

CROSS REFERENCE SHEET

Name or Subject Bacteriology

File No.

Regarding

Date

SEE

Name or Subject

File No.

Jordan, E. O.

Whitman, C. O.

File cross reference form under name or subject at top of the sheet and by the latest date of papers. Describe matter for identification purposes. The papers, themselves should be filed under name or subject after "SEE."



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CROSS REFERENCE SHEET

Name or Subject Bacteriology File No.

Regarding Date

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For use in all Filing Systems
Cat. No. 30-5802

File cross reference form under name or subject at top of the sheet and by the last date of paper. Describe matter for identification purpose. The paper, themselves should be filed under name or subject after "SEE".

THE UNIVERSITY OF CHICAGO.

Tordae

Feb. 4, 1896

Pres. W. R. Harper, -

Dear Sir:

(6)

As you may perhaps recall, I had planned, before the announcement of Miss Kulver's gift, to go abroad for 12 months. It now seems to me desirable that I should be on hand to look after the planning and equipment of those lines of work for which I am responsible, and I have accordingly announced courses for the Summer Quarters.

I have ^{lately} been hoping, however, to spend the coming Spring Quarters at the Pasteur Institute in Paris ~~and~~ working at some line of research in which I am

particularly interested, and in studying the model laboratory equipment. I find myself in the somewhat difficult position of being able to go abroad for 12 months, but not for 3! Would it in any way be possible for me to receive my pay for the extra work I have been obliged to do this winter (Autumn and Winter Quarters)? I may point out that this work has been forced on me by the size of the class, and that no definite arrangement has been made as to whether I am to receive pro rata salary or vacation credit for this. I recognize of course the difficulties in the way of paying me now for the work done in the Summer of 1894 and would not urge this. At the same

particularly interested, and in studying the
 model laboratory equipment. I find
 myself in the somewhat difficult position
 of being able to go abroad for 12 months,
 but not for 3! Would it in any
 way be possible for me to receive my
 pay for the extra work I have been
 obliged to do this winter (Autumn and
 Winter quarters)? I was faint out that
 this work has been forced on me by the
 size of the class, and that as definite
 arrangements have been made as to whether
 I am to receive my rate salary or vacation
 credit for this. I was going to assume the
 difficulty in the way of paying me was for
 the work done in the Summer of 1904 and
 would not pay this. At the same

THE UNIVERSITY OF CHICAGO.

time I think you will appreciate the
embarrassment of my situation in not
being able to utilize the six months of
extra work I have done -

Very sincerely yours,

Edwin C. Jordan

THE UNIVERSITY OF CHICAGO

time I think you will appreciate the
embarrassment of my situation in not
being able to utilize the six months of
extra work I have done.


Very sincerely yours

Charles C. Gordon

Jordan
University of Chicago
February 16th, 1896.

Pres. W. R. Harper, -
Dear Sir: -

In reply to your letter of February 10th which I have just received, I append a statement of the sum due me for extra work.

$\frac{2}{3}$ pro rata salary for
Summer of 1894 @ \$500.00  \$333.33
 $\frac{2}{3}$ pro rata salary for $\frac{1}{2}$ extra work
Autumn & Winter Quarters, 1895-'96 @ \$2000.00 - 444.44
\$777.77

If I can be paid part of this sum (say \$300-\$400) at once I can probably arrange to borrow the remainder of the money I need until next summer. In such case I would ask that a definite date for payment of the rest might be set in order that I may place my financial affairs on a secure basis. I shall have to make my final arrangements for letter, of credit, for borrowing etc. by March 1st at the latest. I should greatly appreciate any definite statement you could make me at



once. If it is impossible that I should be paid any part of the sum owing me before March 1st, it is very important that I should know it as soon as possible. If I could have at once a statement of just what I may expect as to time of payment of part or whole of the above sum it would relieve me from much embarrassment +

In regard to the matter of which you spoke yesterday, I may say that I have no objection whatever to transferring my quarters from the Anatomical Building to the Zoological. I made the other arrangement in the interests of harmony. If it seems to you desirable that I should occupy one-half of the fourth floor of the Zoological Building, I think it would lessen any unpleasant feeling on the part of Dr. Baur if both he and I had a formal statement from you to that effect. It puts me in an unpleasant position to be forced to appropriate space which another man desires and for which he is planning. I do not wish to take any responsibility in the matter. On this

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point also I should be glad to hear from you at the earliest possible moment, in order that I may confer with Mr. Cobb before details of construction are further arranged.

I very much desire to talk with you as soon as possible about my work in bacteriology and general biology for next year. I feel sure that it is not the intention of ~~the~~ the University that routine teaching should absorb all an instructor's time. I may simply point out now that the courses in bacteriology alone at present contain more students than the average number in other special lines of work. In justice to myself I feel that I should not be obliged to carry next winter such a burden of teaching as I have had to carry this year. Would you be willing to grant me an interview on this matter at some definite hour on your return?

Very truly yours,

Edwin C. Jordan

1. The first part of the paper is devoted to a general
discussion of the subject. It is divided into two
main parts, the first of which is devoted to a
general discussion of the subject, and the second
to a more detailed discussion of the subject.

2. The second part of the paper is devoted to a
discussion of the subject. It is divided into two
main parts, the first of which is devoted to a
general discussion of the subject, and the second
to a more detailed discussion of the subject.

3. The third part of the paper is devoted to a
discussion of the subject. It is divided into two
main parts, the first of which is devoted to a
general discussion of the subject, and the second
to a more detailed discussion of the subject.

4. The fourth part of the paper is devoted to a
discussion of the subject. It is divided into two
main parts, the first of which is devoted to a
general discussion of the subject, and the second
to a more detailed discussion of the subject.

5. The fifth part of the paper is devoted to a
discussion of the subject. It is divided into two
main parts, the first of which is devoted to a
general discussion of the subject, and the second
to a more detailed discussion of the subject.

Jordan
ON

Sept. 26, 1896

Jordan
Bart
My dear President Harper, -

I do not know how far it is practicable for the University to exert its influence in municipal affairs, but if occasion should arise in connection with the present discussion over the water-supply I should be glad to place what experience and information I have gained at the disposal of the authorities.

My connection with the Massachusetts State Board of Health some years ago gave me exceptional opportunities for investigation of this question, and I have since that time made a rather detailed personal study of the situation in London, Paris and other European cities.

It is suggested in the newspapers that a commission should be appointed by the Mayor to study the question of Chicago's water-supply. I should be sorry to see another such colossal blunder as the drainage-canal perpetrated. Already there is talk of a simple extension of the water-tunnels farther into the lake! The



THE UNIVERSITY OF CHICAGO
LIBRARY

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Sept. 22, 1894

My dear President

I do not know how far it is practicable for the University to exert its influence in municipal affairs, but if occasion shall arise in connection with the present discussion on the water supply, I shall be glad to place what experience and information I have gained at the disposal of the authorities. My connection with the Administration of the Board of Water and Sewerage was one of confidential assistance for investigation of this question, and I have since that time made a rather detailed personal study of the situation in Chicago, and the European cities. It is suggested in the newspaper that a commission should be appointed by the Mayor to study the question of Chicago's water supply. I should be very glad to see another such school abroad on the Chicago question. Unfortunately, though there is talk of a single commission of the water-towers further into the lake! The

question of filter for the schools is being botched badly,
as you are aware.

If you see any place where scientific opinion on these
questions would come into play I shall be glad as a
citizen with some special knowledge to do what I can.
I do not care for recompense.

Very truly yours,

Edwin C. Jordan.

number of letters for the school is being started early
as far as possible.

If you see any place where scientific papers or other
publications would be of use to the school, I shall be glad to
communicate with some official authority to see that I can
get it out for me for reference.

Very truly yours

William D. Foster

October 7th 1896.

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My dear Pres. Harper, —

I could not arrange to do the extra work proposed by the Junior College Faculty without injustice to myself. I must, though reluctantly, recall to you just what I am doing. Besides the class in General Biology, I have eight students in Special Bacteriology. Some of these students are doing research work, and the work for all has to be planned according to individual advancement and aptitude. I give one advanced lecture a week to these students besides conducting a journal club. I have just organized a Bacteriological Club to meet regularly throughout the year. I am also, you will remember, doing the Dean's work of the Ogden School, the work of departmental Examiner and of Library Adviser for the Department. I am not given to counting hours, but I have hardly five working hours a week under my own control.

Furthermore, I am obliged to question the value of such a course as is proposed. I do not think discussion of biological problems would be at all profitable without definite

visual images to fall back upon. The course in General Biology is designed to cover just the ground mentioned. I do not believe that there is a short and easy road, and I regard the laboratory work as essential to any accurate notion of biological conceptions. The laboratory is the birthplace of scientific ideas.

Very truly yours,

Edwin C. Jordan.

The enclosed
is a letter from
the University of Chicago
to the University of
California at Berkeley
concerning the
transfer of the
rights to the
University of Chicago
of the patent
rights in the
invention of the
University of
California at
Berkeley.

Jordan

June 30, 1898.

My dear President Hearper: -

I wish to express my appreciation of your kindness in letting me know what I could count on at Rush next year before I left Chicago. The five hundred dollars will be a great relief to me financially, and I certainly feel deeply obliged to you for your action in the matter. I am quite anxious to learn the details of the arrangement, as regards number of hours per week, etc. Would it be possible for you to send me a word here? I tried to see you just before leaving, but was unable to do so.

Very truly yours,

Edwin C. Jordan -

(98)

June 29, 1897

My dear President Lincoln: -
I wish to express my appreciation
of your business in letting me know what I could count on
at that time you were I left Chicago. The firm would
allow me to be a great relief to me financially, and I
certainly feel happy to give for your action in the
matter. I am quite anxious to learn the latest of
the arrangements for my work, and I am sure
that it is possible for you to send me a great deal.
I tried to see you just before leaving, but was unable
to do so.

Very truly yours,

John F. Ford -

(18)

The University of Chicago

November 14, '98.

Jordan
Bact

My dear Pres. Harper:-

I gather from what you have said to me and from the letters you have sent that there is little likelihood of anything coming to me by way of Rush Medical School this year. Could you indicate to me any possible way of adding to my income? I had until lately depended, on the basis of your assurance, upon the sum of \$500.00. I am very desirous to meet the obligations I have incurred on the strength of this understanding. You will, I am sure, understand that I am already somewhat hard-pressed because of the failure to obtain what I had counted upon with entire confidence.

Very sincerely yours,

Edwin C. Jordan

(66)

The University of Chicago

November 1, 1901

My Dear Professor Huxley:

I thank you very much for the letter of the 27th.

From the letters you have sent I have seen that there is little likelihood of anything coming to me by way of such material before this year. Could you indicate to me any possible way of obtaining it at present? I had until last night expected, as the result of your statement, that the sum of \$200,000. I am very anxious to have the matter settled. I have been on the subject of this negotiation for a long time.

I am very anxious that I may be able to obtain the material before the fall. I am sure that I had counted on this matter for some time.

Very sincerely yours,
Huxley

Wm. D. Huxley

(11)

April 2nd. 1909.

Dear President Judson:-

Dr. Hektoen has referred to me your letter regarding milk analyses. It has been my policy never to permit purely commercial work to be taken up by anyone in the laboratory, but on several occasions Dr. Heinemann has made examinations of milk where public health interests have seemed involved. It seems to me that the distinction is a proper one and that we should be careful to avoid having the name of the University used for purely gainful purposes. On the other hand I feel that we owe it to the community to make the resources of the University available wherever a genuine service to public health can be rendered. Under some conditions milk analyses come under the latter head.

Yours very sincerely,

Edwin O. Jordan

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The Journal of Infectious Diseases
CHICAGO

NEW YORK
L. B. LIPPINCOTT
NEW YORK

April 2nd, 1908.

Dear President Judson:

Dr. Henshaw has returned to the good harbor harbor-
and will analyze. It has been my policy never to permit myself to
be taken up by anyone in the laboratory, but on several
occasions Dr. Henshaw has made examinations of my work and in his
reports has been most helpful. It seems to me that his criticism
is a most one and that he should be consulted in order to have the
of the University used for purely general purposes. On the other hand
I feel that we owe it to the community to make the resources of the
University available wherever a genuine service to public health can be
rendered. Under some conditions this analysis may be under the latter

Yours very sincerely,

Wm. D. Jones

Bacteriology

April 6, 1909

Dear Mr. Jordan:-

Yours of the 2d inst. with regard to milk analysis received. Of course we don't want to engage in commercial work. This is the statement, however, which was made to me:

1. The Harvard department does give milk analyses.
2. The fee charged therefor at Harvard is very much less than what is paid to Mr. Heinemann for individual analysis.

I am wondering whether the Harvard policy depends on the fact that, while of course in a sense this milk analysis is commercial, at the same time it has so important a bearing on public health as to make it worth while. What do you think about it?

Very truly yours,

H. P. J.

H. P. Judson

Mr. E. O. Jordan,
The University of Chicago.

April 6, 1909

Received

Dear Mr. Jordan:-

Yours of the 2d inst. with regard to milk
analysis received. Of course we don't want to engage in commer-
cial work. This is the statement, however, which was made to me:
1. The Harvard department does give milk analyses.
2. The fee charged therefor at Harvard is very much less than
what is paid to Mr. Heinemann for individual analyses.
I am wondering whether the Harvard policy depends on the fact
that, while of course in a sense this milk analysis is commercial,
at the same time it has so important a bearing on public health as
to make it worth while. What do you think about it?

Very truly yours,

H. P. Judson

Mr. E. O. Jordan,
The University of Chicago.

The University of Chicago

Jordan

*Courtesy of
J. H. Wood*

(3)

January 21st, 1899.

(H)

My dear Pres. Harper:--

I have had Mr. Parker and Mr. Simpson make careful estimates of the expense of fitting up the rooms that will be needed for the work next year. The total cost of lockers, work-tables, gas-piping and plumbing will amount to \$160.00. The room at present is entirely bare and is not supplied with either gas or water. I should be very glad if the authorization for this work could be given very soon in order that we may be entirely ready when the work of the Summer Quarter begins. In case it seems impossible to incur the attendant expense, will you kindly notify me in order that we may make arrangements for limiting the size of the classes.

Very truly yours,

Edwin Q. Jordan

To be done in June

The University of Chicago

Commenced
February 1st

(3)

January 21st, 1888

(H)

My Dear Professor:

I have had Mr. Barker and Mr. Simpson make
a full statement of the expenses of the rooms that
will be needed for the next year. The total cost of the
rooms, heating and plumbing will amount to \$100.00. The
rooms at present are entirely bare and in need of a
great deal of work. I should be very glad if the
amount could be given very soon in order that the
work may be done in time. The work of the
rooms is very important and will be kindly
helped in the most efficient manner. The amount of
the statement is enclosed for your reference.

Very truly yours,

Very truly yours,

John C. Smith
To the University of Chicago

The University of Chicago

Jordan

May 6th, 1899.

(58)

*Hygiene
H. J. Jordan
H. J. Jordan*

My dear President Harper:--

I was much interested in the chance word you let drop the other evening in which you suggested that my work might be looked upon as having a somewhat "commercial" tinge. It seems to me that there must be some misconception in regard to the work in which I am interested.

I am not one of those who believe that the University ought to stand aloof from the community in which it is placed, but I do agree most heartily with the view that the resources of the University should not be employed in any direct aid to individuals or groups of individuals engaged in money-making or money-getting. The exploitation of the commercial and industrial aspects of biology, chemistry and physics can, it seems to me, be safely left to the technical schools. This, I think, is what is ordinarily meant by commercialism in this connection.

I do not see how the line of work bearing upon public health can by any possibility be classed in the same category with "commercial" undertakings. No one is making or attempting to make money. When expert advice regarding measures of public hygiene that affect the health and welfare of the whole community is asked for it ought, I think, to be looked on in the same light as service to the public in other ways, for example, upon a Monetary Commission

May 27, 1903

(50)

My dear President:—

I was much interested in the common word you let drop the other evening in which you suggested that my work might be looked upon as having a somewhat "commercial" slant. It seems to me that there must be some misapprehension in regard to the work in which I am interested. I am not one of those who believe that the University ought to stand aloof from the community in which it is placed, but I do not most heartily with the view that the resources of the University should not be employed in any direct aid to individuals or groups of individuals engaged in money-making or money-getting. The exploitation of the commercial and industrial aspects of biology, chemistry and physics can, it seems to me, be safely left to the technical schools. What I think, in what is ordinarily meant by commercialism in this connection.

I do not see how the kind of work bearing upon public health can be any reasonably be placed in the same category with "commercial" undertakings. No one is seeking or attempting to make money. Then experts advise regarding measures of public hygiene that affect the health and welfare of the whole community is asked for. It ought, I think, to be looked upon as the same thing as a service to the public in other ways. For example, upon a University Commission

The University of Chicago

or an Educational Commission. Commercial interests are sometimes met with in the course of such service as you will remember was the case with the introduction of filters into the Public School, but I do not think that fact ought to deter us from doing what we can to introduce better hygienic and economical methods into municipal affairs.

I make this explanation because I should be very sorry to have you or any one else in the University feel for a moment that the work in which I am engaged smacks of commercialism in any form. The safeguarding of public health seems to me as little liable to such an imputation as any line of work pursued in the University.

Very truly yours,

Edwin R. Jordan

Pres. W. R. Harper,
University of Chicago.

The University of Chicago

of an Educational Committee. Committee in various new positions
not with in the course of such service as you will remember was the
case with the introduction of letters into the Public Health, but I
do not think that I ought to insist on them being what we can do
introduce better hygiene and educational methods into medical at-

least.

I make this explanation because I would be very sorry to have

you or any one else in the University feel for a moment that the

work in which I am engaged means of communication in any form.

The safeguarding of public health seems to me as little likely to

such an implication as any line of work pursued in the University.

Very truly yours,

Wm. D. Fisher

Pres. V. R. Harper,
University of Chicago.

October 2nd, 1899.

My dear Pres. Harper:--

I enclose the only statement I have received from the authorities at Rush in regard to my compensation for the course to be given there. I am entirely unwilling to let the matter go on this basis. I am willing to give one twenty-four hour course -- the course planned for the current quarter ^{for} \$500.00, but I do not see how in justice to myself I could undertake the work for a smaller sum. I learn from Dr. Eycleshymer that he is receiving \$300.00 for a course of ten lectures. ~~X~~ Unless my work can be arranged ^{on the basis I have suggested above} I should prefer to let the matter drop altogether. If possible can the matter be settled within a few days, since the course should be begun at once and I do not feel like starting the work till a perfectly definite agreement with the Rush authorities is obtained?

Very truly yours,

Pres. W. R. Harper,
University of Chicago.

Edwin O. Jordan

October 10, 1935

My dear Mrs. Harper:

I understand the only statement I have received from the authorities at that in regard to my compensation for the course so far given there. I am entirely unwilling to let the matter go on this basis. I am willing to give one thousand dollars more for the course planned for the future year. I am willing to give \$500.00, but I do not see how it is possible to give \$1000.00. I have received \$500.00 for a course of ten lectures. I think my work can be arranged so that I should prefer to let the matter drop also. I should like to see the matter dropped also. It is possible that the matter be settled within a few days. Since the course would be begun at once and I do not feel like waiting the work will be completed before the settlement with the Board authorities is obtained.

Very truly yours,

John D. Hart

Fred. A. Hart
University of Chicago

Rush Medical College
IN AFFILIATION WITH
The University of Chicago

Prof. Edwin O. Jordan,

Chicago. Sept. 12th, '99.

University of Chicago.

My dear Doctor Jordan:-

Your note of the 10th is at hand and we will let the announcements of your course go in as I had prepared them.

In regard to compensation, Prof. Ingals, the Comptroller, is the only one to speak in regard to the matter, but my understanding was that you were to receive compensation at the same rate as a full professor whose full salary is ^{\$3000.00} ~~\$366~~.00 for 540 hours' work. If this were the case, your compensation for the courses outlined would be for 48 hours, or, 48 - 540ths of 3000, namely, \$266.00. I will speak to Dr. Ingals in regard to the matter.

Very truly yours,

John M. Dodson

THE UNIVERSITY OF CHICAGO
 DEPARTMENT OF AGRICULTURE
 CHICAGO, ILL.

Chicago, Sept. 12th, 1907.

Prof. Edwin C. Jordan,

University of Chicago.

My dear Professor Jordan:-

Your note of the 10th is at hand and we will let

the announcements of your course as in as I had prepared them.

In regard to compensation, Prof. Ingalls, the Controller, is the

only one to speak in regard to the matter, but my understanding was that

you were to receive compensation at the same rate as a full professor whose

full salary is \$2500.00 for 540 hours' work. If this were the case, your

compensation for the course outlined would be for 45 hours, or, 48 -

\$4000.00, namely, \$2500.00. I will speak to Prof. Ingalls in regard to

the matter.

Very truly yours,

Bart
January 26th, 1900. *Howes*

My dear President Harper:--

I am desirous of not being misunderstood either by yourself or by the Rush authorities in regard to the work at Rush for the coming year. I am quite willing, but not anxious to do the work on the same basis as arranged for the present year, but I can hardly view in the light of a promotion an opportunity to do more work for the same recompense I am receiving. I am very far from wishing to make anything that appears to be an exorbitant demand from the standpoint of the authorities at Rush, and I very well understand that they can hardly afford to take into consideration the time spent by me in travel between the two institutions. At the same time, I am myself obliged to consider this point, and I cannot feel that for six hours a week, or 72 hours of my time, five hundred dollars, or about seven dollars an hour, is an altogether absurd figure, especially when it is remembered that there are many members of the University on the same salary as myself who for eight hours a week, or 96 hours in all, are receiving six hundred and sixty-six dollars. I do not, however, wish to urge this point, but prefer to leave the matter in your hands, in full confidence that you will appreciate how the matter appears to me from the simple point of view of time-expenditure and money-return.

I do not think that I am inclined to be unduly heedful of the matter of seniority, but I am sure that you will recognize that

Woods

January 20th, 1900.

My dear President:—
I am extremely sorry that I am unable to do more for the coming year. I am quite willing, but not anxious to do the work on the same basis as arranged for the present year, but I can hardly give in the light of a promise and opportunity to do more work for the same purpose. I am very far from wishing to make anything that appears to be an extraordinary demand from the standpoint of the authorities at home, and I very well understand that they are hardly likely to take into consideration the time spent by me in travel between the two institutions. At the same time, I am myself obliged to consider this point, and I cannot feel that for six months a week, or 75 hours of my time, five hundred dollars, or about seven hundred dollars, is an excessive amount of expense, especially when it is remembered that I have also my members of the University on the same salary as myself who for eight hours a week, or 40 hours in all, are receiving six hundred and sixty dollars. I do not, however, wish to urge this point, but prefer to leave the matter to the Board, in full confidence that they will appreciate the value of my services to the University and will not be less generous in their response.

I do not think that I am inclined to be unduly anxious of the matter of salary, but I am sure that you will be sympathetic.

EDWIN O. JORDAN
ASSISTANT PROFESSOR OF BACTERIOLOGY

THE UNIVERSITY OF CHICAGO
CHICAGO, ILLINOIS

the present situation has elements of surprise and discouragement
for me, and I can hardly be blind to the implication involved in
the more advantageous terms accorded recent appointees .

Very sincerely yours,

Edwin O. Jordan

President W.R. Harper,
University of Chicago.

THE UNIVERSITY OF CHICAGO
CHICAGO, ILLINOIS

LEWIS D. JORDAN
ASSISTANT PROFESSOR OF MATHEMATICS

The present situation has changed of course and I am
let me, and I am sorry to find that the investigation involved in
the more advanced work has been abandoned.

Very respectfully,
Yours,

William V. Johnston

President V. V. Johnston,
University of Chicago.

WILLIAM BOLDENWECK, President.

JAMES REDDICK, Clerk.

FRED M. BLOUNT, Treasurer.

ISHAM RANDOLPH, Chief Engineer.

FRED'K W.C. HAYES, Attorney.



Western Bank Note Company, Chicago.

THE Sanitary District of Chicago

SECURITY BUILDING

BOARD OF TRUSTEES:

WILLIAM BOLDENWECK.
JOSEPH C. BRADEN.
ZINA R. CARTER.
BERNARD A. ECKHART.
ALEXANDER J. JONES.
THOMAS KELLY.
JAMES P. MALLETT.
THOMAS A. SMYTH.
FRANK WENTER.

Chicago, Jan. 7, 1899.

W. R. Harper, President,

University of Chicago,

City.

*Mr. Fowler
Please send
me list (?)
of those I
send your
name on
M.H.
(17)*

Dear Sir:-

It is the purpose of this District to have a series of analyses made of the waters of the Chicago, the Desplaines, the Illinois and the Mississippi Rivers to show the extent of pollution under the existing conditions, and after the water is let into our Channel to again secure an analyses for the purpose of comparing the condition of the water then with what it is now. We wish to secure the services of competent chemists, bacteriologists and microscopists for this work, men whose character and reputation would be a guarantee to all men of the fidelity and care exercised in making the tests.

Will you kindly give me a list of the names of men eminent in this line of work that I may lay them before our Board of Trustees when they come to select the men to carry out their plans. An early reply will greatly oblige,

Yours very respectfully,

Isham Randolph

Chief Engineer.

The University of Chicago

Jordan

January 11th, 1899.

My dear Pres. Harper:--

The Drainage Canal problem is exactly in line with the series of experiments carried on by the Mass. State Board of Health at the time I was chief biologist to the Board in 1888 - 90. I have had somewhat extended experience in chemical, bacterial and microscopical analysis of ^{water, and} ~~canals~~ feel a keen interest in the scientific problems involved in such an inquiry as that proposed. I presume, owing to the large extent of territory to be covered, the investigation would have to be carried out on the cooperative plan, and the suggestion of Dr. Reynolds that the University of Chicago, the University of Illinois and Washington University, St. Louis, be asked to unite under a general plan seems to me a good one. It is of course essential that the work be carefully coordinated.

I should be glad to see Mr. Randolph or any member of the Board personally in case it seems desirable to you or to them, and to consider the general line of investigation it would be advisable to pursue.

I am very desirous of being concerned in the proposed investigation and shall feel deeply indebted to you for any steps you may see fit to take to further my interests.

Very truly yours,

Edwin D. Jordan

The University of Chicago

January 18, 1931.

My dear Mrs. Harkness:

The University of Chicago is deeply

informed that the matter of your interest in the

Board of Health is of great interest to the

Board in 1930-31. I have not received extensive

information, but I am sure that your

work is of great interest to the Board in 1930-31.

I am sure that your work is of great interest to the

Board in 1930-31. I am sure that your work is of great

interest to the Board in 1930-31. I am sure that your

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Very truly yours,

John D. Harkness

EDWIN O. JORDAN
ASSOCIATE PROFESSOR OF BACTERIOLOGY

THE UNIVERSITY OF CHICAGO
CHICAGO, ILLINOIS

November 14th, 1903

Bacteriology
✓
My Dear President Harper:-

I am hoping very much that it may be possible to make at once some thoroughly satisfactory arrangement for Dr. Kyes and his work. I feel sure that Dr. Kyes is on the eve of some important discoveries, which will bring great credit to himself and to the University. It seems safe to say that there is hardly any line of work now being pursued in the biological laboratories that bids fair to yield results of greater significance than this work of Dr. Kyes in the field of immunity. All branches of our medical research in particular are sure to feel and be benefited by Dr. Kyes' work. His wholly unique experience in Ehrlich's laboratory and the brilliant outcome of his investigations up to this time put Dr. Kyes in the front rank of students in scientific medicine in this country. It will I am sure be understood that the lines of investigation opened up by Dr. Kyes' work will be brought to fruition in other laboratories unless he be afforded at once suitable opportunities for prosecuting his study. I am exceedingly anxious for all the interests of the University and especially for the future of research in medicine that the importance of the situation be clearly recognized. I do not believe that the interests of medical investigation here can be too strongly emphasized at the present time. In many respects our situation is a critical one.

Yours very sincerely,

Edwin O. Jordan

November 14th, 1903

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Yours very sincerely,

Edwin C. Larsen

The University of Chicago

Office of the Secretary

Dear President: I have sent copies
of this report to each Trustee
and a few extra to Mr. Jordan.
Can you use any extra copies?

Very truly
J. H. Benson

THE UNIVERSITY OF CHICAGO

LIBRARY

From the University of Chicago
Library
This report is a copy of the
original report of the
University of Chicago
Library
The University of Chicago
Library

INVESTIGATIONS OF RESPIRATORY DISEASES

By the Department of Hygiene and Bacteriology

The Board of Trustees has made three appropriations of \$2,000 each to aid the Department of Hygiene and Bacteriology in its work of research on respiratory diseases. The Metropolitan Life Insurance Company, New York, also, has made two grants of \$3,900 each for the same purpose.

The Department makes the following report of its investigations during the past year:

September 26, 1921.

President Harry Pratt Judson,
University of Chicago.

Permit me again to express my appreciation to you and to the Board of Trustees of the University for the grant of \$2,000 made last year in aid of our work on respiratory diseases. It has been of great assistance in our investigations.

During the year we have completed our tabulation and study of an extensive series of observations made in certain state institutions of Illinois on vaccination against respiratory disease. We employed a widely-used vaccine, containing certain varieties of streptococci and pneumococci as well as so-called influenza bacilli. All these bacteria have at times been connected with outbreaks of respiratory disease. About 6,000 persons were under observation during a period of seven months, approximately half of this number receiving the vaccine. Ordinary cases of colds (rhinitis) and bronchitis developed with about equal frequency in vaccinated and unvaccinated groups. Influenza attacks amounted to 4.1 per cent among the vaccinated and 4.8 per cent among the unvaccinated, a difference not statistically significant. These results are believed to be important as checking the indiscriminate use of vaccines against varieties of respiratory disease still largely of unknown nature.

Studies have also been made on the possible occurrence of a filtrable virus as the cause of common colds and influenza, but so far without positive result. In the course of this work some important technical sources of error in the interpretation of laboratory data have been brought to light.

Extensive data have been accumulated on the occurrence of micro-organisms in the respiratory tract in health and in disease and these are now being tabulated and studied. Two papers in this field are practically ready for publication and one article by Associate Professor J.F. Norton and other members of

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the Department has already appeared. A special study of an unusual outbreak of respiratory disease among the pupils of the School of Education has also been completed and is nearly ready for the printer.

Work now in progress includes an epidemiological study in one of the county institutions, a similar investigation in connection with infant welfare work in Chicago, and continued bacteriological study of the respiratory tract by methods that are being steadily improved and elaborated.

The grant made last year has been partly spent for laboratory assistance, but to a large extent also in needed equipment which will be of permanent value in all our work.

(Signed) Edwin O. Jordan.

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Work now in progress includes an epidemiological study in one of the county institutions, a similar investigation in connection with infant welfare work in Chicago, and continued bacteriological study of the respiratory tract by methods that are being steadily improved and elaborated. The grant made last year has been partly spent for laboratory maintenance, but to a large extent also in needed equipment which will be of permanent value in all our work.

(Signed) Edwin C. Jordan.

November 26, 1920

Dear Mr. Jordan:

I have your note of the 22nd relating to Mr. Norton. Of course the matter will be considered in connection with the budget.

Very truly yours,

Mr. Edwin O. Jordan,
Faculty Exchange.

HPJ:JN

November 28, 1930

Dear Mr. Jordan:

I have your note of the 22nd relating to Mr.
Horton. Of course the matter will be considered in
connection with the budget.

Very truly yours,

Mr. Edwin O. Jordan,
Faculty Exchange.

WJ:JH

+175

The University of Chicago
Department of Hygiene and Bacteriology

November 22nd, 1920.

Dear President Judson:-

[In my budget recommendation^s, sent under separate cover, I am recommending the promotion of John F. Norton to an ~~Associate~~-Professorship. Dr. Norton's four year term as ~~Assistant~~-Professor expires at the end of the current year and I feel that his value to the University warrants his promotion at this time. He has proved an invaluable man in the department, is an excellent teacher and has an unusual mastery of the details of laboratory supply and equipment. He is deeply interested in investigation and is publishing regularly papers of good quality although of no remarkable originality. He is active in the affairs of professional societies and has been chosen for various offices of responsibility. I do not feel that any mistake will be made by his appointment on the permanent staff of the department.

Sincerely yours,

Edwin R. Jordan

The University of Chicago
Department of Zoology and Botany

November 22nd, 1920.

Dear President Johnson:-

In my budget recommendation, sent under separate cover, I am recommending the promotion of John F. Norton to an Associate-Professorship. Dr. Norton's four year term as Assistant-Professor expires at the end of the current year and I feel that his value to the University warrants his promotion at this time. He has proved an invaluable man in the department, is an excellent teacher and has an unusual mastery of the details of laboratory supply and equipment. He is deeply interested in investigation and is publishing regularly papers of good quality although of no remarkable originality. He is active in the affairs of professional societies and has been chosen for various offices of responsibility. I do not feel that any mistake will be made by his appointment on the permanent staff of the department.

Sincerely yours,

Wm. L. Fisher

get address

+21

The University of Chicago
Department of Hygiene and Bacteriology

Shirley, Mass.

June 30, 1921.

Dear President Judson:-

I have just received from Dr. Norton the news of his promotion. I have rarely had anything so much at heart for the welfare of the University, and I want to thank you very warmly for what I know could have been brought about only with much thought and management on your part.

Sincerely yours,

Edwin C. Jordan

The University of Chicago
Department of Religion and Philosophy

Chicago, Ill.

June 10, 1921.

Dear President Johnson:-
I have just received from Dr. Horton
the news of his resignation. I have rarely had anything
such as hurt for the welfare of the University, and I want
to thank you very much for what I know could have been
brought about only with such thought and management on your

Sincerely yours,

July 5, 1921

Dear Mr. Jordan:

Thank you for yours of June 30th. I was very glad that we found it possible to make the arrangement that you so much desired. Of course it was rather hard to accomplish as you know things of that kind just now are not easy.

Very truly yours,

Dr. Edwin O. Jordan,
Shirley, Mass.

HPJ:JH

July 8, 1921

Dear Mr. Jordan:

Thank you for yours of June 30th. I was very glad that we found it possible to make the arrangement that you so much desired. Of course it was rather hard to accomplish as you know things of that kind just now are not easy.

Very truly yours,

Dr. Edwin O. Jordan,
Whitely, Mass.

WJ:JH

Hygiene

✓

BUREAU OF HEALTH REGULATIONS

Governing Infantile Paralysis

1. Inspection applies only to students under 16 years of age.
2. Students from infected areas should be excluded for a period of not less than two weeks.
3. Infected areas are defined as follows:
 - (a) In Illinois as per the attached list.
 - (b) In other states east of Illinois, if the student has a Federal Health Certificate it is evidence that the district from which the student comes is under suspicion, and the student should be excluded for two weeks; if the student has no Federal Health Certificate and comes from territory east of Pittsburgh he should be excluded for two weeks. In case of any doubt as to the wisdom of exclusion, each case should be specially referred to the Department of Medical Inspection, Bureau of Health.

The above information supplied by Dr. Rawlings,
Assistant Chief, Bureau of Medical Inspection.

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The above information supplied by Dr. R. H. H. H.

Assistant Chief, Bureau of Medical Inspection.

List of Restricted Areas - Infantile Paralysis.

Bureau County -

Clarion Township

none (Lamoille just West in Lamoille Township)

Westfield Township

Arlington

Cherry

Hall Township

Beatanville

Todd

Hegeler

Churchill

Dalzell

Spring Valley

Marquette

DeWitt County -

Turnbridge Township

Kenney

Rowell

Texas Township

Ospur

Creek Township

Lane

Nixan Township

Weldon

List of Restricted Areas - Infantile Paralysis.

Bureau County -

Clarion Township

none (Lemelle just west in Lemelle Township)

Westfield Township

Atlington

Cherry

Hall Township

Beatonsville

Todd

Hegeler

Churchill

Dalzell

Spring Valley

Marquette

DeWitt County -

Turnbridge Township

Kennedy

Howell

Texas Township

Opdyke

Greek Township

Lane

Nixon Township

Weldon

LaSalle County

Cedar Point
Dana
Dayton
Deer Park
Earlville
Garfield
Grand Ridge
Kangley
Kernon
La Salle
Leeds
Leland
Leonore
Lostant
Marseilles
Mendota
Meriden
Oglesby
Ottawa
Peru
Ransom
Rutland
Seneca,
Serena
Sheridan
Streator
Tonica
Triumph
Troy Grane
Utica
Wedron

Macon County

Argenta
Blue Mound
Brady
Casner
Decatur
Elwin
Emery
Forsyth
Harriestown
Long Creek
Macon
Maroa
Mount Zion
Niantic
Oakley
Oreana
Prairiehill
Walker
Warrensburg

LaSalle County

Cedar Point
 Dana
 Dayton
 Deer Park
 Earlville
 Earlfield
 Grand Ridge
 Langley
 Kernon
 La Salle
 Leoda
 Leland
 Leonore
 Lottant
 Marshall
 Mendota
 Meriden
 Oglesby
 Ottawa
 Peru
 Ransom
 Rutland
 Seneca
 Seneca
 Sheridan
 Streator
 Tonic
 Triumph
 Troy Grove
 Union
 Weston

Mason County

Argenta
 Blue Mound
 Brady
 Ganser
 Decatur
 Elwin
 Emery
 Forsyth
 Harrisburg
 Long Creek
 Mason
 Matos
 Mount Zion
 Niantic
 Oakley
 Oran
 Prairieville
 Walker
 Warrensburg

Marshall County -

Evans Township

Porterfield

Menona

Custer

Evans

Bennington Township

Taluca

Caton

Rutland

Moultrie County -

Dora Township

Lake City

Dalton City

Lovington Township

Lanton

Ullrich

Lovington

Lowe Township

Williamsburg

Fairbanks

Arthur

Piatt County -

Atwood

Bement

Cerro Gordo

Cisco

DeLand

Galesville

Marshall County -

Evans Township

Porterfield

Menom

Carter

Evans

Bennington Township

Talbot

Caton

Rutland

Monticello County -

Dora Township

Lake City

Dalton City

Jovington Township

Lanton

Ulrich

Jovington

Low Township

Williamsburg

Fairbank

Arthur

Piatt County -

Atwood

Bement

Carro Gordo

Cisco

Deland

Galveston

Piatt County (Cont'd.)

Hammond

Harris

La Place

Lintner

Mansfield

Milmine

Monticello

Pierson Station

White Heath

Pitt County (Cont'd.)

Hammond
Harris
La Place
Linter
Mannfield
Mims
Monticello
Pierce Station
White Earth

BUREAU OF HEALTH REGULATIONS

Governing Infantile Paralysis

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The above information supplied by Dr. Rawlings, Assistant Chief, Bureau of Medical Inspection.

BUREAU OF HEALTH REGULATIONS
Governing Infantile Paratyphoid

1. Inspection applies only to students under 16 years of age.
2. Students from infected areas should be excluded for a period of not less than two weeks.
3. Infected areas are defined as follows:
 - (a) In Illinois as per the attached list.
 - (b) In other states east of Illinois, if the student has a Federal Health Certificate it is evidence that the district from which the student comes is under suspicion, and the student should be excluded for two weeks; if the student has no Federal Health Certificate and comes from territory east of Pittsburgh he should be excluded for two weeks. In case of any doubt as to the wisdom of exclusion, each case should be specially referred to the Department of Medical Inspection, Bureau of Health.

The above information supplied by Dr. Rawlings, Assistant
Chief, Bureau of Medical Inspection.

Don't want.

THE PHYSICAL WELFARE OF STUDENTS.

I. Responsibility of a University for the physical well-being and all-around development of its students well recognized in the past few years, as indicated by the attention given to the following factors in many places:

1. Housing---Dormitories.
 2. Food---Commons.
 3. Social Development---Clubs, etc.
 4. Physical Development---Gymnasium, Athletic Fields, and Required Work in Physical Training.
 5. Medical Advice---Physical Examinations of the well, and Special Consultations for the sick.
 6. Protection from Contagion, etc.---By Medical Supervision.
- In some institutions courses in personal hygiene have been established for the instruction of students in fundamental factors that influence health and working efficiency, but so far, no adequate and coherent plan of providing proper care for the sick student or protection for the University community as a whole has been developed in any institution of importance.

II. Suggested Plan for the University of Chicago.

1. Organize Department of Health and Sanitation,--which shall be made responsible for the supervision of student health and for the sanitary conditions of buildings and grounds, i.e., centralize the general administration of all factors modifying the health of the community, just as the responsibility for buildings and grounds is centralized.
2. Define the scope and purposes of this proposed Department somewhat as follows:
 - A. Educational.
 - a) Provide instruction in personal hygiene to all students. Required of undergraduates, optional for others.
 - b) Provide instruction in general, personal, and school hygiene to all students in the College of Education.
 - B. Preventive.
 - a) Close supervision of buildings on the campus with reference to dormitory conditions in general, such as cleaning, heating, ventilating, etc., etc., in co-operation with the Superintendent of Buildings and Grounds.
 - b) Regular inspection of rooming and boarding houses, with a view to compiling a list of recommended places. (Already provided for.)
 - c) Physical examination of students of all grades for the purpose of determining functional and organic status, and of obtaining a basis for advice as to general habit of living, exercise, and program, in general, insofar as health and working capacity are affected. (Already provided for.)
 - d) Medical supervision of the children of the Elementary and High Schools for the purpose of guarding against conditions that favor disease and limiting the spread of any contagion that may obtain a foothold among the pupils, who are at this age very susceptible to acute infections. (Already provided for.)
 - C. Curative. *Medical supervision of ill students.*
 - a) Provide medical advice and treatment for such students as may be sick at minimum expense to them; office

THE PHYSICAL WEAR AND TEAR OF STUDENTS.

Physical Education

I. Responsibility of a University for the physical well-being and all-around development of its students well recognized in the past few years, as indicated by the attention given to the following factors in many places:

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2. Food---Commons.
3. Social Development---Clubs, etc.
4. Physical Development---Gymnasium, Athletic Fields, and Required Work in Physical Training.
5. Medical Advice---Physical Examinations of the well, and Special Consultations for the sick.
6. Protection from Contagion, etc.---By Medical Supervision.

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 - C. Curative.
 - a) Provide medical advice and treatment for such students as may be sick at minimum expense to them; office

II 2 C

hours for those who can call; room visits for those unable to come to office. provide for daily morning reports from head of house or janitor in cases of sickness.

- b) In cases where sickness is serious, or even of a sort that will confine the student to room for two or three or more days, arrange to place him in infirmary, (men at Hitchcock, women at Green,) or in University infirmary, if one is established, under care of trained nurse and own physician, if desired. *(Already provided)*

Many of the rooms, even in the dormitories, are not suited for the proper care even of slightly sick persons. This plan would provide proper care and attention for the individual, as well as adequate protection for the community, at a minimum expense.

Operative or more serious cases would, of course, be sent to a regular hospital. In this connection, provision should be made for prompt notification of parents or friends, and duplicate lists kept on file at the President's Office and in the Physician's Office. *of cases*

3. The Executive Officer of this Department should be a duly qualified medical practitioner and a regular member of the University faculty.

III. Discussion.

1. Advantages of the Plan. The development and operation of such a plan as the one proposed would have three principal advantages.

A. A single, well organized, clearly defined department would take the place of several agencies, loosely or not at all related, with large gain in efficiency, in proportion to the cost to the University, and a great saving, in the long run, to the individual student. At the same time it would afford adequate means for the protection of the community in general. Such an organization as this would make the repetition of such a mistake as the installation of expensive drinking fountains equipped with common drinking cups impossible.

- B. This plan provides for definite, adequate instruction to two classes of people in a subject that has been largely, if not entirely, neglected in the curriculum so far, i.e., Hygiene.

a) The Undergraduate Body: Courses in practical, every-day hygiene. The grade and amount of ignorance on the simple, elemental facts of every-day living that exists among otherwise well informed men and women is astonishing, and can scarcely be realized by anyone who has not had an examining room and clinical experience.

b) The College of Education Students who are being trained for positions as teachers: courses in general, personal, and school hygiene, so that they may be prepared to deal intelligently with individual cases and general conditions that will be met among those for whom, as teachers, they will be responsible.

- C. The educational value of conclusions based upon a careful study of the material made available in the course of the routine administration of such a plan would be very great. ~~and is at present lost, except in the gymnasium.~~

hours for those who can call; room visits for those unable to come to office. Provide for daily morning reports from head of house or janitor in case of sickness.

b) In cases where sickness is serious, or even of a sort that will confine the student to room for two or three or more days, arrange to place him in infirmary, (men at Hitchcock, women at Green), or in University infirmary, if one is established, under care of trained nurse and own physician, if desired.

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III. Discussion.

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A. A single, well organized, clearly defined department would take the place of several agencies, loosely or not at all related, with large gain in efficiency, in proportion to the cost to the University, and a great saving, in the long run, to the individual student. At the same time it would afford adequate means for the protection of the community in general. Such an organization as this would make the repetition of such a mistake as the installation of expensive drinking fountains equipped with common drinking cups impossible.

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b) The College of Education Students who are being trained for positions as teachers: courses in general, personal, and school hygiene, so that they may be prepared to deal intelligently with individual cases and general conditions that will be met among those for whom, as teachers, they will be responsible.

C. The educational value of conclusions based upon a careful study of the material made available in the course of the routine administration of such a plan would be very great.

III 2. Practicability.

- A. Most of the factors necessary to the carrying out of such a plan are already available, though operating independently and with no harmony of action.
- a) A plan of co-operation between this department and the Department of Household Administration, by which the results of the inspection of boarding and rooming houses might be made available to the University Physician.
 - b) University Physician.
 - c) Various Physical Examiners: Drs. Small, Norris, Frew, and Raycroft.
 - d) The resident nurse in the women's halls.
 - e) Infirmarys, Green and Hitchcock, for minor cases of sickness.
- B. A University Infirmary can be established. (See separate report.)

3. Methods.

A. Organization.

- a) ~~Appoint~~ ^{would be} the executive head of this department, the University Physician.
- b) Make men and women now engaged in various sorts of work now in progress members of the staff of this Department.
- c) Arrange for co-operation in practical administration of work with

Department of Bacteriology.
Department of Household Administration.
Local Physicians.
Department of Buildings and Grounds.
Department of Hygiene and Physical Education at the School of Education.

B. Instruction.

- a) Develop and give brief, adequate, required courses in Personal Hygiene to all undergraduates, men and women separately, in small groups.
- b) Develop and give general and special courses in hygiene and sanitation suitable for persons training to become teachers or public health officers.

C. Sanitary Supervision: Periodical inspection of all places in which students lodge or board.

- a) Intra-University, making such recommendations to the President as conditions may demand.
- b) Extra-University, modifying the approved list according to conditions as found.

D. Medical Supervision.

- a) Physical examination and advice based on data so obtained.
- b) Means for controlling such foci of acute infection as may appear.
- c) Supervision of all cases of sickness occurring among students in residence.
- d) Check up absences and find out causes. (Dean's Offices.)
Instructors report to office those absent two consecutive days.
- e) Proper disinfection where necessary.

- III. 2. Practicability.
- A. Most of the factors necessary to the carrying out of such a plan are already available, though operating independently and with no harmony of action.
- a) A plan of co-operation between this department and the Department of Household Administration, by which the results of the inspection of boarding and rooming houses might be made available to the University Physician.
- b) University Physician.
- c) Various Physical Examiners: Drs. Small, Norris, Frew, and Raycroft.
- d) The resident nurse in the women's halls.
- e) Infirmaries, Green and Hitchcock, for minor cases of sickness.
- B. A University Infirmary can be established. (See separate report.)
3. Methods.
- A. Organization.
- a) Appoint the executive head of this department, the University Physician.
- b) Make men and women now engaged in various sorts of work now in progress members of the staff of this Department.
- c) Arrange for co-operation in practical administration of work with
- Department of Bacteriology.
Department of Household Administration.
Local Physicians.
Department of Buildings and Grounds.
Department of Hygiene and Physical Education at the School of Education.
- B. Instruction.
- a) Develop and give brief, adequate, required courses in Personal Hygiene to all undergraduates, men and women separately, in small groups.
- b) Develop and give general and special courses in hygiene and sanitation suitable for persons training to become teachers or public health officers.
- C. Sanitary Supervision: Periodical inspection of all places in which students lodge or board.
- a) Intra-University, making such recommendations to the President as conditions may demand.
- b) Extra-University, modifying the approved list according to conditions as found.
- D. Medical Supervision.
- a) Physical examination and advice based on data so obtained.
- b) Means for controlling such foci of acute infection as may appear.
- c) Supervision of all cases of sickness occurring among students in residence.
- d) Check up spasms and find out causes. (Dean's Office.)
- Inspectors report to office those absent two consecutive days.
- e) Proper disinfection where necessary.

III 3 E. Medical Treatment.

- a) Ambulatory cases. Office fitted up for examination and treatment of such cases as present themselves. Main office and two extra rooms, one for men and one for women; physician assisted during office hours by nurse; medicine furnished at cost; treatment otherwise free.
- b) More serious cases. Knowledge gained by daily morning reports of cases of sickness in dormitories or lodging houses by responsible persons, janitors, boarding-house keepers, etc. Failure to make report of case of sickness to be penalized. Morning rounds to investigate such cases, with a view to instituting proper measures.

F. Use the infirmaries now in existence, in which---

- a) Equipment is already installed and fairly complete.
- b) General expenses might be met from a special fund provided for the purpose, and from nominal fees from those treated.
- c) Foods supply.
 - 1) Hitchcock---From breakfast room.
 - 2) Green---From women's commons. *Officer*
- d) Supervision under the Medical ~~Director~~---open to all students, whether under the care of
 - 1) The University Physician, or
 - 2) Physicians outside the University who may have been called in by the student.

G. Organize University Hospital near campus, which shall be available for the care of all emergency cases, cases of acute sickness, contagion, and otherwise.

- a) Location---
- b) General arrangement and provisions---
- c) Financial outlay.
 - 1) Initial expense---
 - 2) Maintenance---

H. Plans at other institutions. (Material being collected.)

Revision of plan
outlined March
1907. March 1910.

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2) Maintenance---

c) Financial outlay.
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c) Woods apply.

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a) Ambulatory cases. Office fitted up for examination

III 3 E. Medical Treatment.

A minority report of the Dean's committee on matters of Hygiene, etc.

With the exception of a few provisions of the report as submitted, I am in hearty sympathy. I think it is only right for me to state that I was not informed of the final meeting of the Committee, and did not know such a meeting had been held, until after the report was drawn up and submitted; consequently I had no opportunity to discuss these provisions as they were finally drawn up.

In the matter of having a sanitary expert to take charge of all the important questions of hygiene, food inspection, drinking water, ventilation, etc. It was specifically stated by Dr. Hektoen who introduced the subject, that this should of course be a department entirely distinct from either the physical examinations or the medical supervision of the students. I believe all the members agreed with his suggestion. I was consequently surprised to see in the report that the committee recommended the Department of Hygiene and the medical supervision of the students be included under the same head. I have asked Dr. Hektoen since the report was submitted if I was correct in my interpretation of his suggestion, and he assured me that I was; that of course it should be an entirely separate department. It seemed to me therefore that this construction should be given as a recommendation of the Committee, and not as a minority opinion.

In regard to the medical supervision of the students, it is perhaps not inappropriate just here, to explain a little in detail what is being done in this line. If I could have been present⁴ at the last meeting I would have spoken of it there, as I am sure the Committee as a whole is not fully acquainted with the method in use. The University Physician has an office hour every week-

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day in his office in Cobb Hall for free consultation for students. There is an average of over 1500 consultations a year.

Office consultations represent only a part of the work. Whenever a student is taken sick in any of the dormitories, it is immediately reported to the University Physician, who investigates the case and reports the exact condition (nature of the case, the attending physician, etc.) to the President. In the case of any contagious disease, the student is isolated and removed when possible, and the rest of the dormitory protected as fully as possible from contagion. After the termination of such a case thorough disinfection is done.

No fee is charged in these cases. When, however, the University Physician is called upon to attend cases of illness a moderate fee is charged, if the student is able to pay for such visits. A very considerable amount of gratuitous service is constantly rendered in this way. The University maintains two beds for the use of our students in the Chicago Baptist Hospital. Any student who is taken sick can have the use of this bed, provided his sickness is not of a contagious character. He is expected to pay for the services of his attending physician unless otherwise specified. If however, he is unable to do this, he is assigned to the care of one of the attending staff physicians, whose services in such cases are rendered gratuitously. We have made use of the Hospital in this way in a considerable number of instances. I thoroughly agree with the recommendation, that a Hospital building somewhere on the University grounds, for both men and women, with facilities for the proper isolation of contagious cases is urgently needed. I might add, that steps are already in progress, for securing a small building for the use

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of emergency or contagious cases, with the necessary equipment for its operation.

In regard to the physical examination of students:- I believe that as the University requires the work of physical training, it is the duty of the University to see that each student who is to do the work, is in proper physical condition to do this work. This, it seems to me is the primary purpose of this examination, and consequently it should be done as soon as the student enters and before beginning the work. This has always been done in the Women's department, examinations being completed in the first two or three weeks after the opening of the quarter. Only the lack of adequate quarters has prevented it from being completed in a single week. Any minor details of an examination could be made later on, as necessary, but the important feature of the examination- to discover whether or not there exists any contraindications to taking up the work, can be done by one examiner in a comparatively short time. I do not see why a single examiner, giving his entire time to this work, could not complete it in a equally short period of time in the men's department. At the meeting I attended, when this question of having several examiners was discussed I am sure that the majority of opinion was against such a recommendation.

In regard to having an oculist to examine the eyes, I do not agree to the advisability of it, for the following reasons:- Among all the lines of activity where physical examinations are made we can take as the highest standard of efficiency, those conducted by the government in examining applicants for the medical service in both the Army and Navy; or even the examination required by the applicant for a policy in any of the

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best established life insurance companies. All that is required here, is the test for the acuteness of vision, and the test for color-blindness. Most of the insurance companies do not even require as much as this. Any physician who is qualified to make a physical examination is certainly qualified to make these tests. If any evidence of a diseased condition of the eyes is found, the examiner should record such a condition, and advise the students to consult an oculist; but it is not his province as the examiner, to go further than this. The ears, nose, throat, or any other organ of the body, might show evidence of a diseased condition, as in fact we not infrequently find to be the case. Why would it not be just as reasonable to recommend the employment of specialists in these other lines? In the case of women, the necessity arises much more frequently, of making special inquiry into the condition of the nervous and sexual systems, than for symptoms referable to the eyes, consequently a neurologist and a gynecologist could be recommended with equal propriety on the examining force.

In regard to the employment of a woman physician for the women students, I understand that there has been some objection to the method as it has thus far been conducted. I do not wish to enter any objections to this recommendation if there is any serious opposition to our present method, which is this:- The University Physician examines the heart/ lungs, eyes, and ears; and the remainder of the examination is made by the director of the department and her assistants. I would only say that the women very frequently during the examinations express their interest in what the examination reveals as to the condition of their hearts and lungs. Not infrequently, too, mothers of the girls

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have spoken to me of their appreciation of this work, and have thanked me for doing it.

On the other hand, it is undoubtedly true that some of the women object to having a man make this examination; some even object just as strongly to either a man or a woman, protesting against any examination. I think it would possibly be advisable to have some woman physician upon whom we could call, to report to her such cases, or to make any special examinations where such appeared necessary. It is my opinion that more than one regular examiner in each department would cause needless confusion, would not materially hasten the necessary work, if done as I believe it can be arranged, and is therefore unnecessary .

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Blair P. Swell

DR. CHARLES P. SMALL
100 STATE STREET
CHICAGO.

January 9, 1911.

ANSWERED

JAN 11 '11

G. E. VINCENT,

Dean George E. Vincent.

My dear Mr. Vincent:-

In regard to the report of the committee on "Hygeine" etc. which has been submitted to you, I wish to say that my signature as a member of the committee endorsing all the items of the report as submitted, is unauthorized and I protest against it as I do not agree with a few of the items as expressed in the report.

At the last meeting of the committee which I attended, several of the members expressed opinions contrary to the ones given in the report as the opinions of the committee. On one item five members present (a majority of the committee) expressed an opinion contrary to the one submitted in the report.

My principal reason for protest however, is that at the final meeting of the committee, when the report was to be put into shape for its submission, I was not notified that such a meeting was to be held, and knew nothing about it until this report was already in your hands.

It seems to me that in matters so closely involving my own work, it is hardly just to me that I was not allowed to have a voice in the deliberations of the committee on which I had been appointed.

If this report in its entirety expresses the opinion of a majority of the committee, before it is taken up for

ANSWERED

JAN 11 1911

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DR. GEORGE E. VINCENT
100 STATE STREET
CHICAGO, ILL.

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Very truly yours,

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The University of Chicago

FOUNDED BY JOHN D. ROCKEFELLER

THE BARTLETT GYMNASIUM
OFFICE OF THE MEDICAL EXAMINER

Division of Physical Culture and Athletics

Report of the Committee Appointed by the Deans to Consider and Make Recommendations on the following Questions:

- I. Methods of Supervising Sanitary Conditions in the University.
- II. Provisions for ~~the~~ Protecting the Well from Infection and ~~the~~ Caring for the Sick.
- III. Physical and Medical Examinations of New Students.
- IV. Provisions for Regular Courses of Lectures on Personal Hygiene.

A. General Statement.

The responsibility of educational institutions for the physical well being and all-round development of its students is coming to be more definitely recognized, as indicated by the attention that has been given to the various factors that tend to improve living and working conditions, viz.: Dormitories for better housing; Commons for proper food; Students' Clubs and Unions for healthful social intercourse and development; Gymnasia, Swimming Pools, Athletic Fields, and required Physical Training for proper physical growth and development; Physical Examinations and Medical Advice to enable the individual to maintain a high grade of working efficiency; and Medical Supervision for the care of the individual and the protection of the community.

Students in the University are required to maintain a standard of work that involves strenuous mental and physical effort and the ability to meet the requirements depends upon a reasonable degree of health and vigor.

The University is a community in which students are brought into intimate contact in class-room, laboratory, and dormitory, each one exposed thereby to more than the ordinary possibility of infection from one to another if any one of them is suffering from tuberculosis, diphtheria, typhoid fever, certain skin and venereal diseases.

The University is in duty bound to see that such conditions are maintained and that such supervision is exercised as shall insure to each student freedom from additional or avoidable risk to his health, due to his residence and work in the University. It can not insure to the student freedom from the usual diseases common to all, but it should make provisions that will (a) enable the individual to obtain proper care at a minimum expense of money and time, and will (b) protect the community from

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-2-

the spread of such sickness.

In general, then, it is the duty of the University to protect its students by all reasonable means from infection through such sources as:

- a. The drinking water supplied or its method of distribution.
- b. The food supplied at the Commons and elsewhere.
- c. The rooms and houses that are on the University approved list.
- d. The admission of students suffering from or carriers of infectious diseases.
- e. Failure to detect and isolate promptly cases of infectious diseases which may arise.

It is also the duty of the University to inform each student as to his physical condition, so that he will not undertake physical or mental work in excess of his abilities, and, if necessary, to forbid the student from undertaking such work.

The University should also make provision for the instruction of all of its students in the fundamentals of personal hygiene and of those phases of community hygiene that are especially related to the University community, and will increase his efficiency as a member of society.

B. Recommendations.

I. The Committee recommends that a University Board of Hygiene should be created to take charge of general questions of Hygiene in the University, and that there should be appointed an executive officer who should have supervision and charge of all matters which fall under the heads of Hygiene, Sanitation, and Medical Supervision in the University.

II. The Committee further recommends that arrangements should be made by which such a Board and its executive officers might be able to avail themselves of the laboratory facilities of the University.

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III. The Committee recommends that the University should establish an infirmary, where resident men and women students who are sick might be properly cared for. Provision should be made in this infirmary for the adequate isolation and care of cases of infectious diseases, such as chicken-pox, measles, scarlet fever, diphtheria, and so on. This infirmary might be established in a suitable building on the University property, e.g., 5845 Drexel Avenue. A sufficient appropriation should be provided by the University to maintain this infirmary, and its staff, with the understanding that students who are sick and use the infirmary are to be charged a fee proportionate to the services required, and that the money received from this source is to be used in defraying the expenses of the infirmary.

The need for this provision is most pressing.

The Commissioner of Health, Dr. W. A. Evans, promises his full co-operation in the matter of the establishment of such an infirmary.

IV. The Committee recommends that a course of lectures on personal hygiene be given to all new students as soon as possible after their entrance into the University. (It is suggested that the sections of English 1 include practically all the Freshmen during the first quarter of residence, and that these groups are not too large to hear such lectures to advantage.) There should be organized a major course in Hygiene which should be open to all students.

V. It is considered extremely desirable that the physical examinations of new students in the University should be completed within the first two weeks after their entrance into the University. Attention is called to the fact that these examinations would be greatly increased in value if they could be made during the days of registration before the beginning of the quarter. These examinations should include an adequate examination of the eyes by a trained oculist. The medical examination of women should be made by women physicians. The staff necessary to make these examinations within the time indicated would be:---

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THE BARTLETT GYMNASIUM
OFFICE OF THE MEDICAL EXAMINER

Division of Physical Culture and Athletics

-4-

For University Men---Two additional physicians, who should be used, one in the morning, and one in the afternoon, until the examinations are completed.

For School of Education Girls---A woman physician for at least a week to assist in making the medical examinations of girls who are entering the School for the first time.

For School of Education Boys---An additional physician to assist the present staff in the physical examinations, so as to have them completed as soon as possible.

The Committee recommends that a statement formulated on the basis of careful consideration by the home physician of certain important points about the physical condition of the student, be required of each entering student. Students who find it impossible to present such a statement should have the medical examination during the registration days, if possible.

VI. The Committee recommends that increased provision be made for the medical supervision and care of the students in general, as follows:---

For Women---An arrangement should be made by which a woman physician may be connected with the University on such a basis as to allow her to make the medical examinations of women, as indicated above, and to give lectures on Hygiene, already referred to, and to hold convenient office hours during the year for consultation by women who are sick.

For Men---The work of the Medical Officer should be so arranged as to allow him to keep office hours for consultation by men students who are sick, and to give lectures on personal hygiene to incoming students, and to give adequate consideration to questions of Hygiene and Sanitation in the University in general.

VII. The Committee recommends that the present vaccination certificate requirement be strictly enforced, and that each student who returns to the University after a long vacation be required to report regarding his own health during the vacation and whether he was exposed to infectious disease. This will enable the University authorities to investigate suspicious cases.

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The University of Chicago

FOUNDED BY JOHN D. ROCKEFELLER

Division of Physical Culture and Athletics

-5-

VIII. The Committee recommends that no undergraduate student be allowed to take more than three majors' work in the University without examination by, and the permission of, one of the permanent University examining physicians.

The Committee presents in this report an outline of general considerations which it believes to be of great importance, and specific recommendations for their administration. It stands ready to make a detailed presentation of the expense that would be required to put one or all of these recommendations into effect.

Respectfully submitted,

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John M. Dodson
Gertrude Dudley
Ludwig Hektoen
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December 21, 1910.

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December 21, 1910.

Box 15, folder 11
President Harper.
With compliments.

Experiments in Grafting Hydra.

By

Mary Hefferan.

With 3 plates and 2 figures in text.

Sonderabdruck

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By
Mary Hefferan.

With Plates XXIII—XXV and 2 figures in text.

Eingegangen am 22. December 1901.

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A. Introduction.

After TREMBLEY's famous experiments on Hydra in 1740—44, several investigators in the next few years repeated parts of his work with more or less success. Among them were BAKER (1773), RÖSEL VON ROSENHOF (1755), and LICHTENBERG (1773), who obtained union of grafts by binding them together with a hair. Then for a

century little work was done upon the morphology of Hydra until ENGELMANN (1878), and MARSHALL (1882), described the formation of polyps from pieces of tentacles, results which have been disproved by NUSSBAUM (1887—90) and Miss PEEBLES (1897). NUSSBAUM and ISCHIKAWA (1899) experimented upon the eversion of polyps, and differed as to the manner in which the ectoderm regained its normal position. ISCHIKAWA also united polyps by pushing them together on a bristle.

It was not until the time of WETZEL (1895) that extended experiments in grafting were made. WETZEL united hydra in various ways, using individuals of the same species or of different species, and making grafts »autoplastic« (GIARD), or »homoplastic«, according as the pieces were from the same or from different individuals. He grafted like ends together and found that they united readily, showing that polarity did not exist in Hydra in the sense in which the term is used with plants. Later polyps united by like ends separated or fused in such a manner as to form a normal Hydra.

WETZEL continued his experiments in 1898. He examined some grafts histologically and concluded that, as in the experiments of BORN and JOEST on tadpoles and earthworms, only body layers of the same kind fused together. He reached the same conclusions as before in regard to the non-existence of polarity, and from one experiment of his own and one of ZOJA (1890), suggested the possibility of heteromorphosis in Hydra. He did not obtain union between Hydra fusca or Hydra grisea, and Hydra viridis.

The work of WETZEL in regard to regulation of graft abnormalities was confirmed and extended by RAND (1899), who worked with Hydra viridis, and by Miss PEEBLES (1900), who used Hydra fusca and Hydra grisea. I shall refer later to some differences in their results from these two forms. The most recent work¹⁾ on the morphology of Hydra is that of PARKE (1900), who studied variation in the number of tentacles of different species and noted some regulation of abnormal forms found in nature.

The experiments upon the regulation of graft abnormalities here described were carried out at the University of Chicago during parts of the year 1899—1900, on the lines already followed by RAND and

¹⁾ Observations and Experiments on Regeneration in Hydra viridis, by HELEN DEAN KING, 1901, Archiv f. Entwicklungsmech. XIII. page 135, appeared as this article was going to press.

by Miss PEEBLES. To Professor CHARLES B. DAVENPORT, of Chicago, who suggested these investigations, my sincerest thanks are due for helpful criticism and direction during their progress.

B. Material and Methods.

The Hydra used in this investigation were of four species. Three of these are described by NUSSBAUM ('87), who discusses the synonyms given by earlier authors and gathers them under the terms 1) Hydra viridis, a small, green polyp, about 1 cm long, almost perfectly cylindrical, with 5—10, 5 mm long tentacles, 2) Hydra grisea, orange yellow or reddish, colorless when starved, length about 2 cm, 5—18 1 cm long tentacles, 3) Hydra fusca, brown in color, 2—5 cm long with 5—10 tentacles of considerable length. In addition to these three species I have studied a fourth, which is abundant in the vicinity of Chicago. It has been described by BRAUER ('91), but unnamed, and called by DOWNING (in MSS) Hydra monoecia. It is a very large form, light brown or yellow in color, with 5—8 tentacles which may be extended to ten times the length of the body. The sexes are separate.

In the fall of 1899 Hydra fusca and Hydra monoecia were abundant in Jackson Park lagoon, Chicago, near the Lake Michigan end. It was attached to Elodea, and aquarium jars could easily be stocked by bringing in the plant with the attached Hydra. Hydra viridis was not found that year in Jackson Park, but in the fall of 1900 a colony of it appeared in a limited region of the lagoon, where it was fairly plentiful for some weeks on the Elodea and then disappeared. In the spring of 1901 Hydra viridis was not found at all and Hydra fusca and monoecia only in very meager numbers in the lagoon. The excessively low temperature of the lake water during the spring may have been the cause of this scarcity. All four species of Hydra have been found in other places, i. e. Wolf Lake, small streams in South Chicago and Stony Island, and in Salt Creek, at Riverside, Chicago.

I found some difficulty at first in keeping the Hydra in the laboratory. Hydra viridis lives best in jars containing Spirogyra, with plenty of Protozoa and very small Entomostraca. The other species thrive in jars containing Elodea in small quantities, some decaying vegetable matter, but not enough to pollute the water, and plenty of Daphnia, Cyclops and Cypris. It is necessary to keep the

jars covered, as the appearance of a surface scum of dust and bacteria in a jar is quickly followed by the disappearance of the Hydras. The conditions for maintaining the proper equilibrium of oxygen tension in the water by means of the right quantity of algae can only be determined by experience.

The large, brown Hydras will eat almost anything that is small enough for them to engulf. I have seen them take in pieces of boiled egg yolk or small pieces of worms or snails. *Hydra monoecea* will devour *Hydra grisea*, tentacles and all. One feeding experiment especially gave most interesting results. A small red crustacean is found in great numbers at South Chicago, Indiana, in April. Later in the season this form loses its bright red color and turns dark blue. Then it disappears as does *Branchipus*. A few *Hydra fusca*, which by chance I placed in the dish with some of these red crustaceans, seized upon them readily, with the result that after digestion the whole polyp with its buds turned bright red. The pigment extended even up into the ectoderm of the tentacles and only under a lens could it be seen that the thin layer of ectoderm was not colored. The color persisted for several days. The buds remained pink for some time after they separated, notwithstanding the fact that they had received the pigment through the parent only. Later the color gradually faded out. Some interesting experiments in feeding might be made with this form.

Various methods have been used in grafting *Hydra*. LICHTENBERG ('73) bound them together with a hair; ISCHIKAWA ('89) got them to unite by pushing them together on a bristle; WETZEL ('95, '98) also used a bristle. RAND (1900) invented a method of placing the *Hydra* together in small paraffin grooves under water. I found that in most cases the *Hydra* could be made to unite if they were simply held together gently for a few minutes with dissecting needles. The polyps to be grafted were placed upon a glass slide under the dissecting lens, with sufficient water to cover them but not enough to cause much disturbance from surface tension when needles and scalpel were introduced. The cuts were made with a small scalpel or a lancet needle. The pieces were pushed together and held in position a few minutes until, by the accumulation of protoplasmic material at the point of union, the wound was firmly closed. Very often the whole of the cut surfaces did not unite at first, but usually, if the adhesion of only a few cells at one edge could be accomplished, it was enough to insure the complete welding of the whole in a few

hours. It was necessary to keep the needles at hand and to watch the polyps closely for some minutes, as the first strong, sudden contraction was apt to separate them, after which they would unite if pushed together again at once. I found also that the pieces fused much more readily if the cut was not a clean, sharp one, but somewhat irregular. If the *Hydra* did not unite readily at first the process was facilitated by breaking the cut edge slightly with the needle. This seemed to overcome the tension by means of which the cut edges turn in and bring the ectoderm over the naked entoderm so that the wound closes quickly of itself. This breaking of the edges allowed the two pieces to dovetail into each other, in which case they united easily.

I thought that I observed a seasonal difference in the readiness of the protoplasm to graft. Late in the fall when the Hydras were not budding and were only in fair condition, they fused readily with one another. During the winter my *Hydra viridis* in the aquarium grew very small although otherwise in good condition. The polyps still united readily, although the operation was somewhat difficult on account of their minuteness. In the spring, upon obtaining fresh *Hydra fusca* from Jackson Park, in fine condition and budding rapidly, I was surprised to find them exceedingly difficult to unite. *Hydra grisea* was also difficult. However, I found that the large, brown *Hydra monoecea*, and *Hydra viridis*, obtained from South Chicago and Salt Creek were very easy to work with. The latter two species are in general easier to manipulate than *Hydra fusca* and *Hydra grisea*, *Hydra viridis* because of the rapidity with which it regenerates and regulates itself, and *Hydra monoecea* because of its size and general plasticity.

After the grafts were made the compound was left upon the slide and water added gradually for some minutes. It was then removed to a stender dish containing water and some *Hydra*-free algae. I found it unnecessary to change the water, only adding a little from time to time.

In the description of the experiments I shall use the terms graft, stock, and compound in the sense in which they were employed by RAND (1900) and Miss PEEBLES (1900). By lateral graft I shall mean a case in which the graft is inserted like a bud into the side of the stock; by tangent grafts, cases in which the polyps have had shavings or slices cut from the trunks and are put together side by side without removing either end. By end to end grafts, cases in which

a head or foot has been removed and a head or foot of another polyp joined to the cut end in place of the lost part. In speaking of the ends I have used the terms head, oral end or + pole as synonymous, also the foot, aboral end or — pole.

C. Experiments and Results.

I. Lateral Grafts.

RAND ('99) from his experiments on *Hydra viridis* drew the following conclusions:

1) Lateral grafts in *Hydra viridis* do not persist as permanent abnormalities.

a) If a piece bearing tentacles be grafted into the trunk of a *Hydra*, there results in most cases a slow migration of the graft down the trunk of the stock until graft and stock arise directly from a common foot. A constriction then slowly forms between graft and stock, which finally separate. Sometimes the graft constricts and separates from the stock before migration to the foot is completed.

c) Pieces (from which tentacles have been removed) may fail to regenerate tentacles, in which case they are completely resorbed by the trunk of the stock. There is sometimes a downward migration of a graft that undergoes resorption.

MISS PEEBLES (1900) working with *Hydra fusca* and *Hydra grisea*, says »I have not observed the 'wandering' of the smaller component of the graft which RAND ('99) describes. The two foot ends seem to be brought together by the forward growth of the new body, not by any migration of the smaller pieces«.

The following experiments which I have made with both *Hydra viridis* and *Hydra fusca* gave some results interesting in this connection.

1. *Hydra fusca*.

Experiment 1. Oct. 29, 1899. I cut a well grown bud just above its base from one individual of *Hydra fusca* and grafted it upon the side of another polyp. On Oct. 30 they were well united, with the body layers and body cavities continuous (Fig. 1*a*). On Nov. 4 the graft had swung around to lie in the same direction as the stock (Fig. 1*b*). Nov. 13 showed them as in Fig. 1*c*, a symmetrical double headed *Hydra*. A comparison of this figure and the one before it shows the space between the two heads much shortened. When the polyp contracted the heads were brought close

together as in Fig. 1*d*. The stock had produced one and the graft two more tentacles. The next drawing was made on Nov. 15 and shows gradual narrowing of the distance between the heads. On Nov. 27 (Fig. 1*f*) there were still two distinct hypostomes although the tentacles were close together, some lying directly in the space between the mouth openings. Upon examination Dec. 12 the mouths were fused into one opening and the tentacles altogether numbered only eight, a reduction of four. One of these was branched at the tip, showing that the reduction had at least in this case taken place by a process of fusion.

Experiment 2. Nov. 4. Grafted a large seven tentacled *Hydra monoecea* upon the side of another large polyp of the same species. After removal to the stender dish they presented the appearance shown in Fig. 2*a*. On Nov. 6 the compound appeared to be in thriving condition, the stock had straightened out and the body walls and cavities were continuous. Nov. 12 they appeared as in Fig. 2*b*. Two days later the gradual lengthening of the common foot end and fusion of the nearly equal oral parts of the body had begun (Fig. 2*c*). An ovary was forming on the stock. A few days later this specimen was accidentally destroyed but not until the tendency towards fusion had been plainly evident.

Experiment 3. Nov. 6. Grafted a young *Hydra fusca* on the side of a large one of the same species. On Nov. 7 the position of the graft is shown by Fig. 3*a*. The regulation was very slow, the graft remaining in about the same position and directed backwards for over a week. On Nov. 17 it was at the middle of the body of the stock (Fig. 3*b*). Three days later it had swung around and the length of the portion of the stock from the graft to the foot had increased noticeably (Fig. 3*c*). The drawing of Nov. 28 (Fig. 3*d*) shows the two heads to be fusing gradually, the two arms of the Y shaped figure being much shortened and equal in length. The regulation proceeded very slowly, for on Dec. 18, forty two days after the graft was made, the heads were still some distance apart. Food was taken during all this process by either mouth and the graft had produced one tentacle. I did not preserve the polyp longer than forty five days, the ultimate fate of the abnormality being obviously as in Experiment 1.

Several other experiments of side grafts were made with *Hydra fusca*, the graft being inserted from one half to one fourth of the length of the *Hydra* from the foot. The result in each case was

the migration of the graft toward the oral end of the stock and final fusion of the two heads into one. In only one experiment of side grafting with *Hydra fusca* did I get a different result from that described above.

Experiment 4. Nov. 14. Grafted the oral half of one *Hydra* so near the foot of another that part of the foot was cut off in the process. On Nov. 16 the stock had produced a bud and the graft was firmly united close to the foot of the stock with body cavity opening into that of the stock (Fig. 4 *b*). The bud developed and separated Nov. 23. On Nov. 27 I cut a ring of tentacles from both graft and stock. By Dec. 15 the stock had regenerated five tentacles and the graft three. The graft had migrated nearer to the foot and swung around so that its long axis was in the same direction as that of the stock (Fig. 4 *c*). A few days later the two separated, having persisted in abnormal form for over a month, a rather remarkable fact when we consider how short a distance the graft had to travel to reach the foot, if this process were necessary for separation, and that meanwhile a bud had developed and separated in eight days.

2. *Hydra viridis*.

Experiment 5. Nov. 6. I cut the aboral half from a *Hydra viridis* and grafted the oral half on the side near the middle of a second polyp of the same species (Fig. 5 *a*). The two united well and remained in good condition. On Nov. 10 the graft was perceptibly moving downward and a drawing made Nov. 16 shows the two heads arising from a common foot which is considerably less than half the stock (Fig. 5 *b*). The arms of the Y above the angle are still of equal length, which indicates that splitting has taken place instead of migration of the graft. There might possibly be another explanation i. e. that the graft increased in length as it moved down, but I see no reason why it should grow while the stock did not grow. On Nov. 20 the division had nearly reached the foot, and separation took place a few days later.

Experiment 6. Same as above except that the graft was inserted above the middle of the stock, and was somewhat longer than the oral part of the stock above the graft (Fig. 6 *a*). In this case migration seemed to take place instead of splitting, for the graft moved down until equal in length to the oral part of the stock. Then it continued its migration until it was less in length and finally

constricted off before reaching the foot. The final separation produced two very unequal *Hydras*, for the graft evidently did not increase in length (Fig. 6 *b* and *c*).

Experiment 7—10. Nov. 10. Made side grafts in *Hydra viridis* as above, inserting the grafts at different levels. In every case migration toward the foot and final constriction and separation occurred, either before or after reaching the foot, thus agreeing exactly with the results of RAND'S similar experiments on *Hydra viridis*¹⁾.

3. Conclusions.

It seems to me clear that both the migration observed by RAND and the fusion described by Miss Peebles take place in the process of regulation of *Hydra fusca* and *Hydra monoeica*. During the first part of the process the length of the foot end of the stock increases without any perceptible diminution in the length of the graft, but with a decrease in the length of the oral part of the stock above the graft. That is, the graft creeps up the stock. When the head end of the stock and the graft become equal in length the movement of the latter ceases and both diminish in length simultaneously until the two tentacle rings are brought together and fusion results. This is apparently a problem in tension. The inner angle of the two arms of the stock and graft is the seat of a tension which acts unequally on the two arms as long as the arms are unequal in length, the pull being on the side of the longer arm, tending to drag the shorter arm up. As the arms become more equal in length the tension becomes equalized and the process passes gradually over into that of upward growth in the line of the bisector of the angle of the Y shaped figure and a fusion of the two inner walls of the arms. The stretch or tension at the vertex of this angle as seen in the drawing, is indicated by the disappearance of the sharp angle between stock and graft and its replacement by the curved line which represents the part of the upper body wall between the gradually approaching heads.

The stronger tendency in side grafts of *Hydra fusca* is not to separate but to remain united to the stock and finally to fuse with it. There is evidently a point near the foot of the *Hydra* stock, however, where the tendency to fusion toward the oral end of the

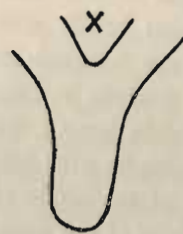
¹⁾ Miss KING (1904) also found that regulation of double headed *Hydra viridis* was "always brought about by the separation of the parts of the polyp into two individuals".

stock and graft gives way to the more feasible method of regulation by a short migration and constriction at the foot of the stock. There must then be a point of equilibrium where the graft would move neither way. Just where this point is, would be hard to determine because of the difficulty of cutting the thin shaving from the side of the body in any exact position owing to the contractility of the Hydra. It lies probably somewhere in the aboral $\frac{1}{5}$ of the body.

When we compare the process of regulation of *Hydra viridis* with that of *Hydra fusca* we find a marked difference. In both cases, after a few days, the lateral graft swings around, causing a bend in the axis of the stock so that the whole compound forms a symmetrical Y shaped figure. The base of the graft curves into the trunk of the stock as described by RAND in his comparison of grafts and buds. In so far the two species are alike. The tendency then is, in *Hydra fusca* to fuse toward the head and form one polyp; in *Hydra viridis*, to split towards the foot and separate into two individuals.

I can think of no reason for this remarkable difference in the behavior of lateral grafts of *Hydra fusca* and *Hydra viridis* except the possible one of capillarity. The most noticeable difference, aside from that of color, which can have nothing to do with this phenomenon, is that of size. *Hydra fusca* is a much larger (i. e. three or four times as large) cylinder than *Hydra viridis*. It is well known that large drops of any liquid run together or fuse more easily than small drops, because the surface tension bears an inverse ratio to the radius of the drop. The same thing may be true for two semi-fluid cylinders in contact. The greater the diameter of the cylinders at the angle \times the less the cylindrical capillarity and the stronger the longitudinal tension which draws \times up and pulls the two arms together. The less the diameter of each cylinder at \times , the stronger the circular tension and the tendency to regulation by regaining the cylindrical form.

Fig. 1.



II. Tangent Grafts.

1. Experiments and Results.

The struggle between the tendency of grafted Hydras to fuse, in order to regain the normal form, and the tendency to separate, is often seen in abnormal compounds of the same species. This was rather well brought out by the following experiments.

Experiment 11. Nov. 9. Two large seven tentacled *Hydra fusca* were each cut as for a lateral graft, i. e. small round pieces were cut from the body wall in each at about the same level, slightly below the middle. The Hydras were then pushed together with the wounded surfaces in contact, and they readily united (Fig. 7a). Nov. 12 they appeared as in Fig. 7b, both fastened to the bottom of the stender dish by their aboral ends, and extended in parallel directions. Between them was a short connecting band in which the continuity of ectoderm, entoderm and body cavities could be seen. Two days later this band appeared thinner. On Nov. 15 it was reduced to a mere ectodermal thread, and later the polyps separated by snapping this thread midway between them (Fig. 7c).

Experiment 12. Nov. 14. Same as above with the same result, the separation taking place in five days.

Experiment 13. Nov. 14. Grafted two *Hydra fusca* together as in experiment 11 except that I reversed one polyp so that the poles of the two were in opposite directions (Fig. 8a). On Nov. 17 there was rather a broad band between the two Hydras (Fig. 8b). One polyp was fastened to the dish by its foot, the other necessarily floated free. The body cavities were connected, and when the animals contracted, as they did simultaneously, the tentacle rings were drawn opposite each other in the middle of the body whose long axis was a line passing through the two feet (Fig. 8c). The pull seems to have been through the connecting band in a line drawn through the two heads, making a very peculiar connection. On Nov. 24 the Hydras appeared as in Fig. 8d. The long axis of the compound passed through the two heads. The feet extended on opposite sides nearly at right angles to the axis. This was still more marked in Fig. 8e, drawn on Dec. 4. It was almost impossible to determine which foot belonged originally to which head or how regulation would be accomplished. Owing to an oversight, the polyp was not observed again until Dec. 15 when it was in the condition represented in Fig. 8f. The two components had swung around with the heads lying in the same direction. The aboral ends became united by downward growth at the base of the Y. Upward growth of the same kind joined the oral arms.

Experiment 14. Repeated experiment 13, cutting a slightly larger area. Two days later the Hydra presented the appearance shown in Fig. 9a. The next day the polyps had swung around as in the previous experiment so that the long axis and large extent of the

body cavity was through the oral ends, the small aboral ends lying opposite each other. There was no way of distinguishing the original head and foot of one polyp. Fig. 9 *c* shows the aboral ends somewhat separated or shifted but still no signs of constriction or absorption. The end is foreshadowed however by Fig. 9 *d*, where the connecting band between the two Hydras, which formerly had the diameter of the widest part of the Hydras themselves, is narrower and distinguishable, and the two polyps are again distinct without having accomplished the reversal which would put them with poles in the same direction. Separation followed as shown by Fig. 9 *e* and *f*. The constriction occurred near the foot.

Experiment 15. Nov. 16. Repeated experiment 12, cutting slightly larger areas (Fig. 10 *a*). The polyps united readily. On Nov. 18 they appeared as in Fig. 10 *b*, the two Hydras having actually one body cavity in the region of the union instead of a mere band of connection. The result was easily prophesied. Fusion of the two components into a normal polyp progressed slowly and uniformly as seen in Fig. 10 *c-d*. The last drawing was made Dec. 15.

Experiment 16. Repeated experiment 15 with the same result. Nov. 17—Jan. 5.

2. Conclusions.

The results of these few experiments show that the probability of separation or fusion as a means of regulation in tangent grafts, when the poles are made to lie in the same direction, depends largely upon the area of the uniting surface between the two polyps. The larger the area of surface, the more probable that fusion will take place, partly no doubt from mere capillary attraction. There is a point, however, below which the adherent forces of the protoplasm are overcome by the tendency of the polyps to free themselves from the abnormal contact and the consequent pull brought to bear on the connecting band. [In these experiments the polyps both had the glandular foot left on them, and when both animals contracted sharply with the feet fastened to a support and somewhat widely apart, the pull on the connection between them was considerable. The area of adhesion must be large enough then to resist this separating force.

In the two experiments in which the poles were reversed, we saw that one compound persisted and became normal, the other finally separated into its components. In the latter case the uniting surface was made larger than in the former. This apparent anomaly

is explained, I think, when we consider that in the case of fusion the reversal of poles was corrected by the polyps twisting around before fusion took place. With a union of a larger area this swinging around of one polyp may have been impossible and therefore fusion did not result. In order to determine if fusion would take place with poles in opposite directions I performed the following experiment.

Experiment 17. Nov. 23. Having removed the foot of a *Hydra fusca*, I grafted the cut aboral end into the side of a second polyp near the oral end. The next day I cut off the head of the graft and with some difficulty, because of the strong contraction of the polyps, managed to get a good union between this end of the graft and the stock near the aboral end of the latter. The whole area of union was sufficiently extended and firm, as seen in the drawing made Nov. 25 (Fig. 11 *a*). There seemed to be no reason why fusion should not take place. However on Nov. 26 I found that the graft had separated at the upper point, i. e. the aboral end of the graft. On the next day it had begun to swing around so that the aboral end would lie in the same direction as that of the stock (Fig. 11 *b* and *c*). Then fusion downward of the aboral ends began to take place and was almost completed when the last drawing (Fig. 11 *d*) was made on Dec. 11. Glandular foot cells formed in the end of the graft before fusion was completed.

The question of the relation of «polarity» in *Hydra* and the probable fate of a graft as seen in Experiment 17, raised many interesting problems as to the regulation of abnormal grafts. It is known from the results obtained by WETZEL ('95) and confirmed by Miss PEEBLES (1900) that if the tentacles of two polyps are removed and the cut oral surfaces grafted together, in other words, if positive poles are united, a certain result will follow; i. e. a new head will appear near the line of union, the bodies will bend from this point as an angle and fuse together towards the aboral ends. If however two Hydras are put together by uniting unlike poles, that is, if a head end be grafted on a foot end, the compound will often remain permanent. If the remaining head and foot are cut from this compound, a new head will invariably form at the head end, a new foot at the opposite pole, and a normal animal result. Suppose that instead of leaving free ends in this latter case, the free ends were brought together also, unlike poles being united to form a complete circle. There would then be no place for a head to form, if the

initiative force for the formation of a head comes from either a free oral or from two oral ends in union. Very likely the break for a head would take place somewhere at a point of least resistance, i. e. where the union was not perfectly strong. This problem I have as yet been unable to solve, for although I still think that the graft might be made my endeavors to secure a perfect Hydra ring have thus far failed. On account of the contractibility under manipulation two Hydras grafted end to end make too short a structure to bend around in order to unite the free ends. Therefore I grafted three or four together, making a long chain, but since it was necessary to wait several hours between each graft in order that the previous one might become firm I found that usually before the last union could be made the first had become irregular. I also united the polyps in pairs and then put the pairs together, but this also was unsuccessful. The difficulty of producing a fairly permanent polyp of abnormal length raised a second question already suggested above. Under what conditions does an end to end graft with unlike poles together remain permanent and become a normal Hydra? Can Hydra of abnormal length be produced in this way?

III. Polyps of Abnormal Length.

1. Experiments and Results.

Experiment 18. Oct. 29, 4 P. M. Grafted two specimens of Hydra viridis end to end. The poles were placed in the same direction and only the two extremities to be united were cut off. On Oct. 30, 9 A. M. the two Hydras seemed to be perfectly joined and the body cavities continuous. The point of union was almost unnoticeable except for a slight constriction around the body when the polyp contracted (Fig. 12 *a*). I cut off the ring of tentacles and grafted a third Hydra on to this end, poles again in the same direction. On Oct. 31 at 9 A. M. the condition was as seen in the drawing, Fig. 12 *b*. The first union between *a* and *b* was at *x*, the second between *b* and *c* at *y* where there is a slight projection of the body wall. Nov. 1, 9 A. M. the condition appeared as in Fig. 12 *c*. The compound did not appear reduced in size, but the projection at *y* had become a foot by which the polyp could attach itself to a needle. The body cavities still seemed to be perfectly continuous. On Nov. 2, 9 A. M. constriction had taken place and *c* separated leaving *a* and *b* without a head. The next day *b* had produced a bud (Fig. 12 *d*). No sign as yet of tentacles or hypostome. On Nov. 5 four tentacles had

developed on *b* and five on the bud. A mass of debris collected by glandular cells which seemed to have formed at *x* was easily removed by the needle. The union between *a* and *b* still seemed to be perfect, with only a slight enlargement of diameter at that point. When the Hydras were extended little trace of the grafting could be seen. However, careful observation showed that the compound could attach itself at the middle, and on Nov. 6—7 there was no noticeable change. Nov. 8 showed a slight constriction of the body walls at *x* (Fig. 12 *e*). Nov. 9, the bud was detached and constriction of the body wall was deeper. On the next day the body cavities were no longer continuous, although contraction still took place throughout the animal upon stimulation of either end. On Nov. 19 *a* and *b* separated while I was removing the collection of loose material from *x*. Two days later I noticed that *a* had formed no tentacles but seemed to have a foot at either end. Under a microscope I saw that a bit of the glandular structure of *x* had remained slightly attached to the oral end of *a*, which persisted unchanged, with no tentacles for six days. On Nov. 27 these few cells were missing, and the next day the beginnings of three short tentacles and a hypostome were seen and the last of the three Hydras had returned to the normal condition. This peculiar effect of a few glandular foot cells in preventing the regeneration of oral structures was striking, since Hydra viridis usually shows new tentacles in less than 24 hours.

The particular feature of this experiment was that, although the union at *x* seemed to be perfect, and that at *y* less so, but no less than in many other cases where the graft had remained permanent, separation eventually took place. It seemed probable that the length of the compound structure was at fault.

Experiment 19. Nov. 1. Cut off head end of one and foot end of another large Hydra monoecea and united the main pieces. They were enormous Hydras which, when extended, were at least an inch in combined length. On Nov. 2 they were in good condition, union of body cavities perfect etc. There was no visible projection nor were there irregularities in the walls except a slight constriction at the point of the graft. On Nov. 5 the lower Hydra had begun to reproduce a head and tentacles at this point (Fig. 13 *a*). The next day each head took in large pieces of boiled egg yolk, which showed the body cavities plainly in communication. On Nov. 7 more tentacles appeared and a beginning of constriction at the point of union

showed itself. The compound was afterwards lost, but the components would have separated eventually.

Experiment 20. Nov. 5. Grafted a pair of *Hydra viridis* end to end, cutting off only the ring of tentacles and foot. A head was produced at point of union and the parts separated Nov. 9.

Experiment 21. Cut two individuals of *Hydra viridis* near the middle of each and transferred the oral end of one to the aboral end of the other. Both became perfectly normal Hydras. For the first few days one showed at the place of union a green zone darker than the color of the rest of the bodies, probably caused by an accumulation of protoplasm, which seems always to flow to the point of union when adhesion takes place. A slight constriction is usually seen between the polyps upon contraction for a few days after union. On Nov. 20 I could find no indication of graft.

Experiment 22. Nov. 15. Cut off slightly more than the aboral $\frac{1}{3}$ of a *Hydra viridis* and grafted on an oral $\frac{2}{3}$ of another. This made the compound a little more than the normal length of a *Hydra*. Nov. 19 the *Hydra* was fastened to the side of the dish and looked perfectly normal.

Experiment 23. Nov. 15. Cut about $\frac{3}{4}$ of a *Hydra viridis* and added this to $\frac{3}{4}$ of another. On Nov. 16 the *Hydra* appeared as in Fig. 14 a. When extended it seemed nearly twice as long as the average *Hydra viridis* in the aquarium. On Nov. 17 a dark zone was seen at the point of union, and a slight constriction. On Nov. 26 the compound was in bad condition, had lost some tentacles and had become reduced in size. When revived it was not much larger than an average *Hydra*, and there was no evidence of the grafting. However when the tentacles were regenerated one appeared in the middle of the body, evidently at the point of the graft (Fig. 14 b). This persisted for three days, then gradually became absorbed, and the *Hydra* remained in normal condition. It seemed that although the polyp had become smaller through bad nourishment and self absorption, had lost its abnormal length and had suffered considerable protoplasmic readjustment, it still possessed at the point of grafting some potential head protoplasm which upon renewal of favorable conditions reproduced a tentacle. If the compound had still been abnormally long, a complete head would have formed and separation would have followed. The degree of divergence from the normal size was however so small that after further readjustment towards a permanent normal union, the protoplasm at the point of

union lost its local character, and the tentacle was absorbed and disappeared.

Experiments 24 and 25. Nov. 11. Cut two *Hydra viridis* near the middle and exchanged the body halves. Both remained permanent grafts. One was interesting because of the development of a bud which appeared a little above the slight constriction between the two components. As the bud developed it moved down so that before it separated (Nov. 17) it was exactly at the point of union, the constriction being still visible. RAND suggests in his comparison of buds and grafts that even if a bud should tend to migrate down a trunk, as does a graft in *Hydra viridis*, the amount of migration would not be noticeable in the short time during which it remains attached. In this case the slight migration was easy to determine on account of the mark of constriction in the trunk.

Experiment 26. Nov. 6. Grafted together the halves of two *Hydra viridis*, cutting near the middle so that the resulting compounds were about the normal length. The grafts persisted and the compounds became perfect polyps.

Experiment 27. Nov. 22. Made a compound about $1\frac{1}{2}$ the normal length. On Nov. 24 the graft seemed to be well joined. A deep constriction was noticeable between the two components when contracted, but the body cavities were perfectly continuous. When extended a slight projection was seen close to the point of union, which looked like a bud. On Nov. 26 it was found to be a glandular foot by which the compound could attach itself to a needle. Two days later only a very slight constriction was visible and the projection at the point of union was smaller but still glandular. On Dec. 4 the abnormal foot had been entirely absorbed; the constriction was only visible when the *Hydra* contracted sharply. Otherwise the polyp was normal although still slightly longer than ordinary Hydras. It gradually became reduced in size until normal.

2. Conclusions.

Several more grafts were made like those in the preceding experiments, in which a permanent union was never obtained when the compound closely approximated twice the length of a normal *Hydra* or was more than twice the length. The difficulty of obtaining a permanent union was slight when a *Hydra* of only ordinary length was made by grafting a head half and a foot half together, but the probability of a union persisting for more than a few days was less

as the lengths of the components were increased. In experiments 23 and 27, in which the compounds were more than $1\frac{1}{2}$ and less than 2 times the normal length, regulation was begun in the one case by the formation of a tentacle and in the other by the appearance of a foot. In the first case poor condition and consequent reduction of size seemed to be the cause of the abandonment of the process of separation and of the resorption of the tentacles. In the second case the compound, although not under unfavorable conditions, became slightly reduced in size, resorbed the tentative foot and retained the graft union. These two cases seem to have been very near the decisive point, where the balance may go either way, towards regulation by separation of the components or towards permanent fusion. The last result was accomplished in both cases, and accomplished by a reduction of the abnormal length, i. e. the compound simply decreased in size very slowly until it could not be distinguished from an ordinary Hydra. In order to determine how this reduction took place I attempted to make camera lucida drawings of compounds from day to day, but owing to the difficulty of getting the same degree of magnification each time (the amount of water in which the Hydra was placed on the slide being a troublesome factor), and of computing the volume of the specimen from the irregular outlines, the results have so far been unsatisfactory. There is no doubt, however, of the difficulty of building up an abnormally long Hydra. Regulation will follow in one of two ways; if the increase in length be inconsiderable the compound will regain the normal size by reduction through selfabsorption; if the length be too great for reduction to be accomplished quickly, constriction and separation of components will take place. The latter phenomenon may be comparable to that which occurs in the formation of liquid cylinders in experimental physics, according to the law enunciated by PLATEAU ('73): "If the length of a cylinder (of oil), formed between two bases perpendicular to the axis, much surpass triple the diameter, equilibrium becomes unstable, at some point constriction takes place, and the figure separates spontaneously into two unequal portions. The exact value of the limit of stability is between 3 and 3.6 times the diameter. The mode of deformation of the cylinders is the result of a property which is inherent in them."

No constant direct ratio can be determined between the diameter and length of the cylindrical Hydra, since, through contraction and extension, the relation is constantly changing. It is probably true

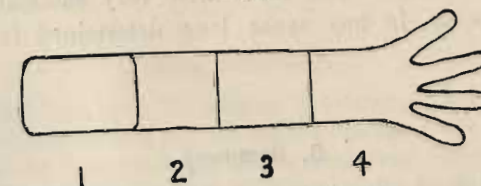
however that a certain relation exists between length and diameter, such that any Hydra of given length must approximate a given diameter; in other words the volume must be fairly constant. A definite volume as well as a definite form is evidently a morphological necessity in Hydra.

IV. Abnormal Budding.

MISS PEEBLES (1900) suggested that it would be interesting to keep double polyps if possible, in order to see how and where buds would appear. I have already mentioned one or two cases of budding compounds. Two others were of interest.

Experiment 28. Oct. 19. I grafted four Hydra viridis in pairs, end to end, cutting off as little as possible. On Oct. 20, I united the pairs with poles in the same direction, making a chain of four

Fig. 2.



individuals. The compound persisted for a few days. On Oct. 21 a slight swelling appeared near the head end of 3 and one near the foot end of 2, which I took to be indications that separation was to follow. On the next day these prominences were plainly buds which, although entirely out of the budding zones of the individual components upon which they were developing, were within what would be the budding region of the whole compound, i. e. the middle $\frac{2}{4}$. The buds developed and separated while a very complicated process of regulation, reduction, and separation of components went on in the abnormally long compound.

The Hydra used in Experiment 26 also budded. Two days after grafting a bud appeared exactly opposite the slight indentation which marked the point of union. In this case I observed no migration of the bud which developed and separated at the dark zone that marks the place of the grafting after constriction disappears. The question as to the origin of the bud, whether from one Hydra or from both, is an interesting one. I endeavored to throw some light upon the problem by grafting Hydra fusc and Hydra grisea

together in the budding region, hoping to get a bud again at the point of union where the marked difference in the color of the two grafted polyps would help to determine to which the bud belonged. I was unable to get a bud at the right point.

From Experiment 28, in which the bud appeared in normal position as to the whole compound, but abnormally in relation to the individual components, 24 hours after grafting, it seems probable that the operation of grafting had a marked influence upon the budding process, at least in regard to the position of the bud. The perfectly normal development and separation of the bud in Experiment 26, which arose in this case at the line of union between the Hydra, showed that the operation of 48 hours before had no effect upon the mechanism of separation of bud and stock, such as that shown by RAND for an operation made at the foot of the bud when half developed. In both these experiments a striking fact to be noted is the evidence that buds arise very suddenly and spontaneously, not being in any sense long determined in position and lying latent.

D. Summary.

- 1) Regulation of lateral grafts in *Hydra fusca* is usually a double process of migration of the graft, and of fusion as the result of tension, i. e. the graft tends to migrate towards the head end of the stock until the head ends of graft and stock are equal in length, when fusion gradually brings them together. There is however a level of insertion somewhere in the aboral $\frac{1}{5}$ of the stock, below which a graft will move downward and constrict off.
- 2) Regulation of lateral grafts in *Hydra viridis* is usually a process of downward migration, constriction and separation at the foot of stock. Occasionally a graft inserted very near the oral end of the stock will persist for some time and finally fuse as in *Hydra fusca*.
- 3) The difference in the behaviour of lateral grafts in *Hydra fusca* and *Hydra viridis* is probably due to a difference in the diameters of the cylinders which form them, and to the action of capillarity.
- 4) When two Hydras are united side by side in tangent grafts, the probability of separation or fusion as a means of regulation depends upon the area of uniting surface, i. e. upon capillary attraction.

Fusion will not take place between such Hydras united with poles in the opposite direction, but if the area of union is not too large, they may swing around until the poles lie in the same direction, and then fuse into one.

5) Hydras united in end to end grafts with poles in opposite directions will not form permanent union. Hydras so united with poles in the same direction will form permanent unions if the length of the compound is less than twice that of a normal Hydra.

6) Buds may arise in a compound polyp of abnormal length within the budding zone of the compound, regardless of that of the individual components. They may also arise at the line of union. The suddenness with which they appear in these unusual places shows that their position is not long predetermined.

Hull Zoölogical Laboratory, University of Chicago,
December 1, 1901.

Zusammenfassung.

- 1) Die Rückkehr zur Norm (Regulation) bei lateralen Aufpfropfungen bei *Hydra fusca* besteht gewöhnlich aus den beiden Processen der Wanderung des Pfropfstückes und der Verschmelzung als Resultat einer Streckung desselben, d. h. das Pfropfstück hat die Tendenz, nach dem oberen Ende des Stockes hin zu rücken, bis die Kopfenden von Pfropfstück und Grundstock von gleicher Länge sind; alsdann bringt sie ein eintretender Verschmelzungsprocess allmählich zur Verwachsung in ein Stück. Immerhin giebt es in der Gegend des aboralen Fünftels des Stocks eine Grenze, unterhalb deren ein Pfropfstück sich aboralwärts bewegt und sich abknüpft.
- 2) Die Regulation seitlicher Aufpfropfungen bei *Hydra viridis* ist gewöhnlich eine Wanderung des Pfropfstückes nach dem Fußende des Stocks zu, mit schließlicher Abschnürung und Trennung. Gelegentlich kann ein sehr nahe dem Mundende befindliches Pfropfstück eine Zeit lang dort beharren und schließlich wie bei *Hydra fusca* mit dem Grundstock verschmelzen.
- 3) Der Unterschied in dem Schicksal seitlich angelegter Pfropfstücke bei *Hydra fusca* und *Hydra viridis* entsteht möglicher Weise durch eine Durchmesser- verschiedenheit der beiderseitigen Cylinderform und durch den Einfluss von Kapillaritätserscheinungen.
- 4) Bei der Vereinigung zweier Hydræ Seite an Seite mittels tangentialen Aneinanderlegens hängt die größere oder geringere Wahrscheinlichkeit der Trennung oder der Verschmelzung von der Größe der Vereinigungsfläche ab, d. h. von der wirksamen Kapillaranziehung. Verschmelzung tritt nicht ein, wenn die Hydræ in umgekehrter Lage vereinigt wurden, ist dabei jedoch das Vereinigungsfeld nicht allzugroß, so können sie sich herumdrehen bis die gleichnamigen Enden nach derselben Richtung liegen und alsdann verschmelzen.
- 5) Vereinigungen aus Hydrästücken, mit den gleichsinnigen Enden nach entgegengesetzten Richtungen, gehen keine dauerhafte Verbindung ein. Derartige,

aber mit gleichsinnigen Enden gleich gerichtete Vereinigungen können sich dauernd verbinden, wenn die Länge des zusammengesetzten Individuums weniger als das Doppelte von der einer normalen Hydra beträgt.

6) Bei einem zusammengesetzten Polypen von abnormer Länge können sich Knospen in der Knospungszone des Gesamtindividuums erheben ohne Rücksicht auf die Knospungszonen der Theilstücke. Sie können auch an der Vereinigungsstelle auftreten. Die Plötzlichkeit ihres Auftretens an diesen ungewöhnlichen Stellen zeigt, dass ihr Entstehungsort nicht lange vorher bestimmt wurde.

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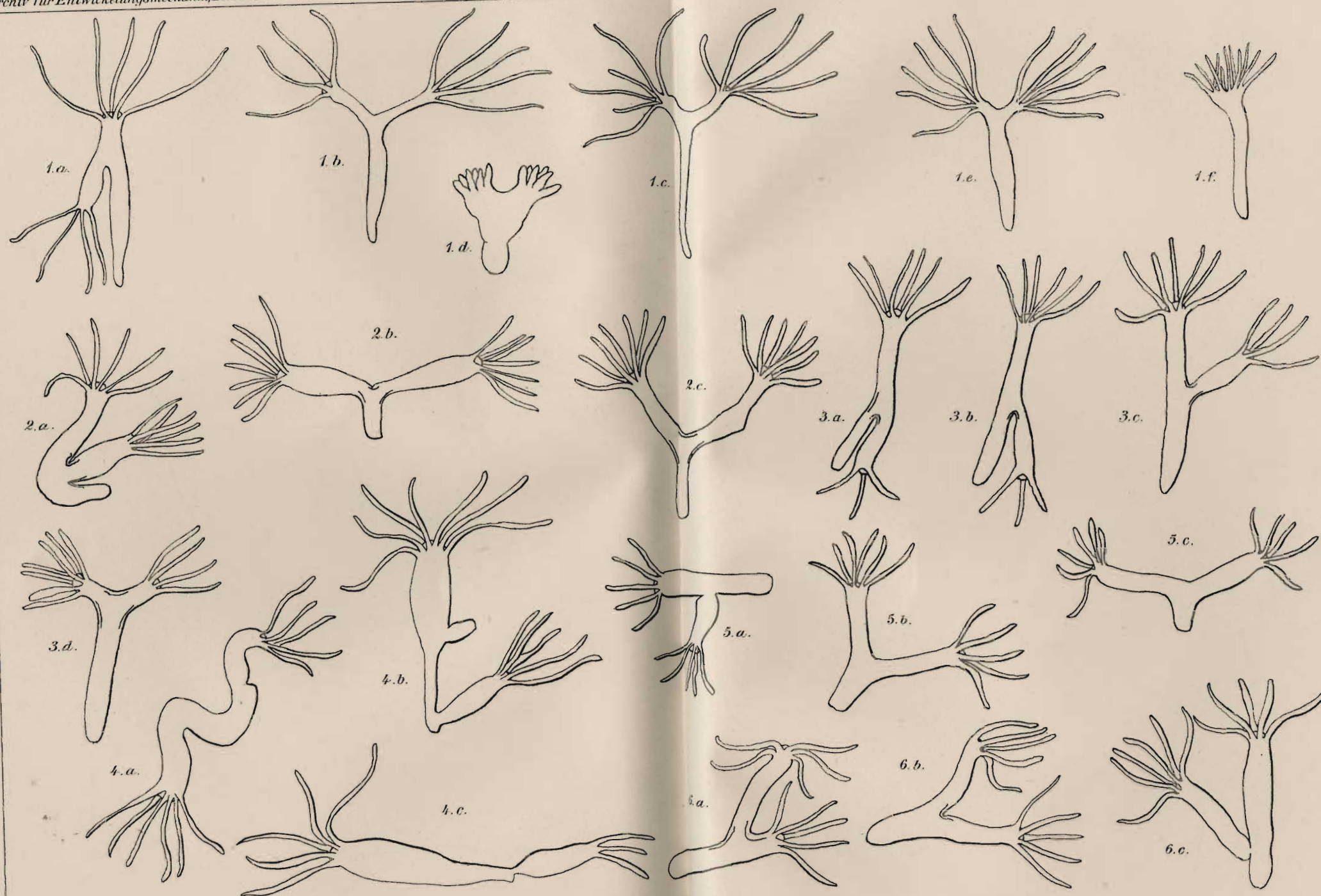
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Explanation of Plates XXIII—XXV.

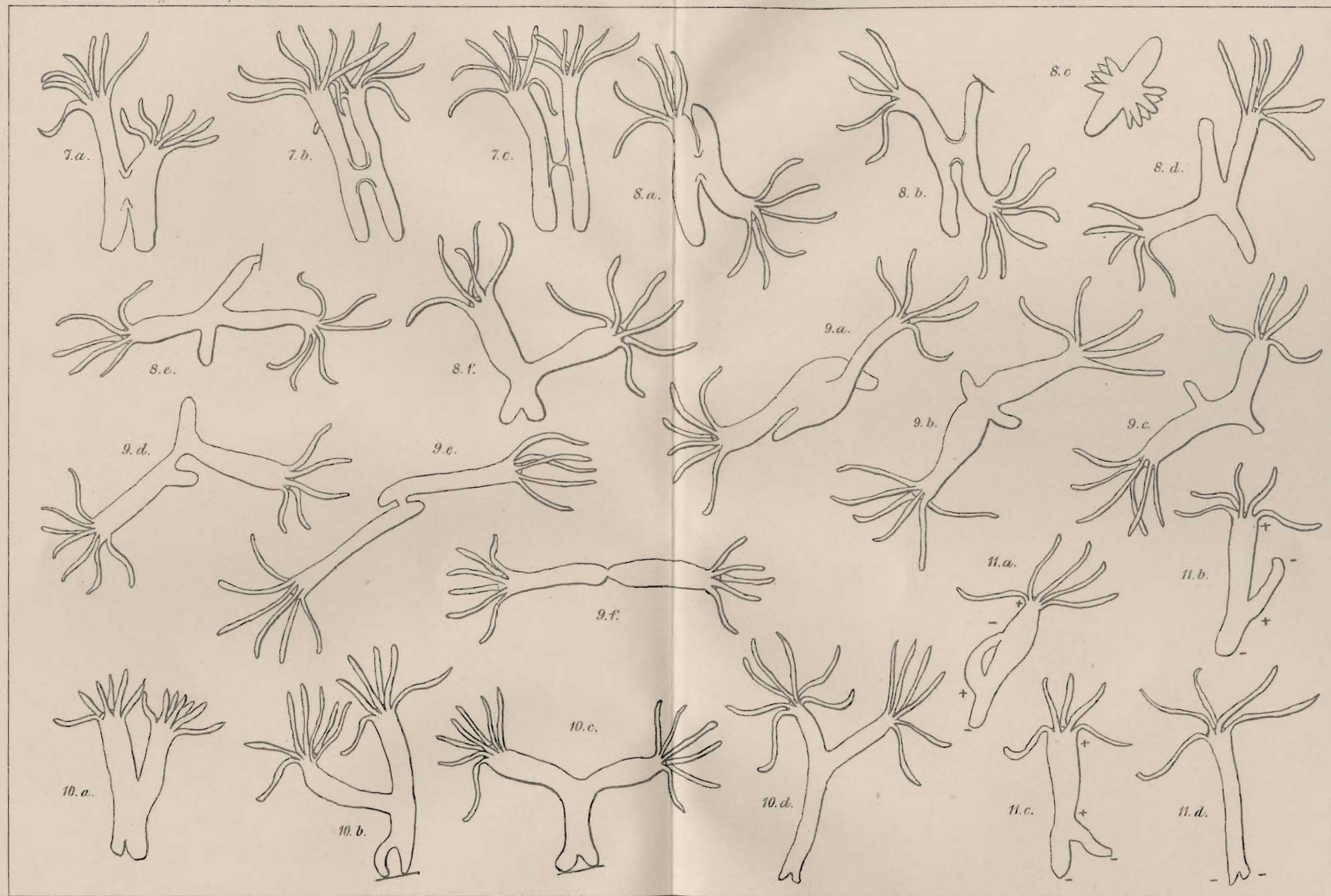
- Fig. 1. Regulation of a lateral graft of Hydra fusca. Experiment 1. a 1st day, b 6th day, c 10th day, d 15th day, e 17th day, f 29th day.
- Fig. 2. Regulation of a lateral graft of Hydra monoecia. Experiment 2. a 1st day, b 9th day, c 11th day.
- Fig. 3. Regulation of a lateral graft of Hydra fusca. Experiment 3. a 2nd day, b 11th day, c 14th day, d 22nd day.
- Fig. 4. Regulation of a lateral graft of Hydra fusca. Experiment 4. a 1st day, b 2nd day, c 31st day.
- Fig. 5. Regulation of a lateral graft of Hydra viridis. Experiment 5. a 1st day, b 11th day, c 15th day.
- Fig. 6. Regulation of a lateral graft of Hydra viridis. Experiment 6. a 1st day, b and c later stages.
- Fig. 7. Regulation of a tangent graft of Hydra fusca. Experiment 11. a 1st day, b 4th day, c 7th day.
- Fig. 8. Regulation of a tangent graft of Hydra fusca. Experiment 13. a 1st day, b 4th day, c 4th day, d 11th day, e 21st day, f 32nd day.
- Fig. 9. Regulation of a tangent graft of Hydra fusca. Experiment 14. a 1st day, b 2nd day, c 5th day, d—f gradual separation.
- Fig. 10. Regulation of a tangent graft of Hydra fusca. Experiment 15. a 1st day, b 3rd day, c—d gradual fusion.
- Fig. 11. Graft showing the influence of polarity. Experiment 17. a 3rd day, b 4th day, c 5th day, d 19th day.
- Fig. 12. Regulation of an end graft of Hydra viridis. Experiment 18. a 1st day, b 3rd day, c 4th day, d 5th day, e 11th day.
- Fig. 13. Regulation of an end graft of Hydra viridis. Experiment 19. a 5th day, Fig. 14. Regulation of an end graft of Hydra viridis. Experiment 23. a 2nd day, b 11th day.

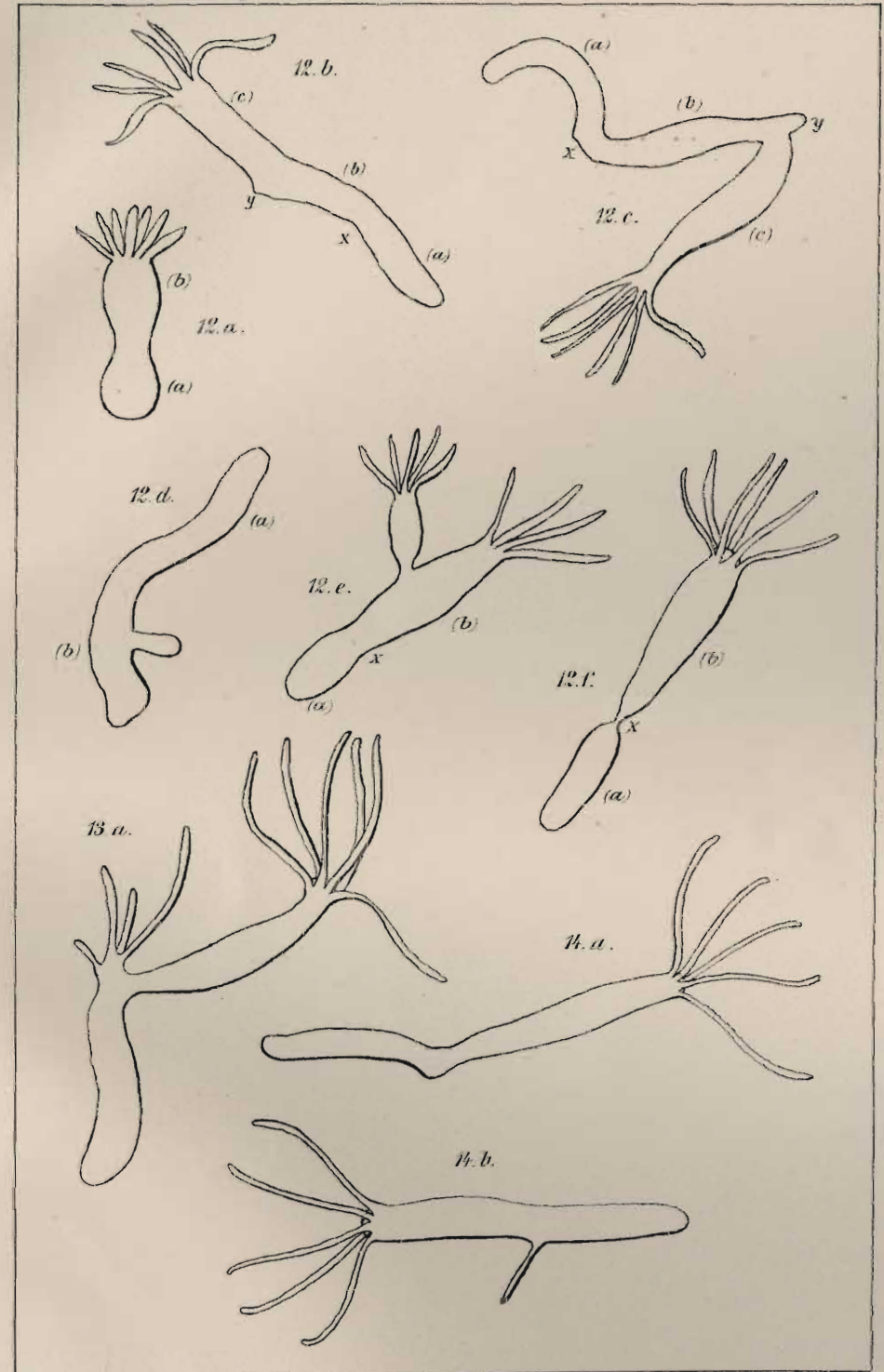
Box 15, folio 11



Box 15, folder 11

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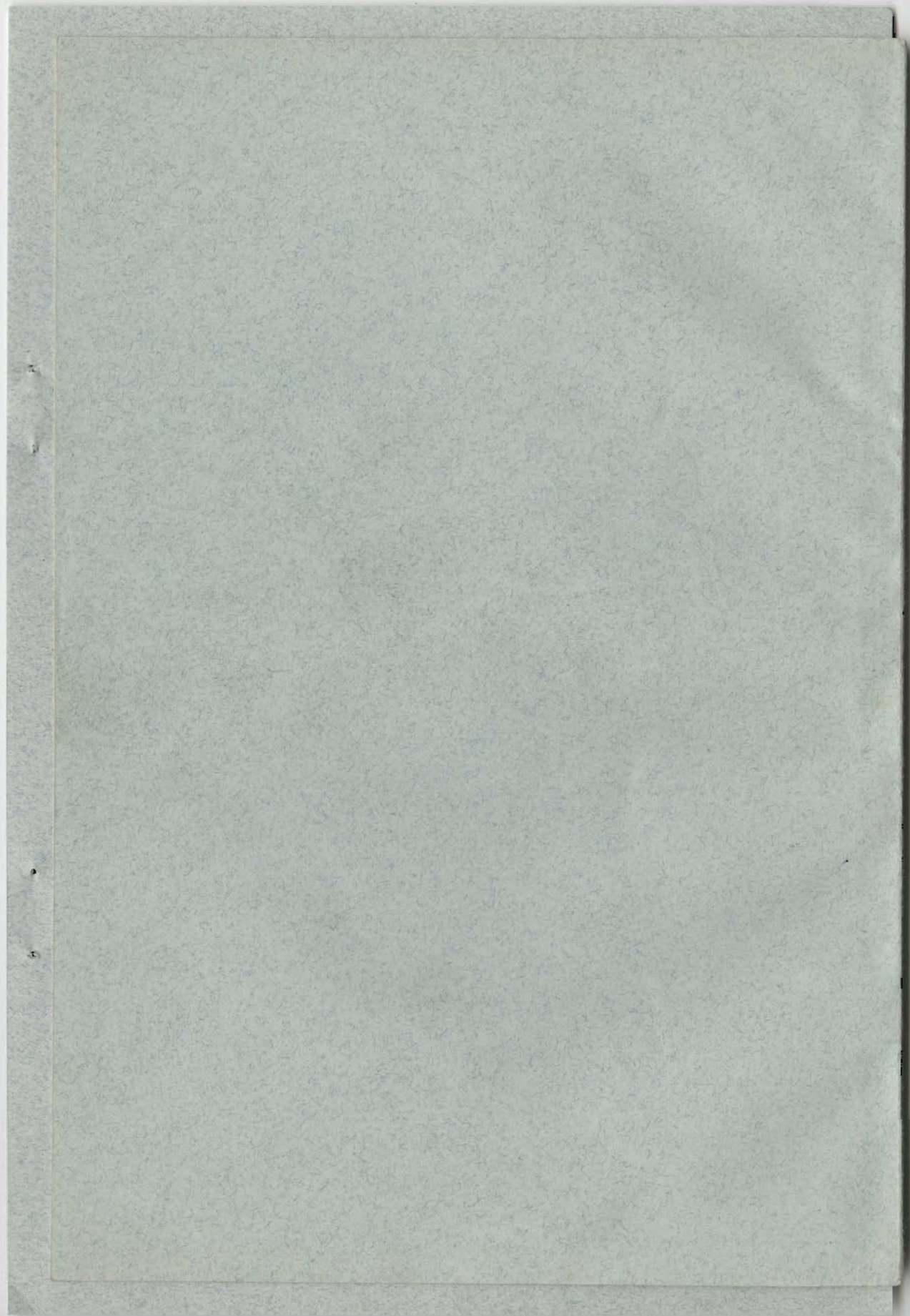




Julius Klinkhardt, Leipzig.

Verlag v. Wilhelm Engelmann in Leipzig.





Box 15, folder 11

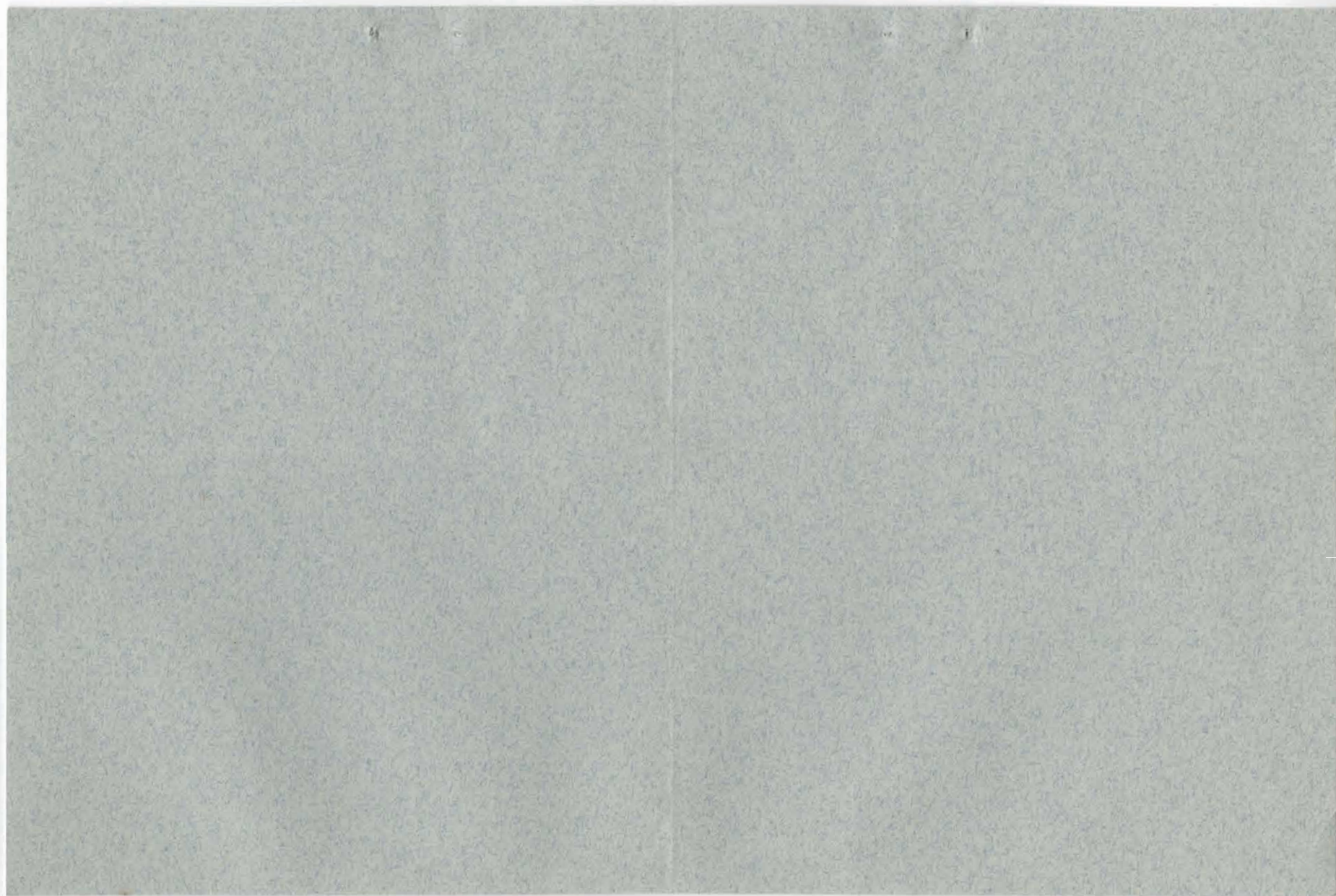
Department of Bacteriology.
Zoology Building.
June 6, 1902.

President H. R. Harper,

Dear Sir:-

I forward you with
this a reprint of an article by me
in the German Archiv f. Entwicklung-
mechanik. just published; I hope
to send you shortly another from
the Centralblatt f. Bakteriologie.

I should also like to say to
you that I am entering upon
my work next year as Curator
of the Bacteriological Museum, with
interest and pleasure, and that I am
especially glad to be of some service
to the Department and to the University.
Very respectfully,
Mary Hefner



The University of Chicago

Department of Hygiene and Bacteriology

Felder

November 18, 1924.

Professor L. C. Marshall,
Faculty Exchange.

My dear Professor Marshall:

I am enclosing a list of projects for this department in accordance with your recent request. I was, unfortunately, in the east when the request reached my office and have only recently returned, hence the delay.

Sincerely yours,

Edwin O. Jordan
Edwin O. Jordan.

EOJ:JC

The University of Chicago
Department of Medicine and Pharmacology

John

November 16, 1934

Professor J. C. Marshall,
Faculty Exchange.

My dear Professor Marshall:

I am enclosing a list of projects for this
department in accordance with your recent request.
I was, unfortunately, in the east when the request
reached my office and have only recently returned,
hence the delay.

Sincerely yours,

Wm. C. Cline
Wm. C. Cline

101-70

Desirable Projects, Department of Hygiene and Bacteriology

1. For the study of the nature of the toxins (specific poisons) produced by certain disease germs (which cause diphtheria, tetanus, botulism, etc.) and of the antitoxins which can be produced in animals to neutralize those poisons in the infected individual:

For each year - technical assistant	\$1500
equipment	300
animals and feed	<u>500</u>
Total	\$2300

Card for

2. For a study to develop new and improved methods for the production of antitoxins and other types of anti-sera by the application of certain chemical discoveries of the last ten years:

For each year - technical assistant	\$1500
equipment	300
animals and feed	<u>500</u>
Total	\$2300

✓

3. For the study by certain new chemical methods of the nature of the virus - at present of unknown nature - which causes the disease smallpox.

For each year - technical assistant	\$1500
equipment	300
supplies, animals and feed	<u>500</u>
Total	\$2300

✓

1. For the study of the nature of the toxins (bacterial poisons) produced by certain disease germs (which cause diphtheria, tetanus, botulinum, etc.) and of the antitoxins which can be produced in animals to neutralize these poisons in the infected individual:

Cost

For each year - Technical assistant	\$1500
Equipment	300
Animals and feed	500
Total	\$2300

2. For a study to develop new and improved methods for the production of antitoxins and other types of anti-sera by the application of certain chemical substances of the last ten years:

For each year - Technical assistant	\$1500
Equipment	300
Animals and feed	500
Total	\$2300

3. For the study of certain new chemical methods of the nature of the virus - as present in common nature - which causes the disease anthrax.

For each year - Technical assistant	\$1500
Equipment	300
Animals and feed	500
Total	\$2300

It would be desirable to plan this study to extend over a period of two or three years.

4. At the present time certain researches are being conducted on the production of anti-bacterial sera for use in pneumonia infections. This would be greatly facilitated and certain existing handicaps would be eliminated by the provision of a capable technical assistant. Such a provision could be made at a cost of approximately one thousand dollars (\$1000) per annum. ✓
In full

5. The department is in a peculiarly favorable condition to undertake the study of the immune reactions in those diseases of man which are caused by animals, such as the hookworm, malaria and dysentery parasites, because it already includes in its staff one investigator (Dr. Falk) now working on the nature of immune reactions in general and another (Dr. Taliaferro) working more specifically on the natural and artificial immunity of animals to animal infections. With the existing laboratory facilities and personnel systematic studies on these problems could be effectually carried on. These are practically virgin fields of research and the studies would undoubtedly yield results of significant practical as well as theoretical interest in the diagnosis and treatment of these diseases. The importance of such work can best be illustrated by the facts

It would be desirable to plan this study to extend over a period of two or three years.

4. At the present time certain researches are being conducted on the production of anti-bacterial sera for use in human infections. This would be greatly facilitated and certain existing handicaps would be eliminated by the provision of a capable technical assistant. Such a provision would be made at a cost of approximately one thousand dollars (\$1000) per annum.

5. The department is in a peculiarly favorable position to undertake the study of the immune reactions in those diseases of man which are caused by animals, such as the hookworm, malaria and dysentery prevalent because it already includes in its staff one investigator (Dr. Park) now working on the nature of immune reactions in general and another (Dr. Fairbairn) working more specifically on the natural and artificial immunity of animals to various infections. With the existing laboratory facilities and personnel systematic studies on these problems could be effectively carried on. These are particularly so in the case of research and the studies would undoubtedly find results of significant practical as well as theoretical interest in the diagnosis and treatment of these diseases. The importance of such work can best be illustrated by the fact

that many of these diseases (such as malaria) cannot now be diagnosed in their chronic stages and that others (such as Chagas' disease) are rarely diagnosed except at the autopsy table.

To carry on researches of this kind the assistance of one person especially competent to collect parasitological material would be necessary and for each study there should be provided in addition a budget of approximately the following size:

Technical assistant	\$1500
Equipment and supplies	300
Animals and feed	500
Total	\$2300

✓
Ans. 7m

6. Experimental studies on the malarial organism in man, in relation to its use in the treatment of syphilis of the central nervous system. Some recent work indicates that certain cases of syphilis of the central nervous system (paresis and syphilitic softening of the brain) can be arrested or cured by a superimposed infection with malaria. This study will require at least a part time competent medical man and a full time technical assistant. Estimated cost per year:

Medical worker	\$2000
Technical assistant	1500
Equipment	300
Total	\$3800

✓

This work should be carried on for several years and

that many of these diseases (such as malaria) cannot now be diagnosed in their chronic stages and that others (such as Chagas' disease) are rarely diagnosed except at the autopsy table.

To carry on researches of this kind the assistance of one person especially competent to collect parasitological material would be necessary and for each study there should be provided in addition a budget of approximately the

following also:

Technical assistant	\$1500
Equipment and supplies	500
Animals and food	500
Total	\$2500

6. Experimental studies on the malarial organism in man, in relation to its use in the treatment of syphilis of the central nervous system. Some reasons were indicated that certain stages of syphilis of the central nervous system (paralysis and syphilitic meningitis of the brain) can be arrested or cured by a superimposed infection with malaria. This study will require at least a part time competent medical man and a full time technical assistant. Estimated cost

per year:

Medical officer	\$2000
Technical assistant	1000
Equipment	500
Total	\$3500

This work should be carried on for several years and

should yield valuable results in the theory of protozoan immunity, life-cycle of the malarial organism, as well as in the treatment of neural syphilis.

7. The study of the effects of outside environment on the development of the malarial organism in the mosquito. The control of all insect-borne diseases rests, to a large extent, on our knowledge of such effects.

Assistant and research worker	\$1500
Special equipment such as insect breeding cages	500
Animals and animal expenses	200
Traveling expenses for field work	<u>400</u>
Total	\$2600

✓
C. J. G. M.

8. Experimental studies on the carriage and methods of infection of those human intestinal parasites such as protozoal dysentery which are animal in nature and are spread by fecal contamination. The facts underlying these phenomena are probably different from those underlying the spread of the bacterial diseases and our knowledge is very fragmentary.

Technical assistant and field worker	\$2000
Equipment	100
Animals and animal supplies	<u>300</u>
Total	\$2400

✓

should yield valuable results in the theory of protozoan immunity, life-cycle of the malarial organism, as well as in the treatment of human malaria.

7. The study of the effects of outside environment on the development of the malarial organism in the mosquito. The control of all insect-borne disease rests, to a large extent, on our knowledge of such effects.

Assistant and research worker	\$1500
Special equipment such as insect breeding cages	500
Animals and animal expenses	500
Traveling expenses for field work	400
Total	\$2900

8. Experimental studies on the outcome and methods of infection of those human infectious parasites such as protozoal dysentery which are animal in nature and are spread by fecal contamination. The hosts underlying these phenomena are probably different from those underlying the spread of the bacterial diseases and our knowledge is very fragmentary.

Technical assistant and field worker	\$1000
Equipment	100
Animals and animal expenses	500
Total	\$1600

9. At the present time researches are being conducted on the nature of the immunity to trypanosome diseases in man and animals. This work is greatly handicapped by lack of adequate technical assistance in the carrying out of routine procedures, such as the making of blood smears, the measuring of parasites, etc. This work would be facilitated by the employment of one full time assistant or two half time assistants. In either case the approximate cost would be about \$1200 per year.

✓
Original

10. Investigations on the Biology of Sewage Disposal.
The proper disposal of human wastes has a two-fold object:
(1) the prevention of nuisances and (2) the avoidance of contamination of water with pathogenic germs. Methods for the disposal of wastes are on a fairly satisfactory basis from the standpoint of preventing an unsightly appearance and disagreeable odors in streams. We know almost nothing, however, concerning the biology involved in these methods of disposal and we know nothing definite concerning the fate of disease germs in passing through sewage purification processes. A comprehensive investigation would require continued work over a considerable period. ✓
It would be desirable to have funds available for five years at the rate of \$1500 per year.

9. At the present time researches are being conducted on the nature of the immunity to trypanosome diseases in man and animals. This work is greatly handicapped by lack of adequate technical assistance in the carrying out of routine procedures, such as the making of blood smears, the measuring of parasites, etc. This work would be facilitated by the employment of one full time assistant or two half time assistants. In either case the approximate cost would be about \$1200 per year.

10. Investigations on the Biology of Sewage Disposal. The proper disposal of human wastes has a two-fold object: (1) the prevention of nuisance and (2) the avoidance of contamination of water with pathogenic germs. Methods for the disposal of wastes are on a fairly satisfactory basis from the standpoint of preventing an unsightly appearance and disagreeable odor in streams. We know almost nothing, however, concerning the biology involved in these methods of disposal and we know nothing concerning the fate of disease germs in passing through sewage purification processes. A comprehensive investigation would require continued work over a considerable period. It would be desirable to have funds available for five years at the rate of \$1200 per year.

11. Preventive measures have been much more effective with insect-borne diseases and with diseases in which the germs enter through the alimentary tract than they have with the respiratory infections. For several years the department has been carrying on investigations on acute respiratory diseases. This is one of the most important problems in the field of public health work. This work could be extended and made much more effective if a grant of, say, \$3000 per annum was available for a period of five years.

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with insect-borne diseases and with diseases in which the
germ enters through the alimentary tract than they have
with the respiratory infections. For several years the
Department has been carrying on investigations on these
respiratory diseases. This is one of the most important
problems in the field of public health work. This work
could be extended and made much more effective if a grant
of, say, \$5000 per annum was available for a period of
five years.

The University of Chicago
Department of Hygiene and Bacteriology

November 15th, 1923

XXVIII a
335535

President Ernest D. Burton
Faculty Exchange

Dear President Burton:

I am enclosing a copy of my letter to the
Secretary of the National Canners' Association, summar-
izing the work of the past year.

Yours very truly,

Edwin O. Jordan
Edwin O. Jordan

EOJ:LA

XXVII

38543

The University of Chicago

Department of Hygiene and Microbiology

November 18th, 1922

President Dwight D. Burton
Faculty Exchange

Dear President Burton:

I am enclosing a copy of my letter to the

Secretary of the National Bureau of Hygiene, Washington, D.C.

in the hope that it will be of some use.

Very truly yours,

Wm. C. Calkins

Wm. C. Calkins

203:12

November 29th, 1923

Mr. F. E. Gorrell
National Canners' Ass'n
1739 H Street, N.W.

Dear Mr. Gorrell:

I am appending a brief statement about the work carried on and in progress under the grant made by the National Canners' Association for the study of food poisoning.

Inasmuch as the first few months following the grant of this fund were spent in obtaining the necessary equipment and in assembling and training the laboratory staff, the data here presented cover a little more than a year of actual laboratory work.

1. With the efficient cooperation of Dr. Geiger, studies have been made of a number of real and alleged food poisoning outbreaks occurring in different parts of the United States. In a considerable number of instances Dr. Geiger has been able to visit personally the locality where the alleged outbreak occurred and has obtained first hand information which has been of value either in showing that the outbreak was in no respect one to be classed as food poisoning, or in obtaining material of value either in showing that the outbreak was in no respect one to be classed as food poisoning, or in obtaining material for bacteriological examinations and tracing the epidemic to its source. By far the majority of outbreaks and single cases investigated in this way proved to have no connection with any article of food eaten. In a number of instances, however, information of scientific value was obtained regarding the real causal factors. Two outbreaks of considerable size, one at Rockford, Illinois, the other at Birmingham, Alabama, were studied in special detail. Both of these were connected with bacteria of the Paratyphoid-Enteritidis group. The results have been published in the Journal of Infectious Diseases (Edwin O. Jordan and J. C. Geiger, "Two 'Food Poisoning' Outbreaks Apparently Due to Bacilli of the Paratyphoid-Enteritidis Group", Jour. Inf. Dis., 1923, vol. 32 #6, pp. 471-478).

2. Dr. Geiger has also made a very thorough examination of the files of the National Canners' Association dealing with reputed outbreaks of food poisoning. In all 749 reported outbreaks of food poisoning were analyzed in this way. An article giving the results of this analysis has been published by Dr. Geiger (J. C. Geiger, "Poisoning by Food Probably Due to Contamination with Certain Bacteria". Epidemiologic Analysis of Seven Hundred and Forty-Nine Reported Outbreaks in the United States. J.A.M.A., 1923, 81 #5, pp. 1275-1282).

November 29th, 1933

Mr. F. E. Gorrell
National Cannery Ass'n
1739 H Street, N.W.

Dear Mr. Gorrell:

I am appending a brief statement about the work carried on and in progress under the grant made by the National Cannery Association for the study of food poisoning.

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2. Dr. Geiger has also made a very thorough examination of the files of the National Cannery Association dealing with reported outbreaks of food poisoning. In all 749 reported outbreaks of food poisoning were analyzed in this way. An article giving the results of this analysis has been published by Dr. Geiger (J. C. Geiger, "Poisoning by Food Probably Due to Contamination with Certain Bacteria", Bacteriological Analysis of Seven Hundred and Forty-nine Reported Outbreaks in the United States, J.A.M.A., 1933, 81, pp. 1275-1282).

3. In the report of the California Botulism Commission, published as Public Health Bulletin 127, 91 single or group outbreaks of botulism are tabulated as occurring in the United States and Canada since 1899. A total of 349 people were affected with 213 deaths, 30 of the 91 outbreaks proved bacteriologically or toxicologically. Since this bulletin has been published we have collected data regarding 32 additional outbreaks, 11 of which have been proved toxicologically. 21 of these outbreaks occurred in 1922, 5 in 1923. The other outbreaks occurred in previous years but information about them has only now become available. These 32 additional outbreaks comprised 81 cases with 69 deaths. The majority of these were from home-canned products, string beans (8) and corn (5) leading. No outbreak of botulism from commercially canned food in the United States has been reported since March, 1922.

4. Since assertions have been made that the toxicity of botulinus toxin is increased by acidification, and since the use of canned foods in salads, etc., makes this point of practical importance, a special study of this question was undertaken by Dr. Geiger in cooperation with Dr. W. E. Gouwens. The results of this study (Effect of Acidification on Toxicity of B. botulinus Toxin, Public Health Reports, September 28, 1923, p. 2249) do not confirm the reported results, and indicate that acidification of botulinus toxin, under ordinary conditions, has no effect in increasing the potency of this toxin.

5. Dr. Geiger and Miss Harriet Benson have published a paper in Public Health Reports, July 20, 1923, p. 1611, on "Intensive Localized Distribution of the Spores of Bacillus botulinus and Probable Relation of Preserved Vegetables to Type Demonstrated".

6. Dr. Geiger has also published several general articles, reviews and addresses on botulism and food poisoning in The Southern Medical Journal, the Journal of the American Public Health Association, The Proceedings of the Institute of Medicine of Chicago, The Proceedings of the Illinois State Association of Science and The Proceedings of the Central Food and Drug Officials.

7. Dr. W. A. Starin has carried on extensive studies in the securing of pure cultures of Cl. botulinum by single cell technique. 800 isolations were made, yielding 253 growths of the A and B Types. This has given us a large amount of absolutely pure material for the study of toxin producing power and other biological characters. In the course of this study it was found that spore isolations yield a slightly higher percentage of growths than vegetative cells and are best suited for isolation purposes. It was also found that Cl. botulinum grows and produces toxin, both at 20 degrees C. and at 37 degrees C, the rate of growth of toxin production being somewhat more rapid at the higher

3. In the report of the California Botulinum Commission, published as Public Health Bulletin 127, 91 single or group outbreaks of botulinism are tabulated as occurring in the United States and Canada since 1899. A total of 349 people were affected with 813 deaths. 30 of the 91 outbreaks proved bacteriologically or toxicologically. Since this bulletin has been published we have collected data regarding 32 additional outbreaks, 11 of which have been proved toxicologically. 21 of these outbreaks occurred in 1922, 5 in 1923. The other outbreaks occurred in previous years but information about them has only now become available. These 32 additional outbreaks comprised 81 cases with 69 deaths. The majority of these were from home-canned products, string beans (8) and corn (5) leading. No outbreak of botulinism from commercially canned food in the United States has been reported since March, 1922.

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7. Dr. W. A. Starin has carried on extensive studies in the securing of pure cultures of C. botulinum by single cell technique. 800 isolations were made, yielding 233 growths of the A and B types. This has given us a large amount of absolutely pure material for the study of toxin producing power and other biological characters. In the course of this study it was found that spore isolations yield a slightly higher percentage of growth than vegetative cells and are best suited for isolation purposes. It was also found that C. botulinum grows and produces toxin both at 20 degrees C. and at 37 degrees C. The rate of growth of toxin production being somewhat more rapid at the higher

temperature. The quantity of toxin eventually produced is the same at each temperature. No atoxic strains of *Cl. botulinum* were obtained among the single cell isolations. No differences were noted among the "A" and "B" Types as regards the relation of exposure to air, the effect of different incubation temperatures, the growth in various culture media, the time elapsing before growth appeared or the degree of anaerobiosis. The "A" Types, however, uniformly produce their toxin more rapidly and in larger amounts than the "B" Types. The period required for the appearance of growth is variable. 60 per cent of the growths appeared within one week. A small percentage of spore isolations exhibited prolonged periods of latency, in one case reaching 90 days. No further growths were observed after three months, although the incubated material was kept under observation from six to eight months. An article covering these facts on single cell isolation is now in press.

8. The agglutination reaction of *Cl. botulinum* has been especially studied by Dr. Starin and antisera were especially prepared by injecting rabbits with detoxified vegetative cells. The resulting tests with the antisera strains among those whose toxins were neutralized by "A" antitoxin and three distinct agglutinative strains among those whose toxins were neutralized by "B" antitoxin. A paper covering these facts has been published in the *Journal of Infectious Diseases*, (W. A. Starin and Gail M. Dack, "Agglutination Studies of *Clostridium Botulinum*", *Jour. Inf. Dis.*, 1923, 33, #2, pp. 169-183).

9. A similar series of studies has been made on the complement fixation reactions of *C. botulinum*. Subgroups within the types were demonstrable by this method and it is interesting that these subgroups are identical with those developed by agglutination reactions (four subgroups within "A" Type and three within the "B" Type). When *Cl. botulinum* is inoculated into peas, corn and spinach, it gives rise to antigenic substances that are detectable by the complement fixation reaction. These substances are demonstrable within six hours after inoculation and persist for at least eight weeks in vegetables kept at room temperature. An article embodying these results and others of considerable technical scientific interest is in press and will appear in a forthcoming number of the *Journal of Infectious Diseases*.

10. On the basis of these fundamental studies a comprehensive series of investigations has been undertaken by Dr. Starin and Mr. Dack into the pathogenicity of *Cl. botulinum*, the factors modifying toxin production, the effect of the amount of inoculum on thermal death point of *Cl. botulinum* spores and some other problems of both practical and scientific interest. These studies are still in progress.

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11. Other studies in various states of completion deal with the absorption of botulinus toxin, through fresh wounds in the skin and from uninjured tissues in other parts of the body; the production of heat resistant toxin by members of the Paratyphosus-Enteritidis group; the relation of different members of this latter group to food poisoning outbreaks; the source of Paratyphoid-Enteritidis bacilli implicated in food poisoning outbreaks, the possible connection of organisms such as Bacillus proteus and Bacillus welchii with outbreaks of gastro-intestinal disease.

I wish to put on record my high opinion of the services rendered by Dr. J. C. Geiger and Dr. William A. Starin in the prosecution of this work, and to express again to the Research Committee of the National Cannery Association my warm appreciation of the opportunity that has been given us to add to the sum of human knowledge about the obscure and difficult problem of food poisoning. I hope that the far sighted policy of the National Cannery Association will find ample justification in the practical results that may sooner or later follow from these inquiries.

Respectfully yours,

Edwin O. Jordan

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Respectfully yours,

Edwin O. Jordan

Ins. Bld.

The University of Chicago
Department of Hygiene and Bacteriology

Pln to EOB

XXVIII A

335295

October 19th, 1923

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My dear President Burton:

We have had for several years from the University a grant of \$2000 in aid of the investigations on respiratory diseases carried on in this Department. The Metropolitan Life Insurance Company has also been aiding these investigations during this period, and has again made us a grant of \$3000 for the current year. We have some promising lines of work under way for this winter, and I should appreciate it very much if a grant of \$2000 could be made for this year's work. I am sending you, under separate cover, a set of the articles already published. We have in press an article on the epidemiology of colds, which has proved of such interest that it is being made the basis of a further very extensive epidemiological investigation by the United States Public Health Service. A statistical study of pneumonia in Cook County Hospital since 1917 is almost completed, and various bacteriological and epidemiological studies are under way.

I wish to express at this time my very cordial appreciation of the generosity of the trustees in making previous appropriations for this work. The results already obtained and the promise of further progress will, I hope, justify this confidence.

Yours very truly,

Edwin O. Jordan
Edwin O. Jordan

President Ernest D. Burton
Faculty Exchange

EOJ:LA

Request the Board to make appn of 2000 for "Investigations in Respiratory Diseases" for next year. an in

XVII K
335000

The University of Chicago
Department of Biology and Botany

October 1933

Handwritten notes

My dear President:

We have had for several years from the University a grant of \$2000 in aid of the investigations on the epidemiology of the disease. The Metropolitan Life Insurance Company has been making a grant of \$2000 for the current year. We have some promising lines of work under way for this winter and I should appreciate it very much if a grant of \$2000 could be made for this year's work. I am sending you under separate cover a set of the articles already published. We have in press an article on the epidemiology of colds, which has proved of such interest that it is being made the basis of a further very extensive epidemiological investigation by the United States Public Health Service. A statistical study of pneumonia in Cook County Hospital since 1917 is also completed, and various bacteriological and epidemiological studies are under way.

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Yours very truly,
Walter D. Hays

President, University of Chicago

Handwritten notes and signatures

The University of Chicago

CHICAGO, ILLINOIS

Office of the President

In regard to Dr. Geiger and the National
Canners' Association.

Dr. Jordan expects to see officials of
the National Canners' Association within
the next few weeks, and further information
on the situation will then be available. It
is hoped that arrangements can be made to
continue the work, at least in part.

C. B.

The University of Chicago
CHICAGO, ILLINOIS
Office of the President

In regard to Mr. Nelson and the National
Guerrilla Association.

Mr. Nelson appears to have obtained of
the National Guerrilla Association within
the next few weeks, and further information
on the situation will then be available. It
is hoped that arrangements can be made to
conduct the work at least for 1911.

C. C.

Harold H. Swift
Union Stock Yards
Chicago

September 20,
1923

XXVIII-A
224000

President Ernest D. Burton,
The University of Chicago,
Chicago, Illinois.

Dear President Burton:

Mr. E. G. McDougall, President of Libby, McNeill & Libby, which concern is closely affiliated with Swift & Company by way of their directorate, writes me as per attached letter, which seems to me quite an unusual testimonial to Dr. Geiger. I send you an extra copy in case it shall seem wise to you to send Dr. Geiger one of them.

Understand that while Dr. Geiger is paid by the Government, yet he is connected in some way on our books with a donation of \$10,000 a year from the National Cannery Association, which probably defrays the expense of the work to which the University is put. Believe the appropriation was \$20,000 for two years ending April 1924. Mr. McDougall thinks the National Cannery Association will renew this donation again for next year, but seems to think that the Government may remove Dr. Geiger to other work. He thinks, therefore, it might be well for the University to impress on the Surgeon General that we consider Dr. Geiger's work vital, most successful, and that there is still a good deal to do, thus preparing the way for continuing him if we request it.

Such a testimonial raises in my mind the question whether rather than to let him get away we might want to try to retain him on our Faculty but, of course, there seems little reason to go to this expense if we could continue the present arrangement. Moreover, a part of his success may be due to his Government connection which, combined with his professional ability, makes an ideal combination.

You and Dr. Jordan, of course, will know what, if anything, ought to be done. Please don't feel any necessity of reporting the facts to me.

Yours cordially,

Harold H. Swift

Handwritten text at top right, possibly a date or reference number.

September 10, 1933

President Franklin D. Roosevelt
The University of Chicago
Chicago, Illinois

Dear President:

Mr. E. A. Tamm, President of the Supreme Court, has been very kind to send me a copy of the report of the Committee on the Administration of the Courts, which is a very interesting and valuable document. I have read it with great interest and have been very much impressed by the wisdom and foresight of the Committee.

I am very glad to hear that the Committee has recommended that the Supreme Court should be reorganized so that it will be able to handle its business more efficiently. I think this is a very wise suggestion, and I am sure that the President will take prompt action upon it. I am also glad to hear that the Committee has recommended that the lower courts should be reorganized so that they will be able to handle their business more efficiently. I think this is also a very wise suggestion, and I am sure that the President will take prompt action upon it.

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Very truly,
Franklin D. Roosevelt

C O P Y

LIBBY, McNEILL & LIBBY
C H I C A G O

Office of
The President

September 15, 1923.

Mr. Harold H. Swift,
Chairman, Board of Trustees,
University of Chicago,
Chicago, Illinois.

Dear Mr. Swift:

We are aware of the fact that Dr. J. C. Geiger's assignment to the University of Chicago by the Surgeon General of the U.S. Public Health Service will terminate on Jan. 1, 1924.

I cannot express in words how valuable the services of Dr. Geiger have been to the Canning Industry. His assignment was for the purpose of studying and investigating causes and prevention of Food Poisoning in the United States. His work has taken him all over the country, and in almost every case has resulted in a more thorough understanding among Health Officials, Local Physicians and the canners themselves. Effective work has been done with sensational publications, which are so prone to publish articles inimical and hostile to Canned Foods, more especially where the apparent cause of illness is unknown and is only under suspicion. In almost every instance he has succeeded in establishing that these illnesses were not caused by Canned Foods, but were caused by most everything except Canned Foods; however, the most valuable results are incalculable from the fact that if Canned Foods remain under suspicion the loss to our business, and to other canners would be very considerable.

In addition to the general work which Dr. Geiger is doing we have called upon him many times for advice and technical assistance with reference to our several canning plants and problems, and this service was gladly rendered.

The above is indicative of the public service the University of Chicago is rendering to our Commercial interests in Chicago, and in the United States.

We trust that Dr. Burton, President of the University of Chicago, is thoroughly familiar with the work that Dr. Geiger is doing and would like to have Dr. Geiger know, either through Dr. Burton or the canners direct, that his work is appreciated, not only by ourselves, but all of the canners in this country.

Yours very truly,

Edward G. McDougall.

C O P Y

LIBBY, McNEILL & LIBBY
C H I C A G O

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Office of
The President

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The University of Chicago
Department of Hygiene and Bacteriology

April 23, 1923

President Ernest D. Burton
Faculty Exchange

My dear President Burton:

I am sorry that the recommendation of our committee for a special research fund did not meet with favor, as it seems to us that some essential points are involved. The main purpose of such a fund would be to provide an income which could not be diverted to purposes other than research. There is always so much pressure upon the general income of an educational institution that research, when not specifically endowed, may at times be seriously crippled.

While we have the utmost confidence in the immediate outlook and in ~~the~~ interest of the present Board of Trustees in research, it seems to us conceivable that at some future time enlargement of the hospital or increased expenses of hospital operation might make such demands on the general income as to interfere with the progress of investigative work. That such a difficulty is not imaginary is shown by our own experience in the situation created by the amalgamation of Rush Medical School with the University. At that time the Hull Biological Laboratories were utilized for medical instruction, and space, staff and equipment originally designed for research were turned over to the task of teaching undergraduate medical students. As a consequence, biological research in the University was greatly hampered for a series of years, and several eminent investigators were drawn away by other institutions.

The committee had in mind three specific purposes to which a Research Fund should be applied: (1) Provision of Research Assistants in the several departments. The complicated and time-consuming laboratory procedures essential in modern research problems call for trained and intelligent assistance above the grade of that afforded by the laboratory technicians. Some assistance of this character is now provided in the Departments of Anatomy, Bacteriology, Chemistry and Pathology, but none in the Physiological group. The new department of Medicine, Surgery and Pediatrics would also need consideration. (2) Research Fellowships. These should make it possible to bring temporarily to the University men holding teaching positions in other institutions where time and facilities for research are not available. Our experience with the Logan Fellowship in Bacteriology has shown that such men are often willing to come at the sacrifice of one half or two thirds of a year's income. It seems fair to suppose that such men would carry back with them a broader view and an increased zeal for investigation. Undoubtedly men of unusual investigative ability would sometimes be discovered in this

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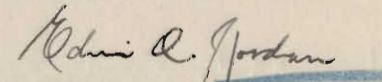
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way. These fellowships would be primarily for research, and would not come into competition with the fellowships of the National Research Council which are designed to encourage young recruits. (3) Aid of Special Research Programs. It is thought very desirable to have a fund available for prosecuting intensively unusually timely or promising lines of work. From time to time new leads and new discoveries will make immediate experimentation and concentration in a particular field of the highest value. Delay in securing necessary equipment and assistance might mean a serious setback, or, as in the case of a transient epidemic disease, irreparable loss of material. A new discovery, like that of insulin, calls at once for careful testing and extension. It is not a matter of indifference whether a new remedy becomes generally available in one year or in ten years.

It is plain to your committee that the administration of a special research fund would be liable to possible abuses and should be safeguarded as far as possible. One feasible method of control has suggested itself to us, namely that recommendations for appropriations from such a fund should be made to the President through a small committee of the faculty, rather than by individuals. It is believed that this method would secure a certain equality of distribution of general research assistance, and that it would be of advantage to have any special project run the gauntlet of professional criticism. While complete departmental autonomy should exist with respect to choice of subjects, personnel, etc., reports on the results obtained by use of the fund might well be made to the Research Committee and through it to the President and Board of Trustees.

With these ends in view your Committee would respectfully suggest a reconsideration of the desirability of safeguarding and promoting the work of investigation by the creation of a Special Research Fund.

Respectfully yours,


Edwin O. Jordan

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Howell G. Jordan