron Novick and Leo Szilard have developed a device that enables them to make quantitative observations of many of the life processes of microorganisms. The Chemostat, as it is called, maintains a population of microorganisms, for instance bacteria, growing at a rate which can be set at will. This is achieved by maintaining the concentration of one growth factor at a fixed low level which can be set at will and which controls the growth rate. One contribution that ~~they~~ <sup>Drs. Novick and Szilard</sup> made to a basic problem in genetics is the following: Previously it has been believed that mutations in bacteria occur when the bacteria divide and that if the bacteria grow fast so that a <sup>large</sup> number of generations will succeed each other within a given period of time there will be more mutations occurring per unit time than if the bacteria grow more slowly. By means of the Chemostat Drs. Novick and Szilard were able to show that this is not the case, and that the number of mutations occurring per unit time is within a wide range (over a factor of 10 in the division rate) independent of the number of generations which succeed each other.

Drs. Novick and Szilard find by means of the Chemostat that a number of substances which are chemically rather inactive and which do not kill bacteria nevertheless cause a great increase in the number of mutations. Caffeine, for instance, in a concentration of less than .2 gram per liter will increase the rate of mutations by more than a factor of 15.

Drs. Novick and Szilard have now begun to use the Chemostat for the study of problems of bacterial metabolism which are not accessible to a quantitative investigation without the use of such a device.

Effects of Irradiation on Single Cells (Raymond E. Zirkle, RI 429)

The observation of effects of irradiation on single cells. A microbeam of fast protons is directed on one small portion of the cell to determine what the local effects are from the standpoint of toxicity.  
Problems connected with radiobiological defense.

THE UNIVERSITY OF CHICAGO

DATE January 12, 1952

TO Drs. J. G. Allen, K. Bloch, Wm. Blbom,  
L. Jacobson, C. P. Miller, Szilard,  
FROM R. Zirkle

DEPARTMENT

Institute of Radiobiology

DEPARTMENT

Office of the Secretary

Theodore M. Switz

IN RE:

The next meeting of the Industrial Sponsors of the Institutes for Basic Research will be held on Monday and Tuesday, February 23 and 24. As usual it will be necessary to revise Research in Progress which is sent out to sponsors in advance of the meeting.

Some comments from sponsors scientific men indicate that it would be helpful if Research in Progress gave somewhat more detailed thumb-nail sketches of current developments rather than titles of areas of investigation as at present. A copy of the last Research in Progress is attached. Would you please revise your section giving a few more details on current developments.

Please return the revised copy by January 21 in the enclosed envelope.



*file*

February 12, 1953

Dr. Theodore M. Switz  
Dir. Industry Relations  
Physical Sciences Development  
Office of Secretary of University  
University of Chicago  
Chicago, Ill.

Dear Dr. Switz,

When I was away from Chicago your Office telephoned Dr. Novick about a revision of the description of our research to be included in the material sent out to the sponsors in advance of meetings. As Novick understood <sup>it</sup> your Office wanted a change in the general description of our work, he talked to me about this over the telephone, but since the field in which we are working did not change, I did not see how I could possibly change the general description previously given.

On my return to Chicago I found a note from you, dated Jan. 12, from which I see that there was a misunderstanding in this matter. What you wanted was not a change in the general description but some details in addition to the general description. Naturally there is no reason why we should not give details if details are wanted. From the deadline set in you note for January 21, I see that we are too late for the present occasion. However, so that you should have the material in hand for the next meeting, I am sending you a description of our work on the attached page. The general description of the work remains unchanged.

Sincerely yours,

Enclosure

LS/llt

Leo Szilard

*fole*

February 12, 1953

Memo to Mr. S.T. Switz in answer to his note of January 12, 1953.

Dr. Novick and I are now mainly concerned with studying by means of the Chemostat the effect of a class of chemical compounds which we discovered in small quantities to be able to counteract the mutagenic effect of purine derivatives. We are also studying by means of the Chemostat the mutation rate of growing bacteria which are exposed to ultra violet radiation.

The mutation rate of bacteria can be increased not only by means of mutagens but by conditions of growth which involve no action by any known mutagen. This effect cannot be counteracted by our anti-mutagens. This phenomenon is being studied by Dr. Fox in our group.

Leo Szilard

LS/llt