

CLASS OF SERVICE	SYMBOL
Telegram	
Day Letter	Blue
Night Message	Nite
Night Letter	N L

If none of these three symbols appears after the check (number of words) this is a telegram. Otherwise its character is indicated by the symbol appearing after the check.

WESTERN UNION



TELEGRAM

NEWCOMB CARLTON, PRESIDENT

GEORGE W. E. ATKINS, FIRST VICE-PRESIDENT

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Telegram	
Day Letter	Blue
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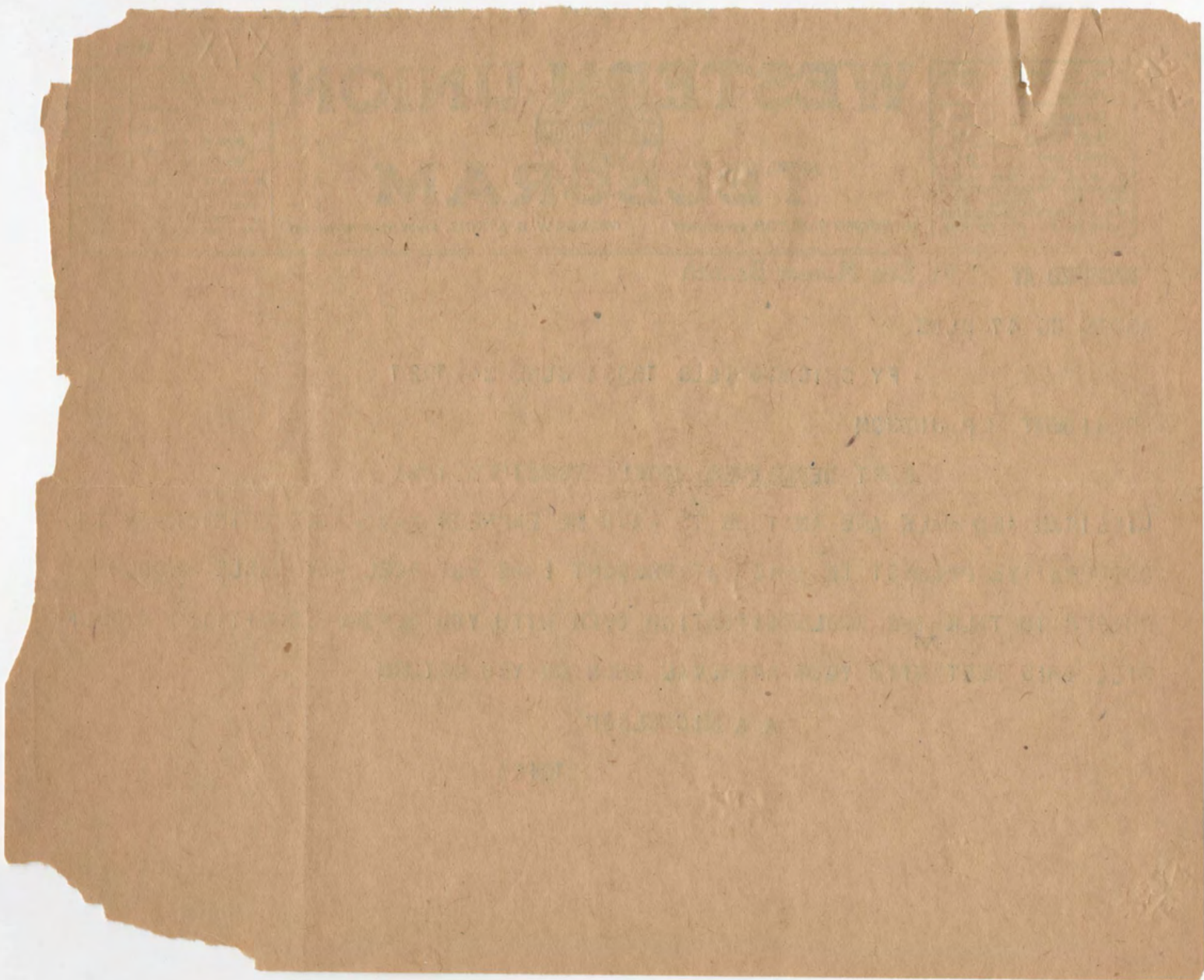
PRESIDENT H P JUDSON

FORT DESMOINES HOTEL DESMOINES IOWA

MILLIKAN AND HALE ARE ANXIOUS TO HAVE ME EXPRESS FAVORABLE OPINION ON THE COOPERATIVE PROJECT TO WHICH AT PRESENT I DO NOT FEEL FAVORABLE SHOULD PREFER TO TALK THE WHOLE SITUATION OVER WITH YOU BEFORE COMMITTING MYSELF WILL THIS MEET WITH YOUR APPROVAL WHEN DO YOU RETURN

A A MICHELSON

1048A



The University of Chicago
Ryerson Physical Laboratory

June 3/21

Dear President Judson

I want you to know how
keenly I appreciate the "cordial best wishes"
which you sent me in your note of yesterday.
I shall hope to be able to show you too that
the interests of the University of Chicago and
especially of the Ryerson Laboratory are, and
always will be, exceedingly dear to me. I do not
see how any definite plan can be worked out
until Mr. Michelson's return (he sails on the 11th) and
I suggest that the whole matter be held in
abeyance until he arrives. Meanwhile, however,
you may be interested in knowing that
while still feeling that I owe it to my field of

work to assist in the development of a new
Institute of Physics in California, I have not
only not accepted, but have expressed my
entire unwillingness to accept, the
Presidency of the California Institute of Technology, so
that the "noble army of masters" still
awaits an addition to its ranks

Very sincerely yours

R. A. Millikan

institutions. Although my salary will then be entirely available for strengthening the work of the Department here in any desirable way, I will keep my hand with the work of the laboratory, assist in assigning problems, and in directing them in so far as it is possible to do so by two or three short visits during the year and a longer one during the Summer. I have some problems under way which I must work out here anyway and shall expect to be back during some Summer Quarter for this purpose. My heart and soul will always be in the work of the Ryerson laboratory and I think that I may yet be able to serve it in a real and effective way. I see large possibilities of cooperation between the two laboratories and



June 2/21

Dear President Judson

After the most careful consideration of all the interests involved it has seemed to me that I owe it to Physics to seize the opportunity which is now presented to ^{help to} start in connection with an educational institution a new Institute of Physics which, both because of location and of quite extraordinary endowment - more than \$2,000,000, being

expressly provided on condition that I direct its work and would not be forthcoming if I were there but a fourth or a half of the time. I therefore suggest the following as the nearest approach to a compromise which seems possible. In my announcement which is made of the

foundation of the new Institute and my appointment as Director, if the University so desires I will be stated that in taking the post I keep my connection with the University of Chicago and continue the cooperation, already begun though the work of both Professor Nicholson & myself, between the two

available for Physics alone — will have exceptional facilities for pushing forward ^{certain parts of} the boundaries of our knowledge of the physical world.

The only remaining question is as to how, in doing so, I can still best serve the interests of the University of Chicago, and help to promote the effectiveness of its Department of Physics.

I have for weeks tried to find a way to split myself ^{equally} between the two institutions but have failed, both because the thing itself is of questionable feasibility, and also because the funds for the new Institute are



after the new one is well started it may be altogether feasible to spend an increasing amount of time here. The one laboratory is in a Technical School - a feature which the University of Chicago lacks - the other is in the atmosphere of a great University which the California Institute lacks.

If the opportunity is properly utilized I sincerely believe that it will be possible to build up two great cooperating centers

of stimulating activity in Mathematics
Physics ~~and~~ Chemistry ^{and their applications}, and I hope
that my present action may
be a step toward that result.

Very sincerely yours
R. A. Millikan

June 6, 1921

Dear Mr. Millikan:

Your note of the 2nd is received.

While of course I regret that we shall lose your active service to the University I must at the same time welcome you to the " noble army of martyrs", in other words the administrative heads of institutions of learning. I give you cordial best wishes for your prosperity, which I am confident will come to you. The suggestion you make as to continued cooperation with the University is very interesting and I shall gladly consider the matter with Mr. Michelson on his return.

Very truly yours,

Mr. R. A. Millikan,
Faculty Exchange.

HPJ:JN

June 6, 1931

Dear Mr. Millikan:

Your note of the 2nd is received. While of course I regret that we shall lose your active service to the University I must at the same time welcome you to the "noble army of martyrs" in other words the administrative needs of institutions of learning. I give you cordial best wishes for your prosperity, which I am confident will come to you. The suggestion you make as to continued cooperation with the University is very interesting and I shall gladly consider the matter with Mr. Nicholson on his return.

Very truly yours,

Mr. R. A. Millikan,
Pasadena, California.

HP:JH

494 S. Hudson Ave.,
Pasadena, Calif.,
→ February 8, 1921.

Mulliken
Dear Mr. Ryerson:

After considerable reflection, I have decided to ask your advice about a matter which I find that I cannot possibly decide without more knowledge than I now have, and which, too, I do not feel that I ought to decide without conference with you, who have been so largely responsible for the development of the work which has engrossed my attention for more than twenty years at the Ryerson Laboratory.

My own situation is in brief this: The California Institute of Technology has asked me to become the permanent Director of the new Norman Bridge Laboratory of Physics, which is being built here, and to couple with that position that of President of the Institute, the conditions which they propose being as follows:

(1) That at least three-fourths of my time shall remain free for the conduct of my scientific work, the major portion of the executive work of the President's office devolving upon a second officer, who will perhaps be known as "Vice-President."

(2) That the Institute endow the Department of Physics with a capital sum sufficient to yield an annual income of fifty thousand dollars, which is to be devoted to work of research and instruction in physics alone. As the total

425 E. Madison Ave.,
Pasadena, Calif.,
February 8, 1931.

Dear Mr. Hyatt:

After considerable reflection, I have decided to ask your advice about a matter which I find that I cannot possibly decide without more knowledge than I now have, and which, too, I do not feel that I ought to decide without some reference with you, who have been so largely responsible for the development of the work which has engaged my attention for more than twenty years at the Hyattson Laboratory.

My own situation is in brief this: The California Institute of Technology has asked me to become the permanent Director of the new Norman Bridge Laboratory of Physics, which is being built here, and to couple with that position that of President of the Institute, the conditions which they propose being as follows:

(1) That at least three-fourths of my time shall remain free for the conduct of my scientific work, the major portion of the executive work of the President's office devolving upon a second officer, who will perhaps be known as "Vice-President."

(2) That the Institute enter the Department of Physics with a capital sum equivalent to \$4000 an annual income of \$100,000 dollars, which is to be devoted to work of research and instruction in Physics alone. On the basis

Page 2 Mr.R.

annual expenditure of the Institute is only about \$170,000 this means that the trustees are developing a new type of Technological School in which very exceptional emphasis is to be laid upon research in Physics and Chemistry, and upon the training of men skilled in these fields.

(3) That my salary be \$15,000 per annum, and that a retiring allowance plan be arranged similar to that at Chicago.

You will agree that the proposal is one to which I ought to give very careful consideration, I had refused a preceeding one, equally attractive so far as salary was concerned, because I thought that it would make it necessary for me to give up quite largely my scientific work and become primarily an administrative officer. The present proposal on the other hand, appears to offer me exceptional conditions for carrying out a research program, for it provides ample funds for research, and gives me complete freedom in their use. The number in attendance upon the Institute is at present limited to about five hundred, and will remain small so that the fraction of the available funds which will have to go into general instructional work, is not large. The present total budget for instructional purposes in Physics is but about \$10,000. The conditions which exist here for solving certain types of physical problems are superb, and they appear to me to be excellent for all kinds of research work

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Page 3 Mr.R.

in Physics.

On the other hand, my roots are sunk deep in the Ryerson Laboratory, and as you know, I have recently been active in planning bigger things for its future, particularly, in the attempt to induce the Rockefeller Foundation to create conditions which will give it, and a few other Laboratories somewhat similarly situated, an opportunity to demonstrate what a properly equipped and organized Department of Physics within a University can do in the way of turning out large results in Physical Research, my firm conviction being that, leaving wholly out of account the matter of the training of men - a function which can be performed only by an educational institution - a dollar put into a Research Laboratory in connection with such an institution will yield four times as much in actual Research-output, as it can be expected to yield in connection with other forms of research investment.

My effort with the Rockefeller Foundation has not thus far been successful, and from an interview which I recently had with Mr. Vincent, I judge that the Foundation is so engrossed in its public-health program that it is not likely to wish to devote more funds to the problems of physics, even though these are from my point of view much more fundamental and also even more important than are those of public health, however important these latter may be.

This probably means that if any new steps are taken in Physics at the University, they will be initiated by the

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On the other hand, my roots are much deeper in the

Research Laboratory, and as you know, I have recently been

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in the attempt to induce the Rockefeller Foundation to create

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in its public-health program that it is not likely to wish to

devote more funds to the problem of physics, even though I have

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more important than any kind of applied physics, however far-

ther these latter may be.

This probably means that if any new steps are taken

in Physics at the University, they will be initiated by the

Page 4 Mr.R.

University itself, rather than by an outside agency. If the University can and will take them, it can easily place itself in a commanding position in the progress of Physics in the United States. If other institutions follow its lead, so much the better for the country. Whether they do so or not however, the Ryerson Laboratory would be likely to be for years to come the chief source and center of the progress of the country in physics.

Now, if I felt that these steps would be taken in the immediate future, and that the conditions at Ryerson would be such that I could make as large a contribution to the advance of Physical Science in Chicago as elsewhere, I should feel that my first duty was to Ryerson, and I should be quite content to remain there regardless of the attractiveness of conditions here. But I am not sure that this is the case.

We started last year a paper program for a Research Institute in Physics and Chemistry, but for architectural reasons which seem to me excellent, the possibility of uniting the two Departments in a physical way has disappeared and with it the possibility of eliminating, by this particular device, the danger of the wasting of funds in unnecessary duplication of work. The new building, when it is erected at the West of Kent will be simply a new Chemistry-Building, and should not be planned with reference to housing physics. Under these conditions it becomes desirable to concentrate the real work in physics of the University in the Ryerson Laboratory, which is already excellently equipped for it, and which with some changes can be made to accomodate it.

University itself, rather than by an outside agency. If the University can and will take them, it can easily place itself in a commanding position in the progress of Physics in the United States. If other institutions follow its lead, so much the better for the country. Whether they do so or not however, the Ryerson Laboratory would be likely to be for years to come the chief source and center of the progress of the country in physics. Now, it is felt that these steps would be taken in the immediate future, and that the conditions at Ryerson would be such that I could make a large & useful contribution to the advance of Physical Science in Chicago as elsewhere, I should feel that my first duty was to Ryerson, and I should be quite content to remain there regardless of the attractiveness of conditions here. But I am not sure that this is the case.

We started last year a paper program for a Research Institute in Physics and Chemistry, but for structural reasons which seem to me excellent, the possibility of doing the two departments in a physical way has disappeared and with it the possibility of eliminating, by this particular device, the danger of the meeting of funds in unnecessary duplication of work. The new building, when it is erected at the foot of Lake will be simply a new Chemistry-Building, and should not be planned with reference to housing physics. Under these conditions it becomes desirable to concentrate the real work in physics at the University in the Ryerson Laboratory, which is already excellently equipped for it, and which with some changes can be made to accommodate it.

all for a score or for scores of years to come, even with the expansion in Physics which is contemplated in the Institute scheme. The pressing need of the two Departments are quite different; the crying need for Chemistry is for a new building--while ours is for increased equipment and facilities. It will be more useful, therefore, to consider them independantly, and with the thought in mind that the physical work of the University is to center wholly in the Ryerson Laboratory.

Last year's budget at Ryerson amounted all told, to about \$50,000, of which more than half, I think, was devoted to instruction, and of which practically none was left for new equipment. The recommendations for next year call for a budget of \$62,500 of which \$10,000 is, if obtained, to be for new equipment. In order to embark upon the program outlined to the Foundation we need:

(1) Each year for ten years the \$10,000 Equipment Fund asked for this year in addition to the \$52,500 asked for for other purposes.

(2) \$10,000 a year to be devoted to five Research Fellowships which are to be primarily assigned for periods of one or two years at a time, to men on Sabbatical or other leave, from other institutions, (these men to work at the Ryerson Laboratory on problems of their own choosing, or on those assigned by the Director of the Laboratory.) These Fellowships would represent the University's contribution to the Research life of the country, particularly, in connection with the smaller institutions. The greatest stimulus to Research over a large area commonly comes thru the develop-

all for a score or for scores of years to come, even with the
expansion in types which is contemplated in the Institute
scheme. The pressing need of the two departments are quite
different; the existing need for Chemistry is for a new building--
while ours is for increased equipment and facilities. It will
be more useful, therefore, to consider them independently, and
with the thought in mind that the physical work of the University
is to center chiefly in the Hyman Laboratory.

Last year's budget at Hyman amounted all told, to about
\$60,000, of which more than half, I think, was devoted to mainten-
ance, and of which practically none was left for new equipment.
The recommendations for next year call for a budget of \$82,500
of which \$10,000 is, if obtained, to be for new equipment. In
order to embark upon the program outlined in the Foundation we need:
(1) Each year for ten years the \$10,000 Equipment Fund
asked for this year in addition to the \$82,500 asked for
for other purposes.

(2) \$10,000 a year to be devoted to five research fellowships
which are to be primarily assigned for periods of one or two
years at a time, to men on Sabbatical or other leave from
other institutions. (These men to work at the Hyman Labo-
ratory on problems of their own choosing, or on those
assigned by the Director of the Laboratory.) These fellow-
ships would represent the University's contribution to the
research life of the country, particularly in connection
with the smaller institutions. The greatest stimulus to
research over a large area usually comes from the develop-

ment of a great research center, in which the research atmosphere prevails, and to which men will come from the smaller institutions for a year or two of intensive research work, and for association with able, progressive minds. The proposed Fellowships would react to the maintenance of a high standard of work at the University for the men who had been there on these Fellowships would almost inevitably send back their best young men to the university. These Fellowships would not compete with the National Research Fellowships which are in general not for instructors, but for young Ph. Ds. between the ages of 25 and 35; they would not compete with the type of Fellowships not in existence in the Universities for these latter are for men who have not yet taken the Doctor's degree.

(3) \$5,000 per year for increase in shop facilities.

The foregoing recommendation involves necessarily an expansion of the shop facilities of the Ryerson Laboratory, which are in fact already inadequate. We need at once a laboratory glass-blower as it is, and we should need to add two more mechanics or their equivalent in shop assistants.

(4) \$3,000 per year for bringing to the United States each Summer Quarter an outstanding European Physicist or Mathematician. This should be in addition to the summer budget as now regularly provided. Thru the start it has already made in its Summer Quarter the University has the opportunity to become a Woods Hole for American Mathematics, physics and chemistry. The course of lectures each year by one of Europe's outstanding scientists is an

ment of a great research center, in which the research atmosphere prevails, and to which men will come from the smaller institutions for a year or two of intensive research work, and for association with able, progressive minds. The proposed Fellowship would result in the maintenance of a high standard of work at the University for the men who had been there on these Fellowships would almost inevitably come back their best years to the university. These Fellowships would not compete with the National Research Fellowships which are in general not for instruction, but for young Ph. Ds. between the ages of 25 and 35; they would not compete with the type of Fellowships now in existence in the universities for those latter are for men who have not yet taken the Doctor's degree.

(5) \$5,000 per year for increases in shop facilities.

The foregoing recommendation involves necessarily an expansion of the shop facilities of the Watson Laboratory, which are in fact already inadequate. We need at once a laboratory glass-blower as it is, and we should need to add two more mechanics or their equivalent in shop assistants.

(6) \$5,000 per year for helping to the United States

each summer further an outstanding European physicist or mathematician. This should be in addition to the amount budgeted as now regularly provided. That the amount is already made in the amount budgeted the University has the opportunity to become a World War for research mathematicians, physicists and chemists. The number of research men back by one of these a considerable number in the

Page 7 Mr. R.

exceedingly important part of such a program.

It is, in addition the finest imaginable way of bringing European science to America.

If these conditions could be realized either by permanent endowment, or by the provision of the funds necessary for a ten year's trial of this plan, I think I should feel that I could make my largest contribution in Chicago. If neither this, nor any other plan which would accomplish substantially the same ends is feasible, I shall feel that I could make my largest contribution either here or elsewhere, where very active interest exists in a strong research program in physics.

At any rate, I shall appreciate very highly your advice in the present situation.

Very sincerely yours,

Ran
RAN/MND

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At any rate, I shall appreciate very highly your
advice in the present situation.

Very sincerely yours,

RECEIVED

THE UNIVERSITY OF CHICAGO.

Physics

Feb 29 - 1893

Amid

Stratton

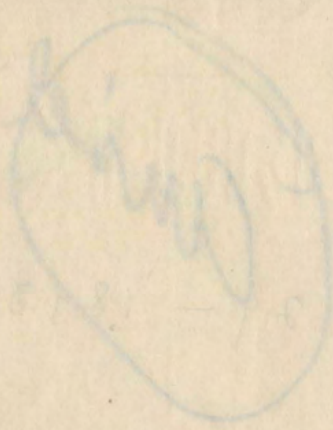
Pres. W. R. Harper :-

University of Chicago.

Dear Sir :-

I was very much surprised to receive your note of Feb. 25. in regard to the examination papers in Physics. Indeed had it been to the effect that the examination was too rigid I should have been inclined to plead guilty.

Physics as it is usually taught consists of a lot of experiments illustrating ^{effects} and calls for too little philosophical thought as to the cause of the phenomena. I believe that I can say without the appearance of boasting that I have been a very successful experimenter in the class room and this fact has made me very careful not to neglect the other and more important side, the training of thinkers.



Dear Mr. Thompson -
University of Chicago

Dear Sir -

I was very much surprised to
receive your note of 10th inst. in regard to the
administration of the University of Chicago. I
am sure that the officials who have been
appointed to the office have been selected with
great care and are of the highest caliber.
I am sure that they will do their best to
maintain the high standards of the University.
I am sure that they will do their best to
maintain the high standards of the University.
I am sure that they will do their best to
maintain the high standards of the University.

I have emphasized this latter point more this year than ever before and it was for this reason that I expected to hear from the students that the course was too hard.

I have born constantly in mind the following facts. 1st - that my students are mostly Freshmen and have not had in many cases the previous training in scientific thought and reasoning they should have had.

2nd - that it is my duty to develop the reasoning powers of the student as well as to amuse him.

3rd - that great advances have been made of late in this department of natural science and it would be a gross injustice to the student, whether he be Freshman or Senior, not to teach him the "New Physics."

"My students have shown the very best of spirit and a perfect willingness to work. I have given them a great deal of personal attention and must say that I am proud of the way in which they handled the last examination."

I do not wish you to infer however that I am perfectly satisfied with the course for I hope that each time it is given, it will contain newer and better features than before.

I am not only willing, but glad to have suggestions and if those parties who have intimated that my examination was not rigid enough, will come to me, I will take great pleasure in receiving any information they may have to offer upon the subject.

I have placed a copy of the questions in the hands of Dr. Chamberlain and shall be only too glad to have you confer with him and completely investigate the whole matter as I fear that such reports will tend to weaken your confidence in me.

Thanking you kindly for calling my attention to the suggestion.

I remain yours.

D. W. Shotton,

Pro Harper

Middleton

The expense attending such an investigation
would be very great. Besides we have not
the apparatus or facilities for developing
practical processes of this kind

The difficulties involved are greater
than Mr. Middleton is aware of

~~2nd~~
Y^r S. M. Shattuck

Mr. Loring

The original estimate
would be very great. I have
the appearance of a battle in
proceeding forward of the line
the appearance of a battle in
the appearance of a battle in

Yours truly
J. M. Smith

Secretary's Office,
Augusta, Georgia.

SOUTHERN LYCEUM ASSOCIATION.

For the Promotion of Lyceum Organization in the South.

Henry Watterson, President

Jno. B. Gordon, Vice-President.

Hugh C. Middleton, Sect'y & Treas.

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Frank L. Stanton, Atlanta, Ga.
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Augusta, Ga., February 11, 1899.

Dr Wm. R. Harper, Prest.,
Chicago.

Dear sir:

You will remember that we had a little correspondence several years ago in reference to the establishment of a large winter Chautauqua assembly in this city, a matter which has not yet materialized, however. I mention that subject as a sort of introduction and excuse for the present letter.

Several months ago in a conversation with Mr Thomas Edison in regard to some important laboratory experiments I wish to make, I suggested that probably I could get one of the Universities interested in the matter. He thought that since the experiments were to promote a commercial object I could not probably get the assistance from a University, tho' he agreed with me that the University would be promoting an important scientific object at the same time. I should be glad if you would tell me whether the Chicago University could assist me in the experiments I desire to make, ^{explained in the following:-} I have always thought that Printing would one day be done by the employment of the Photographic principle--the action of light upon chemically prepared paper--as a substitute for type and ink impressions, at best ^a cumbersome and crude process with poor results compared to the finish of photography. Of course it has long been possible to print a newspaper page by photography, using type and sunlight, but only one page at a time could be printed, making newspaper or book printing impracticable on this account. On the discovery of the X-Rays, however, it immediately occurred to me that here was possibly the solution of the difficulty that had before existed. I reasoned that if X-Ray light could penetrate a 2-foot thickness of wood and photograph upon a sensitive sheet underneath, then if instead of wood, layers of sensitive paper were used, an opaque body ^{placed next to the light,} would be photographed on each sheet of paper--in other words, that it should be possible to print in large multiples, ^{the} point before aimed at. I at once made experiments and demonstrated that this multiple printing could be done. My conception of the idea was in advance of any demonstration of the fact ^{of multiple photography} in the world, so far as there is record, but I did not complete my experiments until after (one or two weeks) a German publication had announced the practicability of multiple photographic prints by the X-Ray. However, that by the way. My experiments convinced me that it was practicable to print in enormous quantities and with great rapidity by this process. Through a hollow type, set up in the

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Hugh C. Middleton, Secretary & Treasurer.

John B. Gordon, Vice-President.

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Chicago.

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You will remember that we had a little correspondence several years ago in reference to the establishment of a large winter Chautauque assembly in this city, a matter which has not yet materialized, however. I mention that subject as a sort of introduction and excuse for the present letter.

Several months ago in a conversation with Mr. Thomas Edison in regard to some important laboratory experiments I wish to make, I suggested that probably I could get one of the Universities interested in the matter. He thought that since the experiments were to promote a commercial object I could not probably get the assistance from a University, tho' he agreed with me that the University would be promoting an important scientific object at the same time. I should be glad if you would tell me whether the Chicago University could assist me in the experiments I desire to make. I have always thought that printing would one day be done by the employment of the photographic principle--the action of light upon chemically prepared paper--as a substitute for type and ink impressions, at least ^{in a crude process} with poor results compared to the finish of photography. Of course it has long been possible to print a newspaper page by photography, using type and sunlight, but only one page at a time could be printed, making newspaper or book printing impracticable on this account. On the discovery of the X-Rays, however, it immediately occurred to me that there was possibly the solution of the difficulty that had before existed. I reasoned that if X-Ray light could penetrate a 2-foot thickness of wood and photograph upon a sensitive sheet underneath, then if instead of wood layers of sensitive paper were used, an opaque body would be photographed on each sheet of paper--in other words, that it should be possible to print in large multiples the point before aimed at. I at once made experiments and demonstrated that this multiple printing could be done. My conception of the idea was in advance of any demonstration of the fact in the world, so far as there is record, but I did not complete my experiments until after (one or two weeks) a German publication had announced the practicability of multiple photographic prints by the X-Ray. However, that by the way. My experiments convinced me that it was practicable to print in enormous quantities and with great rapidity by this process. Through a fellow type, set up in the

Secretary's Office,
Augusta, Georgia.

SOUTHERN LYCEUM ASSOCIATION.

For the Promotion of Lyceum Organization in the South.

Henry Watterson, President.

Jno. B. Gordon, Vice-President.

Hugh C. Middleton, Sect'y & Treas.

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Frank L. Stanton, Atlanta, Ga.
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usual fashion, a large number of copies can now be made at one exposure--several hundred. Several hundred pages of a book or newspaper can be printed in this way at one time. It is practicable now to publish the entire issue of a newspaper in this way. The cost, however, on account of the expense of the present photo paper would be enormous. The X-Ray, however, is probably in its infancy. Mr Tesla recently told me that he had photographed through a 4-feet thickness of wood--far more than was at first done. A foot thickness of paper of about the weight used by Scribner's Magazine contains about 4,000 pages,--a newspaper foot contains more pages. A 3-feet thickness, with 12,000 pages, if this number could be printed at one exposure, under one light, or light-area would far surpass the work of the most rapid press. The time of exposure in X-Ray photography has been greatly decreased since the beginning of the experiments--for ordinary printing a fraction of a second now suffices. It is natural to suppose that a very small exposure will be obtained, as the power of the light is increased and sensitive paper is improved. It is not now practicable but I see no reason to doubt that it will be practicable to print through a pile of paper four or five feet high, containing fifteen or twenty thousand sheets in a fraction of a minute by X-Ray light and a cheap sensitized paper. There are now difficulties, but they will be overcome. Fluorescope paper placed at intervals through even large thicknesses of paper re-vives the light. At present however, the type throws too large a print at the base of great thicknesses. This is a difficulty in the way of large multiple printing. But this can be overcome as such difficulties have been overcome before at the inception of machines. At present the ordinary photographic paper is too costly to make this kind of printing practical for newspaper and book publication. Eminent chemists (photo-chemists) however have given it as their opinion that a cheap sensitizing method can be found. Mr Edison declared to me that he knew a cheap salts could be obtained by experiment, possibly he thought an iron salts, which would be cheaper really than ink. ^{there was, he said, no doubt of it--} ~~the~~ was only a matter of hard experimentation. Mr Edison agreed with me that the discovery of this salts was really the only obstacle in the way of making the process entirely practical. He thought that it would be possible to print a million copies or more per hour by the process. He gave me a letter for use expressing his opinion, in which he uses the following language: "My opinion is that it would be possible to devise a printing system by the X-Rays as you have described, but to make it commercial it will be necessary to experiment for the production of a cheaper chemical than silver salts now used".

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ORGANIZE CO-OPERATIVE LYCEUMS AS A MEANS OF POPULAR EDUCATION.

Secretary's Office,
Augusta, Georgia.

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Mr Edison advised me to push the development of the idea. Mr Nikola Tesla believed the matter was entirely practical, and charged me thus "Keep behind the idea my all means".

I have described the possibilities of large-multiple printing by the use of one light or area of light. Of course, a large number of lights or areas could be used proportionately increasing the result. We can conceive, however, of a roll of sensitive paper several thousand thicknesses through (say 4,000-one foot), traveling on a moving platform through a dark-chamber, pausing automatically under ^{one} X-Ray light a sufficient length of time for exposure and then proceeding through developing solutions and drying and folding machines. With a one-minute exposure this output would be something like a quarter of a million copies to every foot thickness of paper. Thus, much desired rapidity of production for dailies would be obtained. The cost of machinery would be far less than in the present expensive presses. An ordinary press, printing 20,000 papers per hour now costs (or recently cost) upwards of \$30000. The N.Y. World has some ten or twelve "quadruplex presses"; that is, as I understand, ~~xxxxxxx~~ over a million dollars invested in presses to get off its large edition. A large proportion of that expense saved and rapidity increased would mean cheaper worlds. Cheaper books and papers means much. Mr F. E. Milholland, Foreman of the N.Y. Tribune expresses himself thus in a letter to me after a conference with him "I see no reason why you should not go ahead and perfect it. I believe it can be made a success, and when success does come it will be the great revolutionizer of printing of the age."

I applied for a patent two years ago on the process as far as I had carried it, and tho' failing to get patent papers on what I then had perfected (as I expected I would fail) still the matter has been kept alive by proper procedure in Washington. My difficulty is, I am unable financially to carry on the experiments and to spend what should be spent on them to make the experiments really serious. Could the Chicago University help me with them protecting me at the same time in my commercial interests in the matter? If not, could you assist me to get the attention of Mr Rockefeller to the matter?

If Printing is a great art and has done the world good, such an advancement of the art as might make the cost of books and papers one-half their present price would be a great consummation. An important fact is that photographic effects are produced in printing engravings (illustrations) three multiples, and the book product from an artistic point of view surpasses that reached by use of type. I shall be glad to hear from you.

Very truly,

Hugh C. Middleton

Kindly consider to a large extent Confidential except that I should not object to the matter being communicated to Mr. Rockefeller.

Secretary's Office
Augusta, Georgia.

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Very truly,

Hugh C. Middleton

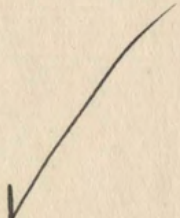
*Highly consider a change
of the Rockefeller with this
and not object to make any communication*

The University of Chicago
Ryerson Physical Laboratory

Chicago Feb. 21, 1902.



Physico



President Wm. R. Harper,
University of Chicago.

My dear Dr. Harper,

Your two notes about "the affair in which Mr. Millikan and I are interested" were duly received. The promotion was just in time to get into the book. We wish to thank the University through you for its confidence in us and to especially thank you for the interest you have taken and the attention you have given to the matter.

Yours respectfully,

C. Riborg Mann.
R. A. Millikan

Chicago Feb. 21, 1902.

President W. A. Harper,

University of Chicago.

My dear Dr. Harper,

Your two notes about "the affair in which
Mr. William and I are interested" were duly received. The proposition
was just in time to get into the book. We wish to thank the University
for the interest you have taken and the attention you have given
to the matter.

Yours respectfully,

W. A. Harper
President

Treasury Department,

Office of the Coast and Geodetic Survey,

Washington, D. C.

Stratton

1899.

Board of Justice
Apr 16

My dear Mrs. Harper

I understand that several newspapers
have published the fact that I have ac-
cepted the position which I spoke to you
about while in Chicago. The fact is that the
Coast Survey asked me to witness the ex-
periment by the Navy department on wireless
telegraphy. A telegram came while I was at
the Chicago Pennsylvania foot ball game ask-
ing me to report immediately to Admiral
Farguhar in New York, as the ship was
to leave on the following Monday morning.

I "made the ship" with five minutes to
spare, the experiment was very interesting
and instructive.

In order that my expenses might
be paid and that I ^{might} have an opportunity
to look over the work in connection with
the position offered me in Washington,

Treasury Department,

OFFICE OF THE COAST AND GEODETIC SURVEY,

Washington, D. C., , 189 .

SUBJECT:

Treasury Department,

Office of the Coast and Geodetic Survey,

Washington, D. C., _____, 189 .

an appointment was made for 30 days which will if I desire be extended until Jan 1st., the end of my vacation. I would not have you think that I would make any permanent arrangement without first consulting your wishes and the convenience of the department. as soon as I have looked the matter over more thoroughly I will drop you a line stating exactly the nature of the work and its relation to the work at the University.

There is no doubt in my mind but that it will be of very great benefit to the University as well as our department to have control of the Bureau of Weights and Measures.

My work this winter would be largely the mapping out of the building, working force, equipment and organization of the U.S. Bureau of Weights and Measures, a work which will be comparatively easy for me after my experience at Chicago, since the

Treasury Department,

OFFICE OF THE COAST AND GEODETIC SURVEY,

Washington, D. C., , 189 .

SUBJECT:

Treasury Department,

Office of the Coast and Geodetic Survey,

Washington, D. C., _____, 189 .

buildings and equipment are those of
a large physical laboratory.

The amount asked of Congress this year
will depend upon my estimate of the cost
of buildings, apparatus, and maintenance,
hence my work would be entirely that
of adviser to the department, at least for
the present. It would not involve any change
in the affairs of our department until the
beginning of the spring quarter, and probably
not then; however if permission were granted
me to accept until Apr 1st we could
during the winter talk matters over and de-
cide whether or not it would be best to
continue. If this plan meets with your ap-
proval the matter can be settled at once
without any further statement from me.

I have always hoped that I might
be called upon to organize the technical
work at the University, and I wish we
were in a position to do it now; I have

Treasury Department,

OFFICE OF THE COAST AND GEODETIC SURVEY,

Washington, D. C., 189 .

SUBJECT:

All communications should be forwarded
under cover to the "Superintendent U. S.
Coast and Geodetic Survey, Washington, D. C."

Treasury Department,

Office of the Coast and Geodetic Survey,

Washington, D. C., _____, 189 .

never lost-sight of it-and I fully
believe it is the greatest-need of the
University today, although you may
not-agree with me then. Hobbs tells
me things are getting along nicely at
the laboratory.

Yours
S. W. Stratton

Treasury Department,

OFFICE OF THE COAST AND GEODETIC SURVEY,

Washington, D. C., 189 .

SUBJECT:

The University of Chicago
Ryerson Physical Laboratory

Physics
Hunter
Chicago May 12, 1902.



President Wm. R. Harper,
University of Chicago.

✓
My dear Dr. Harper,

Enclosed are the documents relating to photography which I have studied and herewith return. This department is in full sympathy with the introduction of photography here both as a practical necessity and as a subject of instruction. We already give some instruction in photography in connection with our course 20 (physical manipulation) but have lately not announced it in our program as we found that it was too popular and the department did not feel justified in diverting the time of the teaching force to this work at the expense of the regular and, as it seems to us, more important work in pure physics. We shall be very glad if the University is now ready to take the matter up and hope that provision may speedily be made for it. As you know this department has long recognized the desirability of having a photographer here not only as a manipulator but also as an instructor and investigator. We are ready to cooperate with the other departments who wish to see the work promoted and hope that definite action in this direction may be inaugurated as soon as possible.

Yours respectfully,

C. R. Mann.

Chicago May 18, 1902.

President Wm. R. Harper,
University of Chicago.
My dear Dr. Harper,

Enclosed are the documents relating to
photography which I have studied and herewith return. This depart-
ment is in full sympathy with the introduction of photography here
both as a practical necessity and as a subject of instruction. We
already give some instruction in photography in connection with our
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not only as a manipulator but also as an instructor and investigator.
We are ready to cooperate with the other departments who wish to see
the work promoted and hope that definite action in this direction
may be inaugurated as soon as possible.

Yours respectfully,

C. R. Mann

The University of Chicago
Ryerson Physical Laboratory

Chicago

August. 1st 1902

President. W. R. Harper.
University of Chicago.

My dear Sir.

Please accept my resignation
from the position as Mechanician of the
Ryerson Physical Laboratory. Kindly have
it take effect September the first.

Very respectfully

Yours

Oscar Lange.

The University of Chicago
Hyerson Physical Laboratory

Chicago August 15, 1911

Professor W. B. Hooper
University of Chicago

My dear Sir

Your recent very interesting
letter to me in the University of Chicago
Physical Laboratory has been
received with great interest.

Very respectfully
Yours truly
R. W. Wood

The University of Chicago
Ryerson Physical Laboratory

(9)

Chicago Aug. 2, 1902.

Physics

President Wm. R. Harper,
University of Chicago.

My dear Dr. Harper,

Lange

Our instrument maker, Mr. Oscar Lange, has been elected as the result of a civil service examination to the position of head instrument maker in the Bureau of Standards recently established by the Government at Washington. While we are very sorry to have him leave us we do not wish to stand in the way of his promotion. The position to which he has been called is in many ways a better one than that which he holds here for it pays a better salary and seems to offer more opportunity for advance. Hence we are willing to have the resignation accepted and do hereby so recommend. We will send you a nomination of a successor as soon as we can find a suitable man, - a thing which it is by no means easy to do. The fact that Mr. Lange was elected to the position at Washington as the result of an examination open to all the instrument makers in the country will show you that it will not be easy to replace him.

Yours respectfully,

C. R. Mann

(P)

Chicago Aug. 2, 1902.

Handwritten signature

President Wm. R. Harper,
University of Chicago,
My dear Dr. Harper,

Our instrument maker, Mr. Oscar Lange,

has been elected as the result of a civil service examination to
the position of head instrument maker in the Bureau of Standards
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easy to do. The fact that Mr. Lange was elected to the position at
Washington as the result of an examination open to all the instru-
ment makers in the country will show you that it will not be easy
to replace him.

Yours respectfully,

Handwritten signature

May 29th, 1906.

My dear Mr. Mann:-

Thank you for your favor of the
28th inst. with enclosure. I am much interested in the
progress made and shall be glad to be kept informed.

Very truly yours,

H. P. Judson

May 28th, 1906.

My dear Mr. Mann:-

Thank you for your favor of the 28th inst. with enclosure. I am much interested in the progress made and shall be glad to be kept informed.

Very truly yours,

H. P. Judson

A NEW MOVEMENT AMONG PHYSICS TEACHERS

CIRCULAR II

The answers to the circular sent out about two months ago by the committee of the Central Association of Science and Mathematics Teachers have revealed the fact that there is a widespread interest throughout the country in the problem of more efficient instruction in elementary physics. The circular was printed in the March numbers of *School Science and Mathematics* and of the *School Review*, and in addition 1,600 copies were mailed to individual physics teachers. Altogether 275 answers have been received. These came from 80 colleges, 30 normal schools, and 165 high schools. The geographical distribution of those who answered is as follows:

Canada, 2; California, 11; Colorado, 6; Connecticut, 4; District of Columbia, 4; Georgia, 2; Illinois, 38; Indiana, 7; Iowa, 11; Kansas, 7; Kentucky, 1; Louisiana, 1; Maine, 5; Maryland, 2; Massachusetts, 24; Michigan, 19; Minnesota, 8; Mississippi, 1; Missouri, 7; Nebraska, 4; New Mexico, 1; New Hampshire, 1; New Jersey, 5; New York, 33; North and South Carolina, 3; North and South Dakota, 5; Ohio, 26; Oregon, 1; Pennsylvania, 18; Rhode Island, 1; Tennessee, 2; Utah, 1; Vermont, 2; Virginia, 4; Washington, 3; Wisconsin, 5.

The tabulated summary of the answers received is as follows:

Question 1. In counting the vote on the list of experiments, the college, the normal-school, and the high-school returns have been kept separate. Every experiment that received a total majority (138) vote appears in the list. Those marked with an * received a total two-thirds vote (184). The numbers in the last column under "success" are the returns from question 3; they tell how many votes each experiment received as being one of the most successful ones in the list.

Question 2. Numerous additional experiments have been suggested. For lack of space we present only those that were suggested by three or more teachers. The numbers indicate the vote. If you wish to have any of these added to the list, please vote on them as before.

Vernier and micrometer, 25; comparison of units of length, 16; use of chemical balance, 9; value of π , 4; uniformly accelerated motion, 4; center of gravity, 22; falling bodies (Whiting's method), 5; wheel and axle, 7; acceleration on in-

College	Normal	High	Total	Success	
80	30	165	275	128	TOTAL VOTE
*59	23	138	220	52	1. Weight of unit volume
*50	19	130	199	67	2. Lifting effect of water
*71	25	158	254	91	3. Sp. g. body denser than water
*51	19	128	198	52	4. Sp. g. of wood with sinker
41	22	109	172	45	5. Weight of water displaced
*68	23	143	234	73	7. Sp. g. of a liquid
*60	23	127	210	64	8. Lever of the first class
45	11	97	153	26	9. Center of gravity of lever
43	18	102	163	36	10. Levers of 2d and 3d classes
*61	21	134	216	45	13. Three forces in a plane
*50	21	131	202	29	14. Inclined plane
49	18	105	172	35	17. Pulleys
*74	24	149	247	65	26. Pendulum
*76	23	145	244	60	28. Boyle's law
*62	19	111	192	32	30. Barometer
*66	17	159	242	49	36. Testing a thermometer
*71	21	124	216	53	37. Linear expansion
*69	24	141	234	57	41. Specific heat
*67	22	143	232	50	42. Heat of fusion of ice
*52	19	119	190	31	43. Heat of vaporization
36	18	96	150	20	45. Relative humidity, dew-point
56	23	94	173	29	51. Boiling-point and pressure
*62	22	118	202	46	57. Wave-length by resonance
51	19	87	157	24	58. Number of vibrations of fork
56	19	82	157	38	61. Phenomena of electrostatics
*61	22	120	203	62	62. Phenomena of magnetism
*65	26	150	241	77	63. Magnetic field with filings
*56	23	139	218	55	66. Single-fluid cell
38	13	108	159	36	67. Two-fluid cell
*53	22	114	189	29	68. Battery grouping
51	15	77	143	25	69. D'Arsonval galvanometer
*57	19	111	187	35	70. Induced currents
53	21	108	182	29	71. Resistance by substitution
*61	22	115	198	53	72. Wheatstone bridge
52	22	100	174	33	76. Electromagnet
36	20	106	162	46	77. Electric bell
41	16	113	170	34	78. Telegraph instruments
*46	20	119	185	29	79. Electric motor
46	20	104	170	22	80. Dynamo
*65	28	152	245	66	85. Plane mirror
43	17	96	156	29	86. Spherical mirrors
*61	23	124	208	56	88. Index of glass
*65	22	136	223	57	91. Focus of converging lens
57	20	104	181	43	92. Conjugate focal lengths
*54	20	117	191	31	93. Relative sizes of object and image
44	18	82	144	12	94. Virtual image
*55	24	129	208	44	100. Photometer

clined plane, 6; principle of moments, 5; inertia balance, 3; determination of g , 10; develop $f=ma$, 4; law of centrifugal force, 6; fluid pressure, 10; hydraulic press, 3; pumps, 6; siphon, 5; hydrometer, 4; rate of exhaustion in air-pump, 3; heat conductivity in liquids, 4; convection currents, 4; cubical expansion of mercury, 3; laws of vibrating strings, 22; Kundt's tube, 9; fall of potential on a wire, 5; wireless telegraph, 3; telephone, 6; specific resistance, 4; Ohm's law, 5.

Question 3. The vote on the most successful experiments is given in the fifth column of numbers in question 1.

Question 4. The following experiments are not satisfactory to three or more of those who answered:

Uniformly accelerated motion, 17; inclined plane, 3; coefficient of friction, 3; Boyle's law, 5; comparison of masses by acceleration test, 8; elastic impact, 4; surface tension, 5; linear expansion, 14; increase in gas pressure at constant volume, 7; increase in gas volume at constant pressure, 13; efficiency of hot-air engine, 4; specific heat, 6; heat of fusion of ice, 10; heat of vaporization, 13; heat of combustion of gas, 4; efficiency of a gas engine, 6; efficiency of a water motor, 7; efficiency of a steam engine, 8; velocity of sound in open air, 4; wave-length of sound by resonance, 5; number of vibrations of a tuning-fork, 11; index of refraction of water, 3; spectrum phenomena, 4.

Question 5. Of those who answered this question 115 use toys, and 76 do not use them. The toys used are:

Balloon, soap-bubbles, tops, tumble jack, wind-mills, Cartesian diver, loop-the-loop, marbles, water wheels, pumps, hydraulic ram, sling-shot, steam and gas engines, motors, dynamos, telegraph, whistles, horns, flutes, color tops, kaleidoscope.

Question 6. The returns from this question concerning the criterion for judging a laboratory experiment are hard to tabulate. Few votes were received for the criteria as suggested in the first circular. Many votes were cast for a combination of two or more, and in these cases a vote was counted for each. The wording was also changed by the voters. The best summary of the vote seems to be this:

One hundred and eighty believe that an experiment should illustrate an important principle of physics; 130 think it should also help to fix in mind a principle that is in practical use; and 96 think that it should in addition interest and arouse the curiosity of the student; 52 are opposed to the use of toy machines, and 41 think it an admirable idea to use them.

Other suggestions as to what a laboratory experiment should aim to do were sent in as follows:

It should emphasize the basis of scientific work (20), so that the learner realizes that he is studying things rather than statements (6). It should give a better understanding of a principle (15) and help to fix it in mind (21). It should tend to develop independent thinking (18), power to reason (19), self-reliance (5), and accuracy of expression (14). It should foster skill in accuracy of observation (19), manipulation (22), and methods of experimentation (6). It should be simple (25), should verify something learned in the class (11), should be suggestive of further experiments (10), and should bring in incidentally phenomena not directly the subject of the experiment (10). It should raise the ideals of the value of careful, accurate, painstaking work (15), and be related to a principle in which the student can see some use (11).

Perhaps these statements, when viewed collectively, may be taken to mean that the laboratory is the place to impress the learner with the value, the meaning, and the methods of truly scientific work. He should learn that good results are obtained in any work only when the conclusions are based on careful, accurate, and unbiased observation, and are drawn with fearless honesty and entire fairness.

He should also see that such conclusions are but close approximations, so that he is ever ready to change or improve them when it is found to be necessary to do so.

Question 7. This question as to what is necessary in order to make physics more nearly fill the place it is capable of taking as a valuable educative factor, has called forth the largest number of suggestions of any. We regret much that we have not the means of printing extracts from many of the answers received. We have tried to include most of the ideas put forth in the following synopsis, though many of the finer distinctions of meaning have been necessarily lost:

Physics should be closely co-ordinated with the daily life and experiences of the students (55). This should not only be done by making the practical applications prominent (40), by bringing the work into close contact with industrial operations (8), by visiting industrial plants (8); but should also lead us to make the problems simple, concrete, and dealing with phenomena familiar to the student, (16), and even to found the discussions on the common experiences of the students rather than on the laboratory apparatus (14). In any case, the value of the principle under consideration must be evident to the student (14), and he must be given a clear understanding of the essential points involved (6). We must give less theoretical and abstract work, and a greater number of applications of the theory that is given (20).

In addition to co-ordination with industrial operations and practical applications of physics, it should be correlated with the universe, by showing that the principles seem to be operative throughout our entire range of observations from the cosmos to the electron (14). We should dwell more on the principles of wide application (15), and have less detail and fewer special cases (6), i. e., should teach fewer things well (14), and make the work less scattering (4). If the subject-matter is not reduced, we should have more time in which to treat it (25). This should be accomplished by requiring a descriptive course in advance of the present course (6), or by extending the work done into the grades (4).

We should lay far greater stress on the observation and study of phenomena as such (35), and pay very much less attention to the numerical relations between portions of phenomena. (48). This means less emphasis on the mathematical and abstract side (30), less quantitative work in the laboratory (33), more demonstration work (12), more class work, questioning, and quizz (7). Some do not agree with this position; they claim that we need more accurate quantitative work (4), better preparation in the elementary mathematics (7), better apparatus (13), and larger equipment (9). Conditions would be much improved if there was a text that had less subject-matter (12), that was inspiring and full of life and human sympathy (7); that was perfectly clear (4), that presented the subject as a consecutive or unified argument (7), and showed how one principle is related to others (15). In like manner, the manual should not make automatons of the student (3), and every experiment should exhibit "something doing," i. e., be active and dynamic rather than static (5). Fifteen express the opinion that all laboratory work should be quantitative, 15 call for simpler apparatus for this work, and 34 believe that there should also be qualitative work done by the students.

In the laboratory work there should be more supervision (7), the experiments should follow the class work (11), and every experiment should have a definite and clearly stated end in view (11).

There are three who believe that public opinion needs education concerning the value of laboratory work, and 3 others who think the lack of appreciation of

school boards is to blame for our failings. It is also suggested that there are too many examinations, that the amount of work required in physics should be commensurate with that required in other subjects, that there should be a reward for concrete knowledge for those who are destitute of ability as abstract thinkers, and that physics should be required of all students with credit varying from $\frac{1}{2}$ to $1\frac{1}{2}$ units.

Others suggest that the essential thing is better-prepared teachers, i. e., from the teaching point of view (33). The teachers should in addition have common-sense (2), tact (3), greater interest in the work (4), and be enthusiastic (21), inspiring (10), sympathetic and natural (4). Other requirements of the teacher are that he be a trained physicist (8), that he have a comprehensive view of the subject (7), that he know more than there is in the text (7), that he keep informed of what is doing in the world by reading current scientific literature (4), and that he plan his work more carefully (4). He should take more personal interest in the students (3), should be able to gain the confidence of the pupils and arouse their interest (3), and should not be teaching merely because he has to do so (3). He must also have imagination and try to understand the pupil's point of view (3), and he must do all this for \$65 a month. Hence some suggest the need of better salaries for the teacher (4), less work for him (6), and a recognition of the fact that laboratory work and lecture demonstration work require vastly more preparation than ordinary class work. Others suggest that the teacher should be free to make up his own list of experiments (3), so that he could adapt the work to local conditions (4), and therefore he should pay no attention to college-entrance requirements (7), but rather should strive to meet the needs of the pupils who do not go to college (4). He should be required to take charge of small laboratory sections only (3), should make the work attractive through variety (9), and have it carefully graded. He should also be a member of some science teachers' association and take active part in its work (3).

Finally, and by far the most important, is the question of the method of presentation. That this should be accommodated to the mental states of children of fourteen to fifteen is suggested by 14, and will doubtless be agreed to by all. We should always begin with physics in the service of humanity, developing the concepts used from the everyday experiences, making it less abstract and more human (5); we chill the student's enthusiasm at the start by confronting him at once by a (to him) strange set of problems and concepts couched in a strange terminology (4). The student craves at that age the explanations that can be given only in the light of the greatest generalizations of science; yet these explanations must be applied to his immediate activities (3). Hence we should cling closely to the largest principles, and let him come to comprehend gradually their meaning and scope by constant application to his own experiences and problems (5). We should introduce vastly more historical and biographical matter (14), and should show the close bearing of science on the world's progress (7). We should lay greater emphasis on the method of thought used in scientific work, and less on the experimentation (9). We should give a careful presentation of each subject before any study of it is required (10), and give the demonstration experiments before the quantitative work is attacked (4). We must also cut out all college physics (7), get a better order of topics (3), co-ordinate the subject with the other subjects in the curriculum (9), and strive for clearer expression of the ideas and concepts (2).

In forming a judgment as to the meaning of this summary of the answers to question 7, the reader must remember that each answer contained only two or three of the suggestions, and that these two or three seemed to the sender to indicate the main causes for the shortcomings of physics teaching. It must then be evident that we are not yet as well agreed as we might be on this most important

point. Perhaps the whole thing might be summed up by saying that we teachers do not comprehend two things as clearly as we should; namely, (1) we fail to understand the nature and needs of the adolescent mind; and (2) we comprehend even less the real nature of science and the real meaning of her services to civilization.

Question 8. Comparatively few of the answers mentioned this question. Those that did notice it classed the experiments as those that teach principles that the average citizen should know, and those that interest the student. The vote was not sufficiently representative to tabulate with effect.

In conclusion, the committee wishes to thank heartily all those who so cordially responded to its request for information.

Since sending out the circular the committee has found that several other associations were considering either the same or a similar problem. Hence we have invited all associations known to be interested in the problem of defining the physics unit, and of getting a satisfactory syllabus for it, to join in the movement and appoint committees to co-operate in carrying the enterprise to a successful and thoroughly representative conclusion. This circular is sent out by the undersigned committees by joint action. If there are other associations which would like to join in this work, we shall be glad to hear from them. It is the plan of the joint committees to work out a new syllabus and submit it to the physics teachers of the country next fall. In order to help these committees to frame such a syllabus, any one interested is invited to send answers to the following questions:

1. How can the drudgery of the notebook be reduced? Is the tabular form of notebook desirable? Should the pupil be required to work out his own form of report? Can you suggest a good minimum requirement for the notebook work?
2. How could the amount of subject-matter be reduced so that greater emphasis could be laid on method of thought and the development of reasoning power?
3. Should physics be placed in the fourth year of the course?
4. How much of the time of the course shall be required to be devoted to laboratory work?
5. Can you suggest any action that the associations could take that would tend to make the teacher of physics freer to develop his laboratory and lecture work more fully?
6. What sort of a syllabus could be devised that will leave the teacher free to exercise his own initiative and yet guarantee that the student should do a unit of work?
7. What should be the aim of the physics course, and what means could be used to find out whether that aim had been accomplished by the work?
8. How can teachers be encouraged to join science teachers' associations and to take part in their work?

Answers should be sent, as before, to C. R. Mann, Ryerson Laboratory, University of Chicago. All teachers are urged to send answers to some of the questions, even if they do not care to answer them all. All answers should be in by August 1. This circular is being sent to all the physics teachers whose addresses are in the possession of the committees because of the great expansion of the work. The next circular, containing the tabulated results from this one and the suggested syllabus, will be sent only to those who are sufficiently interested in the work to answer this.

CENTRAL ASSOCIATION OF SCIENCE AND MATHEMATICS TEACHERS:

- C. R. Mann, University of Chicago, Chicago, Ill.; *Chairman*.
- C. H. Smith, Hyde Park High School, Chicago, Ill.
- C. F. Adams, Central High School, Detroit, Mich.

NORTH CENTRAL ASSOCIATION OF COLLEGES AND SECONDARY SCHOOLS:

- L. E. Ackley, State University, Vermillion, S. Dak.
- C. F. Adams, Central High School, Detroit, Mich.
- J. S. Almy, University of Nebraska, Lincoln, Nebr.
- F. H. Ayres, Central High School, Kansas City, Mo.
- A. D. Cole, State University, Columbus, Ohio.
- J. Dewey, Columbia University, New York, N. Y.
- H. M. Garrett, High School, Beatrice, Nebr.
- C. W. Green, Albion College, Albion, Mich.
- K. E. Guthe, State University, Iowa City, Iowa.
- P. H. Hanus, Harvard University, Cambridge, Mass.
- S. Hayes, High School, Lancaster, Ohio.
- F. S. Jones, State University, Minneapolis, Minn.
- C. R. Mann, University of Chicago, Chicago, Ill.; *Chairman*.
- C. H. Smith, Hyde Park High School, Chicago, Ill.
- E. F. Smith, Humboldt High School, St. Paul, Minn.
- O. M. Stewart, State University, Columbia, Mo.
- A. J. Stout, High School, Topeka, Kans.
- H. L. Terry, State Inspector of Schools, Madison, Wis.
- S. L. Thomas, High School, Council Bluffs, Iowa.
- W. A. Thompson, High School, Webster, S. Dak.
- G. W. Treat, Lawrence University, Appleton, Wis.
- H. I. Woods, Washburn College, Topeka, Kans.

MICHIGAN SCHOOLMASTERS' CLUB:

- C. F. Adams, Central High School, Detroit; *Chairman*.
- H. N. Chute, High School, Ann Arbor.
- C. W. Green, Albion College, Albion.

NEW YORK STATE SCIENCE TEACHERS' ASSOCIATION:

- J. F. Woodhull, Teachers College, New York; *Chairman*.
- O. C. Kenyon, High School, Syracuse.
- J. S. Shearer, Cornell University, Ithaca.

THE AMERICAN PHYSICAL SOCIETY:

- A. D. Cole, State University, Columbus, Ohio.
William Hallock, Columbia University, New York, N. Y.
C. R. Mann, University of Chicago, Chicago, Ill.; *Chairman*.
J. S. Shearer, Cornell University, Ithaca, N. Y.
O. M. Stewart, State University, Columbia, Mo.

NEW JERSEY STATE SCIENCE TEACHERS' ASSOCIATION:

- H. M. Campbell, High School, Long Branch.
I. E. Kline, Blair Academy, Blairstown.
A. T. Seymour, High School, Orange; *Chairman*.
G. H. Trafton, High School, Passaic.

CHICAGO AND COOK COUNTY HIGH SCHOOL TEACHERS' ASSOCIATION:

- E. E. Burns, Joseph Medill High School; *Chairman*.
C. M. Turton, South Chicago High School.
W. E. Tower, Englewood High School.

NEW YORK PHYSICS CLUB:

- J. M. Jameson, Pratt Institute, Brooklyn; *Chairman*.
E. R. von Nardroff, Erasmus Hall High School, Brooklyn.
H. Newcomer, Wadleigh High School, New York.

MISSOURI SOCIETY OF TEACHERS OF MATHEMATICS AND SCIENCE:

- F. H. Ayres, High School, Kansas City; *Chairman*.
O. M. Stewart, State University, Columbia.
J. S. Stokes, State Normal School, Kirksville.

[NOTE.—Just as this circular is going to press, attention has been called to an article in *Science* for May 18, by Professor J. W. A. Young, on "Recent Advances in Prussia in Teaching of Mathematics and the Natural Sciences." This article should be read by everyone interested in this problem since it contains a discussion of some of the work that has been done in Germany in the direction in which these circulars are tending. It has also been suggested, too late for incorporation in the circular, that it would be of great assistance in advancing this work in this country if each physics teacher would select such ideas from the summary of the answers to question 7 as appeal to him, and begin right away next fall making practical experiments with his classes, in order to find out in how far these ideas are capable of being wrought out efficiently in practice. The article on Germany should encourage us to begin this work immediately.]

Chicago May 28, 1906.

President H. P. Judson,
University of Chicago.

My dear Mr. Judson,

Since you were involved in getting me into this physics movement, I thought you would like to see how far it has gone. The enclosed circular is now being sent out, and you see that already nine associations are in it. I have just heard from the Pacific Coast Association tonight, also joining us. Several other associations, like the one of the Middle States and Maryland, do not meet till fall, so we shall have to wait for them to join till then. The thing is creating great enthusiasm, and I have been coerced by the Eastern teachers to come to Washington and New York the end of this week to talk to them about this work. They are interested, since they foot the bill. I have also been engaged as the speaker for the annual meeting of the New York State Science Teachers Asso. ^{in New York} next Christmas, on account of this. So you may see that the leaven is working finely, and we hope to soon have some really digestible bread to offer to the children.

Yours very truly,

C. R. Mann.

Chicago May 28, 1908.

President H. E. Johnson,
University of Chicago,
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Yours very truly,

C. E. Johnson

Ryerson Physical Laboratory
The University of Chicago

Chicago

February 27, 1917.

Dear Professors Coulter and Chamberlain:

In reply to your inquiry as to industrial and commercial developments growing out of the research work of the Ryerson Laboratory and the desirability of the expansion of its ~~activity~~ in this direction, I would say:

activity

1. That the laboratory has already become something of a center for research work in the domain of ultra-violet light and photoelectric effects and the recent development of the quartz mercury arc, both for sterilizing and illuminating purposes, has made this field one of large industrial possibilities. We could doubtless extend our researches in this direction to advantage. Last year we placed two of our graduate students in industrial research laboratories because they had been trained here in the study of this general field of radiation.

2. The Ryerson Laboratory has for the past twelve years specialized in the domain of high vacua, as well as in the allied but somewhat broader field of electronics. Both of these fields have within the past five years shown such large industrial possibilities that our Ph. D's who have had work in these fields are now in considerable demand by the industries. We sent three of them last year to the Research Laboratory of the Westinghouse Electric Company and six of them are connected with the industrial research laboratory of the A. T. & T. Company. Our men have taken a prominent part in the recent development of electronic detecting and amplifying devices which have been so fruitful in extending the usefulness of telephony and allied arts having to do with the general problem of communication. These electronic vacuum tube devices are likely to play an important part in the future of electric power transmission and rectification. We are in a particularly favorable condition to expand in this direction because of the connection of our graduates, who are now prominent and influential engineers, so-called, although their training has been that given wholly to the Ph. D's who go out from Ryerson Laboratory.

3. The Ryerson Laboratory is now being well equipped for work in wireless telegraphy and in the broader field known as signalling. The United States is far behind the other prominent nations in the attention paid to this art and in the funds expended upon it in its military appropriations. For the purpose of defence we are going to need in the next quarter of a century to train men and

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Chicago

2.

to perfect methods in this field. The Ryerson Laboratory should and can play an important part in its development. We have the men now who know the field well but a much larger equipment than we now have for work of this kind could be profitably utilized.

4. In the field of aeronautics this University has as yet done nothing but the practical problems in aeronautics confronting the aviation branch of our government and demanding solution are almost innumerable. These problems require for their proper solution not only physicists but mathematicians and the best equipped mathematicians that the world can furnish. Research in this direction in connection with the University of Chicago would have much practical importance and I know of no place where competent men can be found in more abundance than here.

5. In the domain of X-rays and radioactivity, the Ryerson Laboratory has been active for fifteen years. The large X-ray manufacturers as well as the doctors are now coming to us with their problems. The new developments in X-rays to which this laboratory has made some small contributions are of much importance in medicine and diagnosis and there are practical problems enough to keep a laboratory going on X-ray and radioactivity alone. We could use increased facilities and could expand in this direction in such a way as to be of use both in the industries and in medicine.

These are some of the directions that occur to me now in which it would be desirable to expand the activities of Ryerson Laboratory.

Very sincerely yours,

R. A. Millikan

Professor J. M. Coulter,
Professor T. C. Chamberlain,
The University of Chicago.

Chicago

2.

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Very sincerely yours,

R. D. Miller

Professor J. M. Coulter,
Professor T. C. Chamberlain,
The University of Chicago.

THE CARNEGIE FOUNDATION
FOR THE ADVANCEMENT OF TEACHING
576 FIFTH AVENUE
NEW YORK

7

March 26, 1917.

Received
My dear Mr. Judson:

Thank you for your letter of March 19th and for your cordial expressions of appreciation and good will on my new appointment. President MacLaurin has already announced it to the faculty and therefore there is no further need for keeping this confidential.

It is not without serious misgivings on the part of Mrs. Mann and myself that we sever our connections with the institution which has been our home for more than twenty years, but it seems the only thing to do under the circumstances.

With kindest regards to Mrs. Judson and yourself from both of us,

Yours very truly,

CR Mann

President Harry Pratt Judson,
University of Chicago,
Chicago, Illinois.

THE CARNEGIE FOUNDATION
FOR THE ADVANCEMENT OF TEACHING
876 FIFTH AVENUE
NEW YORK

March 26, 1917

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It is not without serious misgivings on
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nections with the institution which has been our home
for more than twenty years, but it seems the only thing
to do under the circumstances.
With kindest regards to Mrs. Hudson and
yourself from both of us.

Yours very truly,

President Harry Pratt Hudson,
University of Chicago,
Chicago, Illinois.

7/20/21

The University of Chicago

Ryerson Physical Laboratory

July 16, 1921;

Original

President Harry Pratt Judson,
The University of Chicago.

Dear President Judson:

I interpret your letter of July 6th to mean that while you feel it inadvisable to establish a formal scheme of cooperation between the University of Chicago and the California Institute of Technology, you are desirous of having possibilities of cooperation worked out as individual instances arise.

Specific cases which call for action of some kind have come up very quickly, as I felt sure they would and are the occasion of this letter.

(1) A month ago, in view of some conversations I had with Professor H. A. Lorentz at Brussels in the spring, in which he expressed the desire to visit this country once more and to see something of the scientific activity of its western portion, I wrote him, suggesting that he visit us next year, and lecture during the winter quarter at the California Institute of Technology and during either the fall or spring quarters at the University of Chicago. I told him I had no authority to speak for the University of Chicago, but that I had been authorized by the Board of Trustees of the California Institute to offer a half of \$5,000 on behalf of that institution if he came for a quarter apiece at the University of Chicago and the California Institute or to offer him \$3000 if he were able to spend but three months in this country and wished to spend that in California, as he had told me in Brussels that he might wish to do in case he were here in the winter season.

7/2/34

The University of Chicago

Psychological Laboratory

July 18, 1934

President Harry Pratt Judson,
The University of Chicago.

Dear President Judson:

I interpreted your letter of July 6th to mean that while you feel it inadvisable to establish a formal scheme of cooperation between the University of Chicago and the California Institute of Technology, you are desirous of having possible lines of cooperation worked out as individual instances arise.

Specific cases which call for action some kind have come up very early, as I felt sure they would and are the occasion of this letter.

(1) A month ago, in view of some conversations I had with Professor H. A. Lorentz at Evanston in the spring, in which he expressed the desire to visit this country once more and to see something of the scientific activity of its western portion, I wrote him, suggesting that he visit us next year, and I am now awaiting the reply. During the California Institute at Technology, and during either the fall or spring quarters at the University of Chicago, I told him I had no authority to make for the University of Chicago, but that I had been authorized by the Board of Trustees of the California Institute to offer a grant of \$5,000 on behalf of that institution if he came for a quarter's stay at the University of Chicago and the California Institute or to offer him \$3,000 if he were able to spend two or three months in this country and wished to spend that in California, as he had told me in Evanston that he might wish to do so he came he was here in the winter season.

7/5/34
1667

The University of Chicago

Ryerson Physical Laboratory

2.

I had talked this plan over with Professor Michelson and he had approved very heartily the joint plan of trying to get him for three months at each institution.

I have just received a letter from Professor Lorentz, saying that he would like to accept the proposal contained in my letter, but stating that he can secure leave of absence for only four months instead of six months, and suggesting that he lecture in Pasadena from early in January until the first of March and in Chicago for a month, beginning about March 8th. He says that the \$5000 stipend mentioned by me would be suitable, since he wishes to bring his family with him. He asks me to let *him* know at the earliest possible moment whether this arrangement would be satisfactory, so that ~~the~~ they may get official permission from the Dutch Government to take these four months in America and may also begin to prepare his lectures.

If the University wishes to join in this enterprise, I would suggest that it arrange to have Professor Lorentz lecture right through the spring vacation. He is probably regarded among physicists as the world's outstanding theoretical physicist, and his lectures would surely be attended at Chicago by all the mathematicians, physicists and by some of the chemists in the University, as well as by many of the members of these departments in adjoining universities in so far as their university duties permitted them to do so. On the whole, this would make the lecturing through the spring vacation an advantage rather than a disadvantage.

If the University should not care to cooperate in this enterprise, the California Institute of Technology and the Carnegie Institution of Washington would be glad to bear the full expense and retain Professor Lorentz' services throughout the four months in California. It would, however, appear to be in the interest of American physics if he could spend a portion of his time in the Middle West.

May I ask whether the University would care to cooperate, sharing the expense in the proportion of the time spent in the two institutions? I think it

The University of Chicago

Wycliffe Research Laboratory

2

I had talked this plan over with Professor
Michaelson and he had approved very heartily the joint
plan of trying to get him for three months at each
institution.

I have just received a letter from Professor
Michaelson, saying that he would like to accept the
position contained in my letter, but stating that he
can secure leave of absence for only four months instead
of six months, and suggesting that he lecture in Pasadena
from early in January until the first of March and in
Chicago for a month, beginning about March 8th. He
says that the \$5000 stipend mentioned by me would be
suitable, since he wishes to bring his family with him.
He asks me to let him know at the earliest possible mo-
ment whether this arrangement would be satisfactory,
so that the necessary official permission from the Board
Government to take these four months in America and
may also begin to prepare his lectures.

If the University wishes to join in this
enterprise, I would suggest that it arrange to have
Professor Michaelson lecture right through the spring
vacation. He is probably regarded among physicists
as the world's outstanding theoretical physicist,
and his lectures would surely be attended at Chicago
by all the mathematicians, physicists and by some of
the chemists in the University, as well as by many of
the members of these departments in adjoining univer-
sities. It is so far as their university duties are con-
cerned to be on the whole, I think, the
best thing that could be done, rather than a disadvantage.

If the University should not care to cooperate
in this enterprise, the California Institute of Tech-
nology and the Carnegie Institution of Washington would
be glad to have the full expenses and retain Professor
Michaelson's services throughout the four months in California.
It would, however, appear to be in the interest of Amer-
ican physics if he could spend a portion of his time in
the Middle West.

May I ask whether the University would care
to cooperate, sharing the expense in the proportion of
the time spent in the two institutions? I think it

The University of Chicago

Ryerson Physical Laboratory

3.

entirely possible that we might persuade Professor Lorentz to devote an equal number of weeks to the two institutions in case you would prefer such an arrangement.

I wish to write him definitely at the earliest possible moment, and inasmuch as Professor Michelson has already expressed himself in the heartiest accord with the plan, I have not thought it wise to send this letter by way of Pasadena, where Professor Michelson now is.

(2). A case has also come up under one other of the headings presented in my scheme of cooperation. A Mr. E. H. Hodgsons, a Master of Arts from the University of Toronto, and now at work at the Seismological Laboratory at Ottawa, wishes to take his doctor's degree at the University of Chicago in physics, but to do his thesis in seismology. A large seismological program has just been started in California, which is, of course, the ideal place for studies in this field, and a considerable part of this program will be carried out at the California Institute of Technology. Since we do no work in seismology at the University of Chicago, Mr. Hodgsons asked me today whether it would be possible for him to do his thesis work in California under my general direction and have it count for his degree at Chicago. I told him that I suspected such an arrangement could be made but that no official action by the University had been taken which made me at all sure of my ground. There has as yet been no opportunity to submit this case to Professor Michelson, but I should like to be informed as to whether if Professor Michelson and I agree upon it, the case would meet with your approval.

(3). The trustees of the California Institute of Technology are eager to make announcement of the fact that I am to direct the work at the Norman Bridge Laboratory of Physics, and I take it from your letter of July 6th that the University does not care to have included in that announcement any statement of the plan suggested in my letter of June 2nd, regarding the retention on my part of any connection with the University of Chicago. Unless I hear from you to the contrary within a few days, I shall so inform the trustees.

The University of Chicago

Physical Laboratory

3.

entirely possible that we might persuade Professor
Lorenz to devote an equal number of weeks to the
two institutions in case you would prefer such an
arrangement.

I wish to write him definitely at the
earliest possible moment, and inasmuch as Professor
Nicholson has already expressed himself in the
most favorable manner with respect to my plan,
I intend to send him a letter by the first of January,
where Professor Nicholson now is.

(B) A case has also come up under one
other of the headings presented in my scheme of
cooperation. I Mr. E. H. Hodgson, a lecturer of
the University of Toronto, and now at
work at the Batemological Laboratory at Ottawa,
wishes to take his doctor's degree at the Univer-
sity of Chicago in physics, but to do his thesis
in batemology. A large batemological program has
just been started in California, which is, of course,
the ideal place for studies in this field, and a
considerable part of this program will be carried
out at the California Institute of Technology. Since
we do no work in batemology at the University of
Chicago, Mr. Hodgson asked me today whether it would
be possible for him to do his thesis work in Califor-
nia under my general direction and have it count for
his degree at Chicago. I told him that I suggested
such an arrangement could be made but that no official
action by the University had been taken which would
be at all sure of my approval. That having been
said, I suggested to him that he come to Chicago
for a few days, and I should like to be informed as to
whether it Professor Nicholson and I agree upon it.
The case would meet with your approval.

(C) The trustees of the California Institute
of Technology are eager to make arrangements of the
kind that I am to direct the work at the Norman Bridge
Laboratory of Physics, and I wish to from your letter
of July 25th that the University does not care to have
included in that arrangement any statement of the kind
suggested in my letter of June 2nd, regarding the
relation on my part of my connection with the Univer-
sity of Chicago. Since I have been very to the con-
fessing within a few days, I shall so inform the trustees.

The University of Chicago

Ryerson Physical Laboratory

4.

If individual cases of the kind mentioned in (2) are to arise frequently, and are to be favorably looked upon by the University, some connection of the kind that you indicated that Dr. Hale had retained since his removal to California might seem to you desirable. My purpose in including the matter in this letter, however, is merely to avoid the possibility that I have misinterpreted the somewhat indefinite statement contained in your letter of July 6th.

Very sincerely yours,

R. A. Millikan

RAM.L

The University of Chicago

Western Biological Laboratory

It is regrettable that the kind mentioned
in (2) are so scarce frequently, and also in the
of the kind that you indicated that Dr. Kato had
retained since his removal to California might seem
to you desirable. My purpose in including the matter
in this letter, however, is merely to avoid the pos-
sibility that I have misinterpreted the somewhat
indefinite statement contained in your letter of
July 8th.

Very sincerely yours,

R. D. Williams

PAID

The University of Chicago

Ryerson Physical Laboratory

July 29, 1922.

My dear President Judson:

Professor William Francis Gray Swann has agreed to accept a professorship in the Department of Physics at a salary of \$7000.00 per year. It is understood that he is to receive the regular extra compensation for teaching a fourth quarter during his first year of residence at least. He cannot come until July 1, 1923.

Professor Swann was born at Ironbridge, Shropshire, England, August 29, 1884. He was a student at Brighton (Eng.) Technical College, 1900-1903; Royal College of Science (London), University College, Kings College, and City and Guilds of London Institute, 1903-1907; associate in the Royal College of Science, 1906; demonstrator in physics in the Royal College of Science, 1905-1907; assistant lecturer and demonstrator in physics at the University of Sheffield, 1907-1913; came to the United States in 1913; chief of the physical division of the Department of Terrestrial Magnetism, Carnegie Institution, Washington, 1913-1918; professor of physics at the University of Minnesota since August, 1918. He is a fellow of the Physical Society of London; a member of the British Association, A.A.A.S., American Physical Society, Washington Academy of Sciences, and the Philosophical Society at Washington

Professor Karl Compton of Princeton, as indicated by the telegram which came just before you left, will probably accept also for July 1, 1923. He has written to me, since you were here, saying that he had a talk with Professor Magie, Dean of the Graduate School, and Head of the Physics Department at Princeton, and Professor Magie agreed that Compton ought to accept our offer, but asked him to wait until he could communicate with President Hibben, then on his way to Alaska.

Professor Leigh Page of Yale will probably not accept. He had a talk with President Angell, after our first offer, and Mr. Angell impressed him very strongly with his desire to build up the Physics Department, promising two new professors. (Of course, they had to replace Bumstead who died, and Nichols who resigned about two years ago, but Mr. Angell made Page feel that he was doing this for him.) They have also appealed strongly to Page's loyalty as a Yale man, and Page feels very reluctant to leave at the present time, especially during the illness of Mr. Angell. Professor Page has agreed, however, that if things do not go smoothly at Yale during the next year, and if we care to renew our offer, he will consider it. He has been quite definitely in the balance as to whether or not he ought to come here, and I think it is largely due to Mr. Angell's illness at the present time, that he has felt it his duty to return to Yale.

Very truly yours,

Henry G. Gale

The University of Chicago

Physical Department

July 22, 1933

My dear President Johnson:

Professor William Francis Gray Swann has agreed to accept a professorship in the Department of Physics at a salary of \$7000.00 per year. It is understood that he is to receive the regular salary compensation for teaching a fourth quarter during his first year of residence at least. He cannot come until July 1, 1933.

Professor Swann was born at Liverpool, Merseyside, England, August 29, 1884. He was a student at Brighton (Eng.) Technical College, 1900-1902; Royal College of Science (London), University College, King's College, and City and Guilds of London Institute, 1902-1907; associate in the Royal College of Science, 1907-1909; demonstrator in physics in the Royal College of Science, 1909-1910; assistant lecturer and demonstrator in physics at the University of Sheffield, 1910-1912; came to the United States in 1912; spent of the physical division of the Department of Terrestrial Magnetism, Carnegie Institution, Washington, 1912-1913; professor of physics at the University of Minnesota since August, 1913. He is a fellow of the Royal Society of London, a member of the British Association, and the Philosophical Society at Washington.

Professor Earl Compton of Princeton, as indicated by the telegram which came last week, will probably accept also for July 1, 1933. He has written to me, since you were here, saying that he had a talk with Professor Harte, Dean of the Graduate School, and Head of the Physics Department at Princeton, and Professor Harte agreed that Compton ought to accept our offer, but asked him to wait until he could communicate with President Johnson then on his way to Alaska.

Professor Leigh Page of Yale will probably not accept. He had a talk with President Angell, after our first offer, and Mr. Angell impressed him very strongly with the desire to build up the Physics Department, providing two new professors. Of course, they had no regular members who died, and Nichols who resigned about two years ago, but Mr. Angell made it clear that he was doing this for him. They have also requested strongly to Page's loyalty as Yale man, and Page feels very reluctant to leave at the present time, especially during the illness of Mr. Angell. Professor Page has agreed, however, that all things so far as University at Yale are concerned, and if we care to make our offer, we will consider it. He has been quite definitely in the balance as to whether or not he ought to come here, and I think it is largely due to Mr. Angell's illness at the present time, that he has left it his duty to return to Yale.

Very truly yours,

James H. Phipps

The University of Chicago
The Ogden Graduate School of Science

OFFICE OF THE DEAN

June 3, 1925

Dean J. H. Tufts
Faculty Exchange

My dear Dean Tufts:-

Mr. Kannenstine has notified me that he will
leave us at the end of the spring quarter, 1925.

Yours very truly,

Henry S. Gale

HGG:M

Dean

The University of Chicago

The Open Graduate School of Science

June 3, 1925

OFFICE OF THE DEAN

Dean J. H. Tufts

Faculty Exchange

My dear Dean Tufts:-

Mr. Kampenstine has notified me that he will
leave us at the end of the spring quarter, 1925.

Yours very truly,

Henry S. Hales

Dean

HGG:M

The University of Chicago

(RECOMMENDATIONS FOR ASSISTANTS ONLY)

DUPLICATE TO BE RETAINED

Vouchers for free tuition are issued to assistants. In case the person recommended is to be registered as a student for courses the charge for tuition received is regarded as constituting an item in the cost of instruction in the department which has the benefit of the assistant's services and is accordingly charged to the budget of the department, e.g., if the assistant is registered in the graduate school of Arts, Literature, and Science, the budget appropriation for the department concerned will be charged with \$60.00 a quarter in addition to the salary paid.

To the Dean of Faculties: _____ Date _____

School Oyden Graduate Sch. Science Department Physics

The appointment of the following Assistants is recommended:

Name Barton Hoag Address 5731 Kenwood

Degree AB Teaching experience _____

For Summer Quarters, from 1925 to 192

Check type of service: ☒ Classroom instruction Salary \$750 + tuition

☐ Laboratory assistant

☐ Research assistant Comments _____

☐ Reader of papers

Name Chas. M. Blackburn Address _____

Degree _____ Teaching experience _____

For Summer Quarters, from 1925 to 192

Check type of service: ☒ Classroom instruction Salary 500 + tuition

☐ Laboratory assistant

☐ Research assistant Comments _____

☐ Reader of papers

Name Frank M. Durbin Address _____

Degree MS Teaching experience _____

For Summer Quarters, from 192 to 192

Check type of service: ☒ Classroom instruction Salary 250 + tuition

☐ Laboratory assistant

☐ Research assistant Comments _____

☐ Reader of papers

H. G. Gale

Chairman or head

The University of Chicago

(RECOMMENDATIONS FOR ASSISTANTS ONLY)

DUPLICATE TO BE RETAINED

Vouchers for free tuition are issued to assistants. In case the person recommended is to be registered as a student for courses the charge for tuition received is regarded as constituting an item in the cost of instruction in the department which has the benefit of the assistant's services and is accordingly charged to the budget of the department, e.g., if the assistant is registered in the graduate school of Arts, Literature, and Science, the budget appropriation for the department concerned will be charged with \$60.00 a quarter in addition to the salary paid.

To the Dean of Faculty
School
Date
Department

The appointment of the following Assistant is recommended:

Name
Address
Degree
Teaching experience
For
Quarters from
to
Salary
Comments
Check type of service:
Classroom instruction
Laboratory assistant
Research assistant
Reader of papers

Name
Address
Degree
Teaching experience
For
Quarters from
to
Salary
Comments
Check type of service:
Classroom instruction
Laboratory assistant
Research assistant
Reader of papers

Name
Address
Degree
Teaching experience
For
Quarters from
to
Salary
Comments
Check type of service:
Classroom instruction
Laboratory assistant
Research assistant
Reader of papers

Chairman of Board

Physics

Spring Tr. 1925

Dr. Melvin Mooney
National Research Fellow
teaching one section
without pay.

Spencer St. 1952

Spencer

Mr. William W. Spencer
National Bureau of Education
Washington, D.C.
without pay.

Ms.