MC 241
Box 1 Folder 14

Correspondence, General, 1939-43

FORM S1146

CUTLER-HAMMER INC. *Pioneer Electrical Manufacturers*

315 N. 12th STREET — MILWAUKEE, WISCONSIN

CUTLER-HAMMER MOTOR CONTROL CH

PURCHASE ORDER
NUMBER
XAX 23727
DATE
7/26/43

THE CONDITIONS PRINTED BELOW ARE PART OF THE ACCEPTANCE OF THIS ORDER.

WAYNE B. NOTTINGHAM
RADIATION LAB. M.I.T.
CAMBRIDGE, MASS.

QUANTITY	DESCRIPTION	CH PART NO.
2	~~IGNITRONS~~ CAPACITRONS	
	CONFIRMATION	
	RC	

WANTED HERE RECEIVED BY OUR MR. COX VIA

SHIP TO MX

DELIVER TO DEPT.

FOR MFGR. SHOP ORDER NO. DEV.4782-1

CHARGE ACCT. NO. 1715

PUR. REQ. W.COX

THIS ORDER VOID UNLESS SIGNED

By B M Horter
Purchasing Agent

IMPORTANT

SEPARATE INVOICES must be rendered for each order, these to be made out in duplicate and to show our purchase and part numbers. Invoices subject to cash discount will be paid 10th proximo. Net invoices will be paid 25th proximo. BILL OF LADING must accompany invoices, giving weight and rate of freight. PACKING SLIP must be placed in all packages and boxes. ROUTE CARLOAD SHIPMENTS for 12th and ST. PAUL AVE. via C. M. St. P. & PACIFIC RAILROAD. ROUTE CARLOAD SHIPMENTS for 41st and ORCHARD ST. PLANT via C. & N. W. RAILROAD or C. M. St. P. & PACIFIC RAILROAD. ROUTE CARLOAD SHIPMENTS for FOUNDRY at 3019 South 20th Street via C. & N. W. RAILROAD.

BY ACCEPTING THIS PURCHASE ORDER, the seller represents that prices, terms, and conditions thereof do not violate any provision of the Emergency Price Control Act of 1942 applicable to the seller:

SEE REVERSE SIDE FOR OTHER CERTIFICATIONS

Aug. 6, 1943

Cutler-Hammer Inc.
315 N. 12th Street
Milwaukee, Wisconsin

To

Wayne B. Nottingham, Dr.,
Massachusetts Institute of Technology
77 Massachusetts Avenue
Cambridge, Massachusetts

---

2 CAPACITRONS at $50 each $100.00

Delivered to Mr. Irvim W. Cox on July 30, 1943

February 4, 1941

Dr. Max H. Wolff
1458 Elm Street
Manchester, N. H.

Dear Dr. Wolff:

Professor Foster gave me your letter of January 28 for reply.

On this basis it is difficult to know what sort of advice and information you wish to have. The field of photoelectric effects is one in which I have had considerable experience and would probably be in a position to advise you correctly on your problems. If after having a preliminary conference with you I found that someone with less advanced knowledge of the subject could serve you better at a lower cost to you, I would be glad to try to recommend such a person. If you wish my services I would suggest either of the following alternatives: First, you might come to the Institute to discuss your problem - in which case my charges would be $10 per hour for less than three hours, $30 per half day, and $40 for a full day of approximately eight hours' attention to your problem.

The second possibility would be that I might be able to call on you Friday, February 7, since according to the present plans I expect to be on my way toward upper New Hampshire for a week-end of skiing. It would not be too difficult for me to adjust my route so that I could expect to arrive in Manchester between 3:30 and 4:30. If a conference at that time proved satisfactory to you my charges would be $15 per hour.

If you follow either of the above suggestions, arrangements should be made as far in advance as possible so that I can adjust my program accordingly.

Very truly yours,

Wayne B. Nottingham
Associate Professor of Physics

WBN:T

TELEPHONE: 6480-W

OFFICE HOURS:
2-4 AND 7-8 P. M.

MAX H. WOLFF, M. D.
1458 ~~1037~~-ELM STREET
MANCHESTER, N. H.

January 28,1941

Mr.F.L.Foster
Assistant Director
Division of Industrial Cooperation
Massacusetts Institute of Technology

Dear Mr.Foster :

You were kind enough to advise me once before when I asked you for information about the photo-electrical cell. I had some correspondence with both companies you mentioned, but there still remains a technical problem to solve which I myself, not being an expert in this field, am not able to.

Do you know of anybody who is an expert in the field of the photoelectrical cell and is able and willing to give advise? If so what are his terms?

Thanking you for your previous kindness I beg you to remain

your very truly

Max Wolff M.D.

February 16, 1940

Dr. R. L. E. Steifert
Alma College
Alma, Michigan

Dear Dr. Steifert:

I have been very much interested in your paper with Professor Phipps on "Evidence of a Periodic Deviation from the Schottky Line", in the October 1939 Physical Review.

Please send me reprints of that and also the papers by Turnbull and Phipps, if you happen to have them.

I have rebuilt my apparatus so that I can make a thorough test to check your observations on this fact. My first curve, which is obviously not as accurate as I expect to be able to produce, yields negative results from the point of view of checking your periodic deviations. My present experiments were carried through with a filament temperature of 1333°, the idea being that the effect should be more noticeable the lower the temperature. As you are well aware it is extremely difficult to hold everything as constant as it needs to be in order to discover such small deviations. If I am able to make improvements in my present setup to iron out the difficulties, it is possible that I will confirm the results. Also, it is possible, although I see no reason for it, to get these results at the higher temperatures in a more pronounced way than you do at the lower temperatures.

I am particularly interested in obtaining as accurate a story of the discovery of this effect as you can give me. Are you responsible for its

discovery or was it originally discovered and demonstrated by Phipps? Is there a more complete writeup in the form of a thesis covering your work; if so, would it bepossible for me to obtain a copy for study which I would be glad to return after having read it through.

Very truly yours,

Wayne B. Nottingham
Associate Professor
of Physics

WBN T

Chinchilla, Pennsylvania
January 31, 1940

Dear Mr. Nottingham ,

Your most generous offer making it possible for my boy to start at M. I. T. was received with the greatest of joy by all of us. If he receives as much as one third of the tuition in a scholarship, I believe that we can raise the rest to carry him through the year. As you mentioned, the final decision will have to rest until such time as we know his scholarship rating. I trust that this delay will not interfere with any of your plans.

I should like to assure you and your wife that if my boy accepts working for his room and board at your home that you will find him handy and willing to do anything. He has had experience at housework working for his grandmother part time, and has always helped around our own home, inside and outside. Through his scout training, he can handle tools, paint , repair things electrical, etc. Just now, he is chauffeuring and taking care of the fires for a neighbor on week-ends. He is still active in scouting, having reached beyond the rank of Eagle Scout to and including the Silver Palm. I mention the above so that you need not be afraid of the kind and amount of work you may want him to do.

Billy wants to go on into higher education and we certainly want to help him, but, as you already know, we are financially limited. Nevertheless, we are leaving no stones upturned in figuring out the possibilities of a school. Last Saturday, we journeyed to a nearby Junior College that has a comparatively high rating; a place where a local boy, Malcolm Mac Gregor spent his first year. He now attends M.I.T. and you may know him. We found out that in order to receive credit for the first year at your school, he had to take a summer course of private tutoring in Analytical Geometry, and then take both first and second year Physics in his sophomore year to catch up. I know MacGregor from scouting contacts and he is a very bright

boy. So, while Billy could board at home whem attending this school, the transfer would not be easy, and the difference in tuition, considering possible scolarships would be only around one hundred dollars; so it looks as if we are pointing for M.I.T.

Mrs. Rodeman and I wish to thank you again for your personal interest in Billy.

Very sincerely yours,

Willy Rodeman

Chinchilla, Penna.
Jan. 12 1940

My dear Mr. Bottinghame;

Just a line to let you know my boy had his interview with the M.I.T. district man and from what I gather wont be able to matriculate at M.I.T. His scholastic record admits him without an examination but it is the financial side which makes it impossible. He figured he might be able to make it by a full time scholarship grant however our district has no such feature. It is possible that he would be in line for a part freshman scholarship which the district man said would not be over two hundred dollars so that leaves four hundred on tuition to clear up. He also planned on making a hundred or so by some kind of work thru the school year towards his board & room. I planned to contribute two to three hundred.

I had hoped he could make M.I.T. and very disappointed I am that he cannot carry on at a real school. Perhaps he may be able to take

some graduate work. So far the best arrangements have come from "Lehigh"

Yesterday we saw the M.I.T. movies on speed photography. They are great pictures.

Yours truly.

Will G. Roderman

January 23, 1940.

Mr. W. G. Rodeman
Chinchilla
Pennsylvania

Dear Mr. Rodeman:

I was very much interested to hear something more in detail regarding your son's possible entrance here at the Institute. I have discussed the matter with representatives in the Admissions Office and find, as you already know, that the range of possible tuition scholarships might extend to a maximum of $250 (usually less than this.) If your son were fortunate enough to receive this much aid, then you would have to furnish the additional $350.

It occurred to me that we might be willing to help your son during his first year to the extent of his room and board, in case hw would be willing to do an average of about ten hours a week work in compensation. The nature of this work would, of course, be extremely general, and would be adjusted so as to not interfere with his school work. It might mean mowing the lawn, cleaning the car, washing dishes, helping me in the laboratory, or any other service which seemed reasonable.

Although I would not want to guarantee transportation to and from the Institute, I think he could count on it practically all of the time. Of course there would be minor additional expenses for books, transportation to and from home, and clothing which would have to be met. I have not consulted with Mrs. Nottingham on this particular detail, but as long as we have our laundry done at home, I see no reason why your son's laundry could not be included with that. I don't know whether this offer will interest you and your son, and, of course, it would not be possible for you to accept it unconditionally because the tuition awards will not be made until early in August.

After the first year, your son might like to mkke other arrangements, but if he chooses to come here, he would then have established himself well enough so that he could work out his program to suit the conditions which he meets. After the first year it is possible to borrow from the M.I.T. Loan Fund under very favorable

conditions; also, if his scholastick record is maintained at a high average, he will be eligible to receive scholarship aid to the extent of about $200 each year. This, of course, depends from year to year on his performance.

In case you do not find it possible to send your son to Tech under these conditions, I think that your plan to send him to Lehigh would be a very satisfactory alternative. It might be possible after having graduated from Lehigh for him to obtain either a scholarship or an assistantship which would allow him to continue his graduate work and be almost self-supporting.

If there are any details which I can straighten out for you, I would be glad to undertake it.

Very sincerely yours,

Wayne B. Nottingham
Assoc. Prof. of Physics

WBN:W

CC to Mr. Pitre
Mr. Kimball

December 14, 1939.

Dr. W. E. McKibben
Indiana Steel Products Corp.
Valparaiso, Indiana

Dear Dr. McKibben:

Professor Warren in our department, whom you probably know for his researches in X-rays, is interested in trying to create a model which shows the crystallization process. He thinks this can be done if he can obtain about 200 bar magnets about 1/4" in diameter and between 3/4 and 7/8" in length. Professor Warren asked me whether or not I knew anyone who might be able to help him out in this matter, and I told him that I thought you would be able and willing to advise us in this connection.

Would it be possible for us to obtain through you 200 such magnets made from Alnico, and, if so, how much would they cost and how soon could we obtain them? If you make a magnet which is a standard size and not very different from the dimensions suggested above, it seems likely that such a unit would be all right. In this case, you might send a few of them to me or to Professor B. E. Warren here at the Institute.

I want to thank you for the magnets which you gave me while I was at the General Electric Co. in November. They have come in very handy in a number of cases.

Very truly yours,

Wayne B. Nottingham
Assoc. Prof. of Physics

WBN:W

November 20, 1939.

Dr. Keith Henney, Editor
ELECTRONICS
330 West 42nd Street
New York City

Dear Dr. Henney:

I have very recently had occasion to develop a sweep circuit for our oscilloscope, which generates a saw-tooth wave increasing positive voltage with time, so that when applied to a cathode ray oscilloscope the deflection is from left to right. The amplitude may be controlled up to about 425 volts. An 884 tube is used to generate the saw-tooth wave and two stages of amplification are used to give the amplitude desired and yet have the linearity remain satisfactory. The range of frequency is from 3 cycles to approximately 20,000 at the highest frequency. The effective snap-back time is about 20 micro-seconds.

I propose to write a paper describing this sweep circuit, giving the exact details and requirements of every unit in the circuit, so that anyone desiring to duplicate it may do so with the minimum of individual testing. I am not at all sure whether or not it is the kind of paper which you would care to publish; it perhaps belongs in a journal such as the R.S.I.

If you think it is something in which you would be interested, I would like to know in the near future so that I can prepare it with that in mind.

Very truly yours,

Wayne B. Nottingham
Assoc. Prof. of Physics

WBN:W

electronics
radio, sound, communications, industrial applications of electron tubes.... design, engineering, manufacture.
McGRAW-HILL BUILDING
330 WEST 42ND STREET
NEW YORK, N.Y.

November 28, 1939

Mr. Wayne B. Nottingham,
Associate Professor of Physics,
Massachusetts Institute of Technology,
Cambridge, Mass.

Dear Professor Nottingham:

Mr. Henney has turned over to me your letter of November 20 concerning the proposed article on an oscilloscope sweep circuit. The description in your letter indicates a very worth-while article, and accordingly we urge you to go ahead with it at once. Having written so many contributions for scientific periodicals, I am sure you understand the usual arrangement. It is not necessary for you to prepare finished drawings for us, since they will be re-drawn by our Illustration Department. However, we would like a good photograph or two of the device in addition to the technical information.

We would appreciate hearing from you if you have any further questions.

Very sincerely yours,

Donald G. Fink

Donald G. Fink
Managing Editor.

E-SLB

THORDARSON ELECTRIC MFG. CO.
TRANSFORMERS FOR EVERY PURPOSE
TRADE THORDARSON MARK
500 W. HURON ST. COR. KINGSBURY
CHICAGO
Cable Address
"THORDELCO" CHICAGO

October 16, 1939

Mr. Wayne B. Nottingham
Associate Professor of Physics
Massachusetts Institute of Technology
Cambridge, Massachusetts

Dear Mr. Nottingham:

In answer to your letter of October 3, the following are the measured values of resistance of the windings on T-90A06:

Primary

250,000 Ohm Winding - 19,500 Ohms
62,500 Ohm Winding - 4,860 Ohms

Secondary

500 Ohm Winding - 49 Ohms
330 Ohm Winding - 40.3 Ohms
250 Ohm Winding - 36 Ohms
200 Ohm Winding - 33 Ohms
125 Ohm Winding - 12.9 Ohms
50 Ohm Winding - 7.9 Ohms

The high winding resonates at 4000 cycles when terminated in an open grid. The distributed capacity of the 250,000 ohm winding is 70 mmfd. The peak, however, is not very pronounced because of the high resistance of the winding. This transformer uses a magnetic material which has a permeability of about 2000 at the operating density.

The inductance of the 500 ohm winding is 15 henrys, and the leakage reactance, as referred to the 500 ohm winding, is 15 millihenrys. No extra elements, such as resistors or condensers, are employed.

Our type T-90A11 perhaps is more suitable for your particular application. The resistances of the low impedance windings are about fifty per cent higher, while the resistance of the

high impedance windings is about half that of T-90A06. The distributed capacity is about ten per cent that of T-90A06, and the natural resonance is in the neighborhood of 15,000 cycles.

Very truly yours,

R. E. Davy

INDUSTRIAL SALES ENGINEER

REDavy
mjs

October 3, 1939.

Thordarson Electric Mfg. Co.
500 West Huron Street
Chicago, Illinois

Gentlemen:

We have a transformer application which requires close coupling between the primary and secondary windings. The secondary winding should have as many turns as can be put into about half the available winding space and wound in such a way as to have the minimum distributed capacity. The primary space should have as much copper wire as can be wound on consistent with a d.c. resistance of about 10 to 15 ohms. The permeability of the core should be high and the case should offer the best shielding available against the 60-cycle magnetic field. The transformer need not be thought of in terms of high fidelity, because it is to be used in an impulse circuit in which the oscillations set up in the secondary circuit with the grid capacity as the "tuning" element will be ultimately detected.

Because of the fact that we are not in a position to specify more definitely what we want than I have given you here, I do not think we are ready to have a special transformer built to fit these requirements, but would like to select a standard transformer which your engineers have reason to believe comes nearest satisfying our needs.

Upon examination of your catalogue, it looks to me as though T-90A06 might possibly come the nearest to meeting our demands. Would you please give me more information concerning the specifications of this transformer. I would like to know the expected permeability of the iron which you use, the natural resonance frequency of the 250,000 ohm winding when it is terminated by the grid of a receiving tube, and the d.c. resistance of the various secondary windings. I would also like to know whether or not there are any extra elements such as shunting resistances or capacities included in this transformer, or has the transformer simply a primary and secondary winding as usual.

If this is not the transformer which you think most likely to fit our needs, will you please give me the specifications

of whatever transformer you think would meet our requirements best.

Very truly yours,

Wayne B. Nottingham
Associate Professor of Physics

WBN:W

October 17, 1939.

Mr. W. M. Ennis
Room 6-208
M. I. T.

Dear Mr. Ennis:

Following our conversation this morning regarding Professor Nottingham's suggestions in his letter of October 11, I have talked with Professor Harrison and also with Professor Nottingham. We feel that you may be right in thinking that the detailed reports suggested in that letter involve more information than is really necessary; however, since Professor Nottingham made the suggestions only for a trial period, it does not seem to us that it would be too much trouble for you to keep those detailed records for a few weeks so that we can see how they work out. If it should turn out that simpler records were sufficient, we could go over the whole question about the first of December and decide what to do then.

I hope you will cooperate in keeping the records as an experiment for a few weeks.

Sincerely yours,

John C. Slater
Head of the Department

JCS:W
CC to Profs. Nottingham
Harrison

October 11, 1939.

Professor John C. Slater
Department of Physics
M. I. T.

Dear Professor Slater:

In response to your letter of October 4, we have, as you already know, worked out a plan concerning the recording of all glass blowing done here at the Institute in order that we will be able to account for all materials used, and apply the charges to the proper budgets in case that becomes desirable. The plan now formulated is as follows:

Record books, which have been furnished to Messrs. Ryan and Ennis, have in them numbered pages from 1 to 360.

The first 20 pages are to be reserved for the entries of small items.

Pages 20 to 300 are to be reserved for the entry of larger jobs, one page for each job, which upon acceptance by the glass blowers will be assigned a job number which corresponds to the page upon which the records applicable to the job are made.

Pages 300 to 310 will be reserved for small jobs done at the Institute for members of departments other than physics. These jobs are to be done during hours outside of the regular working hours unless especially noted.

Pages 310 to 360 are to be used to record all outside jobs that require more than a few minutes work. These should receive job numbers, and records should be kept in writing. This applies to all work done at the Institute whether on Institute time or on outside time.

The layout plans for the small jobs to be recorded in the section 1 to 20 and 300 to 310 include the recording of the

following:

1) Date.
2) Name of person making request.
3) One or two words describing type of job.
4) Materials used.
5) Cost of these materials.
6) Time.

It is thought that this information can be tabulated to form six columns, and therefore only one line will be needed for each item unless more than one kind of material is used, in which case one line will be needed for each item of material. These records should be kept chronologically.

For the larger jobs, the following information should be recorded:

Date received:
Requested by:
Date for each day on which work is applied to this job.
Materials used.
Cost.
Time.

All entries should be kept complete day by day. If a job requires more than one day to finish it, this information can be supplemented each day as the job progresses. Finally, the date on which the job is finished should be recorded, the total cost of materials, and the total time required. The same information is required for the jobs done at the Institute for persons outside of the physics department.

We wish to give this plan a thorough trial and are starting in on it at once and expect to continue with the plan more or less unmodified until the first of the year. If it turns out that the information obtained is too complete, then we will undertake to revise the present plan so that it will be more practicable. I hope that as a result of this system of recording, we will be able to account rather accurately for all the costs in connection with our glass blowing operations.

I will assume, unless I hear from you, that these plans meet with your entire approval.

Sincerely yours,

Wayne B. Nottingham
Assoc. Prof. of Physics

WBN:W

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

DEPARTMENT OF PHYSICS

CAMBRIDGE, MASS.

October 4, 1939.

Professor W. B. Nottingham
Room 6-205
M. I. T.

Dear Professor Nottingham:

As you know, the Physics Department's research budget for this year is considerably less than last year, and we are having to economize wherever possible. I notice that for the first month in the fiscal year, the glass blower's expenses have run considerably above the figure for a year ago, and I believe that we should do something to check up and see that the glass blowing account is not involving us in any more expense than is necessary.

Might I suggest that you go over with Ennis and Ryan any possible methods of checking up on the expenses that may appeal to you, so we can be sure that the work is being done as effectively as possible.

I might say that I made a similar request with regard to the stock room last year, and Professor Hardy found that we were able to save considerable money there.

Very truly yours,

John C. Slater

John C. Slater
Head of the Department

JCS:W