May 23, 1931

Dean M.S. Ketchum
College of Engineering

Dear Dean Ketchum,

I beg leave to submit the following report on the physics department for the year 1930-1931. This report is arranged as follows:

I CHANGES

Staff
Equipment
Courses
New Curriculum in Engineering Physics
Seminar Rooms

II DEPARTMENTAL ACTIVITIES

Outside Speakers
Colloquium
Seminar
Courses of Instruction
Attendance at Meetings
Advanced Degrees in Physics
Activities of Individual Members of Staff

III NEEDS

Staff Members
Equipment
Instrument Maker
Glass Blower
Stenographer
Elimination of Vibration.
Staff.— The new members of the senior staff this year are: Assistant Professor J.M. Bartlett, Jr., and Dr. C.M. Almy, instructor. Professor Garman has returned from a year abroad and is conducting some research in the laboratory. Professor R. F. Paton’s rank has been changed from Assistant Professor to Associate Professor, beginning September 1, 1930. There have been several changes in the list of assistants, as is shown in Appendix I.

Two important changes in staff have been arranged for next year. Dr. Sanders has left us for a year or two to study in Europe, and his place is to be taken by Mr. Harold M. Mott-Smith, a very able theoretical physicist who has served as mathematical physicist in the General Electric Company for a number of years and has recently been studying quantum mechanics abroad. Dr. P. G. Kruger is to be added to the staff next year as an Assistant Professor. He is a brilliant young man who has already contributed several important experimental papers on line spectra, has studied two years abroad, and held several distinguished fellowships.

Equipment.— Considerable purchases of spectrographic equipment were made last year and this. Only a small part of that ordered this year has yet arrived. All the apparatus which has arrived is in active use and is an essential part of our spectroscopic research program.

We are particularly pleased finally to have secured a ruled grating from Professor R.W. Wood of Johns Hopkins University. It is very difficult to get these and we are lucky to have one. It is a concave grating of good quality, six inches in diameter, 30,000 lines to the inch, and of twenty one foot curvature. It is to be mounted, during the summer, in a room in the basement which is to be remodeled for the purpose. When it is in operation it will make a great many new types of investigation possible.

Courses.— The general physics courses, 1 and 7, are being conducted this year in accordance with the changes authorized last year. That is, the credits for 1a, 1b, 7a, 7b, are now three hours each and those for 3a, 3b, 8a, 8b, are two hours each. Physics 9 and 10 has been abandoned as a separate number, the instruction being combined with Physics 7 and 8. Both of the general physics courses are now operated as two one-hour lectures, two one-hour quizzes and one three-hour laboratory period a week. It has been possible, to some extent, to eliminate student graders in these courses, especially during the second semester. I believe that this has worked a real improvement in the quality of the instruction.
and should be continued if at all feasible. The elimination has been effected by giving the work to the assistants in charge of sections and correspondingly reducing their number of teaching hours. The student apparatus men in these courses have also been eliminated, their work having been taken over by one of the assistant machinists, Mr. W. O. Deem. This has effected a very real improvement in the condition and upkeep of the apparatus of these courses which I am told has a beneficial effect on the student morale. The apparatus has been put back after use in good condition, as it never has before, and this will greatly increase the efficiency of setting up experiments next time. A new text by Saunders, entitled A Survey of Physics, has been tried this year in Physics 7 with somewhat qualified success.

Physics 14 has been given this year for the first time as a course running throughout the year. This has made possible much more thorough instruction in this important basic course and has at the same time allowed them to get further into the subject.

Physics 20, 22 and 120, the advanced light course, has been given by Dr. Almy who has been successful in building up a stimulating and valuable course in the most modern kind of work in light.

Professor F.W. Loomis gave the new courses, Physics 154 and 165 this year for the first time. These courses are intended to acquaint the students with the fields of atomic and molecular structure which are being cultivated intensively in this department in experimental researches.

Physics 166, quantum mechanics and wave mechanics, was given this year for the first time. It is the most advanced course we give and covers these fields which have just recently been discovered and are still being actively cultivated. It has been very ably given by Professor J.H. Bartlett, Jr., who has so interested and stimulated the students that several of them have gone on into research in this field.

New Curriculum in Engineering Physics.—This was authorized last year and went into effect this year. An outline of it will be found in my report for the year 1929-1930.

Seminar Room.—Room 202, which is one of the best rooms in the laboratory, had been set aside since the building of the laboratory, as a Women's Study and Rest Room. Since there was very little use for it in this way, it has been with the cooperation of Professor White's office turned into a seminar room. It is now useful for our seminars, for the meetings of very small courses, for conferences with visiting professors and others, for discussions between members of the department, and for doctors' examinations.
II DEPARTMENTAL ACTIVITIES

Outside Speakers.— The two principal speakers this year were Professor J. Frenkel of the Polytechnical Institute, Leningrad, in November, and Professor R. H. Fowler of Cambridge University, England, in April. Both of them spoke on topics concerned with the quantum mechanics and recent discoveries in atomic physics, and both of them had a stimulating effect on the members of the department and graduate students. I feel that these outside lecturers are very helpful.

Colloquium.— The Colloquium has continued along about the same lines as last year, with weekly meetings at 7:15 p.m. on Thursdays. At these meetings professors and graduate students have given papers on recent investigations of physical problems either here or elsewhere. The only differences from previous years have been that graduate students have had a somewhat larger share in the Colloquium, that the papers have been more numerous and rather more technical, and the sessions longer. A list of the topics discussed is given in Appendix II.

Seminar.— The Seminar on theoretical physics has been held on Monday evenings, at 7:30, and is gradually changing its nature, being taken part in more by graduate students and serving mostly to give them practice in reporting new work in theoretical physics, whereas last year and the first part of this year it was conducted more for the information of some members of the faculty.

Courses of Instruction.— A list of courses given this year in the department is contained in Appendix III. The text books used in these courses are listed in Appendix IV, and the registrations in the courses are listed in Appendix V.

Attendance at Meetings.— The June, 1930 meeting of the American Physical Society at Cornell University, was attended by Professors Loomis and Schulz, and Knipp.

The November, 1930, meeting of the American Physical Society at Chicago, was attended by Professors Loomis, Watson, Knipp, Schulz, Paton, and Bartlett, Drs. Alpay, and Messrs. Wissink, Young, Challacombe, Rassweiler, and Myers.

The joint meeting of the American Physical Society and the American Association for the Advancement of Science, held in Cleveland in December 1930, was attended by Professors Loomis, Bartlett and Knipp.

The February, 1931, meeting of the American Physical Society, at New York, was attended by Professor Loomis.

The April, 1931, meeting of the American Physical Society
at Washington, D.C., was attended by Professor Loomis, Paton, Williams, Bartlett and Watson, and by Dr. Almy, and Mr. Nusbaum.

The May meeting of the American Acoustical Society, at Camden, N.Y., was attended by Professor Watson.

The May meeting of the Illinois State Academy of Science, at Peoria, was attended by Professors Carman, Knipp and Schuls.

**Advanced Degrees in Physics.**—The degrees of Ph.D. in Physics, were awarded in June, 1930, to Messrs. L.T. Bourland and A.N. Guthrie.


The degrees of Ph.D. in Physics, will be awarded in June, 1931, to Messrs. F.W. Cooke and C.H. Li.

The professional degree of Engineering Physicist will be awarded in June, 1931, to Mr. W. Waterfall.

Masters' degrees in physics will be awarded in 1931 to Messrs. B.N. Carter, C.N. Challacombe, W. Myers, C.E.O. Peterson, G.D. Rahrer and N.A. Watson.

**Activities of Individual Members of Staff.**—Professor F.W. Loomis has been conducting researches on the extinction of iodine fluorescence, on the magnetic rotation spectrum of lithium molecules, on the heat of dissociation of lithium, and other problems connected with molecular spectra. He has given two new courses, Physics 164 and 185. He has continued to serve on the Board of Editors of the Physical Review, and was elected in January a member of the Council of the American Physical Society, to serve for six years.

Professor A.P. Carman, who is now Emeritus, has returned from his year abroad and has been engaged on a research project to attempt to detect a Kerr effect in the ether, if it exists.

Professor C.T. Knipp has been engaged on researches having to do with the electrodeless discharge in gases. He served this year as President of the Illinois Chapter of Sigma Xi.

Professor F.R. Watson has been doing consulting work, some of it in connection with the acoustic adjustment of rooms about the Illinois campus, and also in connection with the new Chicago Subway. He is continuing to serve as Editor of the Journal of the American Acoustical Society.

Professor J. Kunz has been carrying on and supervising
researches in the photoionization of caesium vapor, the magnetic properties of magnetite at low temperatures, atomic rays of hydrogen, certain oscillations in cables, and on the corona discharge. All three of the candidates for the doctorate this year have done their research in whole or in part under his direction.

Professor W.F. Schuls has been rewriting his laboratory manual of physics.

Professor E.H. Williams has been building up Physics 14 by introducing new experiments on alternating currents. He has also been assisting in the supervision of two doctor's theses and has completed the experimental part of a research on the susceptibility of copper-nickel alloy.

Professor R.F. Paton has contributed effectively to the success of the innovation in the teaching system in Physics 7 and 8. He has given Physics 16 and 36 for the first time, and has given Physics 45 in a way in which it has not been given before, and which makes it a valuable unit in our list of courses. Together with Dr. Almy, he has nearly completed an analysis of the spectrum of boron hydride.

Professor J.H. Bartlett, Jr., is a new member of the department this year. He has given a course on quantum mechanics, the most difficult and advanced subject we have. He has shown a real mastery of the subject, and for the first time our students are in a position to have sound instruction in this field. Several of his students have become interested and have gone on to do research in this field. Dr. Bartlett has published one important paper, entitled "Orbital Valency", since he has been here. This is, I believe, the most significant paper that has come out of the department. In it he has successfully evolved a method of calculating valence forces in certain diatomic molecules. These forces were a mystery until recently and they have usually been considered not amenable to calculation. Professor Bartlett's method is so successful that, for instance, in a second paper which is about to appear, he has been able to calculate the energy of dissociation of the lithium molecule and get within 2% of the accurate measurements made by Loomis and Nusbaum in this laboratory. He is directing the research of four graduate students. He has contributed many talks before the Seminar and Colloquium, and has had a good deal to do with the discussions there.

Dr. W.H. Sanders has extended Physics 14 from a one semester to a two semester course, which is a great improvement.

Dr. C.H. Almy has done excellent work in building up the advanced light courses, Physics 20, 10 and 120. Especially in the second semester, the laboratory part of these courses has been almost like research and, in fact, several of his students have ended up by doing research problems as part of the course. His
building up a course of this type has meant a tremendous amount of work and attention, and he has been very successful in choos- ing experiments of a modern and interesting kind. He has direct- ed the research of Mr. Rahrer on the OH band spectrum and has carried to some degree of completion in collaboration with Pro- fessor Paton a research on the band spectrum of boron hydride, which was recently reported to the American Physical Society. He has also been very helpful in the choice, design and installation of new spectroscopic equipment which we are getting.

Mr. W.C. Deen, assistant mechanician, has been put in charge of the care of apparatus used in Physics 3 and 8, replac- ing student help, with great benefit to the apparatus. It has taken about half of the time which he used to give to the shop, but should take less next year.

III. NEEDS

The most urgent need of the department is for additional capable and active members of the staff. These are needed to take charge of instruction which is now either not given or inadequately given, and to do and direct research.

The next most urgent need is for certain equipment, especially spectrographic, both for research and for instruction.

The department also seriously needs another machinist who should be more skilled than any of the men we have at present, and should really be an instrument maker. Within a year or so as our more urgent needs for ready made equipment are filled, this need of a machinist will be one of our most serious ones. Our shop is pretty well equipped and the three men in it are competent men in their way and do very good work, but not of a highly pre- cise nature. None of them, for instance, is capable of building a good vacuum spectrograph. Moreover, two of the three men in the shop are now spending some half to three-quarters or even all of their time outside. Mr. DaVon Smith has developed into a general laboratory technician, in which capacity he is more useful to us than in the shop. Mr. Deen, as I have said above, has taken charge of the care of the laboratory apparatus in Physics 3 and 8. Both of these kinds of work relieve the shop somewhat, but I am afraid the shop is not now adequately staffed. Several members of the department think so. A first class instrument maker would relieve the pressure on the shop and also take care of a good deal of work that the shop can not now do.

Another need is for a glass blower. Practically every physics laboratory of importance in the country has at least one glass blower of its own. We make shift to have our glass blowing done by Mr. Anders, the glass blower of the chemistry department. The situation is very unsatisfactory. Mr. Anders is supposed to do his work outside of the hours in which he is employed by the
chemistry department, and to send his bills for it to us. There is no other glass blower in town, so that we have no basis for comparison, but my impression is that his bills are rather high. He is not particularly competent, much of his work is faulty, he often appears reluctant to undertake work or does so only with long and, I think, unnecessary delays. Nor is his attitude towards the members of our department and the graduate students who come to him with work altogether agreeable. All this naturally constitutes a hindrance to the work of the physics department. This work would have been very seriously delayed on several occasions during the past year if I had not been able to secure the assistance of some of Professor Phipps' students.

I believe that the arrangement of having the physics department glass blowing paid for, over and above his salary, is unsound from a business standpoint, and works to the disadvantage of both departments. I believe that the services of Mr. Anders would be unsatisfactory to us under any arrangement.

Probably the only satisfactory solution of the problem will be for the physics department to employ its own glass blower, as most large departments do.

Professor Watson has suggested that we need an additional stenographer. We probably do occasionally have more work than Miss Rogers can do, but I do not feel that this need is as urgent as many others. Perhaps our problem could be solved just as well and more cheaply if a stenographer were available in some other office whom we could call on when our work piles up.

Another problem which is going to be a serious one before long is that of elimination of vibration. It is going to be very difficult to do precise work of any kind in this laboratory as long as it vibrates as badly as it does now. We shall eventually be forced either to eliminate the vibration from this building or find another building remote from traffic. Our vibration problems would be reduced considerably if a concrete pavement could be put in on Green Street. We can feel the whole building shake every time a bus or a big coal truck goes over one of the many big bumps in front of our building. I fear that these jars will throw our large spectrographs out of adjustment.

Respectfully submitted,

[Signature]
APPENDIX I

The Physics Department Staff

F.W. Loomis, Ph.D., Professor of Physics and Head of the Department
A.F. Garman, D.Sc., Professor of Physics, Emeritus
C.T. Knipp, Ph.D., Professor of Experimental Electricity
F.R. Watson, Ph.D., Professor of Experimental Physics
J. Kunz, Ph.D., Professor of Mathematical Physics
W.F. Schulz, Ph.D., Associate Professor of Physics
E.H. Williams, Ph.D., Associate Professor of Physics
R.F. Patton, Ph.D., Associate Professor of Physics
J.H. Bartlett, Jr., Ph.D., Assistant Professor of Physics
W.H. Sanders, Ph.D., Associate
G.W. Almy, Ph.D., Instructor
F.W. Cooke, M.S., Assistant on three-fourths time
C.W. Ireland, M.S., Assistant on three-fourths time
P.C. Ludolph, M.S., Assistant
C.D. Hause, M.A., Assistant on three-fourths time
M.C. Watson, M.S., Assistant on half-time
F.W. Brown, M.S., Assistant on half-time
H.C. Fuller, M.A., Assistant on half-time
W.H. Furry, M.A., Assistant on half-time
J.J. Gibbons, M.S., Assistant on half-time
L.H. Scheuerman, M.S., Assistant on half-time
F.M. Sparks, M.S., Assistant on three-fourths time
C.N. Challacorbe, B.S., Assistant on half-time
R.K. Cook, B.S., Assistant on quarter-time
R.B. Howard, A.B., Assistant on half-time
S.C. Kelly, B.S., Assistant on half-time
M.F. Passweiler, B.S., Assistant on half-time
R.J. Walsh, Jr., M.S., Assistant on half-time
T.F. Watson, M.S., Assistant on half-time
S.C. Weissberg, B.S., Assistant on half-time
G.M. Wissink, M.S., Assistant on half-time
R.T. Young, Jr., A.B., Assistant on half-time
G.W. Fieg, Mechanician
W.C. Deen, Assistant Mechanician
Devon Smith, Assistant Mechanician
H.T. Wyninger, Storekeeper and Lecture Assistant
Della Mae Rogers, Secretary
M.J. Arvin, M.A., Graduate Fellow
J.R. Kerry, M.A., Graduate Fellow
C.H. Li, M.S., Rockefeller Foundation Fellow
J.T. Shih, Ching Rue Fellow
G.P. Rahrer, A.B., Coffin Fellow
R.M. Rusbaum, M.S., Engineering Experiment Station Research Assistant
B.F. Carter, Graduate Scholar
Watt Myers, North Central College Scholar
R.W. Tyler, M.S., Graduate Research Assistant
APPENDIX II
Colloquium Addresses
1930-1931

October 2, 1930
Dr. G.M. Almy - Zeeman Effect in Band Spectra
Professor F.W. Loomis - Neutral Oxygen in Nebular Spectra

October 9, 1930
Professor J.M. Bartlett, Jr. - Recent Theories of the Nucleus

October 16, 1930
Professor R.F. Paton - Excitation Processes in the Hollow Cathode
Mr. C.E. Ireland - A New Determination of e/m

October 24, 1930
Dr. G.N. Wall - Potential Energy of an Ionic Lattice
Mr. F.O. Ludolph - Specific Heat of Methane

October 30, 1930
Professors J.T. Tykociner and Jakob Kunz - Measurement of Currents in the Electrodeless Ring Discharge

November 4, 1930
Professor J. Frenkel - Some Aspects of the New Quantum Theory

November 5, 1930
Professor J. Frenkel - New Quantum Statistics

November 6, 1930
Professor J. Frenkel - Transformations of Light Energy Into Heat in Gaseous and Solid Bodies

November 13, 1930
Mr. W.H. Furry - The Theory of the Selective Photoelectric Effect
Professor F.R. Watson - A New Method of Measuring Sound Absorption

November 20, 1930
Professor G.L. Clark - New Technique in X-Ray Crystallography

December 4, 1930
Professor E.M. Williams - Recent Work on Glaser's Anomaly in Diamagnetism of Gases
December 11, 1930
Dr. W.H. Sanders — Spectroscopy of Soft X-Rays

December 16, 1930
Mr. F.W. Cooke — Intense Electric Fields on Photoelectric Properties of Metals
Professor H.J. Reich — Demonstration of a Periodic Contactor Operated by Neon Tubes

January 8, 1931
Professor H.J. Reich — A Screen Grid Vacuum Tube Voltmeter
Professor F.W. "Comis — The Excitation of Spectra"

January 13, 1931
Professor V. Karapetoff, Prof. of Elec.Eng., Cornell Univ. — Physical Properties and Problems of Dielectrics
Professor J. Kunz — Present Theories and Problems of Dielectrics

February 12, 1931
Professor J.R. Bartlett, Jr. — Scattering of Slow Alpha Particles by Helium

February 19, 1931
Mr. J.J. Gibbons — High Speed Canal Rays
Professor C.T. Knipp — Shadows in the Ring Discharge

February 26, 1931
Professor W.F. Schuls — Analysis of Photoelastic Colors
Professor J. Kunz — Copper-Cuprous Oxide Photo-Cells

March 5, 1931
Mr. H.Q. Fuller — The Persistence of Molecular Vibration and Rotation in Collision

March 12, 1931
Professor E.H. Williams — Magnetic Properties of Copper-Nickel Alloys
Mr. F.W. Brown — Artificial Disintegration by Alpha Particles

March 19, 1931
Mr. C.D. Hause — Direct Measurement of Molecular Velocities
Dr. G.M. Almy — Atomic Weights from the Isotope Effect in Band Spectra
March 26, 1931
Mr. P.C. Ludolph — Mass Defect Curve and Nuclear Constitution
Dr. W.H. Sanders — Molecular Scattering of X-Rays

April 9, 1931
Professor R.H. Fowler — Alpha Rays, Gamma Rays and Internal Absorption Coefficient

April 10, 1931
Professor R.H. Fowler — Internal Construction of Stars

April 11, 1931
Professor R.H. Fowler — Ferromagnetism

April 16, 1931
Dr. G.M. Almy — Boron Hydride Band Spectrum
Mr. W.H. Furry — Calculation of Molecular Energies

April 23, 1931
Mr. R.E. Musbaum — Magnetic Rotation Spectrum of Lithium
Professor J. Kunz — Some Applications of Dimensional Analysis in Hydrodynamics

May 7, 1931
Dr. D.G. Bourgin — Wave Packets
Mr. F.W. Cooke — Photo-ionization of Caesium Vapor
Mr. C.H. Li — Magnetic Properties of Magnetite Crystals at Low Temperature

May 14, 1931
Mr. C.H. Li, — Magnetic Properties of Magnetite Crystals at Low Temperature
Mr. T.F. Watson — Propagation of Barkhausen Discontinuities

May 21, 1931
Professor W.H. Rodebush — The Bose-Einstein Statistics
## APPENDIX III

### TABLE OF COURSES GIVEN IN PHYSICS IN 1930-1931

<table>
<thead>
<tr>
<th>No. and Character of Course</th>
<th>No. Students in Course</th>
<th>Work each week</th>
<th>Instructors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>II 445</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>II 191</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>II 209</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>II 11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physics 15. Electric and Magnetism</td>
<td>II 3</td>
<td>Course not given to small registration.</td>
<td>W.H. Sanders</td>
</tr>
<tr>
<td>Physics 16. Heat</td>
<td>II 15,5</td>
<td>3 recitations and one 3-hr. laboratory period</td>
<td>R.F. Paton R.K. Cook</td>
</tr>
<tr>
<td>Course</td>
<td>No. and character of Course</td>
<td>No. students in Course</td>
<td>Work each week</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>-----------------------------</td>
<td>------------------------</td>
<td>-----------------------------------------------------</td>
</tr>
<tr>
<td>Physics 17. Light</td>
<td>I 12</td>
<td>2 recitations and one 3-hr. lab. period weekly</td>
<td>W.F. Schuls, G.E. Ireland</td>
</tr>
<tr>
<td>Physics 20. Light</td>
<td>I 3</td>
<td>2 recitations per week</td>
<td>G.M. Almy</td>
</tr>
<tr>
<td></td>
<td>II 2</td>
<td></td>
<td>C.D. Haase</td>
</tr>
<tr>
<td>Physics 22. Light</td>
<td>I 2</td>
<td>2 3-hr. lab. periods weekly</td>
<td>G.M. Almy, F.M. Sparks</td>
</tr>
<tr>
<td>lab. for Phys. 20</td>
<td>II 2</td>
<td></td>
<td>C.D. Haase</td>
</tr>
<tr>
<td>Physics 23, 33. Sound</td>
<td>I 15, 8</td>
<td>3 recitations and one 3-hr. lab. period</td>
<td>F.R. Watson, F.M. Sparks</td>
</tr>
<tr>
<td>Physics 25. Architectural Acoustics</td>
<td>II 31</td>
<td>2 1-hr. lectures and recitations</td>
<td>F.R. Watson</td>
</tr>
<tr>
<td>Physics 30. Introd. to Theoret. Elec.</td>
<td>II 19</td>
<td>3 one-hour recitations</td>
<td>E.H. Williams</td>
</tr>
<tr>
<td>Physics 31. Special</td>
<td>I 1</td>
<td>Arrange</td>
<td>E.H. Williams</td>
</tr>
<tr>
<td>Probs. in Adv. Phys.</td>
<td>II 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measurements</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical engineers</td>
<td>II 94</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physics 45. Heat Radiation</td>
<td>I 10</td>
<td>Three recitations per week</td>
<td>R.F. Paton</td>
</tr>
<tr>
<td>Physics 46. Adv. Elec. Measurements</td>
<td>I 2</td>
<td>Two 3-hr. laboratory periods</td>
<td>E.H. Williams</td>
</tr>
<tr>
<td>Physics 76. X-rays.</td>
<td>II 23</td>
<td>Three recitations per week</td>
<td>W.H. Sanders</td>
</tr>
<tr>
<td>Physics 104. Selected</td>
<td>I 8</td>
<td>Two three-hour lab. periods</td>
<td>G.T. Knipp, E.H. Williams, W.H. Sanders</td>
</tr>
<tr>
<td>Probs. in Elec. Meas.</td>
<td>II 12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physics 120. Light</td>
<td>I 13</td>
<td>Two recitations and 2 3-hr. lab. periods</td>
<td>G.M. Almy</td>
</tr>
<tr>
<td></td>
<td>II 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physics 124. Conduction of Elec. thru</td>
<td>I 18</td>
<td>3 lectures and demonstrations per week</td>
<td>G.T. Knipp</td>
</tr>
<tr>
<td>Gases</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>investigitations</td>
<td>II 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physics 132a. Dynamics</td>
<td>I 26</td>
<td>Four lectures per week</td>
<td>J. Kunz</td>
</tr>
<tr>
<td></td>
<td>II 25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. and character of Course</td>
<td>No. students in Course</td>
<td>Work each week</td>
<td>Instructors</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>------------------------</td>
<td>----------------</td>
<td>-------------</td>
</tr>
<tr>
<td><strong>Physics 132c, Hydrodynamics</strong></td>
<td>I 4</td>
<td>Two lectures per week</td>
<td>J. Kunz</td>
</tr>
<tr>
<td></td>
<td>II 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Physics 184, Line Spectra &amp; Atomic Structure</strong></td>
<td>I 8</td>
<td>Three lectures per week</td>
<td>F.W. Loomis</td>
</tr>
<tr>
<td></td>
<td>II 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Physics 185, Band Spectra &amp; Molecular Structure</strong></td>
<td>I 9</td>
<td>Three lectures per week</td>
<td>J.H. Bartlett</td>
</tr>
<tr>
<td></td>
<td>II 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Physics 186, Quantum Mech. &amp; Wave Mechanics</strong></td>
<td>I 9</td>
<td>Three lectures per week</td>
<td>F.W. Loomis</td>
</tr>
<tr>
<td></td>
<td>II 14</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Physics 190, Research</strong></td>
<td>I 10</td>
<td>Arrange</td>
<td></td>
</tr>
<tr>
<td></td>
<td>II 14</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## APPENDIX IV

### Text-Books Used in Physics Courses

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Author</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Duff</td>
<td>Physics</td>
</tr>
<tr>
<td>3</td>
<td>Schulz</td>
<td>Physics Laboratory Manual</td>
</tr>
<tr>
<td>7</td>
<td>Saunders</td>
<td>A Survey of Physics</td>
</tr>
<tr>
<td>8</td>
<td>Schulz</td>
<td>Physics Laboratory Manual</td>
</tr>
<tr>
<td>14</td>
<td>Jeans</td>
<td>Theoretical Mechanics</td>
</tr>
<tr>
<td>16</td>
<td>Roberts</td>
<td>Heat and Thermodynamics</td>
</tr>
<tr>
<td>17</td>
<td>Robertson</td>
<td>Physical Optics</td>
</tr>
<tr>
<td>20a</td>
<td>Preston</td>
<td>Theory of Light</td>
</tr>
<tr>
<td>23</td>
<td>Barton</td>
<td>Text-Book of Sound</td>
</tr>
<tr>
<td>25</td>
<td>Watson</td>
<td>Acoustics of Buildings</td>
</tr>
<tr>
<td>30</td>
<td>Starling</td>
<td>Electricity and Magnetism</td>
</tr>
<tr>
<td>76</td>
<td>Compton</td>
<td>X Rays</td>
</tr>
<tr>
<td>124</td>
<td>Crowther</td>
<td>Electrons, Ions and Ionizing Radiations</td>
</tr>
<tr>
<td>134</td>
<td>Pauling &amp; Goudsmit</td>
<td>Structure of Line Spectra</td>
</tr>
<tr>
<td>136</td>
<td>Dirac Sommerfeld</td>
<td>Quantum Mechanics</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wave Mechanics</td>
</tr>
</tbody>
</table>
### APPENDIX V

REGISTRATIONS IN PHYSICS COURSES OFFERED IN I SEMESTER 1930-1931

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>553</td>
<td>9</td>
<td>562</td>
<td>418</td>
<td>114</td>
<td>26</td>
<td>1</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>3a</td>
<td>523</td>
<td>9</td>
<td>532</td>
<td>403</td>
<td>104</td>
<td>22</td>
<td>1</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>7a</td>
<td>256</td>
<td>15</td>
<td>271</td>
<td>54</td>
<td>179</td>
<td>24</td>
<td>1</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>8a</td>
<td>246</td>
<td>15</td>
<td>261</td>
<td>55</td>
<td>171</td>
<td>21</td>
<td>2</td>
<td>12</td>
<td>-</td>
</tr>
<tr>
<td>14</td>
<td>19</td>
<td>-</td>
<td>19</td>
<td>9</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>17</td>
<td>11</td>
<td>1</td>
<td>12</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>20</td>
<td>3</td>
<td>-</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>22</td>
<td>2</td>
<td>-</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>23</td>
<td>13</td>
<td>2</td>
<td>15</td>
<td>4</td>
<td>5</td>
<td>-</td>
<td>-</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>31</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>33</td>
<td>6</td>
<td>2</td>
<td>8</td>
<td>2</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>44</td>
<td>107</td>
<td>-</td>
<td>107</td>
<td>104</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>45</td>
<td>10</td>
<td>-</td>
<td>10</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>46</td>
<td>2</td>
<td>-</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No registrations</td>
</tr>
<tr>
<td>97</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No registrations</td>
</tr>
<tr>
<td>104</td>
<td>8</td>
<td>-</td>
<td>8</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>120</td>
<td>12</td>
<td>1</td>
<td>13</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>13</td>
</tr>
<tr>
<td>124</td>
<td>16</td>
<td>-</td>
<td>16</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>18</td>
</tr>
<tr>
<td>126</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No registrations</td>
</tr>
<tr>
<td>131</td>
<td>2</td>
<td>-</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>132a</td>
<td>27</td>
<td>1</td>
<td>28</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>27</td>
</tr>
<tr>
<td>132c</td>
<td>4</td>
<td>-</td>
<td>4</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>133</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No registrations</td>
</tr>
<tr>
<td>184</td>
<td>8</td>
<td>-</td>
<td>8</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>186</td>
<td>9</td>
<td>-</td>
<td>9</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>9</td>
</tr>
<tr>
<td>190</td>
<td>10</td>
<td>-</td>
<td>10</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>10</td>
</tr>
<tr>
<td>-----------</td>
<td>-----</td>
<td>-------</td>
<td>-------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>-------</td>
<td>------</td>
<td>-------</td>
</tr>
<tr>
<td>1</td>
<td>449</td>
<td>7</td>
<td>456</td>
<td>329</td>
<td>105</td>
<td>20</td>
<td>2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>438</td>
<td>7</td>
<td>445</td>
<td>322</td>
<td>103</td>
<td>18</td>
<td>2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>161</td>
<td>10</td>
<td>191</td>
<td>45</td>
<td>128</td>
<td>8</td>
<td>9</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>197</td>
<td>12</td>
<td>209</td>
<td>51</td>
<td>140</td>
<td>7</td>
<td>8</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>14</td>
<td>11</td>
<td>-</td>
<td>11</td>
<td>5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>6</td>
</tr>
<tr>
<td>15</td>
<td>3</td>
<td>-</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>16</td>
<td>14</td>
<td>1</td>
<td>15</td>
<td>4</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>-</td>
<td>9</td>
</tr>
<tr>
<td>20</td>
<td>2</td>
<td>-</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>22</td>
<td>2</td>
<td>-</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>25</td>
<td>31</td>
<td>-</td>
<td>31</td>
<td>24</td>
<td>2</td>
<td>-</td>
<td>3</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>30</td>
<td>18</td>
<td>1</td>
<td>19</td>
<td>7</td>
<td>2</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>9</td>
</tr>
<tr>
<td>31</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>36</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>44</td>
<td>94</td>
<td>-</td>
<td>94</td>
<td>93</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>78</td>
<td>23</td>
<td>-</td>
<td>23</td>
<td>5</td>
<td>1</td>
<td>-</td>
<td>2</td>
<td>-</td>
<td>15</td>
</tr>
<tr>
<td>98</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No registrations</td>
</tr>
<tr>
<td>104</td>
<td>12</td>
<td>-</td>
<td>12</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>12</td>
</tr>
<tr>
<td>120</td>
<td>15</td>
<td>1</td>
<td>16</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>16</td>
</tr>
<tr>
<td>126</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No registrations</td>
</tr>
<tr>
<td>131</td>
<td>4</td>
<td>-</td>
<td>4</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>132a</td>
<td>25</td>
<td>-</td>
<td>25</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>25</td>
</tr>
<tr>
<td>132c</td>
<td>4</td>
<td>-</td>
<td>4</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>135</td>
<td>6</td>
<td>-</td>
<td>6</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>6</td>
</tr>
<tr>
<td>136</td>
<td>4</td>
<td>-</td>
<td>4</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>190</td>
<td>14</td>
<td>-</td>
<td>14</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>14</td>
</tr>
</tbody>
</table>
Professor Taunton,

Dear Sir,—

In response to your request for a brief statement of departmental needs coming under my authority, before leaving for the Florida meeting, I submit the following:

Elect. Meas. (Chaps. 44 & 104)

The request for funds in this connection is for the work experiments that Dr. Williams is introducing. He has worked out a list, with the probable cost attached. Aside from this, but little more is needed—possibly less than $50.00 for the year.

Chapman 121.

This course fortunately is well furnished with demonstration apparatus, a number of pieces of which were designed and constructed this year. I should say that $100.00 will take care of everything needed next fall in
This course,
Physics 97 and 131. My work in
these courses comes under electrical
discharge. Most of the apparatus is
designed and constructed as needed.
We need supplies as follows.

Assorted tungsten wire 75.00
(open for me & department)

Assorted Pyrex tubing 100.00
(open for me & department)

Assorted common glass 25.00
(open for me & department)

Pyrex glass stop cooke 50.00
(open for me & department)

Pyrex bulbs from 1/8-
1/2 l. Capacity 40.00
(open for me & department)

Mercury - 2
120.00
(open for me & department)

Special supplies, i.e.
Ni wire, sheet tungsten, etc. 50.00
General purposes.

Vacuum pumps are always needed by myself, my students, and by many others in the department. Twice I have been obliged to dismantle my pumping set on SE basis in room 107 to help out elsewhere.

I suggest that we buy one of the Central Scientific Co's Molecular pumps. I saw this in operation at Cleveland. No vapor pump is needed (mercury or phthalate), it is high speed to high vacuum. Cost complete with 350 cc motor
For my own research, I do not need apparatus as much as I do assistance. Mr. Roberts' presence has made this year's work a cakewalk. I hope that also, or someone equally competent, could be retained for next year.

At your suggestion Professor Brown and I will close out that fund before the fiscal year ends.

I shall also approach Dean Daniels next week for funds to cover the expenses of a part-time assistant.

Sincerely,

C. T. [Signature]

May 7, 1931.
May 11, 1931

Professor F.W. Loomis
Department of Physics

Dear Sir:

In reply to your letter of April 28, I am presenting herewith a statement concerning the matters in the department for which I am particularly responsible and interested.

General Physics Course (Physics 7 and 8).—This year, we are using Saunders' new text. As might be expected in a new text, there are inequalities, both in subject matter and problems. The book appears to assume that the students using it have already some knowledge of physics, so that a number of topics usually found in texts are omitted or minimized; also considerable matter is included that "may be omitted", such material involving the discussion of modern developments or more advanced topics.

The inequalities in the text might be smoothed over by quiz sheets, but we wanted to try a year without such sheets, thus requiring students to study the text more closely. As a result, there appears to be more interest and sensible questions from the students than usual. The scholastic mortality the first semester, however, was large and it has given me concern to ascertain whether or not our method of instruction can be made more effective.

But little apparatus for lecture demonstration has been bought for a number of years, due largely to the interruption of the War and lack of purchases from abroad. It is to be hoped that the recent requests in the budget for apparatus will be granted. It is my intention, as time goes by, to discard defective or shabby apparatus, and replace it with presentable new equipment; also to add other apparatus to keep step with modern developments.

Acoustics Courses.—Instruction in this work has followed the usual course. About 15 students took the first course, while 33 students are registered for the Architectural Acoustics. Next year, I am considering giving an advanced course, using Wood's Sound as a text, which should be interesting to graduate students and advanced undergraduates. Investigational work has been delayed by failure of the firm of Jenkins and Adair to deliver the sound measuring apparatus.
ordered last fall. The delay has been due to the efforts of the firm to perfect the apparatus to meet the modern requirements in this field of investigation.

The Supervising Architect has asked me to advise him concerning the acoustic adjustment of a number of rooms about the campus, and this has been done, involving an expenditure of some $10,000. The expense for this work is a considerable reduction from usual prices, I am told, due to business depression and possibly some advertising advantage in the installation of material at the University on my recommendation.

I shall welcome any suggestions concerning the acoustics work that will make it more effective.

General Suggestions.—Two recommendations in this connection occur to me. I recommend that a stenographer be asked for to assist our department secretary. Many times, I have been obliged to write reports and letters at home or else engage an outside stenographer for the purpose; that is, work that might properly be considered as department business. My private correspondence has been taken care of separately. Also, I am recommending that the shop force be enlarged. Usually, the assistance of a mechanic is available for what work I have, but in a number of cases, I have found it necessary to wait. In the adjustment of lecture apparatus, I have given up systematic planning for construction of new devices or repair of old apparatus, except in urgent cases, due to the press of other shop work. I suspect that the situation is worse for instructors and assistants who desire to get apparatus made or repaired.

Sincerely,

F. R. Watson
May 12 1931

Professor F.W. Loomis
Head of the Physics Department
University of Illinois

Dear Professor Loomis,

My work during the last school year was regular. I was engaged in giving theoretical courses in dynamics and hydrodynamics, in directing investigations for the doctor degree and in personal research. In experimental research I am especially interested in photoelectricity, in magnetism, and in the corona discharge. I should be very glad to get some students interested in these fields. We have the necessary equipments, except in optics where I should suggest the acquisition of a ultraviolet monochromator.

Yours very truly,

Jakob Kunz
Prof. F. W. Loomis,
Head of Physics Dept.,
University of Illinois.

Dear Sir:

My work during the past two semesters has been mainly concerned with the courses in General Physics, Phys. Ia, Ib, 3a, & 3b.

These courses have been made uniform with Physics 7 and 8 so far as the number of credits (5 credit hours each semester) and the order of presentation of the subject matter is concerned, so that students who are unable to register in one of them (because of conflicting registration in some other course) are able to take the other as an alternative.

The method of handling these classes has been changed also. Instead of two lectures, one quiz and two laboratory periods of two hours each, we now give two lectures, two quizzes and one laboratory period of three hours per week. This arrangement has proved to be quite satisfactory.

The elimination of student assistants for grading laboratory reports is another change.

I have also been rewriting the laboratory manual of experiments to take care of changes in methods and new experiments.

The course in Optics, Phys. I7a, was well attended, the enrollment being largely made up of students from the department of Ceramic Engineering.

During the year I attended the following scientific meetings:
Am. Physical Society, Ithaca, Ill. June, 1931
Am. Physical Society, Chicago, Ill. Nov. 1931
Ill. State Academy of Science, Peoria, Ill. May, 1931

Respectfully submitted,

[Signature]
Assoc. Prof. of Physics.
Professor E. W. Zommer
Department of Physics

Dear Professor Zommer:

I submit the following report on the work with which I have been connected during the past year.

The greater part of my teaching has been on connection with electrical measurements. The course in electrical measurements has been strengthened by the addition of four new experiments — alternating current — two using radio frequencies and two using radio frequencies. All the new experiments are now in operation and are giving very satisfactory results. To further improve the course and keep up to date of developments we should add more experiments in alternating current phenomena.

The enrollment in "Electricity and Magnetism" — Physics 30 — is 19, which is larger than normal. Mr. McEugo is doing very good work on some special problems in high frequency work and Mr. J. W. Shih is progressing rapidly with his problem on the magnetic susceptibility of iron-gold alloys.

Champaign, Ill.
May 11, 1931
Mr. C. H. Li has successfully completed his work for a doctor's thesis and is now writing up his report. He will undoubtedly have this finished by the required time.

In the case of my own research work I have completed measurements of the susceptibility of copper-nickel alloys over a wide range of temperatures and compositions. I hope to have the results ready for publication in a short time.

Respectfully submitted,

E. H. OR
May 6, 1931

Professor J. W. Stevens
School of Dept. of Physics

Dear Professor Stevens:—The school year 1930-31 has been a busy one. It has seemed to me that my time should be divided approximately three ways between elementary teaching, intermediate teaching, and research work. At least such an effort has been made.

In Physics 8 a, 8 b where I have been directly responsible the work has gone quite smoothly. The three hour laboratory section, taking the place of two, twelve hour, sections has been a distinct success. The assistants in the course, Messrs. Leblanc, Water, Whallenmee, J. F. Water, Rass-quality have done unusually good work and it has been a pleasure to work with them. The fact that Mr. Deen has been in direct charge of setting up apparatus has aided very materially to the smoothness with which the course has proceeded. He has done a very good job in his part.

In Physics 7 a, 7 b I have had two sections each semester. The new text was quite satisfactory the first semester but is very difficult to teach especially in electricity and magnetism. The students get discouraged.
The first semester I gave a course in elementary statistics as applied to problems in heat, physics 45. This was very interesting and stimulating to me, and I hope it will be possible to maintain a fair enrollment in this course each year. Giving this course the first semester took a good deal of time and my research work did not progress very rapidly.

The second semester the work in heat has gone quite pleasantly. Due to the fact that an excellent text is available in this course the work has taken less time than physics 45 and I have been able to do a little research. In the laboratory work Mr. R.C. Dorf has been a great help to me. In connection with the work in heat I have supervised the work of two graduate students in engineering, enrolled in physics 131, who have been interested in developing a method of high temperature measurement by flame reversal. With the new optical pyrometer recently received this work promises to be quite successful.
and interesting.

Early in December I succeeded in developing an arc in hydrogen between boron electrodes and later in photographing and measuring part of the spectrum of boron hydride. Assisted by Dr. Almy these measurements were reduced and the band constants determined—this last largely by Dr. Almy. Unfortunately some of our data were determined previously independently by Dutch physicists. However, we are hoping to determine the atomic weight of boron from the band isotope effect, and the necessary measurements for this purpose will be taken shortly.

It is with some difficulty that research work is undertaken along with responsibility in elementary as well as intermediate teaching and additional appointments to the permanent staff who would be willing and able to share the responsibility of elementary teaching would facilitate the research opportunity for me very greatly.
My activities for the past two semesters have consisted of teaching, research, and directing of research. I have given the course on Quantum Mechanics, endeavoring to acquaint the students with the important work done in this field up to the present time. In the second semester, the more advanced topics were treated in detail, these topics being transformation theory, relativity theory of the electron, theory of collisions, and the theory of radiation. The students have been required to report on special subjects, and this has stimulated interest markedly.

During the first semester, with the assistance of Mr. Furry, I completed my research begun abroad, on orbital valency. This was reported at the Cleveland meeting of the American Physical Society and published in the issue of the Physical Review for March 1st. In continuation of this work, the valence forces in lithium and beryllium have been investigated, and a joint paper by Mr. Furry and myself given at the Washington meeting of the Physical Society. A fuller account will appear in the Physical Review. I also attended the Chicago meeting.

Mr. Ireland has started an investigation of the structure of the simple hydrides. Mr. Lindolz is studying the separation of multiplets in molecular spectra.

In addition, I have given two talks before the cologneium and six before the theoretical seminars. This seminar studied molecular structure during the first semester and the theory of metals during the second semester.
At the first of the year, the seminar library was rather inadequate, but the situation has gradually improved. Many new and up-to-date books in physics, astronomy, and mathematics have been recommended. The list of current periodicals is still rather small. Agitation was made to lessen the delays due to bindery, etc., as a result of which there will probably be a bindery connected with the main library this next year.

During the coming summer I shall study with Dr. Dirac at Cambridge, England.

James H. Battest Jr.
In accordance with your request, a report on matters with which I have been concerned is presented below.

During the first semester I had classes in Physics 44a and 14a. The former proceeded without appreciable change from other years. The mechanism, being given for the first time as a two-semester course, was far more satisfactory. The increase in time available made possible more thorough treatment and the inclusion of a greater range of topics. In this connection there should be some consideration, I believe, of the extent to which vector methods might be introduced, for the sake of later work in, say, electrodynamics, as well as for their immediate application in the mechanics.

The requirement that engineering physics seniors take 14a-6 introduced less mature students and made the extension of time desirable for this reason too. If the "approved elective" and the "Mathematics 9a" appearing in the first and second semesters respectively could be interchanged, it would help greatly in second semester dynamics.

During the second semester I had no classes in Physics 44a. The presentation of Physics 78 had to be greatly modified because of the lack of a suitable text in English, A. H. Compton's book having gone out of print.

Physics 15 was shifted from the second semester schedule when it was found there would be only 4 students in it. The average number electing the course during the last eight years, including 1930-31, is only 5.5. Nearly all of these have been interested in it only as preparation for high school teaching. In the summer session there are generally enough to form a satisfactory class. Unless some change is made which will increase the size of the class, however, I do not think it worth while to offer this again during the first or second semester.

W.H. Sanders
May 6, 1931

Professor Pomeis:

I am submitting a report of my activities in the Physics Department during the present year (1930-31).

Physics 44a. In this course in electrical measurements I taught in one section for one semester. This involved 6 hours class work each week, of which 2 were spent in lecturing, 4 in laboratory direction. Outside work consisted mostly of reading. The examinations were given every two or three weeks.

Physics 20, 22, 120. Have been in charge of this course in Light. Undergraduates register for 20 (lectures) and (2.2) laboratory while graduates register for 120, which includes both lectures and laboratory. The course runs through the year. The enrollment was 16 the first semester, 18 the second. All but 3 were graduate students. There are 2 lectures each week and 2 3-hour laboratory
periods. It has been necessary to run the laboratory 3 afternoons each week during the second semester on account of lack of apparatus.

In the lectures I have dealt with the subject matter of Physical Optics as comprehensively as time has permitted. The laboratory experiments of the first semester were largely of the standard sort illustrating the phenomena of light as a wave motion. The second semester laboratory work has been given over to experiments on the technique of modern research in light, which means, for the most part, spectroscopy. This requires a good deal of expensive equipment if the students are to acquire any appreciation of modern research. Some good apparatus was on hand, some has been acquired during the present year and plans have been made to equip the laboratory more completely next year. The results
have been satisfactory for a first try at this sort of laboratory work. It has led, in the case of 6 students, to definitely original research in the course of the semester. It has served much better than the ordinary laboratory course to discover students most likely to succeed at experimental research.

Research

I have directed the work of Mr. Gerald Rahner, who is doing research on the OH band spectrum. I have acted to some extent as adviser to other students beginning research in band spectra.

With Prof. Paton I have carried to some degree of completion a research on the band spectrum of boron hydride. I reported the results so far obtained at the recent meeting of the American Physical Society.
Apparatus  Being greatly interested in spectroscopic research, I have helped in the planning for new equipment which is necessary to bring the laboratory up to date in this respect. The most important thing has been the making of plans for the new large grating mounting which we hope to construct this summer. I have also directed the construction of a mounting for a smaller grating. This instrument is now ready for use.

Other Activities  I have talked to the Physics Colloquium three times and the Theoretical Physics Seminar three times. I have attended two meetings of the American Physical Society, one at Chicago in November, and one at Washington in May. At the latter I read a paper on our work with the brom hydride spectrum.

Gerald M. Slung