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UNIVERSITY CIRCULAR

REPORT OF THE PRESIDENT OF THE UNIVERSITY 1921-1922

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ANNUAL REPORT

OF

THE PRESIDENT OF

THE JOHNS HOPKINS UNIVERSITY

1921-1922

BALTIMORE
THE JOHNS HOPKINS PRESS
1922

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JOHNS HOPKINS

UNIVERSITY CIRCULAR

New Series, 1922, No. 7. NOVEMBER, 1922 Whole Number, 341

ANNUAL REPORT OF THE PRESIDENT

To the Trustees of the Johns Hopkins University.

Gentlemen:

I have the honor to submit to you my annual report as President of the University for the academic year ending September 30, 1922. Attached hereto are the reports from the various departments of the University which contain statements of the work done during the year as well as of some of our most pressing needs.

INCREASE IN ENDOWMENT

The most notable feature of the year which has just closed is the great increase in our endowment. From this point of view the academic year 1921-2 was the banner year in our history. During the past year we have received $7,759,658. This large sum has for the most part been contributed for medical work, including within that term the work of the School of Hygiene and Public Health. The general funds of the institution, upon the income from which the work of the University not medical in character must in large part depend, have unfortunately been only very slightly increased. In my last report attention was directed to the necessity of increasing those funds. That necessity is now no less pressing than it then was. Indeed one might justly say that our needs in the immediate future will be greater than they have been during the past two or three years. The building of the Alumni Memorial Dormitory begun during the past summer, the necessity of beginning at once the construction of a Chemical Laboratory at Homewood, for which up to the present we have not secured a donor, will make it necessary to take steps at once to make

the endeavor which so many other institutions have made or are now making to increase the general University endowment.

GRADUATE WORK

Apart from the increase in our endowment, which has been mentioned, the past year has not been an eventful one. I am glad to be able to report that the productive work of our teaching staff continues to be one of the characteristics of the institution. A perusal of the departmental reports cannot fail to produce the impression that the University still has as one of its principal ideals the encouragement of research, both by according to the members of its faculties sufficient time to carry on investigation and by training those among its advanced students who show capacity in methods of research.

In the Philosophical Faculty particular mention should be made of the work of those connected with the George Huntington Williams Expedition to South America. The results of this work are now appearing in "Studies in Geology," a newly established serial publication issued under the auspices of the Department of Geology and published by the Johns Hopkins Press. Reference to the report of the Physics Department will show that interesting investigations have been carried on by Professors Wood and Pfund which have already been rewarded by important results. Professor Jennings of the Department of Zoology has completed a mathematical investigation of "Crossing-over in Inheritance." Professor Willoughby of the Department of Political Science served as Technical Expert to the Chinese Delegation in the Washington Conference on the Limitation of Armament and Far-Eastern Questions.

The bibliographies appended to the departmental reports show that the teaching staff in the Philosophical Faculty, as well as in the other Faculties, do not consider that their entire activity is to be confined to the instruction of students.

ENROLLMENT

The total enrollment in the University this year was nearly 10% greater than the year preceding, the total being 3,872 as compared with 3,530 for 1920-21. The major part of this increase is to be found in the Summer Courses of 1921 and in the part-time students attending the College Courses for Teachers and the Business Courses in Economics. There was also a gratifying increase in the number of graduate students, which is beginning to reach the normal pre-war condition. The increase in the number of undergraduate students is slowing down, although the number here during the past year was actually greater than ever before in the history of the University. Dean Latané indicates that the necessary limitation of the

number of this class of students may to some extent be made "by enforcing more rigidly the entrance requirements and refusing to admit students who do not measure up to them in every particular."

VOCATIONAL ATTITUDE OF UNDERGRADUATE STUDENTS

The report of Dr. French, the Director of the Bureau of Appointments, brings out the interesting fact that 187 of the 218 freshmen who entered the past year had definitely in mind the work upon which they expected to enter after graduation. The professions particularly favored were Medicine with 57 aspirants and Engineering with 53. Twenty expected to become chemists, 18 lawyers, while 20 intended to enter upon business pursuits.

The establishment during the past year in connection with the Undergraduate Department of a School of Business Economics will unquestionably have the effect of giving greater emphasis to the vocational character of our undergraduate body.

MILITARY TRAINING

I regret that I am obliged to report that the Johns Hopkins University is no longer in the distinguished class of collegiate institutions giving military training. The Professor of Military Science and Tactics in his report assumes full responsibility for our failure to attain this honor. He says: "I have inaugurated a system of theoretical instruction which I believe to be sound. In a word my policy is to give a maximum of theoretical instruction with a minimum of drill. This last year the War Department had a system of rating which gave but 25% to theoretical instruction, 25% to practical instruction, and 50% to other matters." One of these other matters is to be found in the plant possessed by the institution available for military instruction such as an armory and a rifle range. Since our move to Homewood we have, as I have before pointed out, no Gymnasium. Such a building would as well serve as an Armory. The lack of a Gymnasium handicaps both the Military Department and the Department of Physical Education, inasmuch as during inclement weather military drill as well as physical training has to be suspended. In both departments the attempt is made to keep the students occupied in bad weather with theoretical work. Such an arrangement has however great disadvantages and cannot be expected to produce the best results.

ALUMNI MEMORIAL DORMITORY

The breaking of ground for the first unit of the proposed dormitories was made one of the prominent features of Commencement Week. The alumni and their friends assembled at Homewood the day before Com-

mencement and the formal ceremony was held in front of Gilman Hall, following the Senior classday exercises. Nearly all the classes were represented. Building construction was started in August and has proceeded rapidly, and it is expected that the building will be ready for occupancy in the Summer of 1923. This dormitory unit is erected by the alumni in commemoration of those graduates and former students who lost their lives in the great world war.

THE LIBRARY

The librarian calls attention in his report to the receipt by the University of the Edward Revere Osler library, a gift by the late Sir William Osler and by Lady Osler, intended to serve as a foundation, together with a sum of $30,000 previously received, for the Tudor and Stuart club. The purposes of this club, which is to consist of designated members of the Faculty, of graduate and undergraduate students, and of a few extra-university members, are "the encouragement of the study of English Literature in the Tudor and Stuart periods"; "the purchase of books relating to the periods" and "the promotion of good fellowship and a love of literature among the members."

THE MEDICAL SCHOOL

The most important events in the last year at the Medical School have to do with changes in personnel. Dr. George Canby Robinson, Dean and Professor of Medicine at Vanderbilt University, Nashville, Tenn., was appointed Acting Professor of Medicine on the resignation of Dr. Wm. S. Thayer, and played an important and acceptable part in reorganizing the department of medicine. The university is greatly indebted to him for the work which he did and to Vanderbilt University for giving him the leave of absence which made it possible for him to help us. In April, 1922, Dr. Warfield T. Longcope accepted the chair of Medicine and took up the work of the department on July 1st.

The following members of our staff have been chosen to fill full-time professorships and to organize their respective departments in the Medical School recently established at the University of Rochester: Dr. George W. Corner, Anatomy; Dr. Stanhope Bayne-Jones, Bacteriology; Dr. Karl M. Wilson, Obstetrics and Gynecology; Dr. William S. McCann, Medicine. When we remember that Dr. George H. Whipple, a graduate of our Medical School, and for a number of years an Associate Professor of Pathology here, is Dean of the Rochester school and its professor of Pathology, we can not but congratulate ourselves at this notable evidence that the influence of our school is still spreading throughout the country. Our satisfaction that this is the case must naturally be tempered greatly by the realization of the loss we shall inevitably suffer through the resig-

nations of those who have been honored by being chosen for these important posts. We must, however, remember that one of the principal functions of our Medical School, as indeed of other parts of the University, has from the beginning of our history been the training of men to fill these important positions in higher education. This was one of the purposes expressed by Dr. Gilman in the inaugural address which he delivered at the opening of the University more than forty years ago. That we are still carrying out in such a striking manner the purpose then announced, is evidence that we are still adhering to our traditional policy.

Among the changes in personnel that have occurred during the past year is to be mentioned the vacancy in the professorship of Surgery caused by the death of Dr. William Stewart Halsted, which occurred on September 9th. The school has suffered an irreparable loss in his death. Pending the choice of a successor Dr. J. M. T. Finney has been appointed Acting Professor of Surgery.

I am glad to be able to report that early in the year work was begun on the new Pathological Laboratory and on the new Woman's Clinic. These buildings will be completed, it is expected, by June 1923, and will make the work of the School much more effective than it could be under the conditions which formerly existed. The construction of these buildings is also significant as the beginning of the realization of the expansion program of the Johns Hopkins Hospital, to which attention has been called in former reports and which is so necessary if we are to look forward to the maintenance by the Medical School of the enviable position that it has attained and now holds.

That the purposes of our school are still, as they have always been, not confined to the education of physicians, or even to that and the training of teachers of medical subjects, but as well embrace the advance of medical knowledge, must be impressed upon any one who examines the list of "Publications of Instructors and Graduates of the Johns Hopkins Medical School for the Year 1921-22" which is appended to the yearly catalogue and announcement of the Medical School. The fact that graduates of the school carry on in their lines, subsequent to graduation, investigation and research to such a degree as this list would indicate, would seem to show that the seeds sown in the early years of their medical education did not fall on stony ground.

THE SCHOOL OF ENGINEERING

The law of the State of Maryland (Laws of 1912, Chapter 10) which made the establishment of the School of Engineering possible, contained in one of its preambles the statement that it was "deemed desirable to extend to the people of this State the opportunities and facilities for

education in applied sciences and advanced technology." In another part of the Act it is said: "It is the intention with reference to the scholarships [provision for which was made in the Act] awarded to the counties and the City of Baltimore, that the entrance requirements to the technical courses or courses preparatory thereto at the Johns Hopkins University shall begin where the graduating requirements of the approved high schools of this State leave off or of the Baltimore Polytechnic Institute."

This legislative Act would seem to have had two purposes: One, the provision for education in applied science or advanced technology; the other, the provision for courses preparatory thereto which should be accessible to graduates of approved State schools.

The growth of the undergraduate body of Engineering students, *i. e.*, those students taking the work preparatory to the courses mentioned as advanced technology courses, has been very rapid in the ten years' life of the school, but little progress has been made in the instruction of advanced students. Of the three hundred students in the school during the past year only three were advanced or graduate students. The report of the Dean of the School calls attention to the need of further support "for stimulating graduate work and experimental research. Members of the staff now engaged in experimental or other forms of engineering investigation are greatly hampered by the routine demands of undergraduate instruction. We need at least one additional member of the staff in each of the branches of engineering who can devote part of his time to graduate instruction and research." Until such time as this request may be granted it is submitted that we are realizing only one of the purposes of the Act providing for the School. Our failure in this respect is of course due to the inadequacy of our means. The addition of $25,000 to the annual budget of the School would make it possible both to grant the request of the Dean of the School of Engineering, and as well to make provision for the annual additions to the equipment of the School which are necessary if that equipment is to be expected to continue to portray adequately the existing conditions of the mechanic arts which are the subjects of the School's instruction.

The School of Engineering, in addition to giving to the best of its ability the instruction mentioned by the Act of the State Legislature which has made the School possible, has, as has been its custom, coöperated with our local industries in the solution of engineering problems. Special mention should be made of the work done in the Power House at the request of the Pennsylvania Water & Power Co. in ascertaining the heating value of coal washed down the Susquehanna River from the culm banks and mine wastes of the Pennsylvania anthracite region and deposited above the dam of the company. As there are estimated to be available about 1,000,000 tons of this coal and as the tests made show that mixtures of

50% of this coal with 50% of bituminous coal can be burned with relatively high economy, the contribution made by the School is one of no small value in days of coal shortage such as those in which we are now living.

It is a pleasure to mention the award to Dean Whitehead, Professor of Electrical Engineering, of the triennial prize of 5000 francs of the Foundation George Montefiore, Liége, Belgium, for his research on "The Corona Voltmeter and the Electric Strength of Air," published by him in collaboration with T. Isshiki, graduate student. This prize is awarded by a jury of ten electrical engineers for the best original work in the technical applications of electricity.

That we are not giving the attention which should be given to graduate work in Engineering, it is evident is not due to the lack of instructors competent to carry on that work.

SCHOOL OF HYGIENE AND PUBLIC HEALTH

The most important event in the life of the School of Hygiene and Public Health during the past year has been its permanent endowment by the Rockefeller Foundation. Founded four years ago upon an annual budget which was finally fixed at $250,000 in addition to such tuition fees as might be obtained, the school has, through the munificent action of the Foundation in appropriating to it $6,000,000, all of which was paid in cash during the past year, been assured the opportunity of continuing its work permanently. Such a gift is gratifying, not only because the permanent continuance of the School is thereby made certain, but as well because it is a very tangible expression on the one hand of the Foundation's confidence in the ideals and purposes of the school, and on the other of its belief that these ideals and purposes are being realized.

It must be remembered, however, that magnificent as the gift is, it does not enlarge the present opportunities of the School except in one respect, viz., the provision of quarters much more commodious than the somewhat makeshift accommodations which the School at present commands. This improvement in its physical surroundings is of course something which is greatly to be desired and would have been long delayed had it not been for the Foundation's action. But that a school which has been so successful in the early years of its life will not find new opportunities for service can not be doubted, and it must be borne in mind that the Trustees in availing themselves of the generosity of the Foundation have assumed responsibility for future development.

A perusal of Dr. Howell's annual report on the work of the School cannot fail to convince the reader that the opportunities for useful work in collaboration with the public health authorities are very great. Partic-

ular attention may be directed to the work being done by the departments of Epidemiology and Immunology in conjunction with the City Department of Health in the study of diphtheria, that done by the department of Biometry and Vital Statistics under a grant from the Commonwealth Fund in the study of tuberculosis, that done by the department of Medical Zoology in carrying out investigations both in the tropics and in the State of Maryland in Protozoology and Entomology, that done by the department of Physiological Hygiene in the problems of school ventilation, and that done by the department of Chemical Hygiene in the study made in coöperation with the Medical School and Hospital of the dietary factors concerned in rickets and bone formation in general. Mention should also be made of the "Washington County Demonstration Unit" established by the School in coöperation with other public health organizations, which has just completed its first year of work.

All of these undertakings are significant not only of the opportunities open for work in coöperation with other health agencies which will be of definite value to the public, but as well of the directions in which the School will have to move if it is to make provision for the necessary field work for its students. For a school of public health, not being able to rely as may a medical school upon a hospital to provide practical work for its students, must for this important branch of its instruction either look to existing health agencies or must itself organize new agencies. That the establishment of further agencies of this character will be one of the activities which the school will have to assume is very probable. A greater endowment than that now available will be necessary in order that this development may take place.

The imposing list of publications appended to Dr. Howell's report is indicative that the faculty of this, the newest school of the University, has the same ideals for the realization of which the University was founded forty-six years ago.

THE SUMMER COURSES

The coöperation of the University in connection with the Summer Courses with other agencies has continued. The enrollment was, however, somewhat smaller than during the preceding year. This decrease was to be expected in view of the unprecedented increase of that year. The most interesting and probably the most important work in the Summer Courses during the past summer was done in connection with a demonstration school conducted with the active coöperation of the Baltimore City School Board as one of the city vacation schools. Such a school was started in the summer of 1921. Ninety per cent. of the children that summer did their work satisfactorily and were recommended for the next higher half-grade. Those who were thus promoted were under observation during the subse-

quent half-year, and it was found that ninety-one per cent. of those remaining in school in February had done satisfactorily the work of the grade to which they had been promoted. Probably the most significant feature of the undertaking is to be found in the fact that a plan which made it possible for a child to do in the eight weeks of the summer vacation school what requires five months of ordinary school work, was carried out under such conditions as make it possible of ready adoption in systems of public education. The success of the experiment in the summer of 1921 was so marked that it was followed by a very large number of applications for admission to the demonstration vacation school last summer. The net roll at the close of the school was 327. Of these 132 were in the junior high school, and 245 in the elementary grades; of the former 131, of the latter 187, were recommended for promotion, the recommendations being based on psychological tests, teacher judgments and pupil marks. The University department of education, which with the coöperation of the city department of education formulated the plan, has, it is believed, made a valuable contribution to one of the most important of the problems in our public schools, *i. e.,* the saving of as much time as possible for the more than ordinarily bright student.

THE COLLEGE COURSES FOR TEACHERS

The report of the Director of these courses shows a notable growth in the attendance as well as in the number of courses given. Owing to the fact that these courses are given at hours when the buildings of the University are not occupied by the regular University classes, expansion to a very large extent is possible without interfering with our primary work. As these courses from the beginning have been financed from the tuition fees paid by those attending them, this particular expansion of our work may be secured also without burdening our rather overburdened University budget. Any increase in the number of the courses and those attending them may be regarded with less apprehension than a similar increase in our regular full-time students.

Last year 66 courses were given which were attended by 1037 persons. During the previous year these numbers were 54 and 759, respectively. Of the 1,037 students attending these courses 114 were candidates for the degree of Bachelor of Science, while the same number, *i. e.,* 114, were students from the other departments of the University. In fact students from every one of the other departments were to be found on the roster of the College Courses for Teachers. Two hundred and eighty-nine of the students in the courses of the year before continued their work here this past year. Seventeen candidates received the degree of Bachelor of Science during the year.

FINANCIAL STATEMENT

The Financial Report, showing in detail the operations for the fiscal year ending June 30, 1922, and the condition of the University finances on that date, has been published, and copies may be obtained from the Treasurer by those interested. Reference to this report will reveal the following facts:

Total Income from Operations was			$1,388,436.68
An increase this year of			$20,791.21
This increase came from the following sources:			
Increase in Endowment:			
Funds Income		$131,977.30	
Increase in Tuition Fees		33,292.64	
		$165,269.94	
Less:—			
Decrease in miscellaneous income	$70,848.43		
Amount set aside to cover 1921 advances from De Lamar and Welch Funds	73,630.30		
		144,478.73	
			$20,791.21

Of the total income, the amount received from students was 22 per cent., the income from invested funds 40 per cent., from the State of Maryland 6 per cent., and from other items 32 per cent.

The total operating expenses for the year were			$1,388,436.68
A net increase for the year of		$20,791.21	
This increase is accounted for as follows:			
Increase in salaries	$79,292.58		
Less:—			
Decrease in wages, fuel, supplies, etc. $42,525.95			
Decrease in apparatus, books, and plant 15,975.42	58,501.37		
		$20,791.21	

The amount paid for salaries during the year constituted 66 per cent. of the total expenses, the amount paid for expenses 32 per cent., and the amount paid for apparatus, equipment, and other items 2 per cent.

The result of the increase noted in income is that again we closed the year without a deficit, although we have at the same time enlarged the sphere of our activities. This result is, of course, extremely gratifying. It does not, however, as was pointed out in my last report, in any way make less necessary the endeavor to secure a larger endowment.

We have for the past year or two been using for our current expense of operation the income from money obtained from the sale of some of the

buildings at the old site. All of this money will have to be devoted to paying for the construction of a new Chemical laboratory at Homewood. The incidental loss of income from this source, due to the construction of this laboratory, together with the fact that the grant of $30,000 a year from the General Education Board will lapse at the end of the coming year, makes it necessary for us to look forward to facing in the years to come an annual deficit which will hardly be less than $60,000, unless our income can in some way be increased. The only way that I can see to secure a permanently larger income is through an increase of our income-bearing endowment which shall be available either for general university purposes or for the needs of the Philosophical Faculty. This increase in our endowment is necessary merely in order to continue the work of this Faculty as it is at present, and takes no account of the great desirability of constructing the other laboratories, viz., for Biology, Geology, and Physics, which were included in the general plan adopted for Homewood and for which at present we have no funds.

ASSETS AND LIABILITIES (JUNE 30, 1922)

The University has Assets as follows:			
Stocks, Bonds, Productive Real Estate, etc., belonging to Endowment Funds			$16,873,602.17
Plant, Equipment, etc.—			
Howard Street Buildings		$ 342,182.08	
Medical School Buildings		314,164.68	
Homewood Land and Development		2,360,400.58	
Equipment, Books, etc		770,567.13	
			3,787,314.47
Accounts receivable			168,950.56
Cash on hand			1,621,799.10
Making Total Net Assets (Book Value)			$22,451,666.30
Corresponding to Liabilities, i. e., Funds and Balances, as follows:			
Permanent Endowments (Trust Funds)—			
Funds Consolidated for investment	$ 5,880,242.48		
Funds separately invested	12,624,829.52		
Profit Balance consolidated funds	87,444.10		
		$18,592,516.10	
Unexpended Income of Special Funds		66,807.57	
Sundry Open Accounts		106,792.68	
Unexpended Balance—Cash Contributions.		17,813.92	
			$18,783,930.27
Leaving			$3,667,736.03
Which is represented by—			
Plant, Equipment, etc		$3,787,314.47	
Against which has been charged—			
Homewood Development in excess of Funds available for that purpose		119,578.44	
			$3,667,736.03

GIFTS AND BEQUESTS

Alumni Memorial Dormitory Fund. A fund of $215,000.00 raised by the Alumni for the erection of a Dormitory at Homewood. Amount collected from students,	$ 977.77
For Research in Social Hygiene and preparation of Educational Material on Public Health and Venereal diseases, The American Social Hygiene Board has appropriated,	2,460.00
As an Endowment for the Department of Art as Applied to Medicine, an anonymous donor gave to the University securities of par value amounting to,	110,000.00
The same donor contributed for current expenses of the Department of Art as Applied to Medicine,	2,716.67
Bachelor of Science Alumni Endowment Fund, additional subscriptions,	145.00
Mr. William Bingham gave for a Fellowship in Cardiographic Medicine,	1,500.00
The executors of the estate of Mrs. Mary King Carey made a final distribution on account of the University's residuary legacy,	1,123.16
Class of 1917 Endowment Fund, additional payments,	40.00
Commonwealth Fund appropriation for Tuberculosis Investigation,	13,750.00
Amounts received from the Executors of Estate of Captain Joseph R. DeLamar,	794,987.49
Dohme Lectures gift,	1,000.00
Gift of Mr. David Dows and Mrs. Jane Dows for the Kenneth Dows Tuberculosis Research Fund,	17,500.00
For Fellowships in Chemistry, E. I. DuPont de Nemours Co. contributed,	1,500.00
General Education Board's appropriation for increased salaries,	30,000.00
General Education Board's appropriation for endowment, on full-time basis, of the Department of Obstetrics, as a part of the William H. Welch Endowment Fund,	400,000.00
On account of the General Education Board's appropriation of $400,000.00 for the erection of a new Pathological Laboratory, there has been received,	100,000.00
Forward,	$1,477,700.09

Forwarded,	$1,477,700.09
Additional amounts received from the executors of the estate of Mrs. Helen M. H. Grafflin,	3,466.00
The United States Government appropriated from its Interdepartmental Social Hygiene Board Fund for Research in Social Hygiene and for preparation of Educational Material on Public Health and Venereal diseases,	1,845.00
Medical Students' Loan Fund, additional subscriptions,	160.00
Gift from National Research Council for Experimental Psychology,	800.00
Contributions for the support of the Department of Psychiatry,	5,500.00
Payment by the Rockefeller Foundation for the support during the year of the School of Hygiene and Public Health,	265,659.80
School of Hygiene and Public Health Endowment Fund and School of Hygiene Building Fund received from the Rockefeller Foundation,	6,000,000.00
Rockefeller Foundation appropriation for investigation in the Fluke Disease in China,	1,500.00
Max Rosenberg gift for lectures in Aesthetics,	3,500.00
Total Gifts and Bequests for the year ending June 30, 1922,	$7,760,130.89

PERSONAL MENTION

The University has suffered a severe loss through the death of Dr. William S. Halsted, which occurred on the seventh of September. Dr. Halsted came to Baltimore in 1889 as acting Surgeon to the Johns Hopkins Hospital and Chief of the Dispensary, and was made Associate Professor of Surgery in the medical faculty. In 1892 he became Professor of Surgery and Surgeon in chief to the Hospital, and early won distinction, as shown in the many honors granted by universities and learned societies throughout the world. His death removes a leading figure in the surgical profession.

The University was honored on the afternoon of November 22 with a visit from Marshal Foch, of France. The Board of Trustees, members of the Faculty and the student body, with their families and other friends, assembled on the portico and lawn in front of Gilman Hall. The Reserve Officers' Training Corps also was present, with a band. The President,

on behalf of the University, welcomed Marshal Foch, who responded through his Aide. The honorary degree of Doctor of Laws was then conferred upon him.

The following appointments and promotions have been made for 1922-23 *:

In the Philosophical Faculty

Joseph T. Singewald, Jr., Ph. D., from Associate Professor to Professor of Economic Geology.

William O. Weyforth, Ph. D., from Associate to Associate Professor of Political Economy.

Broadus Mitchell, Ph. D., from Instructor to Associate in Political Economy.

Jose Robles y Pazos, from Instructor to Associate in Spanish.

Leslie C. Beard, Jr., Ph. D., Instructor in Chemistry.

Alexander Ellett, A. B., Instructor in Physics.

Robert C. Gillies, A. B., Instructor in Political Economy.

Foster E. Klingaman, M. S., Instructor in Physics.

Charles C. Thach, Jr., Ph. D., Instructor in History and Political Science.

Erwin W. Tschudi, A. M., Instructor in Physics.

Carol V. B. Wight, Ph. D., Instructor in Latin.

In the Engineering Faculty

Frederick W. Lee, Ph. D., from Associate to Associate Professor of Electrical Engineering.

J. Trueman Thompson, B. S. in Eng., from Associate to Associate Professor of Civil Engineering.

In the Faculty of Hygiene and Public Health

William W. Ford, M. D., from Associate Professor to Professor of Bacteriology.

Carroll G. Bull, M. D., from Associate Professor to Professor of Immunology.

Robert W. Hegner, Ph. D., from Associate Professor to Professor of Protozoology.

Linda B. Lange, M. D., from Instructor to Associate in Bacteriology.

Ethel May Kinney, M. D., from Assistant to Instructor in Chemical Hygiene.

J. Graham Marston, M. D., Assistant in Immunology.

COMMEMORATION DAY

The annual exercises commemorating the opening of the University were held Wednesday morning, February 22, in the Lyric Theatre, this being the forty-sixth anniversary. The Archbishop of Baltimore made the invocation. The orator of the day was the Honorable Calvin Coolidge, Vice-President of the United States. The achievements and progress of the University during the preceding twelve months were reviewed by the

* The appointments in the medical faculty are mentioned in the statement of the Dean printed in the appendix to this report.

President of the University. His statement and the address of Vice-President Coolidge are printed in the *Alumni Magazine,* June 1922. The honorary degree of Doctor of Laws was conferred upon Mr. Coolidge. Degrees in course were granted as follows: Bachelor of Arts, 2; Bachelor of Science, 1; Master of Civil Engineering, 1; Doctor of Philosophy, 4; Doctor of Medicine, 1; Doctor of Public Health, 2; Doctor of Science in Hygiene, 1. The following degrees, authorized by the Trustees and conferred since Commencement in June 1922, were publicly announced: Bachelor of Science, 2; Bachelor of Engineering, 1; Doctor of Philosophy, 2; Doctor of Medicine, 1. All recipients of degrees during the year 1921-22 are named in the appendix to this report. The music was again rendered by the Johns Hopkins Orchestra and by a male quartet. The annual meeting and dinner of the Alumni Association were held in the evening and were attended by an unusually large number of members. The speakers were the Archbishop of Baltimore, Mr. Daniel Willard, Mr. J. L. G. Lee, Speaker of the Maryland House of Delegates, and the President of the University.

COMMENCEMENT

The ceremony of conferring degrees was held in the afternoon of Tuesday, June 13, in the Lyric Theatre. Rev. Dr. O. C. S. Wallace, Pastor of Eutaw Place Baptist Church, offered the opening prayer. The President of the University made his annual address to the graduates, reviewing the work of the previous year and telling of the University's needs. The honorary degree of Doctor of Laws was conferred upon Miss M. Carey Thomas, recently President of Bryn Mawr College, Professor Bright making the presentation. A portrait, in oil, of Professor L. S. Hulburt was presented to the University by Professor Lovejoy on behalf of the donors, consisting of colleagues and former pupils. Degrees in course were conferred as follows: Bachelor of Arts, 77; Bachelor of Engineering, 44; Bachelor of Science in Chemistry, 14; Bachelor of Science, 14; Bachelor of Science in Hygiene, 4; Master of Arts, 21; Doctor of Philosophy, 30; Doctor of Engineering, 1; Doctor of Medicine, 79; Doctor of Public Health, 6; Doctor of Science in Hygiene, 4. Certificates in Public Health were granted to 6 persons. The names of the recipients of degrees are appended to this report. The Johns Hopkins Orchestra furnished the music for this occasion. A full account of the exercises, together with the address of the President and the statements of Professors Bright and Lovejoy, is published in the *Alumni Magazine,* November, 1922.

PUBLIC LECTURES AND ASSEMBLIES

The thirteenth course of lectures on the Herter foundation was given October 5, 6, 7, in the Medical Amphitheatre. The lecturer was Sir

Arthur Keith, Hunterian Professor in the Royal College of Surgeons, England. His subject was "The Differentiation of Modern Races of Mankind in the Light of the Hormone Theory."

Lectures on the James Schouler Foundation were given by Mr. Francis W. Hirst, of London, on "The Currencies, Deficits, and Armaments of Europe," January 12; Mr. Henry W. Nevinson, Staff Correspondent of the Manchester *Guardian*, on "The Deliverance of Ireland," January 27; Professor S. L. Joshi, of the College of Baroda, India, on "New Forces in Old India," March 2; Baron S. A. Korff, formerly Professor in the University of Helsingfors, on "Aspects of the Russian Revolution," March 10; Professor Victor A. Belaunde, of the University of San Marcos, Peru, on "The Culture and Ideals of Latin America," March 16; Professor W. W. Willoughby, on "China at the Conference," March 23.

Lectures on the George Huntington Williams Memorial Foundation were given as follows:

A series on "Problems of International Adjustment" by foreign publicists visiting the United States on the occasion of the conference on limitation of armaments, the lecturers being M. Philippe Millet, editor of *Le Petit Parisien*, on "France," November 28; Baron Naibu Kanda, on "Japan," December 12; Admiral Tsai Ting-Kan, on "China," December 15; Professor Alfred E. Zimmern, formerly of the University College of Wales, on "Great Britain," December 19, and on "Nationality and Politics," January 9.

Professor Jacques Cavalier, Rector of the University of Toulouse, France, gave three lectures, December 7 and 14, January 4, on "Les Universités et la renaissance de la vie provinciale en France."

A series of three lectures on "Evolution in the Light of Present Knowledge" was given as follows: Professor Edward W. Berry, of this University, on "The Geologic Record of Evolution," April 13; Professor Herbert S. Jennings, of this University, whose topic was "Can We see Evolution in Process," April 20; Professor John P. Lotsy, Research Fellow of the Dutch Society of Science, Holland, on "Evolution by Hybridization," April 27.

The public afternoon lectures on the De Lamar Foundation in the School of Hygiene were continued through the year. The lecturers and their subjects are named in the statement of the School of Hygiene appended to this report. Fifteen lectures were given.

Single lectures were given as follows:

Professor Christian Gauss, of Princeton University, on "Dante," November 2; Professor Ernest Cohen, of the University of Utrecht, Holland, on "Scientific Work in Holland," December 2; Professor Joseph Strzygowski, of the University of Vienna, on "The Origin of

Early Christian Church Art," February 15 *; Francis W. Aston, F. R. S., Fellow of Trinity College, Cambridge, "Present Knowledge of the Structure of Atoms," March 27; Professor William G. MacCallum, of this University, on "The Ductless Glands and their Relation to Human Well-Being," April 6.

Under the auspices of the Archæological Institute of America several lecturers spoke in our halls, including Professor E. Baldwin Smith, of Princeton University, on "The Idealistic Art of the Thirteenth Century in France," November 18; Professor Charles Peabody, of Harvard University, on "Art Primitive and Prehistoric," March 23; Professor Henry R. Fairclough, of Leland Stanford University, on "Some Antiquities of the Dalmatian Coast," April 24; Professor Walton B. McDaniel, of the University of Pennsylvania, on "Vagabonding in Classic Lands," May 6.

THE NIGHT COURSES

The Night Courses in Business Economics and for Technical Workers, the details of which are given in the reports of the Department of Political Economy and the Engineering School respectively, were carried on as heretofore. The total registration was 874 as compared with 1,162 the previous year.

Yours respectfully,

FRANK J. GOODNOW,
President.

* Professor Strzygowski's lecture was under the joint auspices of the University and the Archaeological Institute of America.

REPORTS ON THE INSTRUCTION IN THE CHIEF BRANCHES OF STUDY, 1921-22

Prepared by the Principal Instructors in the Several Departments

ARCHAEOLOGY AND ART

The work in Archæology and Art has been carried on by means of the Archæological Seminary, various courses of lectures and practical exercises, demonstrations in the museum of the University, in the Peabody Gallery, in the Walters Art Gallery, and especially by means of conferences with individual students. The members of the Seminary meeting weekly devoted their attention to selected problems and topics in Hellenistic and Roman Art and Culture. There were again this year eleven advanced students in the seminary, each one of whom presented a long original paper and shorter reports. Seven of these followed archæology as their principal subject and four as a subordinate subject. Of these, as last year, one absolved the requirements for the degree of Ph. D., and two the requirements for the degree of Master of Arts, their names and the titles of the dissertation and essays being as follows:

Mrs. Grace Hadley Beardsley—The Ethiopian and Negro in Greek and Roman Civilization (Ph. D. dissertation);
Mrs. Hilda North Dulac—Old Age and Maturity in Greek and Roman art;
Charles H. Skalet—Chapters in the History of Sicyon.

There were 83 other students (94 in all) taking archæology and art as undergraduate or graduate or special students, or in the College Courses for Teachers.

In addition to his direction of the Seminary, Professor Robinson lectured once a week during the year on the History of Greek and Roman Sculpture (19 students). Associate Professor Magoffin lectured once a week on the Topography and Monuments of the Ancient Roman World (3 students). Professor Robinson also lectured once a week on the Private Life of the Greeks as illustrated by Greek literature and the Monuments (31 students), and once a week on the History of Greek Literature with readings of selections (23 students). In the Greek department once a week throughout the year he interpreted the whole of the Argonautica of Apollonius Rhodius and gave a few lectures on his style and times (3 students). In the College Courses for Teachers he lectured two hours a week throughout the year on the History of Art (31 students). Associate Professor Magoffin conducted an undergraduate course on the Private Life of the Romans once a week through the year (25 students).

On July 27, Professor Robinson lectured at the Boston Museum before the Archæological Club on "the Sturge Collection of Vases in Toronto," on a catalogue of which he had been working for the previous six weeks in Toronto. On September 1 at the College Women's Club of the North Shore at Gloucester, Mass., he lectured on "Greek Lyric Poetry"; on October 14 at the Roland Park Country School he gave an illustrated lecture on "War Memorials, Past and Present"; on October 29 he gave the presidential address before the Johns Hopkins Philological Association on "Sappho and Her Influence on Later Literature"; on November 30 he lectured at Agnes Scott College at Decatur, Georgia, on "the Comic and Grotesque in Ancient Literature and Art," and on "Sappho"; December 1 he gave an illustrated lecture on the Hoover foundation at Roanoke College, Salem, Va. on "Classical

Cities in Asia Minor"; on December 3 he talked at Randolph-Macon Woman's College on "Experiences in Greece" and gave an illustrated lecture on "The Seven Biblical Churches of Asia"; at the annual meeting of the Archæological Institute held at the University of Michigan December 28-30 he read a paper on "A New Epitaph from Sinope and a New Epitaph in Dialogue Form from Sardis"; and before the American Philological Association, December 30 in Detroit, he read a paper on "Sappho's Influence on Later Literature"; on January 19 he read a paper at the meeting of the Johns Hopkins Philological Association on "Unpublished Greek Epigrams" and gave several original verse translations of new Greek epigrams; on February 25 he gave an illustrated lecture at the Museum of the University of Pennsylvania on "Caricature in Ancient Art"; on April 6 he lectured on "Roman Life as Illustrated by the Antiquities of the Johns Hopkins University" to the Latin Club of the Western High School; on May 8 he talked to the School Arts League of Baltimore on "Art in the Colleges"; on May 11 he gave an illustrated lecture on "Classical Sites of Asia Minor" at Wesleyan University, Middletown, Conn.; he made the presidential address at the meeting of the College Art Association of America at the University of Pennsylvania April 13-15; on May 13 he attended the Managing Committee of the School at Athens in New York and made several reports; on May 15 he gave an illustrated lecture at St. Michael and All Angels Church, Baltimore, on "The Seven Biblical Churches of Asia."

Lectures were given under the auspices of the Baltimore Archæological Society by Professor E. Baldwin Smith of Princeton on "The Idealistic Art of the Thirteenth Century in France"; by Professor Joseph Strzygowski of the University of Vienna on "The Origin of Church Art"; by Professor Charles Peabody of Harvard on "Art Primitive and Prehistoric"; by Professor Henry Rushton Fairclough of Leland Stanford Junior University on "Some Antiquities of the Dalmatian Coast"; by Professor Walton B. McDaniel of the University of Pennsylvania on "Vagabonding in Classic Lands." Students of the archæological department attended these lectures as part of their work.

Mr. Franklin P. Johnson, Ph. D. 1920 has been reappointed Fellow of the American School of Classical Studies in Athens for 1922 23. Mr. Charles H. Skalet has been appointed Charles A. W. Vogeler Fellow in Archæology for 1922-23. Dr. J. B. Edwards, Ph. D. 1914, has been appointed professor of classics at Wells College. Miss Ella Bourne, Ph. D. 1916, has been appointed professor of Latin at Mills College, Oakland, California. Miss Adele M. Wildes, graduate student in Archæology 1919-20, Fellow in Athens last year, has been appointed instructor in classics in the Woman's College at Brown University. Mr. W. S. Rusk, graduate student in Archæology 1918-20, has been appointed assistant professor of the history of art at Wells College.

Professor Robinson has been elected President of the Baltimore Archæological Society; Honorary President of the School Arts League; President of the College Art Association of America; General Secretary of the Archæological Institute of America.

Needs.—The needs of the Department of Archæology and Art, which was established only seventeen years ago, and which has received inadequate appropriations, are great. Many of the important archæological publications are lacking in the library and funds are especially needed to purchase photographs, to mount and care for those we have, and to buy some of the more expensive illustrated archæological books, to provide a fine collection of lantern slides, and to purchase antiquities and casts to add to our excellent archæological museum. Funds are also needed to publish a catalogue of the museum and especially of the beautiful collection of coins, which was recently presented by a former trustee, Mr. William H. Buckler. Ultimately a chair of mediæval and modern art should also be established. Money is needed for

all these things and there are always many opportunities for archæological research such as the excavation of Sardis, which has already yielded things of the highest artistic and linguistic importance, the inscriptions being published by Mr. Buckler and Professor Robinson. There is also great need of a special museum building and we have material enough to start such a museum if it could be built.

PUBLICATIONS

A seminary paper of Mr. A. D. Fraser, A.M. 1920, on "The Age of the Extant Columns of the Olympieum at Athens" has been published in the *Art Bulletin* iv, pp. 5-18, and part of his Master's Essay on "Xenophon and the Boeotian Helmet" in the *Art Bulletin* iv, 1922, pp. 99-108. For Dr. Magoffin's publications see the Department of History.

David M. Robinson.

Notes on Two Inscriptions from Sinope. *American Journal of Philology*, xliii, 1922, pp. 71-73.

An Amphora of Nicosthenes in Baltimore. *American Journal of Archæology*, xxvi, 1922, pp. 54-58.

A New Epitaph from Sinope and a New Epitaph in Dialogue Form from Sardis. *American Journal of Archæology*, xxvi, 1922, pp. 80-81.

Sappho. *The Baltimore Sun*, January 22, 1922.

Discovery of a New Prehistoric Site in Greece at Zygouries. *Art and Archæology*, xii, 1921, pp. 38-39.

General Meeting of the Archæological Institute of America. *Art and Archæology*, xiii, 1922, pp. 41-42.

The College Art Association of America. *Art and Archæology*, xiii, 1922, p. 240.

Review of Robert's Die griechische Heldensage. *American Journal of Philology*, xliii, 1922, pp. 90-92.

Review of Buschor's Greek Vase Painting. *Art and Archæology*, xiii, 1922, pp. 193-194.

Review of Poulsen's Delphi. *The Classical Weekly*, xv, 1921, pp. 45-48; *Art and Archæology*, xii, pp. 45-46.

Review of Nutting's Furniture of the Pilgrim Century 1620-1720. *Art and Archæology*, xii, 1921, pp. 282-283.

Review of Mooney's Travel among the Ancient Romans. *Art and Archæology*, xiii, 1922, pp. 45-46.

Review of Phoutrides, Kostes Palamas, Life Immovable. *The Classical Weekly*, xv, 1922, pp. 92-94.

Review of Dickins, Hellenistic Sculpture. *The Classical Weekly*, xv, 1922, pp. 118-120.

Review of Allen, The Greek Theater of the Fifth Century Before Christ. *The Classical Weekly*, xv, 1921, pp. 29-30.

Review of Blegen, Korakou, A Prehistoric Settlement near Corinth. *American Historical Review*, xxvii, 1922, pp. 810-811; *Art and Archaeology*, xiii, 1922, pp. 285-6.

Editor: Bulletin of the Archæological Institute of America, vol. xii, 1921-22, pp. 1-137.

Editorial Work as editor-in-chief of *The Art Bulletin*, as associate editor for *Art and Archæology*, *The Classical Weekly*, *The American Journal of Philology*, and as editor for the series "Our Debt to Greece and Rome."

DAVID M. ROBINSON,
W. H. Collins Vickers Professor of Archæology and Lecturer on Greek Literature.

CHEMISTRY

The following courses were given during the year 1921-22:

UNDERGRADUATE COURSES

1 B. General Inorganic Chemistry. Professor Gilpin. Three lectures and six hours laboratory work each week. This course is followed by Engineering students and by Academic students who do not intend to take more than one course in Chemistry. The lectures for three-quarters of the year deal with the preparation and properties of the inorganic elements and the practical applications of chemical substances and for one-quarter of the year with the more important classes of organic compounds. In the laboratory the first term is devoted to general experiments with inorganic substances and during the second term to the preparation of inorganic and organic substances.

2. Inorganic Chemistry. (a) A course of lectures on the quantitative principles of chemistry and their application to the reactions of inorganic chemistry. The lectures were given three hours weekly throughout the year by Associate Professor Cartledge. (b) A laboratory course to accompany the preceding lecture course. The first half-year was devoted to quantitative experiments and the second half-year to qualitative analysis. The laboratory course was conducted by Associate Professor Cartledge, Dr. Whitner and assistants.

3. Organic Chemistry. Professor Gilpin. Three lectures and six hours of laboratory work each week. About two-thirds of the year was devoted to a study of general organic chemistry and a study of the method of preparation and properties of organic compounds. The latter part of the year was given up to a short course of lectures on Elementary Physical Chemistry and laboratory work in Quantitative Analysis. The lectures in Physical Chemistry were given by Associate Professor Cartledge.

GRADUATE COURSES

1. General Chemistry, a course of lectures through the year. This course is an introduction to theoretical chemistry for students not sufficiently prepared to take Physical Chemistry. It is required of fourth-year undergraduate students who are candidates for the B. S. in Chemistry degree and is open to first-year graduate students. This course is given by Professor Frazer.

2. Physical Chemistry, a course of lectures extending through the year, by Associate Professor Patrick.

3. Advanced Inorganic Chemistry, a course of lectures through the year, by Associate Professor Lovelace.

4. Advanced Organic Chemistry, a course of lectures extending through the year, by Professor Reid. This course is required of fourth-year B. S. in Chemistry candidates.

5. Principles of Quantitative Analysis, a course of lectures through the year by Dr. Thornton. This course is required of fourth-year B. S. in Chemistry men.

6. Mathematics for Chemical Students, a course of two lectures per week during the second half of the year was given by Dr. Musselman.

7. Journal Meetings. Reports on current articles in chemistry were given weekly from October to May by members of the faculty and the more advanced students.

8. Students' Lectures. A course of thirteen lectures on assigned topics was given by the research students in May.

9. A laboratory course extending through the year, in the reactions and preparations of organic compounds, by Professor Reid.

10. Quantitative Chemistry, a laboratory course extending through the year, by Dr. Thornton.

11. Physical Chemical Methods, a laboratory course conducted by Associate Professor Patrick.

12. Inorganic Reactions and Electro-chemical Methods, a laboratory course extending through the year, by Associate Professor Lovelace.

LECTURES

Dr. Ernst Cohen, Professor of Chemistry in the University of Utrecht, gave a course of five lectures before the students of the graduate department November 30, December 1 and 2. He gave two lectures on The Metastability of Matter, one on The Diffusion Problem and two on Piezochemical Problems. He also gave a public lecture at Homewood on Scientific Training and Work in Holland.

Professor Jacques Cavalier, Recteur de l'Université de Toulouse, gave two lectures on "Explosives" before the Chemical students.

Professor Charles Moureu, of the College of France, gave a lecture in December on Acteylene Compounds.

Dr. Edgar F. Smith, Professor of Chemistry at the University of Pennsylvania and President of the American Chemical Society, gave a lecture on Historical Chemistry.

RESEARCH

During the year a large number of problems were under investigation by members of the staff and advanced students associated with them.

Professor Frazer had associated with him in research Messrs. W. A. Whitesell, A. Grollman, and R. Gilchrist. The problems investigated were:

1. Attempts to activate catalysts for certain specific reactions. (Mr. Whitesell).
2. The preparation of more perfect osmotic cells (Mr. Grollman).
3. The preparation of pure Osmium (Mr. Gilchrist).
4. The atomic weight of Osmium (Mr. Gilchrist).

Professors Frazer and Lovelace had associated with them Messrs. L. C. Beard, Jr., W. R. Norris, S. S. Negus, and R. K. Taylor. The problems investigated were:

1. The vapor pressure lowering of sucrose solutions at 25° (Mr. Beard).
2. The vapor pressure lowering of sodium chloride solutions at 20° (Mr. Norris).
3. Further studies of the vapor pressure of solutions were continued with the collaboration of Mr. Negus and Mr. Taylor.

Professor Reid had associated with him in research Messrs. A. B. Brown, W. S. Hoffman, W. R. Waldron, T. B. Grave, J. C. Swenarton, F. C. Hahn, T. M. Berry, D. G. Foster, J. T. Chappell, and Mrs. A. Moses. The problems investigated were:

1. The catalytic alkylation of ammonia and aniline (Mr. Brown).
2. The catalytic dehydration of alcohols (Mr. Brown).
3. Anthraquinone thioethers (Mr. Hoffman).
4. The influence of sulphur on the color of azo dyes (Mr. Waldron).

5. Alkyloxy-piperidine compounds (Mr. Grave).
6. Higher alcohols formed by fermentation (Mr. Swenarton).
7. Flourine derivatives of anthraquinone (Mr. Hahn).
8. The alkylation of benzene (Mr. Berry).
9. Azo dyes containing sulphur (Mr. Foster).
10. Esterification by means of Silica Gel (Mr. Chappell).
11. The reaction of sodium on akyl disulphides (Mrs. Moses).

Associate Professor Patrick had associated with him in research Messrs. E. H. Barclay, L. Y. Davidheiser, F. V. Grimm, J. S. Long, and Dr. J. E. Sharp who held the Grafflin Scholarship. The problems investigated were:

1. Rate of oxidation of nitric oxide (Mr. Barclay).
2. Adsorption of ammonia by Silica Gel (Mr. Davidheiser).
3. Adsorption of Butane by Silica Gel (Mr. Long).
4. Influence of capillarity on adsorption from solution (Dr. Sharp).
5. Measurement of Dielectric Constant of liquids at their boiling point (Mr. Grimm).

Associate Professor Cartledge has been engaged in research on the activity of water in salt solutions, and the effect of salts upon the solubility of non-electrolytes.

PUBLICATIONS

J. C. W. Frazer, with L. van Doren, P. L. Lotz, and H. K. Parker.
The use of the water interferometer as a pressure gauge. *Journal of the American Chemical Society*, **43**, 2497 (1921).

J. C. W. Frazer, with P. L. Lotz.
The measurement of the osmotic pressure of sucrose solutions at 30° C and 55.7° C. *Journal of the American Chemical Society*, **43**, 2501 (1921).

J. C. W. Frazer, with C. S. Piggot.
The use of manganese in the catalytic oxidation of ammonia. *Journal of the American Chemical Society*, **43**, 2034 (1921).

J. C. W. Frazer, with T. H. Rogers, C. S. Piggot, W. H. Bahlke, and J. M. Jennings.
The catalytic oxidation of carbon monoxide. *Journal of the American Chemical Society*, **43**, 1973 (1921).

E. Emmet Reid, with C. M. Mackall and G. E. Miller.
Derivatives of anthraquinone and Aliphatic thio ethers, dithio-ethers, and thio-ether sulphonic acids. *Journal of the American Chemical Society*, **43**, 2104 (1921).

E. Emmet Reid, with C. H. Milligan.
The transfer of hydrogen from an alcohol to an aldehyde. *Journal of the American Chemical Society*, **44**, 202 (1922).
The ethylation of Benzene and naphthalene. *Journal of the American Chemical Society*, **44**, 206 (1922).

E. Emmet Reid, with Raphael Rosen.
Sesqui-mustard gas or bis-β-chlor-ethyl ether of ethylene dithio glycol. *Journal of the American Chemical Society*, **44**, 634 (1922).

E. Emmet Reid, with Neil E. Gordon.
The solubility of liquids in liquids. The partition of the lower acids, particularly formic, between water and various organic solvents. *Journal of Physical Chemistry*, **26**, 773 (1922).

E. Emmet Reid.
Organic catalysis. *Journal of Industrial and Engineering Chemistry*, **14**, 838 (1922).

E. Emmet Reid.
The translation of Sabatier's La Catalyse en Chimie Organique which was in press at the time of the last report has been published by D. Van Nostrand.

W. A. Patrick, with B. S. Neuhausen.
A study of the system Ammonia-Water as a basis for a theory of the solution of gases in liquids. *Journal of Physical Chemistry*, **25**, 693 (1921).

W. A. Patrick, with L. Y. Davidheiser.
The adsorption of ammonia by Silica Gel. *Journal of the American Chemical Society*, **44** (1922).

W. A. Patrick, with E. O. Holmes, Jr.
The action of ultra-violet light on gels. *Journal of Physical Chemistry*, **26**, 25 (1922).

W. A. Patrick, with F. V. Grimm.
Heat of wetting of Silica Gel. *Journal of the American Chemical Society*, **43**, 2144 (1921).

The following articles have been submitted for publication:

The preparation of pure Osmium—Raleigh Gilchrist (associated with J. C. W. Frazer).

The Atomic Weight of Osmium—Raleigh Gilchrist (associated with J. C. W. Frazer).

The following pieces of research are now ready for publication:

The use of salts of Barium for the decomposition of silicates—Dr. G. H. Whiteford (associated with J. C. W. Frazer).

The adsorption isotherms of "Hopcalite" for carbon dioxide and water vapor—Dr. C. E. Lanning (associated with J. C. W. Frazer).

The following completed investigations of Professors Frazer and Lovelace are to be submitted soon for publication:

The lowering of the vapor pressure of water at 20° by dissolved lithium chloride, with Dr. W. H. Bahlke.

The study of the vapor pressure of sucrose solutions at 25°, with L. C. Beard, Jr.

STUDENTS

The number of students enrolled in the Chemistry Department was 245, of whom 54 were graduate students following Chemistry as their principal subject, and sixteen were candidates for the B. S. in Chemistry in their fourth year and devoting all of their time to Chemistry.

The number of students in the undergraduate department was less this year on account of the omission of Chemistry 1 A.

The following received the degree of B. S. in Chemistry:

Bryant, C. B.	Harden, W. C.
Cabe, M. R.	Lemmon, N. E.
Downey, F. J., Jr.	McComas, J. A.
Edwards, W. R., Jr.	Naviasky, J. A.
Fontz, Robert	Silesky, A. H.
Gerber, Karl	Thompson, J. C., Jr.
Hambleton, R. W.	Whittington, R. J. R.

One was granted the degree of Master of Arts: T. M. Berry.

The following were awarded the degree of Doctor of Philosophy:

Wm. S. English: The oxygen pressures over mixtures of manganese dioxide and other metallic oxides with reference to catalysis.

L. H. Opdycke: Adsorption of vapors by silica gel by a dynamic method.

E. H. Barclay: A study of the permutite metathesis with silica gel.

L. C. Beard, Jr.: The vapor pressure lowering of sucrose solutions at 25° C.

A. B. Brown: The catalytic amination of alcohols.

L. Y. Davidheiser: The adsorption of ammonia by silica gel.

R. Gilchrist: Preparations of pure osmium and the atomic weight of osmium.

F. V. Grimm: Measurement of Dielectric Constant of liquids at their boiling point.

Wm. S. Hoffman: The reactions of anthraquinone sulphonic acids with mercaptans.

J. S. Long: The adsorption of butane by silica gel.

W. R. Norris: The vapor pressure lowering of sodium chloride solutions at 20° C.

W. R. Waldron: The influence of sulphur on the color of azo dyes.

Dr. J. E. Sharp held the Grafflin Scholarship and Messrs. A. B. Brown and F. V. Grimm held the E. I. du Pont de Nemours Fellowships.

E. Emmet Reid,
Secretary, Chemical Staff.

EDUCATION

The session of 1921-1922 was the best year in the history of the Department of Education. This is true when considered from every aspect of the work, such as the direction of inquiries by the staff, the number and quality of investigations undertaken and completed by the students, the scope of the instruction offered, and the number of students registered. Five hundred eighty-two students received instruction through the medium of the twenty courses given by the department, the number of regular members having been increased by the appointment of special instructors. The students were distributed among the following groups: graduate, nineteen; undergraduate, fifty-five (eight A. B. and forty-seven S. B. candidates); special, four hundred forty-two; at extension centers, sixty-six.

The addition of Dr. Fowler Dell Brooks, who began his work at the University in the summer session of 1921, enabled the department to provide for the much needed expansion in the fields of educational psychology, measurements, and tests.

The Educational Seminary continued to devote its attention to the administrative aspects of the problems of specific professional interest to its members. The problems of the year related themselves more directly to certain phases of elementary, secondary, and collegiate instruction. The investigations were directed by Professor Buchner. The following studies were carried forward during the year: R. N. Dempster, "Coördination of preparatory training to work in college as based on students' records"; W. R. Flowers, "The place of civics in the high school curriculum"; E. R. Hoke, "The measurement of achievement in shorthand"; G. A. Kramer, "A Study of the elementary school curriculum"; S. W. Sparks, "First-year Latin vocabulary scales and their diagnostic value." Mr. R. E. Hoke and Mr. E. R. Hoke completed their requirements for the doctor's degree, which was conferred upon the former February 22, and the latter, June 13. Mr. R. N. Dempster and Mr. S. W. Sparks completed their requirements for the degree of Master of Arts, which was conferred June 13.

The investigations in the field of Experimental Education were conducted under the direction of Professor Buchner and Dr. Brooks. Reports of the following studies were made: C. E. Adams, "Measurement of results of history teaching"; F. R. Bonn, "Correlation between teachers' ratings and intelligence quotient of pupils"; I. V. Flowers, "Grade Variability"; W. R. Flowers, "Comparison of group intelligence scores with success in various high school subjects"; G. G. Grim, "A diagnostic test in fractions"; G. A. Kramer, "Failure in reading and intelligence"; A. LeSchack, "On introducing algebra into seventh grade or first-year junior high school"; E. C. Seitz, "Reliability of teachers' marks as compared with standard tests and measurements"; L. L. Thomason, "Testing the social and moral values in a student-analysis record"; B A. Wentz, "Experiments in teaching algebra"; A. L. White, "Compulsory mathematics for ninth grade commercial pupils"; E. G. White, "Correlation between the ability of tenth grade students to generalize in geometry and the intelligence or general ability of the same students."

Professor Buchner conducted a course on Educational Surveys, one hour weekly through the year.

The Educational Conference brought together once a month, from November to May, the instructors and advanced students in the department for special and early review of the most significant new literature and current tendencies in educational research.

The outstanding need of the department is a school located at Homewood where the experimental undertakings can be given a definite and continuous setting. The University has practically reached the limits of its contributions to elementary and secondary education with its available resources. Proper provisions for such a school, which should begin with children of kindergarten age and end with the preparation of boys and girls for college, would enable the University to conduct experiments in teaching under conditions favorable for demonstrations, the results of which could be incorporated into the practices of systems of public education. Practical achievement in this important direction is limited at present to the school facilities available under the auspices of the Summer Courses. With an all-the-year-round school at Homewood, the University's contributions to education could be made without interruption.

During the year two numbers were added to *The Johns Hopkins University Studies in Education*, each containing a distinctive contribution to the literature of education: No. 4, "The Effect of the Physical Make-Up of a Book upon Children's Selection," (pp. 162), by Associate Professor Bamberger; No. 5, "A Measuring Scale for Free-Hand Drawing: Part I—Representation," (pp. 61 and 4 folders), by Professor Linus W. Kline, of the Skidmore School of Arts, and Miss Gertrude L. Carey, of the Duluth (Minnesota) Public School System. "The Improvement of Speed and Accuracy in Typewriting," by R. E. Hoke, and "The Measurement of Achievement in Shorthand," by E. R. Hoke, are two investigations completed during the year, and will appear as forthcoming numbers in the series.

UNDERGRADUATE COURSES

The scope of the instruction, as arranged in accordance with the regulations governing the requirements of certificates issued to secondary teachers fixed in accordance with law by the Maryland State Board of Education, continues to prove satisfactory in enabling students to meet both academic and professional needs in this subject with the sole exception of practice teaching. The program of courses for 1921-22 was considerably extended, through the College Courses for Teachers, to meet specific needs of Baltimore

city teachers, as indicated by some of the conclusions and recommendations of the Baltimore School Survey conducted in 1920-21.

Professor Buchner gave instruction in the History of Education and Principles of Education, each course meeting two hours a week through the year.

Associate Professor Bamberger conducted three courses, Elementary Education, The Individual in Relation to Classroom Organization and Management, and Special Problems in Classroom Leadership, each course meeting two hours a week through the year. The students in the third course which was conducted at Public School No. 2, undertook some valuable experimental studies in education. Among them were: (a) topics of interest that elementary children care to talk and write about; (b) the spontaneous oral vocabulary of children with regard to maturity, mental ages, and social environments. She also conducted an additional course on Methods and Plans for the Intermediate Grades of the Elementary School, not announced in the circular, two hours a week through the year.

Dr. Brooks gave instruction in Educational Psychology, Educational Psychology of Elementary School Subjects and Tests of Elementary School Subjects, and Educational Measurements and Intelligence of School Children, each course meeting two hours a week through the year. In response to the request of a special group of students at the beginning of the session, he also conducted at Public School No. 76 a course on Intelligence of School Children and Tests of Elementary School Subjects, two hours a week through the year.

Dr. Weglein gave instruction in Secondary School Organization and Class-Room Management and The Junior High School, each course meeting two hours a week through the year.

Dr. Riddle conducted a course on The Teaching of French in Secondary Schools, two hours a week through the year.

Dr. Leslie H. Ingham, of the Baltimore City College, conducted a course on Materials and Method of Teaching General Science in Junior High Schools, two hours a week through the year.

Mr. Philip Dougherty, of the Baltimore Polytechnic Institute, conducted a course on Materials and Methods of Teaching Civics in Junior High Schools, two hours a week through the year.

Assistant Superintendent Carleton E. Douglass, of the Baltimore Public Schools, conducted a course on The Organization and Management of Elementary Schools, two hours a week through the year.

Miss Frances M. Berry, Kindergarten-Primary Supervisor of the Baltimore Public Schools, conducted a course on The Principles of Kindergarten-Primary Education, two hours a week through the year.

University Extension Centers were maintained during the year at three places in Maryland. At Frederick, Professor Buchner conducted a course on The Principles of Education, two hours weekly. Associate Professor Bamberger conducted at Havre de Grace a course on The Individual in Relation to Classroom Organization and Management, and the same course at Woodside, each two hours weekly.

During the year Professor Buchner continued his services as a member of the Commission on Accrediting Higher Institutions of the Southern Association of Colleges and Secondary Schools, and attended its meeting in Birmingham, and also as a member of the National Council of Education of the National Education Association.

Associate Professor Bamberger concluded her services as Secretary-Treasurer of the National Society of the College Teachers of Education at the

Chicago meeting in February, and continued as Vice-President of the Educational Society of Baltimore. Between October 28 and January 13, she delivered a series of four lectures on "The Modern School on a Scientific Basis" before the Progressive Education Association at Washington: "How it Uses a Workshop," "How it Uses a Laboratory," "How it Uses a Library," and "How it Classifies Children."

PUBLICATIONS

F. E. Bamberger.
The effect of the physical make-up of a book upon children's selection. *The Johns Hopkins University Studies in Education, No. 4.* Baltimore, pp. 162. The Johns Hopkins Press, 1922.

F. E. Bamberger, Editor.
Studies in Education. Educational Monographs, The Society of College Teachers of Education, No. XI, 1922. (Publication of the Society, No. 16.)

F. D. Brooks.
Changes in Mental Traits with Age, Determined by Annual Retests. Teachers College, Columbia University Contributions to Education, No. 116, Oct., 1921, vi, 86 pp.
Rate of mental growth, ages nine to fifteen. *Journal of Educational Psychology*, December, 1921, vol. 12, pp. 502-511.

L. W. Kline and G. L. Carey.
A measuring scale for free-hand drawing: Part I—Representation. *The Johns Hopkins University Studies in Education, No. 5.* Baltimore, pp. 61 and 4 folders. The Johns Hopkins Press, 1922.

E. E. Franklin.
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G. G. Grim.
A diagnostic test in fractions. 1922.

M. R. Patterson.
The Homewood Demonstration School at Johns Hopkins University [1921]. *School and Society*, vol. 16, November 18, 1922, pp. 577-584.

EDWARD F. BUCHNER,
Professor of Education.

ENGLISH

1. Advanced Courses.

The advanced students in English are organized into a Seminary, which is conducted by Professor Bright. Graduate students are admitted to the Seminary as soon as they have satisfied initial requirements for specialization and research. The discipline of the Seminary is designed to impart training in scholarly methods of dealing with literary and linguistic problems. Study and investigation are bestowed on selected periods of literary and linguistic history, on departments of literature extending through successive periods, and on the works of important writers, taken separately or in groups. Usually there is a change of subject each half-year. During the academic year, 1921-1922, the sessions of the Seminary occupied four hours a week.

The work of the Seminary during the academic year was bestowed on the pre-Shakespearean Drama, especially on the Moralities and Interludes. The principal texts in this division of the subject were critically studied.

Professor Bright lectured once a week during the year on problems in the history of English Sounds and Inflections.

He also lectured once a week during the year on the principles of English Prosody, with interpretations of English Lyrics.

Professor Bright gave a course in Anglo-Saxon, two hours a week, through the year. This course was to introduce the subject of technical linguistics and to prepare the student for a complete survey of the history of English.

2. College Courses.

English Composition 1 was given three hours weekly throughout the year. Associate Professor French met the whole class twice a week for lectures and assignments; for the criticism of themes and for recitations the class was divided into eight sections, three of which were taught by Dr. Litz, three by Mr. Uhler, and two by Mr. Ludlow. During the second half-year a special section repeated the work of the first term under the direction of Mr. Uhler, and thus absolved conditions and failures while going on with the regular work of the second term. A mimeographed text, *Usage, Structure, and Style*, prepared for this course, served as a handbook. The course included practical exercises in the use of the library and the reading, month by month, of assignments in prose and verse.

English Composition 2, an elective course in expository writing and in oral English, was given two hours weekly through the year by Dr. Litz. The class met as a whole one hour a week and in several smaller groups for an additional hour of recitation and conference. *The Century Handbook of Writing* was used as a manual of usage, and Eason and Weseen's *English, Science, and Engineering* as a text.

English Literature 1 consisted, during the first half-year, of an account of the Revival of Learning and its influence on Elizabethan prose and verse, with the detailed study of Book One of *The Faerie Queene* and other poems by Spenser; and during the second half-year, of a survey of the development of the English drama and the study of the more important comedies of Shakespeare, with special attention to *Twelfth Night*. The class was taught, three hours weekly, by Associate Professor French, with the assistance of Mr. Ludlow in the reading of manuscripts.

English Literature 2 was given by Professor Greene, three hours a week, through the year. The course included a study of the English and Scottish popular ballads, of the poems of Burns, Scott, Wordsworth, Coleridge, Byron, Keats, and Shelley, and of the novels of Scott. In connection with the weekly lectures and discussions the members of the class did a large amount of reading, and prepared six papers.

English Literature 3, an elective course in American literature, was given by Associate Professor French two hours weekly through the year. The first half of this course consisted of a brief survey of the literary history of America and the study of the types of verse represented in American literature; the second half was devoted to American prose. Pattee's *Century Readings in American Literature* was used as an anthology.

English Literature 5 was given by Professor Greene, three hours a week, through the year. The course included (*a*) the reading and discussion of ten of the plays and of the *Sonnets* of Shakspere, and a careful study of *King Richard the Second* and of *Macbeth*; (*b*) a survey of the origin and development of the English drama from the liturgical plays to its culmination in the tragedies of Shakspere. The class read and discussed representative Miracle Plays, Moralities, and Interludes; Early Comedy and Early Tragedy; representative plays by Lyly, Peele, Greene, Kyd, five plays by Marlowe, and one play by Ben Jonson.

English Literature 6 was given by Professor Greene, three hours a week, through the year. During the first half-year a careful study was made of the minor poems of Milton and of Book I of *Paradise Lost;* Books II-IV were read privately by the members of the class. The second half-year was spent in the study (*a*) of English forms of verse; (*b*) of the writings of Dryden, Swift, and Pope; (*c*) of some of the literary features of the English Bible.

English Literature 7, a course in Victorian writers, was given by Professor Greene, three hours a week, through the year. This course included a study of the essay, as represented by Carlyle, Macaulay, and Ruskin; of poetry, as represented by Tennyson and Browning; of the novel, as represented by Dickens. The reading included *Sartor Resartus* and several essays by Carlyle; five essays by Macaulay; chapters in *Modern Painters* and *The Stones of Venice, Sesame and Lilies,* and *Praeterita;* much of the poetry of Tennyson and Browning; and one novel by Dickens. The lectures included a discussion of the social and political conditions of the time. The members of the class prepared eight papers, which were read and discussed in the classroom.

Public Speaking 1, a course in reading and speaking, was given as an elective, one hour a week through the year, by Mr. Uhler. For convenience in instruction the class met in three sections. Knapp and French's *The Speech for Special Occasions* was used as a text-book.

Contests in Public Speaking and Debating were held during the year as follows:

(1) The Freshman-Sophomore Debate, December 16, 1921, on unemployment insurance. Won by the Sophomore team.

(2) The Twenty-fifth Annual Adams Debate between the senior and junior classes, January 21, on the government ownership and operation of coal mines. Won by the seniors.

(3) The Triangular Intercollegiate Debate, March 4, by teams representing the University of North Carolina, Washington and Lee University, and Johns Hopkins, on the same subject as that of the Adams debate. The negative won in each case and the highest score was made by Washington and Lee.

(4) The Southern Oratorical Contest on April 8, at Vanderbilt University. First prize was won by Albert G. Langeluttig, '22, representing Johns Hopkins.

(5) The Adams Contest in Public Speaking, April 20. The Adams Medal was won by Charles B. Monmonier, '24.

(6) The Tocqueville Contest in Oral Discussion, for the Tocqueville Medal, offered by the Baron Pierre de Coubertin, May 4. Won by Edward L. Putzel, '22.

3. College Courses for Teachers.

English 2, a course in American literature, was given by Associate Professor French, two hours weekly through the year. The course consisted of a study of American prose and verse by literary types. Pattee's *Century Readings in American Literature* was used as an anthology.

English 1, a course parallel to English Composition 1, in the College of Arts and Sciences, was given two hours weekly by Dr. Litz.

PUBLICATIONS

James W. Bright.

The Mission of the College for Women. An address delivered at Hollins College, Founder's Day, February 21, 1922. *Hollins Magazine,* March, 1922, 237-257.

Brief Mention of Books, in *Mod. Lang. Notes* (xxxvi), November, 1921—(xxxvii), June, 1922, as follows:—Richard F. Jones, The Background of

'The Battle of the Books';—A. E. Burlingame, The 'Battle of the Books' in its Historical Setting;—T. S. Omond, A Study of Metre;—F. P. LeBuff, 'The Hound of Heaven': An Interpretation;—Edward Sapir, Language: An Introduction to the Study of Speech;—Gustav Stern, 'Swift,' 'Swiftly,' and their Synonyms: A contribution to Semantic Analysis and Theory;—Philological Quarterly;—Robert Bridges, Milton's Prosody;—Otto Jespersen, Language: its Nature, Development, and Origin.

John C. French.

Review of Carl Van Doren, The American Novel, *Mod. Lang. Notes*, xxxvii, 115-7.

Brief Mention of Robert M. Gay, Writing Through Reading, *Mod. Lang. Notes*, xxxvi, 127-8.

College Life at Johns Hopkins. *The Johns Hopkins Alumni Magazine*, x, 274-82.

JAMES WILSON BRIGHT,
Caroline Donovan Professor of English Literature.

GEOLOGY

The Geological Laboratory was open daily throughout the year for both graduate and undergraduate students. The attendance during the year was unusually large, the number of graduate students being the largest in the history of the Department, and the number of students in the undergraduate courses was also heavy.

LECTURES

Undergraduate Courses

(a) Geology I: Physiography, Dynamical and Historical Geology, by Professor Swartz. *Three lectures and one afternoon of practical work each week.*

(b) Geology II: Mineralogy and Elementary Petrography, by Professor Swartz. *Three lectures and two afternoons of practical work each week.*

(c) Geology III: Applied Geology, by Professor Mathews. *Three lectures each week.*

(d) Geology IV: Historical Geology, by Professor Berry. *Three lectures each week.*

Graduate Courses

(e) Geophysics, by Professor Reid. *Two lectures each week.*

(f) Petrography and Mineralogy, by Professor Mathews. *Three lectures and one afternoon of laboratory work each week.*

(g) Paleontology, by Professor Berry. *Three lectures and two afternoons of laboratory work each week.*

(h) Principles of Economic Geology, by Associate Professor Singewald. *Three lectures each week.*

(i) Exploratory Surveying, by Professor Reid. *Two lectures each week.*

(j) Geological Conferences. *Weekly.*

(k) Evening conferences in historical geology met on alternate Saturday evenings at the residence of Professor Berry. The following formal program was presented during the year by former Hopkins men:

Nov. 26. The study of sediments. Dr. Marcus I. Goldman.

Dec. 10. The formation of the Antilles by block faulting. Dr. Wendell P. Woodring.

Jan. 14. The geology of the Great Basin. Dr. Edmund M. Spieker.

Feb. 11. Structure of the Little Rocky Mountains. Dr. Frank Reeves.
March 11. Problems of the western Cretaceous. Dr. John B. Reeside, Jr.
March 25. Relation of deep seated faulting to present surface structural features. Dr. Wm. Taylor Thom, Jr.
April 8. Geological problems in Colorado. Dr. Julian D. Sears.
May 13. Cretaceous geology of Texas and Mexico. Dr. Lloyd W. Stephenson.

FIELD STUDIES

Field trips were arranged weekly during the fall and early winter months for the undergraduate students to various points of geological interest in the vicinity of Baltimore. In the spring a more extended trip of a week or more was conducted by Dr. Swartz across Maryland from the old volcanics of South mountain to the folded Paleozoic rocks and coal mines of Western Maryland. Specially arranged field trips for graduate students were omitted during the past year since the long seasons of practical field work which the graduate students now have each summer makes such trips during the academic year less essential than formerly.

Such work by geological students is chiefly in conjunction with officials of the U. S. Geological Survey, with officers of the various state surveys, or with individuals and former students of the Department who are now in charge of investigations for various companies. During the summer students are scattered from Alaska to Mexico and the diversified geological experiences of the summer proves mutually helpful through interchange of reports during the winter.

During the coming season the assignment is as follows:

J. B. Eby will assist Dr. E. M. Spieker in his work in Utah.

J. K. Roberts will continue his areal and structural studies on the Triassic of Virginia under the auspices of the Virginia Geological Survey.

Joel H. Swartz will complete the areal and structural studies on the Chattanooga black shale of Tennessee under the auspices of the Tennessee Geological Survey.

George M. Hall will be in charge of a party studying the underground water resources of Montana under the auspices of the U. S. Geological Survey.

Mark H. Secrist will continue his investigation of the zinc deposits of Tennessee under the auspices of the Tennessee Geological Survey.

J. Edward Hoffmeister will assist in areal geological work among the foothills of the Rocky Mountains in Montana under the auspices of the U. S. Geological Survey.

Walter R. Smith will be the geologist in a reconnaissance party of the U. S. Geological Survey in Alaska.

Walter B. Jones is with the Eagle field forces in Mexico.

Lewis B. Kellum is with the Transcontinental forces in Mexico.

John Douglas will be engaged in making laboratory tests of oil sands for the U. S. Geological Survey.

D. S. Mossom, Raymond H. Haseltine, and A. F. Richardson are working in Maryland under the auspices of the Maryland Geological Survey.

Quentin Singewald is field assistant on the U. S. Geological Survey in Nevada.

James Galluly is assisting Dr. Frank Reeves in the Little Rocky Mountains.

W. H. Rubey is in areal work in the Black Hills.

R. E. L. Collins is assisting Dr. Willis T. Lee in a reconnaissance across Wyoming.

Two students absolved the requirements for the doctorate. J. B. Eby presented a dissertation on the Coal Resources of Wise and Scott Counties,

Virginia, and has received appointment on the U. S. Geological Survey. J. K. Roberts presented a dissertation on the Triassic of Northern Virginia, and has been appointed Associate Professor of Geology at Vanderbilt University.

ACTIVITIES

The work of the Department has continued in full activity during the entire year although the crowded conditions have greatly hampered research. The members of the staff have been working up the material gathered in their summer field work. Particular emphasis has been laid on the material collected in South America by the Williams Expedition and the results of these investigations are now appearing in "Studies in Geology," the newly-established serial issued under the auspices of the Department.

Professor Mathews, during the last season, has continued his work as Chairman of the Division of Geology and Geography of the National Research Council in connection with the academic work of the Department and in conjunction with his activities as director of the several State bureaus for which he is responsible. This work has been carried on in addition to his regular duties of instruction. Dr. Mathews was re-elected Chairman of the Advisory Board of Surveys and Maps and Treasurer of the Geological Society of America and was also elected President of the Association of American State Geologists. Under his supervision an exhaustive bibliography of all geological bibliographies published during the last twenty-five years has been prepared by Miss Grace Reed, Librarian of the Department.

Professor Reid has continued his studies in dynamical geology and seismology. He was chairman of the Section of Seismology of the American Geophysical Union. As the representative of the State Department, he attended the dissolution meeting of the International Seismological Association at Strassbourg in April and as the representative of the seismological section of the International Geodetic and Geophysical Union at Rome in May. He also represented the Johns Hopkins University at the seven-hundredth anniversary of the University of Padua in May.

Professor Berry has continued his studies of South American paleontological materials. During the year he has completed a monograph on the Middle and Upper Eocene Floras of Southeastern North America for the U. S. Geological Survey. Reports on Miocene floras from Hayti and Mexico were prepared for the U. S. National Museum and several reports on Lower Cretaceous, Upper Cretaceous, Eocene, and Pleistocene plants from Alberta and British Colombia were prepared for the Geological Survey of Canada. He has continued his work as associate editor of the *American Journal of Science*, *Botanical Abstracts*, and the *Pan-American Geologist*. During the year he was elected a member of the National Academy of Sciences, a Fellow of the American Academy of Arts and Sciences, and a member of the National Research Council.

Dr. Swartz has continued his studies of the Carboniferous and Silurian Strata of Western Maryland. He has prepared a report upon the stratigraphy and correlation of the Carboniferous of Maryland and has in manuscript a contribution to the Monograph of the Silurian of Maryland to be published by the Maryland Geological Survey.

Dr. Singewald, in addition to his academic duties, was engaged in geological studies of South American materials in preparation for the publication of reports on the Quimsa Cruz Tin District and the Potosi Silver-Tin District of Bolivia. The summer was spent in professional work in southern Mexico.

During the year there were in the Department 17 graduate students with geology as their principal subject and 138 others taking the subject for a subordinate or as undergraduates.

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The geology of the Corocoro copper district of Bolivia. *J. H. U. Studies in Geol.* no. 1, 1922. (With J. T. Singewald, Jr.)

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Stratigraphy of the Carboniferous of Maryland. *Md. Geol. Survey*, vol. 11, 1922, pp. 337-348. (With C. K. Swartz.)

Mathews, Edward B.

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STATE BUREAUS

The Department coöperates with the State of Maryland in the conduct of the Maryland Geological Survey, the State Board of Forestry, and the Maryland Weather Service, the Chairman of the Department acting as Director and Executive Officer of all three bureaus. During the last year these bureaus, with the rest of the State offices, have been examined by experts and special committees and certain changes were recommended to and accepted by the Legislature of 1922. Messrs. Griffenhagen and Associates, Ltd., experts on organization, recommended that "the Johns Hopkins University shall assume increased authority and responsibility of the Geological and Economic Survey, which is already part of that institution." Subsequently the report of the Reorganization Commission recognized that "this Survey enjoys an excellent reputation for efficiency and economy of operation" and that it is "important to maintain contact with the Johns Hopkins University" which is to be secured by the appointment of the President of the University as *ex officio* Chairman of an advisory board of three which is to function after the Survey is transferred to the control of the University of Maryland.

According to the Reorganization Bill, all of these bureaus are to be placed under the charge of the University of Maryland from January 1, 1923, the State Weather Service being abolished and the work formerly conducted by it transferred to the State Geologist.

The physical transfer of the functions of the Geological Survey to College Park would be a serious loss to the Geological Department and would result in a marked decrease in efficiency in the work for the State. Fortunately, there is no purpose at the present time to inaugurate such a change. Under the direction of President Woods the State Board of Forestry and the Maryland Geological Survey will maintain their present offices and the supervision of the State Weather Service become one of the responsibilities of the State Geologist.

EDWARD B. MATHEWS,
Chairman, Geological Department.

GERMANIC LANGUAGES

SEMINARY

The Germanic Seminary, conducted by Professor Collitz, met *twice weekly through the year* for the study of Old Saxon Alliterative Poetry. The poems generally known as *Heliand* and *Genesis* (the latter consisting but of the few fragments left of the original poem) have, in this country and in England, as yet hardly received the full share of attention to which they may lay claim on account of their close connection with the Anglo Saxon poems traditionally ascribed to Cædmon. In this as in many other respects *Heliand* and *Genesis* constitute—from a linguistic as well as a literary point of view—a most instructive subject for seminary work, and have for this reason repeatedly figured in the repertoire of the Germanic Seminary. The cantos selected for interpretation were: (1) of the *Heliand:* the Introduction, the Marriage Feast of Cana, John the Baptist, the Sermon on the Mount; (2) of the *Genesis:* the Complaint of Adam; Cain and his Offspring.

The Seminary in German Literature was conducted by Associate Professor Kurrelmeyer, and met *twice weekly through the year.* The first half-year was devoted to the study of Gottsched and his school. In the second half-year the dramas of Grillparzer. Kleist, and Hebbel were studied, with incidental consideration of the Fate Tragedy.

OTHER GRADUATE COURSES

Professor Collitz gave the following graduate courses:

1. Gothic. *Two hours weekly through the year.* An introductory course, consisting of lectures on Gothic grammar and of practice in reading and translating passages selected from the Gothic Bible (or more particularly from the Gothic New Testament).

2. Introduction to the Study of Germanic Philology. *Weekly through the year.* A course of lectures, dwelling chiefly on the following topics: (1) general aspects of the study of language; difference as to aims and methods between linguistics and philology; language as viewed from the standpoint of phonetics, of general (or philosophical) grammar, and of historical grammar; (2) a brief survey of the cognate Indo-European languages; (3) the Early Germanic (or Primitive Germanic) period; mutual relationship between the various Old Germanic dialects.

Associate Professor Kurrelmeyer gave the following graduate courses:

1. Middle High German (Elementary Course). *Two hours weekly, first half-year.* Paul's *Mittelhochdeutsche Grammatik* and Hartman von Aue's *Armer Heinrich* were used.

2. Middle High German: *Kudrun. One hour weekly, second half-year.*

UNDERGRADUATE COURSES

Associate Professor Kurrelmeyer gave the following undergraduate courses:

Elementary German. *Three hours weekly.* Vos, *Essentials of German*; Gerstäcker, *Germelshausen;* Wildenbruch, *Das edle Blut.*

German 2. Contemporary Literature. *Three hours weekly.* Sudermann, *Frau Sorge;* C. F. Meyer, *Das Amulet;* Raabe, *Die schwarze Galeere;* Keller, *Kleider machen Leute;* Hebbel, *Agnes Bernauer;* Ludwig, *Der Erbförster;* Hauptmann, *Die versunkene Glocke.*

German 5. Scientific Readings. *Two hours weekly.* Wright, *German Science Reader;* Kip, *A Scientific German Reader.*

Associate Professor Roulston gave the following undergraduate courses:

German 1. Modern Prose Readings and Prose Composition. *Four hours weekly through the year.* Wildenbruch, *Lachendes Land;* Keller, *Das Fähnlein der sieben Aufrechten;* Schurz, *Lebenserinnerungen;* Storm, *Der Schimmelreiter.* Prose Composition: Carrington and Holzwarth, *German Composition.*

German 5. Medical German. *Three hours weekly through the year.* Rebmann, *Der menschliche Körper und Gesundheitslehre;* Loehlein, *Die krankheiterregenden Bakterien;* Kreibig, *Die Sinne des Menschen.*

Associate Professor Roulston also conducted two courses of *three hours weekly through the year* in the College Courses for Teachers. One of these was an elementary course in which Vos, *Essentials of German,* was thoroughly studied; Gerstäcker, *Germelshausen,* and Storm, *In St. Jürgen,* were read. The other course corresponded to the regular German 1 of the undergraduate department, although less reading and more work in Prose Composition were done.

OTHER ACTIVITIES

Together with their colleagues of the English and the Romance departments, the members of the Germanic department shared in making preparations for and acting as hosts for the University at the thirty-eighth meeting of the Modern Language Association of America, held in the buildings of the Johns Hopkins University on December 28, 29, and 30, 1921. For an account of the various sessions held by the Association it must suffice here to refer to the *Proceedings* of the Meeting, found in the Appendix to Vol. xxxvii, No. 1 (March, 1922) of the *Publications of the Mod. Lang. Association,* pp. i-xli. As to the group meetings of the Germanic section, additional details may be found in a report contributed by Professor E. H. Mensel (Smith College) to the *Monatshefte für deutsche Sprache und Pädagogik* (ed. by the National Teachers' Seminary, Milwaukee, Wis.), 1921, pp. 54-56. Professor Kurrelmeyer was elected a Vice-President of the Association for 1922 (cf. *Proceedings,* p. xxxvii).

Professor Collitz continued his services as editor of *Hesperia,* and as a member of the "Joint Committee on Grammatical Nomenclature"; Professor Kurrelmeyer as a co-editor of *Modern Language Notes* and as Secretary of the J. H. University Philological Association; Professor Roulston as managing editor of the *Johns Hopkins Alumni Magazine.*

PUBLICATIONS

Hermann Collitz.

Germanische Wortdeutungen. 1. Gotisch *inn, inna.* 2. Gotisch *duginnan* 'beginnen.' *Mod. Lang. Notes,* xxxvii, pp. 215-217 and 274-279.

William Kurrelmeyer.

Review of Fischer, *Schwäbisches Wörterbuch, Mod. Lang. Notes,* xxxvi, pp. 446-447.

Review of Kluge, *Etymologisches Wörterbuch der deutschen Sprache, Mod. Lang. Notes,* xxxvi, pp. 482-490.

HERMANN COLLITZ,
Professor of Germanic Philology.

GREEK

SEMINARY

Advanced instruction in Greek has been carried on chiefly through the medium of the Greek Seminary, which met three times a week under the direction of Professor Miller. Since the organization of the Seminary in 1876, it has been the custom of the members to concentrate their attention in any one year on some leading author or some leading department of Greek literature. In pursuance of this custom the principal subject of study during the past year has been the Greek Historians—more especially Thucydides, the *Hellenica* of Xenophon, and the Polybian account of the history of the Achaean League. Besides these works, Aristotle's 'Αθηναίων πολιτεία was closely studied, and Dionysius of Halicarnassus' περὶ Θουκυδίδου was read and interpreted. Papers containing the results of special investigations were furnished by several members of the Seminary, and the director gave a number of lectures on Greek historiography, chronology and allied topics.

OTHER GRADUATE WORK

Besides lecturing to the Seminary and directing its work, Professor Miller conducted the following graduate courses:

1. Lectures and practical exercises in Greek Paleography, weekly through the year.

2. A course in Greek Composition, weekly through the year.

Professor Robinson conducted a course in Apollonius Rhodius, weekly through the year.

UNDERGRADUATE COURSES

Professor Robinson gave a course in Greek Literature, one hour weekly through the year.

Dr. L. H. Baker conducted the following courses:

1. Benner-Smyth, *Beginner's Greek Book;* Xenophon, *Anabasis* 1 (Greek Elements), three hours weekly through the year.

2. Xenophon, *Anabasis* 2; Homer, *Iliad* 1 (Intermediate Greek), three hours weekly to February.

3. Xenophon, *Memorabilia* (selections); Plato, *Apology* and *Crito;* Herodotus (selections); Homer, *Odyssey* 1 and 2; Prose Composition (Greek 1), four hours weekly through the year.

4. Lysias (select orations); Isocrates, *Cyprian Orations;* Euripides, *Alcestis;* Lucian, *Vera Historia;* Prose Composition (Greek 2), three hours weekly through the year.

5. Thucydides 7; Aristophanes, *Frogs;* Aeschylus, *Prometheus Vinctus* (Greek 4), two hours weekly through the year.

OTHER ITEMS OF INTEREST

Professor Miller read a paper entitled "A Contribution to the History of the Greek Tenses" before the Johns Hopkins University Philological Association, and, at Ann Arbor, Mich., before the American Philological Association. He continued to act as one of the vice-presidents of the Classical Association of the Atlantic States, and attended the Pittsburgh meeting of this association.

Dr. Baker read a paper on Pindar before the Classical Club of Baltimore.

On October 23, the ninetieth anniversary of his birth, Professor Gildersleeve was the recipient of congratulations from his friends, former pupils,

colleagues and the University authorities. The last number of the forty-second volume of the *American Journal of Philology*, which had been founded by Professor Gildersleeve and edited by him for forty years, was published on that date, and the whole volume was appropriately dedicated to him. A special feature of the anniversary celebration was the announcement of the dedication of the volume, the reading to Professor Gildersleeve of the dedicatory inscription, and the presentation to him of a handsomely bound copy of the volume.

PUBLICATIONS

B. L. Gildersleeve.
Brief Mention, *American Journal of Philology*, xliii, 370.
Index Scoliodromicus (compiled, under the direction of Professor Gildersleeve, by Dr. Baker), *American Journal of Philology*, xlii, 370-382.

C. W. E. Miller.
To Basil Lanneau Gildersleeve, *American Journal of Philology*, xlii, v.
Review of Heidel's Anaximander's Book, *American Journal of Philology*, 368 9.
Note on an inscription from Sinope, *American Journal of Philology*, xliii, 72-3.
Review of Philological Quarterly, Vol. 1, No. 1, *American Journal of Philology*, 187-8.
Editorial work on the *American Journal of Philology*, of which whole numbers 167-170 were brought out.

L. H. Baker.
Index Scoliodromicus (under the direction of Professor Gildersleeve), *American Journal of Philology*, xlii, 370 82.
Review of von Wilamowitz-Moellendorff's Griechische Verskunst, *Classical Weekly*, xv, 205-7.

C. W. E. MILLER,
Professor of Greek.

HISTORY

The graduate work in American History was conducted by Professor Latané, who gave the following courses:

1. American History since the Civil War. *Two hours weekly, first half-year.*

2. American Diplomacy in the Orient. *Two hours weekly, second half-year.*

In the Seminary in American History the following papers were presented: "Charles Sumner's Position on Reconstruction," by Mr. W. S. Smoot; "President Grant's San Domingan Policy," by Miss Clara V. Hartfield; "The Legal Tender Decisions," by Mr. C. S. Sydnor; "The Contested Election of 1876-77," by Miss Frances E. Baldwin; "Contemporary French Opinion on the American Civil War," by Mr. W. R. West; "Reconstruction in Alabama," by Mr. C. S. Sydnor; "The Diplomatic Mission to the Orient of Edmund Roberts," by Mrs. B. T. Geiser; "Relations with the Hawaiian Islands," by Miss Clara V. Hartfield; "Relations with the Samoan Islands," by Mr. K. C. Frazer; "Chinese Immigration to the United States," by Miss Frances E. Baldwin; "American Consular Jurisdiction in China," by Mr. Raphael Semmes; "The Boxer Uprising and the Relief of the Legations," by Mr. K. C. Frazer.

With the assistance of Dr. Thach, Professor Latané conducted an undergraduate course in American History and a course in Diplomacy and International Law.

The graduate work in European History was conducted by Professor Vincent, who gave the following lecture courses:

1. The Ancient Régime and the French Revolution, *two hours weekly, first half-year.*

2. The Nineteenth Century, *two hours weekly, second half-year.*

Under his direction the Seminary of European History met on alternate weeks and during the first half-year gave its attention to social and economic conditions in France just previous to the Revolution. The voluminous material published by the French Government was at their disposal, and each member was assigned a small area for intensive study. The Cahiers des Doléances prepared for a selection of municipalities formed the bases of inquiry, and reports of progress were submitted at each meeting of the Seminary. The subjects presented were as follows: Ville de Bourges, by Miss Frances E. Baldwin; Ville d'Angers, by Mr. K. C. Frazer; Ville de Chatillon sur Marne, by Miss Clara V. Hartfield; Ville d'Angouleme, by Mr. C. S. Sydnor; Assemblée Generale de Coutance, by Mr. W. R. West.

The second half-year was devoted to studies on the Congress of Vienna, 1815. Members of the Seminary were assigned different countries and presented reports on their positions in the work of the Congress. The subjects presented were as follows: France in the Congress of Vienna, by Mr. K. C. Frazer; Prussia, by Mr. C. S. Sydnor; Great Britain, by Mr. Raphael Semmes; Holland and Belgium, by Miss Frances E. Baldwin; The Smaller German States, by Mr. W. R. West; The Holy Alliance, by Miss Clara V. Hartfield.

For undergraduates Dr. Vincent conducted the usual advanced class in English History, chiefly constitutional in treatment. With the assistance of Dr. Thach and Mr. Frazer he also began a new course in European History intended as an introductory subject for freshmen. By means of lectures and textbooks the development of European civilization was studied from the fifth to the eighteenth century with a view of showing the foundations of modern political and social problems. The attendance required the use of the auditorium of the Civil Engineering building.

Associate Professor Magoffin conducted the usual graduate courses in Greek and Roman History. In addition to these (as he had spent the previous year in Rome as Professor in Charge of the School of Classical Studies of the American Academy in Rome), he gave a graduate course in the Topography and Monuments of the Ancient Roman World (Archæology and Art Courses). He also gave his regular undergraduate courses in the History of Greece and Rome, and in Roman Private Life.

Dr. Magoffin was elected President of the Archæological Institute of America at its annual meeting at the University of Michigan December 28, 1921.

He was appointed by President Goodnow as the Johns Hopkins Southern Visitor, and in April visited the University Alumni in a number of the Southern cities and universities.

He was granted the honorary degree of LL. D. at Washington College, Chestertown, Maryland, on June 19, 1922.

PUBLICATIONS

John H. Latané.

"The Truth about the Treaty and what Really Happened at Paris." *The World's Work*, August, 1921, pp. 341-345.

"A Friendship of a Hundred Years." *The World's Work*, October, 1921, pp. 628 632.

"The Product of our Schools and Colleges." *School and Society*, December 17, 1921, pp. 564-567.

A series of articles in the *Baltimore Sun* on the Washington Conference,

in the issues of November 7, 8, 19, 21, 30, December 11 and 14, 1921, and January 7 and February 6, 1922.

Revised edition of "From Isolation to Leadership," containing three new chapters,—"The War Aims of the United States," "The Treaty of Versailles," and "The Washington Conference," pp. 191-290, Doubleday, Page & Co.

R. V. D. Magoffin.

Review of Ettore Pais' "Fasti Triumphales Populi Romani." *American Historical Review*, vol. xxvii (1922), pp. 284-285.

Review of H. R. James' "Our Hellenic Heritage," vol. i. *The Historical Outlook*, vol. xiii (1922), p. 105.

Review of Tenney Frank's "Vergil: A Biography." *Baltimore Evening Sun*, May 20, 1922.

Report as Professor in Charge of the School of Classical Studies of the American Academy in Rome, 1920-1921. *Bulletin, Archæological Institute of America*, xii (1921), pp. 72-77.

JOHN H. LATANÉ,
Professor of American History.

LATIN

During the past year the Latin Seminary met two hours weekly through the year under the direction of Professor Frank. Ten plays of Plautus and four of Terence were studied with special attention to dramatic structure, metrical technique and textual problems. Students' reports alternated with lectures. Mr. C. V. B. Wight, Rogers Fellow, completed his researches in the biography of Asinius Pollio and Mr. Clayton M. Hall finished his historical commentary on Nicolaus' "Life of Augustus." Both absolved the requirements and received the degree of Ph. D.

Dr. Frank also lectured to the graduate students one hour a week through the year on Historical Latin Grammar.

In the first half-year Professor Mustard lectured twice a week on the Latin Prose Authors of the Empire. In the second half year he continued his lectures on this subject, and conducted a short series of exercises in Latin Prose Composition.

Undergraduate courses were given as follows:

Professor Frank:

Latin I: Livy (selections); Horace (selections). *Four hours weekly through the year.*

Professor Mustard:

Latin II: Pliny (selected letters); Catullus; Terence, *Adelphoe;* Plautus, *Captivi. Three hours weekly through the year.*

Latin IV: Vergil: *Bucolics* and *Georgics*; Tacitus, *Annals* (selections). *Three hours weekly through the year.*

PUBLICATIONS

Tenney Frank.

Vergil, A Biography. Henry Holt & Co., 200 pp.

Horace, Carm. III, 4: Descende Caelo. *A. J. P.*, xlii, 170-173.

The Carmen Saeculare of Horace. *A. J. P.*, xlii, 324 339.

The Scipionic Inscriptions. *Class. Quart.*, xv, 169 171.

Horace's "Swan" Song, Ode II, 20. *Class. Phil.*, xvi, 386 7.

Articles on De Sanctis, Fowler, *et al.* in the *Manual of Historical Bibliography* of the Am. Hist. Assoc.

On Vergilian Determinism. *Class. Weekly*, xv, 24.

Report on conditions in Middlebury College. *Bull. Am. Ass. Univ. Prof.*, vii, 28-37.
Various Reviews.

Wilfred P. Mustard.
Report of Rivista di Filologia e di Istruzione Classica, vols. xlviii and xlix. *American Journal of Philology*, xlii, 180-182, 271-273, and xliii, 171-173.
Notices of Haines' Fronto, vol. ii; Ker's Martial, vol. ii; Ettore Stampini's Studi di Letteratura e Filologia, second series; Rostagni's Ibis. *A. J. P.*, xlii, 188-189.
Report of Revue de Philologie, vol. xliv. *A. J. P.*, xliii, 80-82.
Illustrations of Tibullus. *A. J. P.*, xliii, 49-54.
Notices of Stemplinger's Horaz im Urteil der Jahrhunderte and of White's Ausonius, vol. ii. *A. J. P.*, xliii.
Pegasus as the Poet's Steed. *Classical Weekly*, xv, 136.

TENNEY FRANK,
WILFRED P. MUSTARD,
Professors of Latin.

MATHEMATICS

GRADUATE COURSES

Professor Morley gave the following courses:

1. Higher Geometry. *Three hours weekly, first half-year.*

The course was a detailed account of inversive Geometry, as far as the introduction of automorphic functions.

2. Elliptic Functions. *Three hours weekly, second half-year.*

An elementary account with special reference to problems of flow.

3. The Mathematical Seminary.

Associate Professor Cohen gave a course in the Theory of Functions. *Two hours weekly, first half-year; three hours weekly, second half-year.*

The functions of a complex variable were studied from both the Weierstrass and the Cauchy points of view.

Associate Professor Murnaghan lectured on the Theories of Elasticity and Hydrodynamics. *Three hours weekly, through the year.*

Particular attention was devoted to the modern treatment of the Problem of Resistance in Fluids. In Elasticity Poincaré's discussion of St. Venant's problem was developed. The latter part of the course was devoted to a presentation of the Theory of Integral Equations and its application to the vibrational problems of Mathematical Physics.

Dr. Musselman gave a course in the Theory of Statistics. *Two hours weekly, through the year.* After a study of the elements of the theory of probability, the mathematical theory of statistics and correlation was discussed. The theory of curves and the various methods of fitting curves to data were given in detail.

Dr. Musselman also gave a course in Mathematics for Chemists. *Two hours weekly, last half-year.* The topics in Calculus and Differential Equations useful in applied mathematics were discussed and their application to Thermodynamics and Chemistry treated.

UNDERGRADUATE COURSES

Course 1. This course covered the subjects of elementary Plane Analytic Geometry and the beginnings of Calculus. Students who had not matricu-

lated in Plane Trigonometry were given about five weeks' instruction in that subject before entering upon the course proper. The classes met three times a week during the year, and, in addition, met once a week in "Conference," a two-hour session for the purpose of supplementary explanation of the work of the week, and of preparation for the work of the coming week.

One hundred and ten students successfully completed this course, the class being divided into seven sections, taught by Associate Professor Murnaghan, Associates Musselman and Nelson (2 sections), and two student-assistants, Mr. Redditt (2 sections), and Mr. Moore.

Course 2. Differential and Integral Calculus.

As in Course 1, the class met three times a week during the year for regular class work and once a week in a two hour conference.

Seventy-four students successfully completed this course, the class being divided into five sections taught by Professor Hulburt, Associate Professors Cohen and Murnaghan, and Associates Musselman and Nelson.

Course 3. This course, which met three times weekly throughout the year, was devoted to the solution of most of the types of differential equations likely to be encountered. Many applications, especially to geometry and mechanics, were made. Underlying topics in calculus, not usually given in Mathematics 2, were supplied. The course was conducted by Associate Professor Cohen.

Course 4. For the first half-year this was a four-hour course, and was taken by four students. The subjects taught were Determinants and the Elements of Projective Geometry.

During the second half-year the course was a five-hour course and was followed by six students. The subjects treated were some topics in Advanced Calculus, Gamma Functions and Fourier's Series.

Professor Hulburt gave the course.

PUBLICATIONS

F. Morley.

Pleasant Questions and Wonderful Effects. Presidential address before the American Mathematical Society, December, 1920. *Bulletin Am. Math. Soc.*, vol. 27, no. 7.

F. D. Murnaghan.

1. The Absolute Significance of Maxwell's Equations. *Phys. Rev.*, N. S. vol. 17, p. 73 (1921).
2. A Cubic Space Curve connected with the Tetrahedron. *Amer. Math. Monthly*, vol. 28, p. 203 (1921).
3. The Quest of the Absolute. *Scientific Amer. Monthly*, March, 1921. Reprinted in Relativity and Gravitation (Ed. J. M. Bird). Munn & Co. (1921).
4. The Derivation of Symmetrical Gravitational Fields. *Phil. Mag.*, vol. 43, p. 19 (1922).
5. The Deflexion of a Ray of Light in the Solar Gravitational Field. *Phil. Mag.*, vol. 43, p. 580 (1922).
6. Vector Analysis and the Theory of Relativity. *Johns Hopkins Press* (1922).

C. A. Nelson.

A conjugate system with conjugate axis curves. *Tôhoku Math. Journal*, vol. 20, nos. 3, 4.

The American Journal of Mathematics is in its forty-fourth volume.

FRANK MORLEY,
Professor of Mathematics.

ORIENTAL SEMINARY

In the Oriental Seminary, under the direction of Professor Haupt, twenty courses in the various branches of Oriental research were given during the past year, special attention being paid to the Old Testament and the cuneiform inscriptions bearing on the Scriptures.

Fifteen hours weekly during the year were devoted to the study of *Hebrew and the Old Testament.* In the Old Testament Seminary, two hours weekly through the year, Professor Haupt gave a critical interpretation of the *Book of Joel,* supplemented by the reading of *Selected Psalms.* He also conducted a weekly series of exercises in *Hebrew Prose Composition,* the students translating idiomatic English sentences into Hebrew. In addition to these advanced courses, he interpreted, through the year, *Selected Chapters of the Authorized Version,* explaining a number of Maccabean Psalms, legal sections, and some passages in the New Testament. Dr. Blake gave, through the year, a series of lectures on *Comparative Hebrew Grammar* with special reference to phonology and the morphology of the noun and verb. The instruction in *Elementary Hebrew* was given, three hours weekly through the year, by Associate Professor Ember who also conducted the *Second Year's Course in Hebrew,* two hours weekly during the first half-year, while during the second half-year this course was given by the Rayner Fellow elect, Mr. Finesinger. Dr. Rosenau met a class through the year, for the *Cursory Reading of the Hebrew Bible,* and conducted a course, through the year, in *Post-Biblical Hebrew,* interpreting selections from the Mishnah and Talmud. He also gave a series of lectures on the *Literature of the Old Testament* with special reference to composition, date, and authorship. A series of lectures on *Biblical Archæology,* illustrating life in ancient Egypt, Babylonia, and Palestine, were given by Dr. Dougherty.

A course in *Interpretation of the Aramaic Portions of the Book of Daniel,* with special reference to the vocabulary of Biblical Aramaic, was conducted, through the year, by Dr. Blake.

Dr. Blake gave a series of lectures, through the year, on the *History of the Ancient East* (Egypt, Babylonia, Assyria, Persia, Israel, Judah, and the minor nations of Western Asia), preceded by a sketch of the prehistoric period.

In *Arabic,* Associate Professor Ember conducted courses in *Elementary Arabic,* two hours weekly through the year, and in *Advanced Arabic,* one hour weekly through the year, selections being read from Fischer's Chrestomathy.

In *Assyriology,* Professor Haupt lectured, weekly through the year, on *Comparative Assyrian Grammar* and conducted weekly exercises in *Assyrian Prose Composition,* the students translating from unpointed Hebrew into cuneiform. Dr. Dougherty met a class for the reading of selected *Cuneiform Historical Texts and Contract Tablets,* two hours weekly during the first half-year, and one hour weekly during the second.

In *Egyptology,* Associate Professor Ember interpreted the *Pyramid Texts,* two hours weekly through the year, and gave courses in *Hieratic* and *Coptic,* each one hour bi-weekly through the year.

After Associate Professor Ember's departure, early in April, for the purpose of pursuing special investigations in Europe, his courses were continued by Dr. Blake and Mr. Finesinger.

Dr. W. G. Seiple, of Sendai, Japan, who held the Rayner Fellowship during the year 1904-5, conducted a course in the elements of *Japanese*, weekly during the second half-year.

The instructors and advanced students met weekly, through the year, to present new discoveries and reports on important articles in the leading Oriental journals. The following original contributions were presented:— Professor Haupt, Oct. 3: Ass. *laxû*, jaw = Heb. *lô'* (JBL 33, 290) = Arab. *nû'* = Eg. *nḫ*. Ass. *qâtu*, hand = Talmud. *qáttâ*, handle < *qn* > Heb. ***qanâ***, manipulate, fashion, create, get; Arab. *qáin*, smith; Heb. *qen*, nest, orig. *structure;* Heb. *qînâ*, elegy, orig. *composition;* Heb. *qannâ*, irascible, orig. *touchy.* Changes among European orientalists.—Oct. 4: Cancer in the cuneiform inscriptions and in the Old Testament.—Oct. 5: Explanations of terms for *carcinoma* in native Arabic dictionaries.—Oct. 11: Arab. *âxar*, other (orig. *following;* cf. Lat. *alter*) not connected with *ax*, brother, but like *âxir*, last < *xr*, hole, anus (AJSL 23, 250). Prefixed aleph in Heb. *aḥôr*, posterior, remnant of preposition as in Heb. *eṯmôl* (JBL 36, 148). *Dôr aḥḥér*, Joel 1, 3, not *another* generation, but *next* generation. Joel = Protogenes < *ụa'al;* cf. Arab. *áụụal*, first (AJSL 22, 255). Jacob and Arab. *'aqb*, son, descendant, orig. *successor.*—Oct. 18: Heb. *rêšît-ôn*, first-born. Arab. *fádaxa* = *šádaxa* = *ṯádaǧa* (partial assimilation of *x* to *d*).—Nov. 1: Jehoram's disease (2 Chr. 21, 19) not cancer of the rectum, but membranous colitis. Heb. *rĕḵûš* orig. *pack-animal*, then *baggage*, train, suite, retinue, court, household (2 Chr. 21, 16).—Nov. 8: Heb. *'ûšû* (Joel 4, 11) < *'ašáš* = Arab. *ǧássa*, invade; cf. *ǧâça*, to plunge (with partial assimilation of *s* to *ǧ* as in *muǧiça* = *muǧisa*. Brunch words and portmanteau-words. Ass. *barbaru*, wolf (= Sum. *ur-bara*, lit. *wild dog;* JBL 36, 255) and Arab. *kalbu-'l-barri*.—Nov. 15: *Heb. bôrît*, lye, orig. *cleanser* < *br* > Heb. *barûr*, pure, &c. (JBL 36, 143; 37, 219; 39, 164). Heb. *'ašáš* (Joel 4, 11) =Arab. *ǧássa* either *irrumpere* or *erumpere* (so Vulgate).—Jan. 3: Heb. *aụn*, abundance, fulness (JBL 36, 94, n. 7) and *emptiness*, nothingness.—Jan. 10: Date of Joel. Heb. *argáz*, receptacle = *azgar* = *asgar* < *sgr* (or *skr*) close; *cf.* Syr. *rĕǧâztâ* (or *rĕǧâstâ*) wallet, bag, basket < *zĕǧár* = *sĕǧár* = *sĕḵár*.—Jan. 17: Connection between bakers and brewers in antiquity. Ass. *giššiniš*, like stubble < Sum. *giš*, stalk + *gan*, field. Heb. *hibbîṭ*, look, and Ass. *nabâṭu*, shine; *cf.* Eng. *glance* = *gleam* and *look*.—Jan. 24: *'Aín*, spring, prop. *eye* of the earth. Eg. *smḥ*, east, either < *šm'l*, left, which became *šm"* > *šmḥ* (*ḥ* < *'* < *"*) or Šaphel < *mûl*, front; Eg. *mḥ*, north, refers to Mediterranean, and *r'š*, south, to *beginning* (Gen. 10, 10) of Egyptian kingdom.—Feb. 7: Heb. *kôhén*, priest = Arab. *kâhin*, soothsayer (*i. e.* orig. one who tells the truth) < *kahan* = *kûn* > Ass. *kêttu* = *kêntu*, truth. Heb. *qahál*, congregation, orig. *convocation* < *qahal* = *qûl*, to call < *qôl*, voice. Syr. *ḥĕụârâ*, glance, look, and *ḥiụụârûtâ*, whiteness, orig. *shine.* Arab. *sarǧ*, *sar'*, shoot < Heb. *śârîǧ*, intertwined branch, which etymologically corresponds to Arab. *šájar*, tree, shrub; for *'* > *ǧ* cf. *ṯála'a* = *ṯálaǧa* or *fálaǧa*. Arab. *ḥâša* = *ásra'a* < Heb. *ḥûš*, hasten. Heb. *ḥorp̄*, harvest = Ass. *puxru*, gathering; *cf.* Eg. *pḥrt*, troop, remedy, and NÄ 143, 206;. also *to gather* = to put in order; *to assemble* = to fit together; *to compose* = to bring into a proper condition; a remedy may be *compounded.*—Feb. 14: Modern parallels (*pin it to your lapel; put it into your pipe and smoke it*) to Biblical injunctions with regard to phylacteries. Aram. *šîp̄'â*, overflow, Šaphel of *bǧ;* cf. Arab. *baǧr*, *baǧš*, *baǧi*. Heb. *'ašâ*, to do, and Syr. *'assís*, to occupy, keep busy. Heb. *Çîdôn*, Sidon = *mĕçâd*, fastness, stronghold. Heb. *ḥošḵ*, darkness, and Arab. *ishánkaka.* Arab. *fáụdaj* = *háụdaj*, howdah; contrast Sp. *haba* = Lat. *faba;* *hijo* = Lat. *filius.* Arab. *ṯádina*, stink, connected with *ántana* = Heb. *natân*, Ass. *nadânu* (ZDMG 69, 564). *Ṯádina* < *ṯátina*, prefixed *ṯ* causative (JBL 35, 321, below). Root *tn*, smell (prop. *give* smell; so AV, Cant. 7, 13) also in Heb. *tan*, jackal, prop. *smelly;* cf. Heb. *'ez*, goat, prop. *strong* = ill-smelling (JBL 39, 154,

l. 9). *N* in Ass. *enzu*, goat (> Sum. *uz*, *us*) secondary.—Feb. 21: Ass. *iç tallakti*, a wooden vehicle. Šaphel forms with prefixed *t* in Arabic. Syr. *tĕnânâ*, smoke, steam, reek, fume, transposition of *nĕtânâ*, Arab. *natânah*, stench; *cf.* Eng. *reek*, orig. *to smoke*, then *to emit an unpleasant smell*. Aram. *tĕnânâ* not = Arab. *'utân;* not connected with *attônâ*, oven < Sum. *udun* (MLN 33, 433). Phen. *ytn*, give, and Arab. *yâtana*, give oneself to; *cf.* Eth. *astantâna* (ZDMG 69, 564). Heb. *êtân*, unceasing, derived from same stem.—Feb. 28: Arab. *kásil*, lazy, and Heb. *kôšél*, stumbling, tottering (Is. 5, 27). Arab. *kasmala* < *maksala* (JBL 39, 153, l. 2) = Fr. *trottiner*, Ger. *trippeln;* Eng. *trip* may mean *stumble*. Damîrî's *Ḥaiât al-Ḥaiawân*. Arab. *dahmâ'*, pot, orig. fem. of *ádham*, black; *cf.* Eng. *crock* = *pot* and *soot* (JBL 38, 47) and the Welsh adage *The soot is in the pot*.—March 7: Heb. *môṗét* (< *ma'pit* < *ma'pid*) and Arab. *ádaba* (< *adapa;* cf. *dábba* = *dáffa*) = *ta'ájjaba*.—March 14: Ass. *mašqâtu* (*maš kat-ti*) irrigation ditch. Arab. *xúnnas*, planets, and Ass. *nixêsu*, to move.—March 21: Origin and development of musical instruments. Dialect of the Faroe Islands.—March 28: Nectar, orig. fragrant fat < *qaṭar* > *qĕṭórt*, sweet vapor of sacrifice (JBL 35, 91, n. 11). Ambrosia < *'ambar*, ambergris (AJSL 23, 261). Primary connotation of Hebrew words for gold and silver: *fusible*. Heb. *ḥašmál*, electrum (*i. e.* an alloy of gold and silver) = Ass. *elmešu* < *ḫšm* = *šamaḥ*, Syr. *açmáḥ*, glitter.—April 4: Ass. *šamâxu*, flourish (> Syr. *šĕɣáḥ*) = Heb. *šamáḥ*, rejoice (*cf.* Lat. *lœtus ager*). For *çamaḥ* = *šamaḥ* cf. *çaḥaq* = *šaḥáq*, laugh, and Ass. *çaxâṭu* = Heb. *šaḥáṭ*. Preparation of manuscripts of Oriental articles for the press.—April 11: Heb. *'im*, like, and Eng. *with* = like. Nectar, the fragrance of the burning fat of sacrifices, inhaled by the gods; hence either food or drink; *cf.* Arab. *šárib duxân*, to smoke tobacco, prop. to *drink* smoke.—April 27: *Hookah*, water-pipe for smoking = Arab. *ḥúqqah*, cavity, receptacle, little box.—May 9: The glosses in Joel 2, 14. Absence of first and second persons in Sumerian and Sabean verbs (EB[11] 24, 628[b]). Otto (of roses) = *attar*, Arab. *'áṭar*, doublet of *qutâr*, odor (= Ass. *qutru*, smoke) and *'áṭan*, smoke. Primary connotation *ascending* (cf. *'átan*, or *'áfan*, *fî-'l-jabal*). Arab. *'áraf*, to know = Ass. *erêšu*, to scent (JHUC 316, 24) another doublet. For *ṭ* = *t* cf. Aram. *qaṭṭáiiâ*, cucumbers = Arab. *qittâ'* (JBL 39, 162). *R* = *n* as in Heb. *mizráḥ*, orient = Aram. *maḏnĕḥâ; q* = *'* as in Aram. *árqâ* = *ár'â*, earth, or Heb. *qarâ*, meet = Aram. *'ărá'* (or *'ărá';* cf. Aram. *lĕ-'ur'ĕh* = Heb. *liqrâṭô*) = Arab. *'áraḍa* > *'arḍ-al-jáiš*, military review, parade; *cf.* Heb. *'ăçért*, festal assembly. For the final *â* in Heb. *qarâ* cf. Syr. *mĕḥâ* = Ass. *maxâçu*, to strike = Arab. *máxaḍa* (Judg. 5, 26: *maḥáq*).—May 16: Ass. *tumru*, smoke, not = Syr. *tĕnânâ* (cf. Ass. *zunnu*, rain = Eth. *zĕnâm*, Heb. *zerm*) but = Heb. *tîmôrâ*, pillar of smoke, Khull. 112[a], < *tamár*, to ascend (ZDMG 63, 518, l. 38).—May 23: Black, brown, and yellow locusts in cuneiform vocabularies, corresponding to larvæ, adult females, and adult males. Arab. *síruah* or *síriah*, newly hatched locust, and Syr. *šaruâiâ*, fresh, new, beginner; Arab. *sarû'*, female locust depositing eggs, and Syr. *šaruâiĕtâ*, primiparous < *šárrî*, begin.

Associate Professor Ember, Oct. 5: Carcinomá in native Arabic dictionaries.—Oct. 18: Arab. *šádaxa*, crush, more original than *fádaxa* and *tádaǧa;* cf. Eg. *šdḥ*, crush grapes. Eg. *sn*, brother, connected with *sn*, two.—Nov. 1: Eg. *šdḥ*, crush grapes = Heb. *šḥṭ*, press.—Nov. 8: Eg. *šdi*, hide, pull, orig. *pull off hide*, then *suckle*, then *rescue, take*, connected with Heb. *šiddéd*, Arab. *šádda*. Eg. *ššd* causative of *šd*.—Nov. 15: Eg. *bd*, soap = Heb. *baḏâḏ*, separate; *cf.* Heb. *bôrît*, lye, and *barár*, separate.—Jan. 10: Eg. *čzm* < *kzm*, hound = Arab. *kassâb*, grasper, dog. Eg. *uzḥ*, urinate = Arab. *úzaǧa*.—Jan. 17: Connection between brewers and bakers in antiquity.—Jan. 24: Names of cardinal points in Egyptian: *imn*, west, prop. right; *smḥ*, east, prop. left; *i'bi*, east, prop. left, unfortunate; *cf.* Arab. *áriba; r'š*, south, prop. head; *mḥ*, north, prop. fill.—Jan. 31: Eg. *iw'*, exchange, give one thing for another

= Arab. *'âḍa*.—Feb. 7: Eg. *ḥ'p*, rain, rainy weather = Heb. *ḥorp̄*, autumn, winter. Eg. *ḥnp*, fat = Heb. *ḥelb*. Eg. *mḥt*, north = Arab. *bâḥaḥ*, expanse of water; *cf.* Ass. *Amurru*, Mediterranean, West < *ǧámara* > Arab. *ǧámraḥ*, great body of water (JHUC 306, 22).—Feb. 14: Eg. *smḥ*, ship = Arab. *sábaḥ*, swim, float. Eg. '", speak a foreign language = Arab. *lúǧah* (JBL 33, 292). Eg. *nṳd* = Heb. *nûḏ*, wander. March 7: Heb. *môp̄ēt*, miracle < *ṯap̄â*, be beautiful, Eg. *ṳp ṯ*.—March 14: Accentual character of Egyptian meter. Eg. ', arm = Berber *ǧil*. Eg. *'nm*, man = Arab. *anâm*, Berber *ilem*. Eg. *fk'*, reward = Berber *efek*. Egyptian words for *moon* mean orig. *wanderer:* Eg. *ṯ'ḥ*, *ṳ'ḥ* = Heb. *ṯaréḥ;* Eg. *'bdu* = Heb. *aḇád*, wander away; Eg. *ḥnsṳ* = Arab. *wúnnas*.—March 28: Eg. *ḥmt*, copper, be hot, melt = Arab. *ḥámmu*. Loss of *r* in Egyptian preposition *ṯr*.

Dr. Rosenau, Jan. 17: Shechinah a term like *maqôm*.

Dr. Blake, Dec. 6: Attraction of accent by laryngeals in Ethiopic (e. g. *ferhát*, hear) and by glottal catch in Tagalog (e. g. *big'át*, weight).—Jan. 17: Definite state *ĕlâhâ*, the god, instead of *ĕlâh*, god, in Dan. 3, 15.—Jan. 24: Heb. *mî*, Arab. *man* as adjectives.—Feb. 7: Syr. *šĕp̄aḳ*, pour out, *šĕp̄á'*, overflow; *sĕḇá'*, have enough—a congeneric group.—Feb. 25: Eth. *hî*, also, emphasizing indefinite meaning of relative pronoun.—March 7: Eth. *kôna* and *hallâṳa* parallel to Sp. *ser* and *estar*.—May 2: *Te* of Lat. *iste* perhaps connected with *tu, te;* cf. Arab. *ḏâka*, that.

Dr. Dougherty, Dec. 6: *Têmâ* in Cyrus-Nabonidus Chronicle = Arabian oasis *Taṃâ'*.—Jan. 17: Connection between bakers and brewers in antiquity. —Japanese superstition that closing of a well produces blindness and Semitic *'áṇ*, eye = spring.—Feb. 14: Ass. *gidimu* not < *gadâmu*, but derivative of *ṭamû*, spin, with determinative *gi* = *qanû*, reed.—Feb. 21: Ass. *alpe ša tallakti*, oxen of the wooden way.—Feb. 28: Bab. *kasal*, barren land, and Arab. *kásil*, lazy; *cf.* Arab. *bâ'ir*, sluggard and fallow; Lat. *agrī cessatio;* Gr. *argòs agrós*.—March 14: Ass. *mašqâtu* (*maš-kat-ti*) < *šaqû*, to water, meaning *water's edge* or the like.—April 11: Ass. *buštum* in *alpu buštum* < *epêšu*.

Dr. Sellers, Feb. 21: A Babylonian corn-planter.—March 14: Meter of Sinuhe story.—April 11: Use of *with* in Egyptian for *like*.

The following reports were presented: Professor Haupt, Nov. 15: Albright's articles on Hebrew Chronology, Menes and Narâm-Sin, Magan and Melucha. Synchronism of Menes and Narâm-Sin, Colony of Cretan Mercenaries on Coast of Negeb.—Nov. 22: Fourth edition of Kautzsch's AT; Clay's Antiquity of Babylonian Civilization.—Nov. 29: Paton's *Spiritism in Antiquity;* Alice Fletcher's *Indian Song and Story*.—Dec. 13: Ignaz Goldziher. Present conditions in Palestine according to Sir Herbert Samuel's report.—Jan. 3: Rath's *New Practical Hebrew Grammar;* Thilo's *Hoheslied;* Mrs. Brooks' *Moral Practices in Ancient Mesopotamia;* Mowinckel's *áṇn*, witchcraft; Bulletin 5 of American School of Oriental Research in Jerusalem; Proposed tunnel from Mediterranean to Dead Sea.—*Mitteilungen der Deutschen Orient-Gesellschaft*, No. 61; *Zeitschrift für alttestamentliche Wissenschaft*, vol. 39, parts 1 and 2.—March 7: *Journal of Society of Oriental Research*, vol. 5, part 2.—March 14: Sellin's new commentary on Minor Prophets.—March 21: Program of General Meeting of American Philosophical Society.—*Zeitschrift der Deutschen Morgenländischen Gesellschaft*, vol. 76; Program of annual meeting of American Oriental Society; Gunkel's *Ein Vorläufer Jesu*. —May 2: Hittite laws from Boghaz Keui in *Der Alte Orient*, vol. 23, part 2; The sources of the Assyrian legal code in *Mitteilungen der Vorderasiatischen Gesellschaft*, vol. 26, part 2; The development of Nut, a goddess of heaven, into a goddess of death, *ibid.* part 3.—May 23: Eduard Meyer's *Ursprung und Anfänge des Christentums*, vol. 2.

Associate Professor Ember, Nov. 29: Controversy between Albright, Sayce, and Langdon over synchronization of Menes and Narâm-Sin.—Dec. 13: Deaths of Goldziher and Poznanski.—Hebrew letter on historicity of Jesus.

Dr. Rosenau, Nov. 8: Osterley's *Immortality and the Unseen World.*—Nov. 22: Otto Stahlen's *Hellenistisch-jüdische Literatur; Monatsschrift des Judentums.*—Dec. 20: Death of Talmudic scholar David Hoffmann.—Feb. 14: Henry Malter's *Saadya.*

Dr. Blake, Dec. 6: Reisner's discoveries at Gabal Barkal.—Jan. 3: Completion of arrangements by American Oriental Society for printing his Tagalog grammar.—March 21: Otto Scheerer's article on peculiar representation of *l* sound in Aklân Bisaya.

Dr. Sellers, Jan. 3: Meeting of Society of Biblical Literature in New York.—Jan. 71: Wooden models of tomb of Egyptian noble of 11th dynasty, now in Metropolitan Museum, New York.—Jan. 24: Proposed edition of Egyptian Coffin Texts by Lacau, Gardiner, and Breasted.—March 7: Excavations of University of Pennsylvania at Beth shean.—March 21: Egyptian musical instruments.—May 16: Poem *The Cigarette* in *American Legion Monthly* (April 28) illustrating connection between smoke and nectar.

Mr. Finesinger, March 7: Demotic papyri discovered by expedition of University of Pennsylvania.—March 14: Works of M. J. Berdichewski; Glück's translation of *En Yakob.*—April 11: E. Sapir's *Language.*—April 25: Marx's article on Aramean fragment of Wisdom of Solomon.—May 2: A Hebrew history of Zionism in Russia; Selikovitch's Teachings of Buddha in Biblical Hebrew, Hebrew letter on papacy.—May 16: Selikovitch's poem *Mĕçâṯiṯ.*

At the meetings of the University Philological Association the following papers were presented by members of the Oriental Seminary: Professor Haupt.—Oct. 20: Cancer in the Bible; Nov. 27: The disease of King Jehoram of Judah; Dec. 15: The Poems of Joel; Jan. 19: *to go flooie* and Ger. *flöten gehn;* Feb. 16: Combined Rhythms; March 16: The Sumerian affix *tam;* April 27: Nectar and Ambrosia; May 18; Lydian glucose.—Associate Professor Ember:—Feb. 16: The Egyptian terms of Orientation; March 16: The Egyptian word for *moon.*—Dr. Sellers: Dec. 15: Palmerworm and Cankerworm.

At the annual meeting of the Society of Biblical Literature and Exegesis, held in New York, Dec. 28 and 29, Professor Haupt presented four papers:—(a) Casting all your care upon Him; (b) Maschil and Shiggaion; (c) The Compendium of Eschatology; (d) Mixed Meters.—Dr. Sellers read a paper The Locusts in Joel.

At the General Meeting of the American Philosophical Society, Philadelphia, April 22, Professor Haupt presented a paper on the Biblical Manna.

At the annual meeting of the American Oriental Society, held in Chicago, April 18 20, the following papers were presented by members of the Oriental Seminary:—Professor Haupt: (a) Numeratives in Sumerian and Chinese; (b) The Original Meaning of *kôhén,* priest; (c) The Hebrew Names for Silver and Gold; (d) Oriental Philology and Archæology.—Dr. Rosenau: (a) A Note on *u-šĕḏerôṯ ba-'ărazîm,* 1 K 6, 9; (b) Some Prayers in the Book of Tobit.—Dr. Blake: (a) Long-distance Collection of Philippine Linguistic Material; (b) The Expression *man hû ĕlâh dí . . .* in Dan. 3, 15.—Dr. Dougherty: The Comparative Value of Metals in Babylonia.—Mr. Finesinger: Arabic *láḍṭa* and *lâta.*

Dr. Rosenau read the following additional papers:—The Significance of Jewish Ceremonies, Albany, N. Y., Nov. 28; The Synagogue of the Past and Present, Baltimore Y. M. C. A., Dec. 20; The Songs of Degrees, Jewish Chautauqua Society Assembly at Dallas, Tex., Dec. 28; The Spirit of Jewish Edu-

cation, Baltimore League of Jewish Women's Clubs, Feb. 19: James Cardinal Gibbons and his attitude toward Jewish Problems, American Jewish Historical Society, April 30.

The Rayner Fellow, O. R. Sellers, received the degree of Ph. D. at the end of the session. The title of his dissertation was *The Book of Joel;* his subjects were Old Testament, Egyptology, and History of the Ancient East.

The most pressing needs of the Oriental Seminary are:

(1) The appointment of an Assyriologist to the chair of Oriental History and Archæology;

(2) A less inadequate appropriation for new books in the various departments of Oriental Research, including Assyriology, Egyptology, Biblical Philology, Oriental History and Archæology, Hebrew, Talmud, Rabbinical Literature, Arabic, Persian, Turkish, Jewish Arabic, Syriac, Ethiopic, Amharic, Phenician, Sabean, Philippine dialects, &c., &c.

PUBLICATIONS

Paul Haupt.

Early References to Cancer. *Journal of the American Medical Association,* vol. lxxvii, p. 1440.

Heb. *roʿ*, evil = Arab. *ʿurr*. *Journal of Biblical Literature,* vol. xxxix, pp. 152-155.

Heb. *mardût*, chastisement and chastity. *Journal of Biblical Literature,* vol. xxxix, pp. 156-158.

Pelican and Bittern. *Journal of Biblical Literature,* vol. xxxix, pp. 158-161.

Qaš, straw, and *qäšt*, bow. *Journal of Biblical Literature,* vol. xxxix, pp. 161-163.

Assyr. *birku.* knee, and *karâbu,* to bless. *Journal of Biblical Literature,* vol. xxxix, pp. 163-165.

Addenda. *Journal of Biblical Literature,* vol. xxxix, pp. 170-172.

The Sixth Egyptian Plague. *American Journal of Philology,* vol. xliii, pp. 238-239.

Jehoram's Fatal Illness. *American Journal of Philology,* vol. xliii, p. 239.

The Valley of the Gorge. *American Journal of Philology,* vol. xliii, pp. 240 241.

Heb. *pĕletâ* and Ger. *flöten gehn. American Journal of Philology,* vol. xliii, pp. 241 243.

Combined Rhythms. *American Journal of Philology,* vol. xliii, pp. 243-245.

Heb. *ʿaštê* and Sum. *aš-tân. American Journal of Philology,* vol. xliii, p. 245.

Heb. *qĕtórt* and Gr. *néktar. American Journal of Philology,* vol. xliii, pp. 245-247.

The Etymology of Manna. *American Journal of Philology,* vol. xliii, pp. 247-249.

Hidalgo, and Filius Hominis. *Journal of Biblical Literature,* vol. xl, pp. 167-170.

Greek *sīrós*, silo, and *sōrós*, stack. *Journal of Biblical Literature,* vol. lx, pp. 170 173.

Asmodeus. *Journal of Biblical Literature,* vol. lx, pp. 174-178.

The Last Supper. *Journal of Biblical Literature,* vol. lx, pp. 178-180.

He who runs may read. *Journal of Biblical Literature,* vol. lx, pp. 181-182.

The Son of Man = *hic homo* = *ego. Journal of Biblical Literature,* vol. lx, p. 183.

William Rosenau.

Reminiscences. *Hebrew Union College Monthly,* Cincinnati, O., Dec. 1921-Jan. 1922.

Review of *Saadia Gaon, His Life and Works,* by Henry Malter. *Jewish Times,* May 5, 1922.

James Cardinal Gibbons and his Attitude towards Jewish Problems. *Jewish Times*, April 30, 1922.

Harel and Ha-Ariel, Ezek. 43, 15-16. *Monatsschrift für Geschichte und Wissenschaft des Judentums*, vol. lxv, pp. 350-356.

Frank R. Blake.

A New Method of Syntactical Arrangement. *Journal of the American Oriental Society*, vol. lxi, pp. 467-471.

Raymond P. Dougherty.

Ancient Teimâ and Babylonia. *Journal of the American Oriental Society*, vol. lxi, pp. 458-459.

PAUL HAUPT,

W. W. Spence Professor of the Semitic Languages, and Director of the Oriental Seminary.

PHILOSOPHY

Graduate courses have been given by Professor Lovejoy on Types of Idealistic Metaphysics in the Past Quarter-Century, and on the History of Political Philosophy in England and France since the Sixteenth Century. Fortnightly evening meetings of the Colloquium, established at the beginning of the year, have been held, with valuable coöperation from the Departments of Psychology, Psychiatry and Biology. The purpose of the Colloquium is primarily to afford a convenient means of interdepartmental coöperation in the informal but thorough and sequential discussion of questions of common interest to students of philosophy and to specialists in other sciences. The work of the year has been devoted chiefly to problems concerning the method of psychological inquiry, and the psychology of perception and judgment. One or more papers have been contributed by Professor Bowman of Goucher College, Professor J. S. Moore of Western Reserve University, Professor J. W. Scott of the University College of Cardiff, Wales, Professor Dunlap, Professor Lovejoy, Dr. H. E. Cory and Mr. D. Brunswick.

Dr. George Boas, formerly of the University of California, assumed his duties as Associate in Philosophy at the beginning of the year and has been in charge of the undergraduate courses. An interesting innovation has been the dropping of the traditional course in formal logic, chiefly taken in the past by upper-class students, and the substitution of a special whole-year course for freshmen, entitled "Introduction to College Work," designed to give the student at the beginning of his university course an elementary training in methods of study, in the logical analysis of reasonings of various types, and in correct and critical processes of thinking. The general plan of the course, prepared by a committee of the Board of Collegiate Studies consisting of Professors Barnett, Bliss, French, Hulburt and Lovejoy (chairman), rests upon the belief that the undergraduate should at the outset be made to realize that the acquisition of the art of thinking clearly and competently is an even more important object of a college education than the acquisition of certain masses of information; that he should early be made acquainted with those fundamental procedures and precautions common to all or to many phases of intellectual activity; and that these things are likely to be acquired only through a course long enough to make possible the formation of good intellectual habits, through abundant actual exercise in these activities by the student, under careful individual criticism by the instructor. The course has been placed under the direction of the Department of Philosophy by vote of the Collegiate Board, and the details of the plan have been worked out and the course conducted by Dr. Boas.

The work of the instructor has been supplemented by the following lectures: Lt. Col. C. E. Kilbourne, Army War College, "How a General Plans a Campaign"; Mr. S. W. Geiser, Adam T. Bruce Fellow, "The Logical Bases of Darwinism"; Professor G. W. Corner, Department of Anatomy, "An Experiment in Embryology"; Dean Latané, "Historical Evidence"; Professor E. Bowman, Goucher College, "Experimental Methods in Psychology."

PUBLICATIONS

Arthur O. Lovejoy.

Pragmatism and the New Materialism. *Journal of Philosophy*, xix, 1922, pp. 5-14.

The Paradox of the Thinking Behaviorist. *Philosophical Review*, xxxi, 1922, pp. 135-147.

Reply to Professor Babbitt. *Modern Language Notes*, xxxvii, 1922, pp. 257-274.

The Length of Human Infancy in Eighteenth Century Thought. *Journal of Philosophy*, xix, 1922, pp. 381-385.

Time, Meaning and Transcendence. *Journal of Philosophy*, xix, 1922, Pt. I, pp. 505-515; Pt. II, pp. 533-541.

Review of B. Russell: *The Analysis of Mind*. *The Independent*, cvii, 1921, pp. 215-216.

George Boas.

An Analysis of Certain Theories of Truth. *University of California Publications in Philosophy*, ii, 1921, pp. 187-290.

Review of J. Souilhe: *Etude sur le terme Δύναμις dans les Dialogues de Platon*. *Journal of Philosophy*, xix, 1922, pp. 332 334.

Review of Marie Duclaux: *Victor Hugo*. *The Nation*, cxiii, 1921, pp. 623-4.

Albert L. Hammond.

Appearance and Reality in the Theory of Relativity. *Philosophical Review*, xxx, 1921, pp. 602-615.

Immediate Inference and the Distribution of Terms. *Journal of Philosophy*, xix, 1922, pp. 124-137.

ARTHUR O. LOVEJOY,
Professor of Philosophy.

PHYSICS

The Physical Laboratory has been open daily during the year for the work of advanced and undergraduate students. Regular courses of lectures have been given, and meetings have been held weekly for the reading and discussion of current journals.

The regular courses of instruction were as follows:

By Professor Ames:

1. General Physics. Thermodynamics, Heat Conduction and Quantum Theory. Three hours weekly, through the year.

2. Undergraduate Physics II. Mechanics and Thermodynamics. Three hours weekly, through the year.

3. Journal Meeting. One hour weekly, through the year.

By Professor Wood:

Selected Problems in Advanced Physical Optics. Three hours weekly, through the year.

By Professor Bliss:

1. Undergraduate Physics I. Four hours weekly, first half year.

2. Undergraduate Physics III. Electricity and Magnetism. Three hours weekly, second half-year.

By Associate Professor Pfund:

1. Electron Theory and Atomic Theories. Two hours weekly, first half-year.

2. Undergraduate Physics I. Four hours weekly, second half-year.

The work in Undergraduate Physics I, II and III was carried out in part by several assistants: Mr. H. T. Wensel, Mr. W. G. Brombacher, Mr. F. S. Brackett and Mr. F. P. Upton.

The laboratory work for undergraduates has been under the direction of Professor Bliss and Dr. Pfund with the assistance of the instructors named above. The advanced work and the original investigations have been under the direction of Professors Ames, Wood and Pfund.

There were eighteen advanced students who followed Physics as their principal subject. Of these three absolved the requirements for the degree of Doctor of Philosophy, their names and the titles of their dissertations being as follows:

Mr. W. L. Cheney—"Magnetic Properties of a Series of Pure Iron-Carbon Alloys as Affected by Heat Treatment and Carbon Contact."

Mr. W. G. Brombacher—"Detecting Efficiency of a Resistance-capacity Coupled Amplifier to 6000 Meters."

Mr. F. S. Brackett—"Visible and Infra Red Radiation of Hydrogen."

Three of the advanced students have absolved the requirements for the degree of Master of Arts, their names and the titles of their essays being as follows:

Mr. P. F. Gottling—"The Structure of the Atomic Nucleus."

Mr. W. W. Steffey—"The Experimental Verification of the Theory of Relativity."

Miss Frieda Kenyon—"Isotopes, from a Physical Standpoint."

Professor Ames was invited by the Franklin Institute to deliver an address before it on "Aeronautic Research" which was afterwards published in the *Journal* of the Institute. He also presented a paper before the National Academy of Sciences on "Recent Investigations in Aeronautics," and abstracts of this address have appeared in several places. At the last meeting of the National Academy of Sciences he was elected a member of the Council for a term of three years.

Professor Wood has continued the investigations made last year and several interesting results should be noted in connection with his work. The Balmer Series of Hydrogen has been photographed down to the 18th line with a plane grating spectograph of twenty foot focus yielding the first accurate determination of the wave-lengths of the higher members of the series. The resonance radiation of mercury vapor has been further investigated with respect to its polarization and the effects of admixture of argon, helium and other gases, and some quite new phenomena found of importance in connection with the theory of radiation. Some new and rather remarkable phenomena have been observed in cases where small insulated metal wires have been introduced into the path of the discharge in vacuum tubes. These wires are raised to a white heat under certain circumstances, the effect apparently being due to the action of the surface of the wire in causing the recombination of atomic into molecular hydrogen. A marked change in the spectrum of the gas accompanies the phenomenon.

Professor Bliss has been engaged on the report entitled "On Physics in Relation to Medicine" for the Educational Committee of the American

Physical Society, which will shortly appear in print. He was also invited to give the opening address of the New Science Section of the Association of Colleges and Preparatory Schools in the Middle States and Maryland. This address, entitled "Proposed Changes in the College Entrance Requirement in Science from the Point of View of the College," will appear in "School Science and Mathematics."

Dr. Pfund has developed during the year for photometric measurement a Precision Rotating Sector, whose aperture can be varied and measured to within one-tenth of one per cent. while the sector is in motion. He has continued his work in Colorimetry and has developed a Differential Tintometer which makes possible independent measurements on the strength and brightness of dyes. He has also been engaged in the study of the bands of selective reflection in the Infra-red, from surfaces of Quartz, Iceland spar, etc., to show the effect of physically disrupting the molecule. He is also studying the Potential Gradient from the outside to the inside of the cathode by means of the Stark effect.

The work of the graduate students is illustrated by the dissertations submitted and named above. In addition to these various other problems have been begun.

Since the last report the following papers have been published by members of the staff:

J. S. Ames.

Aeronautic Research. *Jl. Franklin Inst.*, vol. 193, No. 15, 1922.

R. W. Wood.

On Hydrogen Spectra from Long Vacuum Tubes. *Phil. Mag.*, vol. 42, No. 729, 1921.

The Time Interval between Absorption and Emission of Light in Fluorescence. *Proc. Roy. Soc.*, vol. 99, No. 362, 1921.

Fluorescence and Photo Chemistry. *Phil. Mag.*, vol. 43, April, 1922.

A. H. Pfund.

A Precision Rotating Sector: Aperture Variable and Measurable While in Motion. *Jl. Franklin Inst.*, vol. 193, Nos. 5, 641, 1922.

The staff and the students of the Laboratory had the privilege during the winter of hearing two lectures by Dr. F. W. Aston of Cambridge University on the extremely interesting subject of Isotopes. It is hoped that during the following years the University will encourage lectures of this type.

JOSEPH S. AMES,
Director of the Physical Laboratory.

POLITICAL ECONOMY

The instruction in Political Economy was directed by Professor Hollander, who met students daily in seminary organization for formal study and for coöperative research. The courses were designed to afford systematic instruction in general economic principles, intimate acquaintance with special fields of economic activity, and, most important of all, knowledge of and ability to employ sound methods of economic research. Dr. George E. Barnett, Professor of Statistics; Dr. William O. Weyforth, Associate in Political Economy; Miss Theo Jacobs, Associate in Social Economics; and Dr. Broadus Mitchell, Instructor in Political Economy, assisted in the conduct of the work.

ECONOMIC SEMINARY

The students following Political Economy as a principal subject for the degree of Doctor of Philosophy met weekly under the direction of Professors Hollander and Barnett. The work of the year centered in the investigation of representative forms of industrial development in the United States, and in the analysis of significant activities of American labor organizations. The papers and reports presented to the Seminary were as follows: "The Call Money Rate in the New York Money Market," by Mr. Griffiss; "Commercial Credit Companies," by Mr. Merrick; "The Shop Committee," by Mr. French; "A Comparison of Index Numbers of the Cost of Living," by Professor Barnett; "Open Price Associations in the Building Trades," by Miss Morrissy; "The Economist's Spiral," by Professor Hollander; "The Present Position of American Trade Unionism," by Professor Barnett; "Two Industrial Revolutions," by Dr. Mitchell; "Railroad Statistics and their Practical Applications," by Mr. Gillies; "Operating Statistics of Coal Production," by Mr. Tryon; "The Trade Acceptance versus the Assigned Account," by Mr. Merrick; "The History of the Shop Committee in the United States," by Mr. French; "Policies of the United Mine Workers in Times of Industrial Depression," by Mr. Wyckoff; "A Graphical Representation of the Course of the Call Money Rate on the New York Market," by Mr. Griffiss; "Mother's Pensions in the United States," by Miss Duvall; "The Policies of the United Mine Workers, 1919-1921," by Mr. Wyckoff; "The Shop Committee and Trade Unions," by Mr. French; "The Life of Frederick Law Olmsted," by Dr. Mitchell; "Unemployment in Baltimore," by Miss Babcock; "Savings Banks in the United States," by Mr. Black; "Acceptances—Bankers' and Trade," by Mr. Fedder; "Tax-exempt Securities," by Mr. Saiontz; "Wage Policies of Labor Organizations in Times of Industrial Depression," by Mr. Wyckoff; "Savings Banks in the United States," by Mr. Black; "Government Railroading in Canada," by Mr. Gillies; "The Call Money Rate on the New York Money Market," by Mr. Griffiss; "Tax exempt Securities," by Mr. Saiontz.

Appreciable progress has also been made by members of the Seminary in the study of special aspects of the several questions assigned for investigation. During the summer, field work was carried on in various carefully selected localities, and the data thus collected have since been supplemented and corrected by documentary study and personal interview.

Professor Hollander conducted the following courses of lectures:

1. Development of Economic Theory. Two hours weekly, through the year. During the first half year, critical attention was given to the basis of national prosperity and the theory of economic production. During the second half-year study was made of the economic system of John Stuart Mill.

2. Theory and Practice of Taxation. Two hours weekly, through the year. During the first half-year the history of taxation was traced. During the second half-year recent fiscal experiments in the United States and Europe were examined.

Professor Barnett lectured one hour weekly, through the year, on labor problems, with special reference to American conditions.

Professor Barnett, Dr. Weyforth, Miss Jacobs, and Dr. Mitchell conducted the following undergraduate courses:

Political Economy I. Three hours weekly, through the year. In the first half-year the economic development of England and the industrial experience of the United States were studied. In the second half-year particular attention was given to the history of distribution and its application to leading economic problems. (Dr. Weyforth and Dr. Mitchell.)

Political Economy II. Three hours weekly, through the year. In the first half-year a preliminary study of the value and place of statistics as an

instrument of investigation was made; attention was directed to the chief methods used in statistical inquiry. In the second half-year the principles of monetary science were taught with reference to practical conditions in modern systems of currency, banking and credit. (Professor Barnett and Dr. Weyforth.)

Political Economy IV. Three hours weekly, through the year. In the first half-year the problems growing out of modern industrial employment were studied. In the second half-year the history of the industrial corporation was studied. (Professor Barnett and Dr. Mitchell.)

Political Economy VI. Three hours weekly, through the year. In the first half-year the applications of statistics to business and economic problems, such as price levels, cost of living, wage adjustments, business cycles, and business forecasting, were considered. In the second half-year the theory and practice of finance was considered, with particular reference to the problems of taxation presented in the experience of the United States. (Dr. Weyforth and Dr. Mitchell.)

Political Economy VII. Two hours weekly, through the year. History and development of social work. The responsibility of the State and private organizations toward the dependent, defective, and delinquent. (Miss Theo Jacobs.)

COURSES IN BUSINESS ECONOMICS

During the past six years the Johns Hopkins University has offered a series of evening "Courses in Business Economics" under the general direction of the Department of Political Economy. Such instruction is made available at hours and under conditions designed to meet the convenience of those likely to make use thereof. While designed in the main to offer instruction to young men and women actually engaged in, or contemplating entrance into business, industry and commerce, the courses are planned to meet the needs also of those who have a more general interest in the subjects. The following courses were offered during the year:

Current Economic Problems. Tuesday evenings, 8 to 10. Professor Hollander.

Investments. Tuesday evenings, 8 to 10. Professor Barnett.

Business Statistics. Friday evenings, 8 to 10. Dr. Weyforth.

Principles of Business. Thursday evenings, 8 to 10. Dr. Weyforth.

Political Economy. Thursday evenings, 8 to 10. Dr. Mitchell.

Business Psychology. Tuesday evenings, 8 to 10. Mr. Isaacs.

Elementary Accounting. Thursday evenings, 8 to 10. Dr. Bryan.

Principles of Advertising. Thursday evenings, 8 to 10. Mr. Gunts and Mr. Barton.

Principles of Salesmanship. Wednesday evenings, 8 to 10. Mr. Palmer.

Business English. Wednesday evenings, 8 to 10. Mr. Uhler.

Principles of Suretyship. Tuesday evenings, 8 to 10. Mr. Radcliffe.

Railway Accounting. Monday evenings, 8 to 10. Mr. Deverell.

Casualty Insurance. Thursday evenings, 8 to 10. Mr. Clark.

Commercial Law. Wednesday evenings, 8 to 10. Mr. Dickerson.

The total number of attendants on the courses was 627. The total number of registrations for separate courses was 667.

COURSES IN SOCIAL ECONOMICS

The University continued instruction in Social Economics and offered the following courses: Judge Carroll T. Bond, Social Work and Law; Dr.

Richard A. Bolt, Health and Preventable Disease; Dr. Francis Lee Dunham, Social Medicine; Professor Elmer V. McCollum, Home Economics; Courtney Dinwiddie, Community Problems and Organization; Miss Jacobs, Social Case Work; Dr. Weyforth, Social Statistics; Mr. Levin, Immigrant Peoples; Dr. Mitchell, Social Legislation. Miss Jacobs' and Dr. Mitchell's courses ran through the entire year; the other courses for one-half year, with the exception of Professor McCollum's course, which consisted of sixteen one hour lectures. Twenty-one hours a week of field work in approved case-working agencies was required of students taking the full course. Two students completed the two years' course and received the degree of Master of Arts.

PUBLICATIONS

Jacob H. Hollander.

The Economist's Spiral. *Amer. Econ. Rev.*, March, 1922. (Presidential address delivered at the Thirty-fourth Annual Meeting of the American Economic Association held in Pittsburgh, December 27, 1921.)

George E. Barnett.

The Present Position of American Trade Unionism. *Amer. Econ. Rev.*, Supplement vol. xii, pp. 45-55.

William O. Weyforth.

Bogart: War Costs and Their Financing. Review. *Quar. Pub. Amer. Statis. Assoc.*, December, 1921.

Hourwich: Immigration and Labor. Review. *Journal of the Amer. Statis. Assoc.*, September, 1922.

The Reparations Situation. *Baltimore Evening Sun*, January 25, 1922.

Broadus Mitchell.

How to Start Workers' Study Classes. Pamphlet published by Workers' Educational Bureau, pp. 27.

Three Southerners. *South Atlantic Quarterly*, July, 1922.

Platitudes Toward Public-Mindedness, in three issues of *The Trend* (Philadelphia), April 7, April 21, and May 7, 1922.

Review of Tawney's The Acquisitive Society, in *South Atlantic Quarterly*, January, 1922.

POLITICAL SCIENCE

The work in Political Science has been directed by Professor Willoughby, and has for its primary purpose the preparation of advanced students for professional and original work in the fields of constitutional law, international law and diplomacy, and political theory. The instruction has also aimed to supply a training for students desiring to enter the higher branches of the public service, as well as to furnish a philosophical equipment to those who expect later to pursue the study and practice of the law.

Seminary. Weekly two-hour Seminary meetings were held, devoted to the consideration of doctoral dissertations in course of preparation, and to the discussion of current questions in constitutional and international law, and reviews of books and journals. The Seminary was directed by Professor Willoughby and Mr. W. F. Willoughby.

During the first half of the year Professor Willoughby was given leave in order that he might serve as Technical Expert to the Chinese Delegation to the Washington Conference on Armament and Pacific and Far Eastern Questions. During his absence the graduate lectures were given by Baron S. A. Korff.

The following graduate courses were given:

1. Parliamentary Government. *Two hours weekly, first half-year.* Baron Korff.

2. Problems of the Far East and the Washington Conference. *Two hours weekly, February and March.* Professor Willoughby.

3. Principles of Jurisprudence. *Two hours weekly, April and May.* Professor Willoughby.

4. Principles of Public Administration. *One hour weekly, through the year.* Mr. W. F. Willoughby.

5. International Law. *Two hours weekly, through the year.* President Goodnow.

6. The Law of Public Health Officers. *One hour a week, last trimester.* (School of Hygiene and Public Health.) President Goodnow.

Undergraduate Courses

1. The Government and Administration of Modern States. *Two hours weekly, through the year.* Mr. W. F. Willoughby and Dr. C C. Thach.

2. American Diplomacy. *Three hours weekly, first half-year.* Professor Latané and Dr. Thach.

3. Elements of International Law. *Three hours weekly, second half-year.* Professor Latané and Dr. Thach.

PUBLICATIONS

W. W. Willoughby (1920 1922).

Books

An Introduction to the Problem of Govenment (in collaboration with Lindsay Rogers). Doubleday, Page & Co., 1921, pp. 545.

China at the Conference. *The Johns Hopkins Press,* 1922, pp. 419.

The Constitutional Situation in China. *The Carnegie Endowment for International Peace,* 1922, p. 100.

Articles

Suggestions for a Far Eastern Policy. *The Review,* June 23, 1920.

Questions of International Law and Justice Raised by China at the Washington Conference. *Proceedings of the American Society of International Law.* Also in the *Chinese Students' Monthly,* June, 1922.

China: Our Chief Far Eastern Problem. *Annals of the American Academy of Political and Social Science,* May, 1922.

Brief for Appellee. The Federal Land Bank Case in the Supreme Court of the United States, 1921.

What the Conference Did for China. *Chinese Students' Monthly,* April, 1922.

Book Reviews

In *The Review; Annals of the American Academy; American Journal of International Law; International Law Notes; American Political Science Review; Harvard Law Review; American Historical Review.*

W. W. WILLOUGHBY,
Professor of Political Science.

PSYCHOLOGY

During the year 1921-22, there were 21 full-time graduate students registered in Psychology as major subject, and 14 registered as part time students, or with Psychology as subordinate. Of these, 14 were engaged in research in preparation for the degree of Doctor of Philosophy.

In addition to the routine of lecturing and the direction of research, the members of the staff were also engaged in research of their own. Professor Dunlap continued the investigation of vestibular functions, with the coöperation of Mr. Isaacs and Mr. Holsopple, and devised new apparatus for the study of the relation of vestibular and visual functions. Associate Professor Johnson continued the direction of research on children for the Bureau of Educational Experiments in New York City. Both Dr. Johnson and Mr. Isaacs were engaged in problems of mental measurements also. Important problems of child, adult, and animal psychology were under investigation by graduate students.

The greatest difficulty encountered by the department was in the lack of adequate space in which to carry on investigations. Because of the serious situation in this respect, we have had to discourage a number of students from entering the University, and inform others that they might register for lectures and seminary courses, but could not be assured of a chance to engage in research. The necessary work of instruction in laboratory methods has been cut down to a minimum, and certain problems which have been developed here have been turned over to workers in other institutions, where better working conditions are available. A little relief has been obtained by borrowing space from other crowded departments.

Professor Dunlap has continued to edit the *Journal of Comparative Psychology* and *Psychology Classics*, the first number of the latter having appeared this year, and others being in preparation. Besides being President of the American Psychological Association for the year, Professor Dunlap has been a member of the Research Committee of the Illuminating Engineering Society and of the Advisory Committee of the Public Health Service.

Instruction was given during the year by Professor Dunlap in Elementary and Advanced General Psychology, and Social Psychology; by Associate Professor Johnson in Mental Measurements, The Learning Process, and Elementary Psychology; and by Mr. Isaacs in Experimental Methods and Applied Psychology.

A Seminary for the discussion of problems was conducted by the Staff.

PUBLICATIONS

D. J. Carver.

The Immediate Psychological Effects of Tobacco Smoking. *Journal of Comparative Psychology*, 1922, vol. ii, No. 4, pp. 279-302.

Knight Dunlap.

Elements of Scientific Psychology. C. V. Mosby Co., St. Louis, 1922, pp. 368.

An Improvement in Voice Keys. *Journal of Experimental Psychology*, 1921, vol. iv, No. 3, pp. 244-246.

Sleep and Dreams. *Journal of Abnormal Psychology and Social Psychology*, 1921, vol. xvi, No. 2 and 3, pp. 197-209.

Mystical Medicine. *Yale Review*, 1921, vol. xi, No. 1, pp. 190-194.

The Unconscious in Spirit Communication. *New York Medical Journal*, Jan. 4, 1922, pp. 20-24.

The Identity of Instinct and Habit. *Journal of Philosophy*, 1922, vol. xix, No. 4, pp. 85-94.

Improved Forms of Steadiness Tester and Tapping Plate. *The Psychological Review*, 1922, vol. xxix, No. 2, pp. 430-433.

The Reading of Character from External Signs. *The Scientific Monthly*, 1922, vol. xv, No. 2, pp. 153-165.

Buford J. Johnson.

Health Education and the Nutrition Class (with J. L. Hunt and E. Lincoln). E. P. Dutton, New York, 1921, pp. xiii + 281.

Fatigue Effects as Measured by Sugar Content of Blood. *Journal of Comparative Psychology*, 1922, vol. ii, No. 2, pp. 155-171.

James Q. Holsopple.

Reliability of Scores in Steadiness Tests. *Journal of Experimental Psychology*, 1922, vol. v, No. 3, pp. 203 213.

KNIGHT DUNLAP,
Professor of Experimental Psychology.

ROMANCE LANGUAGES

I. ADVANCED COURSES

The Seminary in French Literature met two hours weekly throughout the year. During the first semester, under the direction of Professor Lancaster, the Seminary studied Corneille and his dramatic contemporaries, more especially the source of certain seventeenth century tragedies and their influence upon Corneille. During the second semester, under the direction of Professor Chinard, the Seminary made a study of a series of eighteenth century autograph letters kept in the Library of Congress and of several works of Diderot, including the *Supplément au voyage de Bougainville*, the *Neveu de Rameau*, and *Jacques le Fataliste*.

The Seminary in the French Language met two hours fortnightly under the direction of Associate Professor Blondheim. The French glosses of Rashi of Troyes (1040 1105), in preparation for a forthcoming edition, continued, as in 1920 21, to be the basis of the work done. Problems in French word-history were investigated by the members of the Seminary, the results of several of which are shortly to be published in *Modern Language Notes*. Several papers, concerned with the origin of the Latin Bible, will be utilized in a study of this question that will appear in *Romania*.

Professor Lancaster gave a course on French non-dramatic literature from 1600-1660, *weekly*, and a course on the Sixteenth Century, *weekly*. Professor Chinard gave a course on the lyric poetry of Lamartine and on Hugo's *Contemplations*, *weekly*, and a course on the novels of Maupassant and Bourget, *weekly*. Associate Professor Blondheim gave courses in Elementary Old French Readings, *weekly*, in Advanced Old French Reading, *weekly*, and in Old French Grammar, *weekly*.

Dr. Gruenbaum gave a course in Dante, *weekly*, a course in Italian Classics, *weekly*, and a course in Italian Historical Grammar, *weekly*. Mr. Robles gave *la Critica literaria en el siglo XIX*, *weekly*, and *Dramáticos menores del siglo XVII*, *weekly*.

II. COLLEGIATE COURSES

French Elements, two sections, *each four hours weekly*, by Dr. Williams and Mr. Silin; French 1, four sections, *each four hours weekly*, by Professor

Lancaster, Associate Professor Blondheim, Dr. Williams, Dr. Riddle and Mr. Silin; French 2, a survey of French Literature since 1600, *three hours a week*, by Professor Chinard; French 3, a course on French Literature since 1870, *three hours a week*, by Professor Lancaster; French 4, a composition course, *one hour a week*, by Professor Chinard.

Spanish Elements, three sections, *each four hours weekly*, by Dr. Williams and Dr. Riddle; Spanish 1, two sections, *each four hours weekly*, by Mr. Robles; Spanish 2, Contemporary Novel and Drama, *three hours weekly*, by Mr. Robles.

Italian Elements, *four hours weekly;* Italian 1, *three hours weekly*, by Dr. Gruenbaum.

III. College Courses for Teachers

In the division of the College Courses for Teachers instruction in French was given as follows: French Elements, two sections, *three hours a week*, Dr. Williams and Dr. Riddle; French Reading, *two hours a week*, Dr. Riddle; French Elements, *two hours a week*, and Intermediate French, *two hours a week* (both classes meeting at the Western High School), Dr. Dulac; Practical French, *two hours a week*, Dr. Riddle. Especially qualified teachers were admitted to Professor Lancaster's graduate course on the *Seventeenth Century* and to Professor Chinard's two graduate courses. Dr. Gruenbaum gave two Italian courses: Italian Elements, *two hours a week*, and Italian Readings, *three hours a week*. Dr. Williams gave a course in Spanish Elements, *two hours a week*, and Professor Beardsley a course in Practical Spanish, *two hours a week*.

IV

The following lectures were given by members of the department:

H. C. Lancaster.
"Pre Classical Stage Decoration," before the Modern Language Association of America.

G. Chinard.
"Molière," before the French Societies of New York in honor of Molière's tercentenary.

D. S. Blondheim.
"French Geographical Names," before the Modern Language Association of America.

V. Publications

H. C. Lancaster.
"Seventeenth-Century Prosody: 'Hier,' 'Fléau,' 'Meurtrier,' 'Fuir.' *Modern Language Notes*, xxxvii, 96-101.
Review of C. H. C. Wright, "French Classicism." *Modern Language Notes*, xxxvii, 244, 245.
Review of G. L. van Roosbroeck, "The Cid Theme *in France* in 1600; The Purpose of Corneille's Cid." *Modern Language Notes*, xxxvii, 296-300.
Review of Eleanor F. Jourdain, "Dramatic Theory and Practice in France, 1690-1808." *The Literary Review*, April 22, 1922.

G. Chinard.
Review of A. Smith, "L'influence des Lakistes sur les Romantiques Français." *Modern Language Notes*, xxxvi, 363-6.
"Chateaubriand et l'Abbé C. F. Painchaud." *Modern Language Notes*, xxxvii, 101-106.
"Chateaubriand et Mrs. Sutton." *Modern Language Notes*, xxxvii, 193-207.
Review of W. P. Ker, 'Fleurs de France.' *Modern Language Notes*, xxxvii, 320.
Several articles in *l'Europe Nouvelle* on Franco-American relations.

VI

Mr. L. M. Riddle completed a dissertation for the doctor's degree, entitled "The Genesis and Sources of Corneille's Tragedies from *Médée* to *Pertharite*.

Miss Meta H. Miller completed a dissertation for the doctor's degree, entitled "Chateaubriand and English Literature."

Mr. L. H. Naylor completed an essay for the master's degree, entitled "Virgile et Chateaubriand."

Mrs. Mary Buck Rowe completed an essay for the master's degree, entitled "Studies in Huon de Bordeaux."

Mr. Raphael Levy completed an essay for the master's degree, entitled "The Old French Translation of the Astrological Works of Abraham Ibn Ezra."

H. CARRINGTON LANCASTER,
Chairman of the Department of Romance Languages.

SANSKRIT AND COMPARATIVE PHILOLOGY

Professor Bloomfield was absent on leave during the session of 1921 2. Dr. William Norman Brown, Henry E. Johnston Scholar, who is now on his way to India to continue his researches on the religion and literature of the Jainas, gave instruction in the following subjects:

Elements of Linguistic Science with special reference to the Ethnology of the Indo-European peoples.

The Brāhmaṇas and Upaniṣads.

Readings from the Buddhist Sanskrit collection of stories, called Divyāvadāna.

Readings in Mahāyāna Buddhism.

Readings in the chronicle of the Jaina Savior Pārçvanātha.

Introduction to Pāli the canonical language of the Southern Buddhists.

Elementary instruction in Classical Sanskrit.

Miss Lily D. Greene obtained, at the end of the session, the degree of Doctor of Philosophy, her dissertation being "Indic Flora in Sanskrit Lyric poetry and drama."

MAURICE BLOOMFIELD,
Professor of Sanskrit and Comparative Philology.

ZOOLOGY, BOTANY, AND PLANT PHYSIOLOGY

I. ZOOLOGY

The Zoological Laboratory continues to be crowded, both in the undergraduate and the graduate work. The need for a new laboratory is greatly felt.

The Zoological Seminary met this year but once in two weeks, Thursday evenings, in alternation with the Colloquium of the Philosophical Department, which was attended by a number of the zoological students and staff. The subject discussed by the Seminary was Human Racial Problems.

The Biological Journal Club met weekly, as usual. In addition to the usual reports on current literature and on their own investigations, by members of the departments, a number of addresses were given before the Club by men from outside, including Drs. G. L. Streeter and Warren H. Lewis, of

the Carnegie Institute for Embryology, Dr. G. W. Corner of the Medical School, Professor A. H. Pfund of the Department of Physics, Dr. E. F. Phillips, in charge of Bee Investigations in the Department of Agriculture, Professor L. J. Henderson of Harvard University, and Dr. Ira Remsen, President-Emeritus of the University.

The Naturalists' Field Club has continued its activities during the school year, devoting its energies to general natural history observations and to the distribution, migration, and conservation of birds. The following trips were taken:

Timonium Ant Hills, October 15, 1921; Homewood for Bird Study, Oct. 29, 1921; Druid Hill Park for study of salmon hatching at the Md. Conservation Commission Hatchery, Nov. 12, 1921; Sherwood Forest for study of fish and of oyster bars, Nov. 28, 1921; Christmas Bird Survey of Homewood and Guilford, Dec. 24, 1921; Crow Roost near Arbutus, Feb. 20, 1922; Homewood to map the location of bird boxes, Mar. 18, 1922; and Gudgeon Spawning grounds in Piney Run, near Hanover, Md., April 22, and May 6, 1922.

The following meetings were held, at which the papers listed were read:

"Instinct," by Dr. J. G. Edwards, Oct. 13, 1921; "A Rare Central American Bird," by Professor E. A. Andrews, Nov. 8, 1921; "A Homewood Chipmunk," by Miss Inez Coldwell; "Winter Birds at Homewood," by Mr. H. T. Folger; "Observations on Fish," by Mr. J. M. LeCato; "Habits of Bees," by Mr. A. Shaftesbury; "Submarine Rambles on Tropical Reefs," by Professor Longley of Goucher College, Feb. 20, 1922; "Philippine Islands," by Dr. W. W. Marquardt, Mar. 17, 1922; "Nesting Habits of the Cuckoo," by Mr. E. C. Myers, Apr. 28, 1922; "Observations on the Praying Mantis," by Mr. R. D. Hospers, Apr. 28; "Birds and Gardens," by Dr. A. A. Allen, May 9, 1922; "Natural History Notes, Illustrated," by Mr. B. Lineburg, May 10, 1922; and "Soft shelled Turtles," by Mr. J. F. Müller, May 10, 1922.

Special mention might be made of the lecture of Professor Longley of Goucher College, who described what he had seen under tropical waters in a diving suit; the lecture of Dr. W. W. Marquardt, formerly Director of Education in the Philippine Islands, who told of his experiences in the Philippines during his many years of educational work there; and the lecture of Dr. Arthur A. Allen, Professor of Ornithology at Cornell University, who delivered an illustrated lecture on birds before an audience of between three and four hundred people under the auspices of the Johns Hopkins Field Club, the Maryland Audubon Society, the Guilford Association, and the Wild Flower Preservation Society.

Investigations have been in progress as follows:

Professor Jennings has completed a mathematical investigation of Crossing-over in Inheritance, and has continued his work on Difflugia. Professor Andrews has continued his studies on the natural history of certain infusoria. Professor Mast has continued actively his researches on the reactions of organisms to light. Associate Professor R. P. Cowles has continued in charge of the biological and hydrographic survey of the Chesapeake Bay, of which an account was given in the last annual report; he has been assisted in this work by Messrs. Y. Ibara and M. Glassman. During the summer of 1921 Dr. R. P. Cowles and Dr. A. Schwitalla carried on an investigation of the streams and ponds on the Homewood grounds, studying with special attention the factors which determine the occurrence of a green scum, Euglena, on the largest pond. Data were collected concerning temperature, carbon dioxide content and acidity of the water, at frequent intervals and at twelve stations. This work has been continued during the winter and is to be continued also during the summer of 1922.

Mr. S. W. Geiser has brought to a conclusion his investigations on the sex ratio and the life history of Gambusia. Mr. H. T. Folger has finished an extensive piece of work on the reactions of Ameba to light. Dr. J. G.

Edwards has prepared for publication his work on the effect of chemicals on Ameba. Dr. Ruth Stocking Lynch investigated certain problems of ageing in a rotifer. Miss Inez Coldwell continued her work on the cytology of Difflugia. Mr. A. D. Shaftesbury carried on during the summer certain investigations on bees for the Department of Agriculture at Washington, and has continued this work during the year. Mr. Y. Ibara continued his experiments on the effects of alcohol on the growth of tadpoles. Mr. L. M. Bertholf studied in certain lower animals the process of locomotion on the surface film. Mr. B. Lineburg studied the effects of ethyl alcohol on Ameba; Mr. R. D. Hospers, the reactions of Ameba to electricity; Mr. E. C. Myers, the effects of removing the nucleus in Ameba; Mr. J. Levy, the reproduction of Ameba in isolation cultures; Mr. J. Q. Holsopple, the question of habit formation in Paramecium; Mr. H. S. Forgrave, the effect of certain salts on locomotion in Ameba.

Professor Jennings was one of the vice-presidents of the International Congress of Eugenics that met in New York in September. He presided over many of the sessions of the Section of Genetics, and presented before it a paper on *Inheritance in Unicellular Organisms.* To the symposium of the American Society of Naturalists on the Origin of Variations, at the Christmas meetings in Toronto, he contributed a paper on *Variations Occurring in Uniparental Reproduction.* He read a paper at the annual meeting of the American Philosophical Society in April on *The Supposed Serial Arrangement of the Genes and its Relation to Theories of Crossing-Over in Inheritance.* On April 20 Professor Jennings lectured before the Johns Hopkins University on the subject *Can We See Evolution in Process?*, and on May 5 in Pittsburgh on *The Relation of Heredity to Education.* At the Christmas meetings, Professor Jennings was elected chairman of the new national organization of geneticists formed by a union of sections from the American Society of Zoologists and the American Botanical Society. He was also elected a member of the National Research Council, and has been made a member of the Executive Committee of the Section of Biology and Agriculture of that body.

Dr. R. P. Cowles lectured before the Johns Hopkins Summer School and the Peabody Summer School of Music on July 8, 1921. The subject of his lecture was "Chesapeake Bay." He also addressed the Biological Society of Washington at the Cosmos Club in Washington on April 15, 1922. The title of his address was "A Hydrographic and Biological Survey of Chesapeake Bay."

The requirements for the degree of Doctor of Philosophy were absolved by Mr. H. T. Folger and Mr. S. W. Geiser.

The following positions for the coming year have been accepted by persons now graduate students in Zoology: Dr. S. W. Geiser to be Associate Professor of Zoology in Washington University, St. Louis; Dr. H. T. Folger to be Instructor in Zoology at the University of Michigan; Dr. J. G. Edwards to be Assistant in Physiology at the Johns Hopkins Medical School; Miss Inez Coldwell to be Assistant Professor of Biology at the North Carolina College for Women at Greensboro; Mr. L. M. Bertholf to be Instructor in Zoology at the same institution.

The assistants in Zoology were: Dr. Ruth Stocking Lynch; Dr. J. G. Edwards; Mr. A. D. Shaftesbury; Mr. L. M. Bertholf; Mr. R. D. Hospers; Mr. B. Lineburg; Mr. E. C. Myers.

LECTURE AND CLASSROOM WORK

The following courses were conducted by the different members of the staff:

Professor Jennings.

Zoological Seminary: Human Racial Problems. *Alternate Thursday evenings through the year.*

Genetics: Heredity and Development. *Three lectures weekly, first half-year.*

Investigations. *Daily through the year.*

Professor Mast.

Animal Behavior. *Three lectures weekly, second half-year; two laboratory periods weekly through the year.*

Investigations in General Physiology. *Daily through the year.*

Professor Andrews.

Biology 3: Invertebrate Zoology. *Nine hours weekly through the year.*

Professor Andrews and Associate Professor Cowles.

General Biology. *Nine hours weekly, October 1 to March 15.*

Embryology. *Nine hours weekly, March 15 to the end of the year.*

Associate Professor Cowles.

Comparative Anatomy and Embryology of Vertebrates. *Nine hours weekly through the year.*

The courses in Biology in the Summer School were conducted by Associate Professor R. P. Cowles.

PUBLICATIONS IN ZOOLOGY

Andrews, E. A.

American Folliculinas: taxonomic notes. *American Naturalist*, lv, pp. 347-367, July-Aug., 1921.

Bills, C. E.

Inhibition of locomotion in Paramecium and observations on certain structures and internal activities. *Biol. Bull.*, vol. xvii, pp. 7-13, January, 1922.

Cowles, R. P. and Schwitalla, A. M.

Hydrogen ion concentration of Chesapeake Bay water. *American Society of Zoologists, Proceedings, Anatomical Record*, vol. 23, p. 111, Jan. 20, 1922. (Abstract.)

Edwards, J. G.

The effect of locomotion in Ameba. I. Reactions to localized stimulation. *Amer. Soc. of Zool. Proc., Anat. Record*, vol. 23, p. 127, Jan. 20, 1922. (Abstract.)

Folger, H. T.

A quantitative study of the reactions to light in Ameba. *Am. Soc. of Zool. Proc., Anat. Record*, vol. 23, p. 128, Jan. 20, 1922. (Abstract.)

Geiser, S. W.

Notes on the differential viability in Gambusia. *Science*, vol. liv, p. 309, Sept. 30, 1921.

Notes on the differential death-rate in Gambusia. *Ecology*, ii, pp. 220-222, July, 1921.

Seasonal changes in the testis of Gambusia affinis, the top-minnow. *Amer. Soc. of Zool. Proc., Anat. Rec.*, vol. 23, p. 104, Jan. 20, 1922. (Abstract.)

Observations on sex in the top-minnow, Gambusia affinis. *Ibid.* (Abstract.) P. 112.

A simple method of dealing with electrified microsections. *Science*, vol. 55, p. 212, Feb. 24, 1922.

Hopkins, Hoyt S.

The conditions for conjugation in diverse races of Paramecium. *Jour. Exp. Zool.*, vol. 34, pp. 339-384, Nov. 20, 1921.

Jennings, H. S.

Inheritance in unicellular organisms. *Second International Congress of Eugenics Abstracts*, p. 9, Sept., 1921.

Variation in uniparental reproduction. *Amer. Naturalist*, vol. lvi, pp. 5-15, Jan.-Feb., 1922.

Review of Ritter's "The Unity of the Organism, or the Organismal Conception of Life." *Philosophical Review*, xxx, pp. 616-624, Nov., 1921.

On the advantages of growing old. *The Johns Hopkins Alumni Magazine*, June, 1922.

Lynch, Ruth Stocking.

The cultivation in vitro of liver cells from the chicken embryo. *Amer. Jour. of Anat.*, 29, July, 1921.

Mast, S. O.

Photic Orientation in the robber-fly, Proctacanthus. *Amer. Soc. of Zool. Proc., Anat. Record*, p. 126, vol. 23, Jan. 20, 1922. (Abstract.)

Reactions to light in the larvae of the Ascidians, Amaroucium constellatum and A. pellucidium, with special reference to photic orientation. *Jour. Exp. Zool.*, vol. 34, Oct., 1921.

Mast, S. O. and Ibara, Y.

Effect of ethyl alcohol on tadpoles. *Amer. Jour. of Phys.*, vol. 59, pp. 294-297, Feb., 1922.

Middleton, A. R.

Heritable effects of chemically differing media on the fission rate of Paramecium caudatum. *Amer. Soc. of Zool. Proc., Anat. Record*, vol. 23, p. 93, Jan. 20, 1922. (Abstract.)

Noyes, Bessie.

Experimental studies on the life history of a rotifer reproducing parthenogenetically (Proales Decipiens). *Jour. of Experimental Zoology*, vol. 35, Feb., 1922, pp. 225-255.

Schwitalla, A. M.

The influence of temperature on the rate of locomotion in Ameba. *Amer. Soc. of Zool. Proc., Anat. Record*, p. 128, vol. 23, Jan. 20, 1922. (Abstract.)

II. Botany

Lectures and laboratory courses were conducted during the year as follows:

Professor Johnson.

Botanical seminary. The organization of the living cell in plants and animals.—Based on "An Introduction to Cytology" by L. F. Sharp (a former student in this Department) as well as on various monographs in biological journals, and illustrated by preparations in the department's collection. One *hour a week from November* 1 *to the end of the session.*

Reproduction, Evolution and Phylogeny in Plants from Bacteria to Seed Plants. *Laboratory work, lectures and conferences nine hours per week throughout the year.* Eight field trips on Saturdays.

The Structure and Functions of the Vegetative Organs of Plants. (Undergraduate Biology 3). *Laboratory work, lectures and conferences. Nine hours per week. October* 1 *to January* 31. Four field trips on Saturdays.

The Life Histories of Mosses, Ferns and Seed Plants. (Undergraduate Biology 3). *Nine hours of lectures and laboratory work from February* 1 *to end of session.* Four field trips on Saturdays in the spring.

Mr. J. M. LeCato, formerly assistant professor in Delaware College, gave during the first half year a course in bacteriology to six graduate and undergraduate students. *Three hours of lectures and six hours of laboratory work per week to January* 31.

JOURNAL CLUB

Members of the Botanical Department joined with those of the Departments of Zoology and Plant Physiology for the weekly report and discussions of current biological literature.

ADVANCED WORK

Professor Johnson spent July and August 1921 in the Harpswell Laboratory, at its new site on Mt. Desert Island, Maine, at work on the cytology of certain liverworts and seed plants preserved in Jamaica during the last expedition to that island (1919) by this department. The results of these studies, which were continued in Baltimore during the academic year, are nearly ready for publication.

Work with committees of the Institute for Research in Tropical America has taken considerable time during the year. One result of the efforts of these committees is the adoption of a definite policy by the Institute looking to the establishment of a biological station in continental tropical America.

Assistant Professor Louis J. Pessin of the Mississippi Agricultural College has continued under the general direction of Professor Johnson, the study of epiphytes (air plants) begun while he was in Jamaica with our party in 1919. Mr. Pessin returns to this university in October to complete this study and other work leading to the doctorate.

Mr. Conway Zirkle, who served as assistant in this department for 1921-22, had charge of a course in botany at the summer school of the University of Virginia.

PUBLICATIONS FROM THE BOTANICAL LABORATORY

D. S. Johnson.

Polypodium vulgare as an epiphyte. *Botanical Gazette*, lxxii, p. 237, 1921.

Invasion of virgin soil in the tropics. *Botanical Gazette*, lxxii, p. 305, 1921.

L. J. Pessin.

Epiphyllous plants of certain regions in Jamaica. *Bulletin of the Torrey Botanical Club*, xlix, p. 1, 1922.

THE BOTANICAL GARDEN

The further planting, and labelling with weather-proof, descriptive labels, of trees and shrubs about the Botanical Garden proper, has been continued. In addition a start was made in April 1922, toward the establishment of an arboretum by planting out, in unoccupied areas, several dozen evergreen and deciduous cone bearing trees. The trees planted were taken chiefly from our own nursery where they had become well established and had in some instances already grown to fine "specimen" trees. General plans have been approved for the distribution of other families of trees and shrubs in the different free areas at Homewood, and the planting of certain groups near the Thirty-Second Street entrance and about the two engineering buildings was partially completed last spring.

Seeds and plants for the Botanical Garden have, as for a number of years, been given by the New York Botanical Garden and by La Mortola, the private garden of Cecil Hanbury, Esq., F. L. S., at Ventimiglia, Italy. A number of additional specimen plants of Cactaceae have been given by the estate of Henry B. Vocke. A number of unusual plants from our Garden, of importance in teaching, have been exchanged with the Brooklyn Botanical Garden and with the University of Chicago.

III. Plant Physiology

ACADEMIC WORK

The general graduate course in plant physiology was conducted by Professor Livingston and Doctor Trelease. Three students were enrolled. The other work was all in the form of conferences.

During the year Professor Livingston gave a series of sixty lectures on plant physiology before a group of scientific workers in the Government laboratories in Washington. Some of the men in this group are planning to enter as graduate students in the Johns Hopkins University.

RESEARCH AND RELATED ACTIVITIES

Professor Livingston has continued as permanent secretary of the American Association for the Advancement of Science, having an office and clerical assistance in the Smithsonian Institution, Washington. Besides the usual consultations with graduate students he has given some time to editorial work on a second edition of the English translation of Palladin's Plant Physiology, the first edition having been already exhausted.

Professor Livingston spent the summer of 1921 at the Desert Laboratory of the Carnegie Institution of Washington, at Tucson, Arizona, continuing his studies on ecological physiology, especially with reference to sunshine and atmospheric evaporation as these influence plant activities.

During the academic year Professor Livingston has worked with Doctor Trelease and Professor Hibbard on somewhat elaborate studies on the salt relations of plants—the fundamental scientific basis for fertilizer practice in agriculture. Through the co-operation of all three, several pieces of experimentation on the salt relations of wheat have been completed and the results will soon be ready for publication.

Doctor Trelease has had charge of the laboratory during the year and has co-operated with Professor Livingston and Professor Hibbard in planning, executing, and interpreting experimental studies on the salt nutrition of plants. He has worked out a feasible method for growing plants in water culture with a constantly renewed solution. He has also served as assistant secretary and secretary of the Council of the American Association for the Advancement of Science.

Professor R. P. Hibbard, of the Michigan Agricultural College, has devoted this academic year to research in this laboratory, as Johnston Scholar. He has co-operated with Professor Livingston and Doctor Trelease, in experimental studies on the salt nutrition of plants, as mentioned above.

Mr. L. M. Hutchins, of the Bureau of Plant Industry, U. S. Department of Agriculture, spent this academic year in new and fundamental research on the oxygen-supplying power of the soil as this may influence plant growth. Mr. Hutchins has succeeded in devising a method by which may be measured from time to time the power of the soil to supply oxygen to an oxygen-absorbing surface such as that of a plant's root system. He will continue this new line of study.

The dissertation of Doctor W. F. Gericke, of the University of California, was presented in the fall of 1921, and Doctor Gericke passed his examinations for the Ph. D. degree in December, the degree being awarded at the February convocation.

PUBLICATIONS IN PLANT PHYSIOLOGY

Livingston, Burton E.

Carbon-dioxide-supplying power of the air. *Carnegie Inst. Washington Year Book* **20**: 71-72. 1921.

Comparative rates of water evaporation from different kinds of surfaces. *Carnegie Inst. Washington Year Book* **20**: 72-74. 1921.

Livingston, Burton E., and Shreve, Forrest.

The distribution of vegetation in the United States, as related to climatic conditions. *Carnegie Inst. Washington Publ.* No. 284. 17 x 25.5 cm., xvi + 590 p., 75 pl., including 2 colored maps, 74 fig. Carnegie Inst. Washington: Washington, 1921.

Trelease, Sam F., and Livingston, Burton E.
Continuous renewal of nutrient solution for plants in water-cultures. *Science* **55**: 483-486. 1922.

Trelease, Sam F.
The growth of rice as related to proportions of fertilizer salts added to soil cultures. *Philippine Jour. Science* **16**: 603-627. 1920.
Incipient drying and wilting as indicated by movements of coconut pinnae. *Amer. Jour. Bot.* **9**: 253-265. 1922.
Foliar transpiring power of the coconut. *Philippine Jour. Science* **20**: 167-177. 1922.

Trelease, Sam F., and Paulino, Pedro.
The effect on the growth of rice of the addition of ammonium and nitrate salts to soil cultures. *Philippine Agric.* **8**: 293-313. 1920.

Trelease Sam F., and Jurado, Mariano C.
The growth of rice as related to concentrations and proportions of fertilizer salts added to soil cultures. *Philippine Agric.* **9**: 67-86. 1920.

Johnston, Earl S.
The seasonal march of the climatic conditions in a greenhouse, as related to plant growth. *Univ. Maryland Agric. Exp. Sta. Bull.* **245**: 41-98. 1921.

Macht, David I., and Livingston, Marguerite.
Effect of cocaine on the growth of Lupinus albus: a contribution to "phytopharmacology." *Proc. Soc. Exp. Biol. and Medicine* **19**: 235-236. 1922.

Macht, David I., and Livingston, Marguerite B.
Effect of cocaine on the growth of Lupinus albus. A contribution to the comparative pharmacology of animal and plant protoplasm. *Jour. Gen. Physiol.* **4**: 573-584. 1922.

HERBERT S. JENNINGS,
Director of the Zoological Laboratory.

DUNCAN S. JOHNSON,
Director of the Botanical Laboratory.

BURTON E. LIVINGSTON,
Director of the Laboratory of Plant Physiology.

REPORT OF THE DEAN OF THE COLLEGE FACULTY

To the President of the University:

I have the honor to submit the following report for the session 1921-1922:

The undergraduate enrollment was the largest in the history of the University, totalling 715 as compared with 702 for the preceding session. Of the total, 415 were in the College of Arts and Sciences, and 300 in the Department of Engineering. The number of new students was 283, including 28 transfers from other colleges. Most of the transfers entered the preliminary medical course. Of the new students, 164 enrolled in the College of Arts and Sciences, and 119 in the Department of Engineering. The number of new students exceeded that of the preceding session by 23. As the facilities for undergraduate instruction at Homewood have, during the past session, been taxed to the utmost, it will be necessary to limit the number of admissions for the next session. This can be done to some extent by enforcing more rigidly the entrance requirements and refusing to admit students who do not measure up to them in every particular.

During the session 93 students were dropped from the University for three or more failures. A careful study has been made of these cases, and the following table shows the group of schools from which they came and the percentage of failures:

	Enrollment	*Dropped for three or more Failures*	*Percentage*
Baltimore City College	199	21	10.5
Baltimore Polytechnic Institute	134	20	14.9
State High Schools	108	22	20.3
Private Schools in Maryland	89	9	10.1
Public and Private Schools in other States (including transfers from colleges)	153	21	13.7

It will be seen from this table that the County high schools of Maryland make the worst showing. As we are compelled by law to admit graduates of these schools without examination, there is nothing that we can do except to bring the matter to the attention of the public school officials of the State. This has been done, and we have been assured that the principals of high schools will be instructed to be more careful in certifying students to the University. Of the 108 students admitted on certificate from State high schools at the beginning of the session, 28 fell below our entrance requirements in some particular and had to be admitted with conditions. The figures also show that transfers from other colleges are usually below the average. Hereafter, transfers will not be admitted unless their credentials give evidence of more than ordinary ability.

The intelligence tests which have been given for the past two years to the entering class after matriculation are significant, and have been useful in dealing with cases reported to the office as delinquent in their studies. The following quotation from the report of these tests is of interest in this connection:

"There are some students entering college who have not the capacity to do average college work, as is shown by their records in college work, as well as by their stand in intelligence examinations. It appears that the mortality of such students is high, although we have so far made a complete study only of those who were dropped for failures. In some cases, some of

these students have been reinstated, and have a second time been dropped. We have studied eighty-nine cases who were dropped during the academic years of 1920-21 and 1921-22. Of this group, forty-four were in the lowest quartile in the intelligence scores, twelve in the highest quartile. Several of those in the lowest quartile have been dropped twice because of three failures in studies, having been reinstated after the first failures. Fifty-eight of those dropped have been below the median score for the total group of students.

"There should be an early elimination of those applying for entrance into college who are incapable of doing average work. Available evidence concerning the relative predictive value of college entrance examinations, mental tests, high school certificates, and interviews indicates that a combination of mental tests, with a record of high school preparation in the fundamental subjects, gives the most reliable information. By record we mean not merely a high school certificate, but specific information as to high school achievements."

College courses in this and other universities at present appear to be gauged to meet the requirements of students of average capacity, and little is done to encourage students of exceptional ability. The result is that a bright student has little difficulty in getting the A. B. degree in three years. Of the 66 who received the degree of A. B. in June, 1920, 11, or 16 per cent., had completed the course in three years. Of the 68 who graduated in 1921, 18, or 23 per cent., had completed the course in three years. Most of these had taken courses during one or more summer sessions. Most of those who remain four years for the A. B. degree devote a considerable amount of time to extra-curricular activities. Under the present system there is not much incentive to a man to do real intellectual work during his last year in college. This whole question has been brought to the attention of the Board of Collegiate Studies, and the recommendation was made that some type of honors courses be established for the encouragement of students of unusual ability. There is quite a widespread movement in this direction among American colleges, mainly in the direction of the Oxford system. While the Board of Collegiate Studies was not prepared to adopt a definite plan, they did adopt the following resolution as a first step in this direction:

"A student whose work has been of high standing, and whose request for the privilege is approved by a committee, to be appointed by the President, may, if he has complied with the specific requirements for the A. B. degree other than the number of points and the completion of a major, spend his final year in such graduate work as the committee and the head of the graduate department concerned shall approve. At the close of this year and after passing a comprehensive examination before a committee of the department or departments in which his work has been done, he shall receive the A. B. degree."

The Reserve Officers Training Corps under the direction of Major Garey has maintained a high standard of efficiency, and still continues to attract a large number of students. Major Garey and the other officers detailed here have continued in charge of the classes in physical training, putting the members of the freshman and sophomore classes who were not enrolled in the Reserve Officers Training Corps through a valuable course of physical exercise. The University is greatly indebted to them for this service.

JOHN H. LATANÉ,
Dean of the College Faculty.

REPORT OF THE DIRECTOR OF THE COLLEGE COURSES FOR TEACHERS

TO THE PRESIDENT OF THE UNIVERSITY:

I have the honor to submit the following report on the work of the College Courses for Teachers, conducted in co-operation with Goucher College, during the academic year, October 3, 1921, to May 27, 1922.

This is the thirteenth year of these courses, the plans for which are stated in detail in the *University Circular* of June, 1921. Of the courses announced, instruction of collegiate grade was given in the following: Art I, II, III, and IV; Chemistry I, II, and III; Chinese; Drawing; Education I, II, III, IV, V, VI, VIII, IX, X, XI, XII, XIII, and XIV; English I, II, III, IV, V, and VI; French I, II, III, IV, V, VII, VIII, IX, and X; German I and IIA; History IB and IIA; Hygiene (continued throughout the year, and not two trimesters as announced); Italian I; Journalism; Mathematics I, IIA, and IIB; Oriental Seminary I, II, III, and IV; Philosophy I and II; Psychology I and II; Spanish I and II. Owing to the small registration, the following courses announced were not given: Education VII; French VI; German IIB; History IA and History IIB; Italian II; Latin I and II; Politics; Psychology III; Spanish III. Owing to the absence of Mr. Alfred Breit from the University from the middle of October until early in April, instruction in Russian II was given only during the last six weeks of the year, and Russian I was entirely omitted. Owing to several reasons, change of instructors in the following courses was necessary: French I and Spanish I, Dr. R. C. Williams *vice* Mr. R. M. Merrill; and French II, Mr. L. M. Riddle *vice* Mr. R. M. Merrill. Professor W. A. Beardsley, of Goucher College, was appointed to give the instruction in Spanish II. It is gratifying to be able to call attention to the continuance of university service in meeting newly appearing special needs of the Baltimore public schools. Among the recommendations of the Baltimore School Survey, recently concluded, were the reorganization of the school system and the revision of courses of study throughout the schools. In response to numerous requests for assistance in carrying out these projects, the following courses were arranged for and announced by Dr. H. S. West, Superintendent of Public Instruction: Education XV, Materials and Method of Teaching General Science in Junior High Schools, by Dr. L. H. Ingham, head of Department of Science, Baltimore City College; Education XVI, Materials and Methods of Teaching Civics in Junior High Schools, by Mr. P. Dougherty, head of Department of History and Civics, Baltimore Polytechnic Institute; Education XVII, The Organization and Management of Elementary Schools, by Assistant Superintendent C. E. Douglass, of the Baltimore Public Schools; Education XVIII, Methods and Plans for the Intermediate Grades of the Elementary School, by Associate Professor Florence E. Bamberger; Education XIX, The Principles of Kindergarten-Primary Education, by Miss Frances M. Berry, Kindergarten-Primary Supervisor, of the Baltimore Public Schools; History III, The History of Greece and Rome, by Associate Professor R. V. D. Magoffin; Psychology IV, Laboratory Course in Psychology, by Mr. S. Isaacs, of the University. A course in Educational Measurements (Education VB-VI), by Dr. F. D. Brooks, of the University, was given at Public School No. 76. These courses were conducted by forty-three instructors, six of whom were members of the staff at Goucher College, ten of whom were members of the supervisory and teaching staff of the Baltimore public schools, and the remainder, of the University.

The enrollment in the courses was nine hundred and thirty-three the first half-year, and eight hundred and sixty-one the second half-year, which, with the sixty-seven registered in the courses given at the three University Extension Centers mentioned below, gives a total enrollment of one thousand and thirty-seven. The enrollment of nine hundred and seventy at the University shows an increase of two hundred and seventy-eight, or nearly forty per cent. over the preceding year. One hundred and fourteen were duplicate registrations from other divisions of the University, as follows: Thirty graduate, seven medical, one hygiene, seventy academic, and eight engineering. The primary registration of the year in the College Courses for Teachers was eight hundred and fifty-six, an increase of two hundred and seventy-six, or over forty-seven per cent., over the preceding year. One hundred and ninety-six were men and seven hundred and seventy-four were women. Of the six hundred and ninety-two students registered in the courses given at the University last year, two hundred and eighty-nine continued their registration this year. The continued increase in this direction, as mentioned in the last report, indicates a desirable stabilization of the work which is being undertaken by the students in this division of the University. There were thirty-four graduate students among those primarily registering in these courses. The amount of work accomplished by the students is best indicated by the following figures: One student registered in ten courses, three in seven courses, five in six courses, eleven in five courses, eighteen in four courses, forty-seven in three courses, one hundred and seventeen in two courses, and seven hundred and sixty-eight in one course, each. There were one hundred and fourteen candidates for the degree of Bachelor of Science in attendance.

The occupational distribution of the persons registered continues to indicate the widening range of service which the University is offering to professional and other definite social interests in our community: School officers and teachers, six hundred and thirty-three, and seven hundred including the Extension Courses; students, one hundred and forty-seven; no vocation, fifty-eight; vocation not reported, forty-seven; secretaries, thirty-three; merchants, manufacturers, and various other business representatives, twenty-six; social workers and nurses, ten; lawyers, six; clergymen, four; physicians and pharmacists, three; an artist, an author, and a musician.

The College Courses for Teachers continued during the year the plan of giving courses at University Extension Centers in the State of Maryland, which was begun in 1917-18. Professor Edward F. Buchner conducted a course on the Principles of Education, Education II, at Frederick, with a registration of seventeen. Associate Professor Florence E. Bamberger conducted a course on the Individual in Relation to Classroom Organization and Management, Education XII, at Havre de Grace, with a registration of twenty-three. She also conducted the same course at Woodside, with a registration of twenty-seven. This is the fourth and second successive years in which courses have been conducted in Frederick County and Montgomery County, respectively. Each of these classes met once a week throughout the year. The fifth year of the work, in courses thus conducted, continues to be satisfactory to the instructors. All the teachers completing their courses, respectively, were enabled to meet some of the certificating requirements of the State Department of Education under the new school law.

The conference of the officers and instructors in these courses was held on June 3, 1922. The following amounts of credit for the courses were recommended and recorded in accordance with past practice, as follows: Art I, six points (for a grade of eight and one-half or more), four points (for a grade of six or less than eight and one-half); Art II, three points (for a grade of eight and one-half or more), two points (for a grade of six or less than eight and one-half); Art III, three points; Art IV, three points; Chemistry I, as recommended; Chemistry II, four points; Chemistry III, six points (for

a grade of nine or more), four points (for a grade of six or less than nine); Chinese, as recommended; Drawing, four points; Education I, six points (for a grade of eight or above), four points (for a grade of six or less than eight); Education II, six points (for a grade of eight and one-half or more), four points (for a grade of six or less than eight and one-half); Education III, six points (for a grade of eight and one-half or more), four points (for a grade of six or less than eight and one-half); Education IV, three points (for a grade of eight and one-half or more), two points (for a grade of six or less than eight and one-half); Education V, six points (for a grade of eight and one-half or more), four points (for a grade of six or less than eight and one-half); Education VI, three points (for a grade of eight and one-half or more), two points (for a grade of six or less than eight and one-half); Education VB-VI, six points (for a grade of eight and one-fourth or more), four points (for a grade of six or less than eight and one-fourth); Education VIII, six points (for a grade of eight and one-half or more), four points (for a grade of six or less than eight and one-half); Education IX, six points (for a grade of eight and one-half or more), four points (for a grade of six or less than eight and one-half); Education X, six points (for a grade of eight and one-half or more), four points (for a grade or six or less than eight and one-half); Education XI, six points (for a grade of eight and one half or more), four points (for a grade of six or less than eight and one-half); Education XII, six points (for a grade of eight and one-half or more), four points (for a grade of six or less than eight and one-half); Education XIII, six points (for a grade of eight and one-half or more), four points (for a grade of six or less than eight and one-half); Education XIV, six points; Education XV, six points (for a grade of eight and one-half or more), four points (for a grade of six or less than eight and one-half); Education XVI, six points (for a grade of eight and one-half or more), four points (for a grade of six or less than eight and one-half); Education XVII, six points (for a grade of eight or more), four points (for a grade of six or less than eight); Education XVIII, six points (for a grade of eight and one-half or more), four points (for a grade of six or less than eight and one-half); Education XIX, six points (for a grade of eight and one-half or more), four points (for a grade of six or less than eight and one-half); English I, six points (for a grade of eight or more); four points (for a grade of six or less than eight); English II, six points (for a grade of eight or more), four points (for a grade of six or less than eight); English III, six points (for a grade of eight and one-half or more), four points (for a grade of six or less than eight and one-half); English IV, six points (for a grade of eight and one-half or more), four points (for a grade of six or less than eight and one-half); English V, six points (for a grade of eight and one-half or more), four points (for a grade of six or less than eight and one-half); English VI, six points (for a grade of eight or more), four points (for a grade of six or less than eight); French I, eight points (for a grade of eight and one-half or more), six points (for a grade of six or less than eight and one-half); French II, eight points (for a grade of eight and one-half or more), six points (for a grade of six or less than eight and one-half); French III, six points (for a grade of eight and one-half or more), four points (for a grade of six or less than eight and one-half); French IV, six points (for a grade of eight and one-half or more), four points (for a grade of six or less than eight and one-half); French V, six points (for a grade of eight and one-half or more), four points (for a grade of six or less than eight and one-half); French VII, six points (for a grade of eight and one-half or more), four points (for a grade of six or less than eight and one-half); French VIII, four points (for a grade of nine and one-half or more), three points (for a grade of six or less than nine and one-half); French IX, three points; French X, three points (for a grade of nine or more), two points (for a grade of six or less than nine); German I, eight points (for a grade of nine

or more), six points (for a grade of six or less than nine); German IIA, six points; History IB, six points (for a grade of eight or more), four points (for a grade of six or less than eight); History IIA, six points; History III, six points (for a grade of eight and one-half or more), four points (for a grade of six or less than eight and one-half); Hygiene, four points; Italian I, as recommended; Journalism, six points (for a grade of eight or more); four points (for a grade of six or less than eight); Mathematics I, six points; Mathematics IIA, six points (for a grade of nine and one-half or more), four points (for a grade of six or less than nine and one-half); Mathematics IIB, six points (for a grade of nine or more), four points (for a grade of six or less than nine); Oriental Seminary I, two points; Oriental Seminary II, two points; Oriental Seminary III, two points; Oriental Seminary IV, two points; Philosophy I, six points (for a grade of eight and one-half or more), four points (for a grade of six or less than eight and one-half); Philosophy II, six points (for a grade of eight and one-half or more), four points (for a grade of six or less than eight and one-half); Psychology I, six points; Psychology II, six points; Psychology IV, six points; Russian II, two points; Spanish I, six points (for a grade of eight and one-half or more), four points (for a grade of six or less than eight and one-half); Spanish II, six points (for a grade of eight and one-half or more), four points (for a grade of six or less than eight and one-half).

The degree of Bachelor of Science was conferred by the Trustees of the University, on October 4, 1921, upon Marguerite E. Linthicum and Martin A. Roberts, of Baltimore; on February 22, 1922, upon John C. Taylor, of Baltimore; on June 13, 1922, upon H. Louise C. Buchner, Ethel Cooper, Augusta Dellone, Edna L. Dixon, George G. Grim, Mary C. Howard, Margaret T. Kratz, Zoe M. Mason, Kenneth Rede, Sarah L. Roche, Carl E. W. Schmehl, Georgia D. Sherwood, Agnes Snyder, and Henry T. Yost, of Baltimore.

EDWARD F. BUCHNER,
Director.

REPORT OF THE DIRECTOR OF THE SUMMER COURSES

To the President of the University:

I have the honor to present the following report of the twelfth session of the Summer Courses of the University, which was held during the six weeks from July 5 to August 12, 1922.

The coöperation of other agencies with the University in the preparation of the plans for the summer courses continued to be a feature of this session. The Board of School Commissioners of Baltimore continued its coöperation as in 1921 with the exception of a guarantee as to a minimum registration. The plans of instruction, however, were expanded to meet newer and pressing needs in the city school system. The Board also located a new type of city vacation school of ten grades at Homewood, and provided its teaching staff of a principal and sixteen teachers in order to supply a school for the purpose of demonstrations in teaching and educational investigations. They also granted again the use of necessary rooms and equipment at the Polytechnic Institute for the instruction in manual training and furnished the materials of instruction for the graded demonstration school. The continuation of instruction and training in journalism was made possible through the coöperation of *The Sun*, Baltimore, which detailed a member of its editorial staff to give the instruction, extended the use of its plant as a laboratory, and provided three scholarships to be awarded to students for excellence in this subject. The benefits of the De Lamar Fund for the Extension of Medical Knowledge were extended, through the coöperation of the School of Hygiene and Public Health, by the provision for instruction in School Hygiene and the maintenance of De Lamar scholarships for students in this course. As in former years, the summer session of the Peabody Conservatory of Music continued its coöperation.

The scope of instruction was greatly extended to meet special needs of the Baltimore City teachers under the coöperative arrangements with the Board of School Commissioners, and included an offering of ninety-six courses in the twenty-one subjects listed below. Italian was the only new subject offered for the first time. The courses in manual and industrial arts and in music were expanded, and courses in Americanization were reintroduced.

The persons appointed to give instruction were as follows:

Biology ..... 2 courses

Rheinart P. Cowles, Associate Professor.
Samuel K. Wallace, Assistant.

Chemistry ..... 4 courses

J. Elliott Gilpin, Collegiate Professor.
Leslie C. Beard, Jr., Assistant.

Economics ..... 3 courses

Frank T. Stockton, Instructor in Summer Courses.

Education ..... 33 courses

Mary A. Adams, Teacher in Demonstration School.
Florence E. Bamberger, Associate Professor.
Mary L. Broening, Teacher in Demonstration School.
Fowler D. Brooks, Associate.
Alice G. Bucher, Teacher in Demonstration School.
Edward F. Buchner, Professor.

William Burdick, Instructor in Summer Courses.
Carleton E. Douglass, Instructor in Summer Courses.
Grace C. Fairbanks, Teacher in Demonstration School.
Agnes M. Flinn, Instructor in Summer Courses.
Laura A. Frazee, Instructor in Summer Courses.
Allen W. Freeman, Resident Lecturer.
Howard F. Hart, Instructor in Summer Courses.
Eleanor C. Heavey, Teacher in Demonstration School.
Jesse W. Hubbard, Instructor in Summer Courses.
Isabelle M. Johnstone, Teacher in Demonstration School.
John W. Lewis, Instructor in Summer Courses.
Margaret E. Linthicum, Teacher in Demonstration School.
N. Annette Mann, Teacher in Demonstration School.
Sarah Meseroll, Instructor in Summer Courses.
Florence G. Miller, Teacher in Demonstration School.
Grace W. Mink, Teacher in Demonstration School.
Katherine F. Muesse, Teacher in Demonstration School.
John B. Opdycke, Instructor in Summer Courses.
M. Rose Patterson, Principal of Demonstration School.
Bessie Reddington, Teacher in Demonstration School.
Elizabeth Sakers, Teacher in Demonstration School.
Ray K. Savage, Instructor in Summer Courses.
Virginia Shaffer, Teacher in Demonstration School.
Gertrude T. Shipley, Teacher in Demonstration School.
I. Jewell Simpson, Instructor in Summer Courses.
Elizabeth B. Stansbury, Teacher in Demonstration School.
James Sullivan, Instructor in Summer Courses.
Maurice S. H. Unger, Instructor in Summer Courses.
David E. Weglein, Associate.

English Composition ..... 4 courses
John C. French, Associate Professor.
Francis E. A. Litz, Instructor.
James E. Routh, Instructor in Summer Courses.

English Literature ..... 4 courses
John C. French, Associate Professor.
Francis E. A. Litz, Instructor.
James E. Routh, Instructor in Summer Courses.

French ..... 7 courses
John J. Davis, Instructor in Summer Courses.
Lawrence M. Riddle, Instructor.

Geography ..... 1 course
Jesse W. Hubbard, Instructor in Summer Courses.

German ..... 3 courses
Robert B. Roulston, Associate Professor.

History ..... 3 courses
Oliver P. Chitwood, Instructor in Summer Courses.

Home Economics ..... 2 courses
Francis Zuill, Instructor in Summer Courses.

Italian ..... 3 courses
Charles W. Lemmi, Instructor in Summer Courses.

Journalism ..... 2 courses
Francis E. A. Litz, Instructor.
Raymond S. Tompkins, Instructor in Summer Courses.

Manual and Industrial Arts ..... 8 courses
George M. Gaither, Instructor in Summer Courses.
Eugene B. Link, Instructor in Summer Courses.
Charles A. Pettit, Instructor in Summer Courses.

Mathematics ..... 3 courses
John R. Musselman, Associate.

Music ..... 3 courses
John Denues, Instructor in Summer Courses.

Philosophy ..... 2 courses
Albert L. Hammond, Instructor.

Politics ..... 2 courses
Niels H. Debel, Instructor in Summer Courses.

Psychology ..... 3 courses
Schachne Isaacs, Instructor.

Radio Communication ..... 1 course
William B. Kouwenhoven, Associate Professor.

Spanish ..... 3 courses
Daniel da Cruz, Instructor in Summer Courses.

Sixteen of the instructors were members of the University. To these were added the following representatives of other institutions and school systems: Dr. William Burdick, Director of the Public Athletic League of Baltimore; Professor James M. Callahan, of West Virginia University (History I, II, and III, *vice* Professor Oliver P. Chitwood); Assistant Professor Daniel da Cruz, of Miami University; Assistant Professor John J. Davis, of the University of North Carolina; Professor Niels H. Debel, of Goucher College; Mr. John Denues, Supervisor of Music, Baltimore Public Schools; Assistant Superintendent Carleton E. Douglass, of the Baltimore Public Schools; Miss Agnes M. Flinn, of the Public Athletic League of Baltimore; Assistant Superintendent Laura A. Frazee, of the Baltimore Public Schools; Mr. George M. Gaither, Supervisor of Industrial Education, Baltimore Public Schools; Mr. Howard F. Hart, of the Montclair High School, Montclair, N. J.; Professor Jesse W. Hubbard, of The State Normal School, Worcester, Mass.; Assistant Professor Charles W. Lemmi, of Goucher College; Mr. John W. Lewis, Director of Americanization, of the Baltimore Public Schools; Mr. Eugene B. Link, of the Polytechnic Institute, Baltimore; Miss Sarah Meseroll, Supervisor of Grades, Public Schools, Cortland, N. Y.; Mr. John B. Opdycke, Chairman of the English Department, Theodore Roosevelt High School, New York City; Mr. Charles A. Pettit, of the Polytechnic Institute, Baltimore; Professor James E. Routh, of Oglethorpe University; Mr. Ray K. Savage, Principal of the Jefferson Junior High School, Rochester, N. Y.; Miss I. Jewell Simpson, Assistant Director, Bureau of Educational Measurements, State Department of Education, Md.; Professor Frank T. Stockton, of the University of South Dakota; Dr. James Sullivan, of the University of the State of New York; Mr. Raymond S. Tompkins, of the Editorial Staff of *The Sun*, Baltimore; Superintendent Maurice S. H. Unger, of Carroll County, Md.; Assistant Superintendent David E. Weglein, of the Baltimore Public Schools; Miss Francis Zuill, Supervisor of Home Economics, Baltimore Public Schools; and the following grade teachers, Baltimore City Schools: Miss Mary A. Adams, Miss Mary L. Broening, Miss Alice G. Bucher, Miss Grace C. Fairbanks, Miss Eleanor C. Heavey, Miss Isabelle M. Johnstone; Miss Margaret E. Linthicum, Miss N. Annette Mann, Miss Florence G. Miller, Miss Grace W. Mink, Miss Katherine F. Muesse, Miss M. Rose Patterson, Miss Bessie Reddington, Mrs. Elizabeth Sakers, Miss Virginia Shaffer, Miss Gertrude T. Shipley, and Miss

Elizabeth B. Stansbury. Dr. James M. Callahan, of West Virginia University, gave the instruction in history *vice* Professor Chitwood, whose absence was due to illness, and substituted a seminary course on Leading American Treaties in place of History I. The particular needs of the large registration in French V and VI were most satisfactorily met by organizing a course in what is usually recognized as the second half of elementary French, the instruction being given by Dr. L. M. Riddle. In response to a special request appearing just before the opening of the session, a course in Radio Communication was given by Associate Professor W. B. Kouwenhoven.

The enrollment of University students was seven hundred and eighty-seven. Of these, two hundred and twenty-seven, or nearly 29 per cent., were men, and five hundred and sixty, or over 71 per cent., were women. The total number of course registrations was one thousand nine hundred and seventy-eight, the average number of courses taken per student being over 2.5. The distribution of these elections was as follows: One course was taken by eighty-eight students; two courses, by two hundred and twenty-one; three courses, by four hundred and sixty-four; and four courses, by fourteen, each. Six hundred and nineteen, or nearly 80 per cent., of the students were administrative and supervisory officers, teachers or prospective teachers, in State and county systems, colleges, normal schools, public and private schools. One hundred and six, or over 13 per cent., were students in colleges, normal schools, and other institutions. Sixty-two, or over 7 per cent., included those representing other occupations, and those reporting or engaging in no occupation. One hundred and forty-eight students held academic or professional degrees from fifty-six institutions. Of the one hundred and thirty-two collegiate students registered, ninety-eight were candidates for a baccalaureate degree in this University. The registration showed a decrease of one hundred and sixty two, or 17 per cent., below that of 1921. This decrease was largely due to the smaller number of Baltimore City teachers in attendance, which is readily understood in view of the great number who were in attendance during the summer of 1921 and continued their work at the University during the session of 1921-22.

The geographical distribution of students was as follows: Maryland was represented by seven hundred and seven students, of whom two hundred and thirty-three, or nearly 30 per cent., were from the counties, and four hundred and seventy-five, or over 60 per cent., from Baltimore City; nineteen other states, China, the Philippines, and Porto Rico, by seventy-nine, or nearly 10 per cent. Two hundred and twenty-four students were representatives of the public elementary and secondary school teachers in twenty-two counties of Maryland, Charles County not being represented.

This is the eighth year in which the program included advanced courses designed to meet the various needs of graduate students. It is especially gratifying to note that the registration of this type of students was one hundred and forty-five, being a very slight decrease from that of the preceding session.

The outstanding feature of the session was the demonstration school, operated under plans developed with the active coöperation of the Board of School Commissioners of Baltimore and conducted as one of the city vacation schools. This school was of the new type which was introduced for specific experimental purposes in the session of 1921. It was located in the two engineering buildings and conducted during eight weeks. The general scheme of organization for the demonstration school indicated in the announcement of the Summer Courses was forced to undergo some considerable revision at the opening of the session. The marked success of the experiment in 1921 may be credited with the very large number of applications for admission on the part of children from all parts of the city to this school. It was necessary

to eliminate eighty-eight pupils from the five grades of the junior high school inasmuch as our accommodations were completely filled with the one hundred and thirty-two pupils retained. Those who could not be admitted were placed in the vacation school conducted at public school No. 75, for whom similar opportunity for doing advanced work was provided. In order to accommodate the excess in applications from children in the intermediate grades, namely, fifth and sixth, additional classroom space was made available whereby it was possible to add three sixth grades and one fifth grade. Owing to illness in the family of the teacher and the rather small registration, the first grade was not continued. The net roll at the close of the school was three hundred and seventy-seven, two hundred and two boys and one hundred and seventy-five girls. One hundred and thirty-two were in the junior high school and two hundred and forty-five in the elementary grades. The marked success of this experiment to accelerate the progress of capable pupils is shown in the recommendation for promotion of one hundred and thirty-one pupils in the junior high school classes, and one hundred and eighty seven pupils in the elementary classes, grades two to six, inclusive. These recommendations were based on psychological tests, teacher judgments, and pupil marks.

There are two directions in which experimental efforts may be made in order to lessen the greatly increased amount of time which our present day educational system demands of children and youths. One direction is that wherein efforts are made to eliminate more or less of the so-called unessentials and repetitions in the course of study. The other direction is that of combining a program whereby additional school time and opportunity for brighter children to advance more rapidly may be provided. The department of education in this University has been working in the latter direction. The first large effort was made in the Summer Courses of 1921 when opportunity was definitely offered to normal and superior children in the fourth grade and above to undertake the completion of the next half-year's work in the eight weeks. Ninety per cent. of these children did their work satisfactorily and were recommended for the next higher half-grade. The principal of the demonstration school, Miss M. Rose Patterson, was delegated to make a follow-up study of these cases during the first half year following. It was found that 91 per cent. of those remaining in the public schools in February had satisfactorily accomplished the work of the grade to which they had been promoted. In a detailed report of this undertaking by the principal, *School and Society*, Vol. XVI, No. 412, the outcome of the experiment is thus summarized: "With children well above normal in intelligence for grade, with experienced and enthusiastic teachers, fairly good equipment, and a well-defined plan of work, it is possible to cover successfully a half year's work in two months." Probably the most significant feature of the undertaking is to be found in the fact that it was carried out under such conditions as make it possible for ready adoption in systems of public education. The vivid memories of the accomplishment in the experiment in 1921 carried over forcefully in motivating the undertaking in 1922. By the achievement in these two summer undertakings, the Baltimore school system, under the University project, has made a distinctive contribution in the field of instruction with normal and superior children.

The series of fifty seven special demonstration lessons and of thirty-eight conferences conducted in connection with the demonstration school, beginning July 5 and closing August 9, included: Mr. Savage, student participation in classroom management; Mr. Hubbard, supervised study lesson in geography; Mr. Hart, beginnings of algebra; Mr. Denues, treatment of monotones; Miss Simpson, silent reading, Burgess reading test, and Haggerty reading test; Mr. Douglass, oral composition; Miss Frazee, preparation for dramatization; Mr. Opdycke, laboratory recitation in vocational composition; Miss Meseroll, health and hygiene; Mr. Hubbard, study of a great city; Miss Patterson,

school assembly; Mr. Savage, socialized recitation in history; Dr. Bamberger reading and intelligence tests; Mr. Douglass, appreciation of literature; Mr. Hart, beginnings of trigonometry; Mr. Opdycke, oral composition through the current topic; Dr. Bamberger, remedial instruction in silent reading; Dr. Burdick, physical education; Miss Meseroll, social activities of children; Dr. Brooks, group and individual intelligence tests. Special conferences were conducted by: Dr. West, the problem of rating teachers; Dr. Freeman, medical inspection of schools; Dr. Weglein, changes in secondary education; Dr. Brooks, using graphs and statistics in classroom instruction; Mr. Douglass, the teaching of spelling; Miss Frazee, primary school curriculum; Miss Patterson, results of the demonstration school.

The following table records the courses which were given in the different departments and specifies the credit as graduate or collegiate, with the maximum number of points in the latter, the student enrollment, and the number completing the courses by taking the examination. The percentage of students completing the work of the courses was 94.2 per cent. The failures on examinations totaled thirty individuals in twenty courses in ten different subjects: biology, chemistry, economics, education, English, French, German, mathematics, politics, and radio communication. The number of persons enrolled in each subject appears in the Registrar's report (see page 131).

Subject and Courses	Points Credit	Enrollment	Number taking Examinations
Biology			
General Biology	4	19	18
Zoology	4	18	16
Chemistry			
Organic Chemistry	G	17	17
Qualitative Analysis	G	2	2
Quantitative Analysis	G	2	2
Introduction to General Chemistry	3	8	8
Economics			
The Labor Movement	G	24	21
American Economic History	3	27	26
Elements of Political Economy	3	15	13
Education			
Experimental Education: The Application of Statistical Methods to Education	G	23	23
Experimental Education: The Intelligence of School Children	G	29	28
Experimental Education: Tests in the Elementary School Subjects	G	18	18
Experimental Education: Interpretation and Application of Test Results	G	19	18
Educational Psychology: Elementary School Subjects	G	44	43
School Hygiene	G	12	11
Secondary Education	G	52	51
The Teaching of English in the Senior High School	G	36	35
The Teaching of Mathematics in the Senior High School	G	20	19
The Teaching of History and Civics in the Senior High School	G	9	9
The Teaching of Geography in Secondary Schools	G	15	15
Problems of Organization and Administration in the Junior High School	G	18	18
Methods of Teaching in the Junior High School	G	26	26
The Teaching of English in the Junior High School	G	27	27

Subject and Courses	Points Credit	Enrollment	Number taking Examinations
The Teaching of Mathematics in the Junior High School	G	15	15
Teaching of History and Civics in the Junior High School	G	27	26
Demonstration School: Junior High Grades	G	39	19
Demonstration School: Elementary Grades	1	124	68
Supervision in Elementary Schools	G	25	25
The Organization and Supervision of City Elementary Schools	G	7	7
School Management and School Law	G	28	28
Teaching the Elementary School Subjects	3	54	50
Reading in the Intermediate Grades	3	56	56
The Teaching of Geography in the Intermediate Grades	3	27	26
Pupil Participation in the Activities of the Primary Grades	3	21	21
Selection and Arrangement of Curriculum Materials for the Primary Grades	3	27	27
Literature and Reading in the Primary Grades	3	60	54
First Grade—Kindergarten Adjustments	3	26	26
Current Kindergarten Theory and Practice	2	15	15
Rural and Village School Problems	2	5	5
Problems of Americanization: Principles, Problems and Backgrounds	3	18	17
Problems of Americanization: Methods of Teaching English to Foreign Born	2	26	26
Physical Education: Principles and Practice	2	17	17
Physical Education: Games and Athletics	2	9	9
English Composition			
Style and the Forms of Discourse	3	25	24
The Short Story	3	23	19
Oral English	3	39	37
The Forms of Contemporary Prose Writing	3	8	8
English Literature			
Shakespeare	G	27	25
Tennyson: Idylls of the King	G	9	9
American Verse	3	44	42
History of English Literature: 1600-1750	3	26	24
French			
Corneille	G	7	6
French Romanticism	G	19	19
French Phonetics	G	20	19
Practical French	3	8	8
Intermediate French	3	19	18
Elementary French	3	20	13
French Elements (2d half)	3	12	10
Geography			
Industrial and Commercial Geography	3	31	31
German			
Advanced German	2	2	2
Intermediate German	3	7	6
Elementary German	2	13	8
History			
Leading American Treaties	G	9	9
European History since 1815	G	27	25
American History since 1825	3	21	18

Subject and Courses	Points Credit	Enrollment	Number taking Examinations
Home Economics			
Materials and Methods in Home Economics	3	21	19
Textiles and Clothing	3½	23	23
Italian			
Italian Literature	2	4	3
Practical Italian	3	1	1
Elementary Italian	3	14	12
Journalism			
The Forms of Contemporary Prose Writing	2	6	3
The Principles and Practice of Journalism	3	20	20
Manual and Industrial Arts			
Bench Work in Wood	3	14	14
Mechanical Drawing	2	19	19
Sheet Metal Work	2	6	6
Advanced Sheet Metal Work	2	7	7
Wood Pattern Making	1	1	1
Electrical Work	2	3	3
Advanced Electrical Work	3	8	8
Elementary Manual Arts	2	32	32
Mathematics			
Advanced Mathematics	G	4	4
Advanced Algebra	3	11	8
Introduction to Calculus	3	7	3
Music			
Public School Music: Primary Grades	2	53	51
Public School Music: Intermediate Grades	2	23	22
Public School Music: Junior and Senior High Schools	2	9	7
Philosophy			
Ethics: General and Practical	3	6	6
Contemporary American Philosophy	3	14	9
Politics			
American National Government	G	23	23
American State and Local Government	G	9	9
Psychology			
The Psycho-physiology of Sleep and Dreams	G	19	19
Applied Psychology	G	25	25
Introductory Psychology	3	22	22
Radio Communication		10	10
Spanish			
Spanish Literature	G	4	4
Practical Spanish	3	8	8
Elementary Spanish	2	15	15

The series of Friday evening lectures and entertainments of a more popular character, open to the public, was made especially attractive through the coöperation of the summer session of the Peabody Conservatory of Music. The program was as follows:

July 7—Mr. Max Landow, Pianist, of the Conservatory.
Recital.
July 14—Professor William B. Kouwenhoven, of the University.
"Radiotelephony."
July 20—Outdoor performance of three plays, by the Homewood Playshop.
July 21—Dr. G. Herbert Knight, Organist, of the Conservatory, and Mrs. Alice L. Seippel, mezzo-soprano.
Recital.
July 22—Outdoor performance by the Homewood Playshop.
July 28—Mr. J. C. VanHulsteyn, Violinist, of the Conservatory, and Mrs. Vivienne Cordero Friz, Violinist.
Recital.
Aug. 4—Professor James M. Callahan, of West Virginia University.
"Anglo-American Relations."

The social welfare of the members of the faculty and student body received attention. The usual reception to the faculties was omitted owing to the special Fourth of July celebration arranged in the city the evening of July 5. The University and Conservatory joined in an opening reception on Friday evening, July 7, and a closing reception on Friday evening, August 4. The former was given in the Peabody Art Gallery, and the latter in the Civil Engineering Building, Homewood. The coöperation of the Homewood Playshop, organized during the last regular session, in presenting outdoor performances of three plays, was a distinct contribution to the social welfare of the faculty and students, and was much appreciated. Saturday excursions were taken to Annapolis, July 15, and to Washington, July 29.

EDWARD F. BUCHNER,
Director.

REPORT OF THE SCHOOL OF ENGINEERING

To the President of the University:

I beg to hand you herewith the Ninth Annual Report of the School of Engineering, for the year ending June 30, 1922:

The increase in the enrollment of students noted in the last two reports has been well maintained during the past year. Of the total initial registration of 313, 300 were in attendance at the end of the year. Of these 6 were graduate students, 6 special students, and 288 were regular undergraduate students.

On Commemoration Day, February 22, the degree of Master of Civil Engineering was conferred on one candidate and the degree of Bachelor of Engineering on one candidate. On Commencement Day, June 13, 1922, the degree of Doctor of Engineering was conferred on one candidate, the degree of Bachelor of Engineering on 44 candidates, and the degree of Bachelor of Science in Chemistry on 14 candidates.

At the end of the year the following appointments in the teaching staff were made:

J. T. Thompson, Associate Professor of Civil Engineering.
F. W. Lee, Associate Professor of Electrical Engineering.

We regret to report the resignation at the end of the year of Mr. W. W. Pagon, Lecturer in Structural Engineering.

The Southern Gas Association, embracing the principal municipal gas companies in the South, at its recent convention in Greensboro, N. C., passed a resolution pledging the Association to an effort to raise funds to establish a chair in Gas Engineering in this University. The project is largely due to the vision and enterprise of Mr. L. Irving Pollitt, President of the Association, and its principal purposes are the creation of a regular source of supply of trained young men for the rapidly expanding gas industry, and the encouragement of research in the methods of manufacture and recovery of by-products. Mr. Pollitt was struck with several advantages offered by our School of Engineering for the new venture, among them being our established courses in Mechanical Engineering and Chemistry, and our research laboratory in this field, equipped several years ago. The fulfillment of the plan will depend on the raising of the necessary five-year guarantee fund among gas manufacturers and industries. At this writing no definite statement may be made other than that the Committee in charge is most optimisic.

Among various professional activities in the several departments as described below, that describing experiments in the University Power House on the heating value of coal taken from the bed of the Susquehanna River is of especial interest. This coal washed down from the mines of Pennsylvania has collected in large quantities above the dam of the Pennsylvania Water and Power Co., and at their request we have conducted tests showing an important heating value for this coal.

Professor J. Cavalier, Rector of the University of Toulouse, France, visited the University between the dates December 1 and January 20, as Exchange Professor in Engineering and Applied Science, under the arrangements completed by a committee of seven American universities, of which this University is one, in coöperation with the Institute of International Education. Professor Cavalier is a distinguished chemist and educator. While here he delivered a series of public lectures on the Universities of France and student

life therein. He also lectured to the graduate students in Chemistry on the general subject of explosives, the field of important work by him during the war. He lectured at the Bureau of Standards, and presented a paper at the Convention of the American Chemical Society, held in Baltimore during his visit. He devoted much of his time to a close study of the methods of administration and instruction in the University. He also visited many other points of interest in Baltimore and vicinity. His charming and interesting personality rendered his visit a pleasure to many members of the University. The American representative in France during the year was Dr. A. E. Kennelly, Professor of Electrical Engineering at Harvard University. Many expressions of appreciation of the importance and value of his work have been received by the Committee. For the year 1922-23 the outgoing American professor will be Dean John Frazer, of the Towne Scientific School of the University of Pennsylvania. The visiting French professor has not yet been named.

Other important features of the year's work were the courses of public lectures on Engineering Practice and the Night Courses for Technical Workers. In addition a number of lectures by practicing engineers were delivered in the various courses of instruction. These activities are described in further detail later in this report.

The School of Engineering has continued to render material services to the University in several directions. Practically half of the space in each of the two buildings is occupied by other departments of study. The assembly hall in the Civil Engineering Building has been especially useful for many general University purposes. Practically all of the evening courses in Business Economics and other general subjects are conducted in the buildings of the School of Engineering. The larger of these buildings has a daily program involving approximately all of its space, extending from 8 A. M. until 11 P. M. The power plant of the University is operated under the direction of the Engineering faculty. Its members are constantly engaged in problems arising in connection with the furnishing of heat, light, power, water and gas to the various buildings. At the request of the Trustees, the three professors of engineering constitute an advisory committee on engineering problems arising in the development of the University group at Homewood. During the year this Committee made a careful study and report on the plans of the Alumni Memorial Dormitory.

The usual report to the Governor and the General Assembly of the State was expanded this year so as to include a review of the first ten years' operation of the School of Engineering. It constitutes a convenient summary of the efforts leading to the foundation of the School and its various activities up to the present.

We ask particular attention to the crowded conditions in both Engineering buildings, owing to the presence therein of other departments of study, noted above. The present attendance marks the limit that can be accommodated with our present quarters and teaching staff.

Further support is also greatly needed for stimulating graduate work and experimental research. Members of the staff now engaged in experimental or other forms of engineering investigation are greatly hampered by the routine demands of undergraduate instruction. We need at least one additional member of the staff in each of the branches of engineering, who can devote part of his time to graduate instruction and research.

Scholarships

In the award of scholarships provided by the State, the total number of regular awards, under the conditions of the law, was 88. In addition to these, 24 special scholarships were awarded by the Trustees, the greater

number of these being to students who had resigned their scholarships to enter military duty during the war and who had returned to the University. The total number of scholarship awards therefore was 112.

Honors of Students

The Board of Engineering Studies recommends each year for honorable mention those students in Engineering who combine, to an exceptional degree, scholastic standing with initiative, resourcefulness, skill and other qualities indicating aptitude for the profession of Engineering. The names for the year 1921-22 are as follows: In the graduating class—M. W. Lieberman in Civil Engineering; E. H. Salter and Warren Viessman in Electrical Engineering; and Robert Clementian Muth and Samuel Spintman in Mechanical Engineering. In the third-year class—William Louis Harwetel and James Henry Leonard in Civil Engineering; William Thomas Alderson and Glover Patterson Fallon in Electrical Engineering; and Raymond Charles Dannettel in Mechanical Engineering.

Instruction

Following are statements of the activities of the several branches of Engineering during the year:

Civil Engineering

The following undergraduate courses were given during the first and second terms, as indicated:

Engineering Drawing. *Six hours weekly, first half-year.* Mr. Whiteman.

Surveying. *Seven hours weekly, first half-year.* Mr. Medaugh and Mr. Comber.

Theory of Structures. *Seven hours weekly, first half-year.* Mr. Bryan.

Structural Engineering. *Nine hours weekly, through the year.* Mr. Pagon and Mr. Thompson.

Sanitary Engineering. *Nine hours weekly, through the year.* Professor Gregory.

Reinforced Concrete Design and Construction. *Six hours weekly, first half-year. Nine hours weekly, second half-year.* Mr. Thompson.

Highway Engineering. *Three hours weekly, first half-year.* Mr. Bryan.

Railroad Engineering. *Two hours weekly, first half-year.* Mr. Medaugh.

Descriptive Geometry. *Six hours weekly, second half-year.* Mr. Whiteman.

Strength of Materials. *Three hours weekly, second half-year.* Mr. Comber and Mr. Bryan.

Civil Engineering Drawing. *Seven hours weekly, second half-year.* Mr. Comber.

Hydraulics. *Six hours weekly, second half-year.* Mr. Medaugh.

Theory of Structures. *Eight hours weekly, second half-year.* Mr. Bryan.

Advanced Surveying. *Eight hours weekly, second half-year.* Mr. Medaugh and Mr. Comber.

General Engineering. *One hour weekly through the year.* Seven lectures by Civil Engineering staff.

Mr. G. L. Bryan, graduate student, continued his experimental investigation of problems in Advanced Structural Design, under the direction of Mr. Pagon. Mr. Bryan received the degree of Master of Civil Engineering on Commemoration Day, February 22nd, his essay being entitled "Waterproofing of Dams."

During the year a number of lectures in the field of Civil Engineering, by especially qualified engineers, have been given in connection with various

courses of instruction. These lectures, all illustrated and some with moving pictures, were as follows:

Subject	*Lecturer*
Brick Roads.	Wm. C. Perkins, Chief Engineer, Eastern Paving Brick Manufacturers' Association.
Chlorination of Water and Sewage.	Wm. J. Orchard, General Sales Manager, Wallace & Tiernan Co., Inc., Newark, N.J.
Granite Block Pavements.	C. D. Pollock, Consulting Engineer to the Granite Paving Block Manufacturers' Association.
Sheet Asphalt Pavements.	Prevost Hubbard, Chemical Engineer to the Asphalt Association.
Wood Block Pavements; Penetration and Mixed Macadam Roads; Maintenance.	J. S. Crandall, Consulting Engineer, Tarvia Department, The Barrett Co.
Machinery Used in Modern Road Construction.	Geo. A. Sherron, Eastern Manager of the Koehring Machine Co.
Manufacture of Vitrified Pipe.	Joseph S. Hubbard, Assistant Engineer, Eastern Clay Products Association, Pittsburgh, Pa.
Harbor Development of the Port of Baltimore.	Bancroft Hill, Harbor Engineer, Baltimore, Maryland.
Use of the Triaxial Diagram in Selecting and Proportioning Sand for Sheet Asphalt Construction.	Prevost Hubbard, Chemical Engineer, Asphalt Association, New York City.
Some Things a Young Engineer Should Know.	John H. Gregory, The Johns Hopkins University, Baltimore, Md.

The last three lectures were delivered before the Johns Hopkins Student Chapter of the American Society of Civil Engineers.

This year, as in the past, a number of trips have been taken by the senior students in Civil Engineering and by the students in Sanitary Engineering from the School of Hygiene and Public Health, for the purposes of examining and inspecting existing installations in service and works in operation. The points visited were as follows: Water Filtration Works of the City of Baltimore, at Lake Montebello; Water Purification and Sewage Disposal Works at the House of Correction, Bridewell, Md.; Water Filtration Works at the State College of Agriculture of the University of Maryland, College Park, Md.; Water Filtration Works of the Washington Suburban Sanitary District, Hyattsville, Md.; Water Purification Works of the District of Columbia, Washington, D. C.; Sewage Disposal Works of the City of Baltimore at Back River; Grain Elevator of the Pennsylvania Railroad Co., Baltimore, Testing Laboratories of the City of Baltimore; Two Reinforced Concrete Buildings, during construction, Baltimore; Bureau of Standards, Washington, D. C.; Excavation for Venable Stadium, Foundations of the Union Memorial Hospital and Reinforced Concrete Construction of the Geneva Apartments, Baltimore; Hydro-Electric Plant of the Pennsylvania Water and Power Co., Holtwood, Pa.; Sugar Refinery of the American Sugar Refining Co., Baltimore.

On March 6th and 7th the Portland Cement Association held a "Conference for Home Builders" in the Civil Engineering Building, for the purpose of instructing the general engineering and contracting public in proper meth-

ods of producing Portland cement concrete. It was well attended by local contractors, builders, and engineers. The senior class in Civil Engineering attended selected portions of the program of the Conference.

During the year members of the teaching staff have engaged in professional work of importance in several directions:

Professor Gregory has continued to serve as Consulting Engineer to the City of Columbus, Ohio, in connection with the design and construction of extensive enlargements and additions to the existing water supply, purification and pumping works, has continued to serve as Consulting Expert to the Law Department of the City of Baltimore in connection with the valuation of several water companies being acquired by the City, and is also serving as Consulting Engineer to the Sewer Division of the City of Baltimore in connection with the enlargement of the Back River Sewage Disposal Works and the extension of the sewer system into the newly annexed areas of the City. In October he attended the annual convention of the American Society for Municipal Improvements held in Baltimore, in January he attended the annual meeting of the American Society of Civil Engineers in New York City, and in May he attended the annual meeting of the American Water Works Association in Philadelphia. Two technical books were reviewed by Professor Gregory for the *Engineering News-Record*, "The Efficiency of Pumps and Ejectors," by E. C. Bowden-Smith, and "Sewerage and Sewage Treatment," by Harold N. Babbitt.

Mr. Thompson was engaged in important research work during the summer with the United States Bureau of Public Roads, Washington, D. C., on the measuring of impact blows delivered by motor vehicles on road and street surfaces.

Mr. Comber was employed by David S. Leonard, Constructor and Builder, Brooklyn, New York, on the construction of the Fosler-Stewart Factory at Norwalk, Connecticut.

Mr. Bryan was engaged during the summer on road construction work for the Maryland State Roads Commission.

Mr. Pagon has continued his private practice in consulting engineering in the field of structure and foundations, and has had in hand a number of important pieces of work. Also he has been asked to serve on a consulting board of five engineers to pass on the design of the Zeppelin ZR-1 which is to be built in this country to replace the ZR-2 which was destroyed at Hull, England, last summer.

During the year important additions have been made to the experimental equipment, notably for the work in Highway Engineering, Reinforced Concrete, Surveying, and Structural Engineering. Of particular interest is a complete model of a through plate girder bridge, constructed in the machine shop of the School of Engineering. This model has proven particularly useful for the purposes of instruction.

ELECTRICAL ENGINEERING

The Laboratory of Electrical Engineering was open daily throughout the year and lectures and laboratory work were conducted as follows:

Undergraduate Courses

Elements of Electrical Engineering. *Nine hours weekly, through the year.* Professor Whitehead, Mr. Pullen and Mr. Lampe.

Materials of Engineering. *Three hours weekly, first half-year.* Associate Professor Kouwenhoven.

Electrical Measurements. *Three hours weekly, first half-year.* Associate Professor Kouwenhoven.

Design of Continuous Current Machinery. *Two hours weekly, second half-year.* Associate Professor Kouwenhoven.

Alternating Current Theory. *Three hours weekly, first half-year.* Dr. Lee.

Alternating Current Machinery. *Three hours weekly, second half-year.* Dr. Lee.

Electric Railways and Electric Illumination. *Three hours weekly, first half-year.* Mr. Pullen.

Advanced Electricity and Magnetism. *Three hours weekly, first half-year.* Professor Whitehead.

Electric Transmission and Power Plant Machinery. *Three hours weekly, second half-year.* Professor Whitehead.

Radio Transmission. *Three hours weekly, second half-year.* Associate Professor Kouwenhoven.

Each of the foregoing courses was accompanied by the regular required amount of laboratory work.

The Seminary met weekly for the review of current journals and the presentation of original papers by members of the faculty.

Professor Whitehead has continued his experimental study of the dielectric losses in high voltage insulation and in the losses by ionization in thin layers of air. In this work he has been assisted by Mr. W. C. Ball, graduate student.

The triennial prize of 5,000 francs of the Fondation George Montefiore, Liege, Belgium, was awarded to Professor Whitehead for his research work on "The Corona Voltmeter and the Electric Strength of Air," published by him in collaboration with T. Isshiki, graduate student. The prize is awarded by a jury of ten electrical engineers, of whom five are Belgian and five are from other countries, for the best original work in the technical applications of electricity in all its branches.

Professor Whitehead has contributed regularly to the editorial columns of the *Electrical World,* New York.

Professor Whitehead attended the mid-Winter and Summer Conventions of the American Institute of Electrical Engineers.

Professor Whitehead published a paper entitled "Ten Years of the School of Engineering" in the June number of the *Alumni Magazine.*

Professor Kouwenhoven has continued his studies of the magnetic properties of twist drills as related to heat treatment and mechanical characteristics. He delivered a lecture on the subject of "Magnetic and Physical Properties of Steels" before the Baltimore Section of the American Institute of Electrical Engineers.

Professor Kouwenhoven continued to serve on committees of the American Institute of Electrical Engineers and of the American Society of Testing Materials, and attended the Annual Convention of the latter society.

Professor Kouwenhoven has recently been elected Chairman of the Baltimore Section of the American Institute of Electrical Engineers.

Dr. Lee is continuing his experimental investigation of the electric properties of gases other than air.

During the year professional services of various descriptions have been rendered by members of the teaching staff to the following firms: Westing-

house Electric & Mfg. Co.; United Railways & Electric Co.; Trinity Church, Towson; Baltimore Club; Hayman, Cook, Chestnut & Markell; F. X. Hooper Co.; Mercantile Trust & Deposit Co.; Seamless Hollow Ball Co.; Mt. Washington Presbyterian Church and Goldsmith Brothers.

The American Institute of Electrical Engineers, Baltimore Section, held several of its monthly meetings in the Electrical and Mechanical Engineering Building.

A number of trips of inspection to electrical engineering plants and projects were taken by the advanced undergraduate classes, in charge of members of the faculty, as follows: Westport generating station of the Consolidated Gas Electric Light & Power Co., Baltimore; Circuit breaker and oil switch manufacturing plant of the General Electric Co., Baltimore; Bureau of Standards, Washington, D. C.; Foundry and enameling plant of A. Weiskittel & Sons at Highlandtown, Baltimore; Manufacture and testing of insulators and electrical porcelain at the plant of the Locke Insulator Corporation, Baltimore; Manufacture of glass bottles at the plant of Swindell Brothers, Baltimore; The dam, electric generating station and the transmission line of the Pennsylvania Water and Power Company, Holtwood, Pa.; The blast furnace and steel mills of the Bethlehem Steel Co., Sparrows Point, Md.; The sugar refinery of the American Sugar Refining Company, Baltimore.

MECHANICAL ENGINEERING

No significant changes were made in the Mechanical Engineering courses during the past year, although the increased number of students made additional sections necessary, greatly increasing the burdens of the teaching staff.

Graduate Courses

Mechanical Engineering Seminary. *One hour weekly, through the year.* Professor Christie.

Mechanical Engineering applied to Marine Practice. *Two hours weekly, through the year.* Professor Christie.

Undergraduate Courses

Applied Mechanics. *Four hours weekly, first half-year.* Associate Professor Smallwood and Messrs. Doughtie and Kouwenhoven.

Applied Kinematics. *One hour recitation and six hours drafting weekly, second half-year.* Associate Professor Waterfall.

Heat Engines. *Three hours class work and six hours laboratory weekly, throughout the year.* Associate Professor Smallwood and Messrs. Doughtie and Kouwenhoven.

Machine Design. *Three hours class work and six hours drawing weekly, first half-year; two hours class work and three hours drawing, second half-year.* Associate Professor Waterfall.

Dynamics of Machines. *Two hours weekly, first half-year.* Associate Professor Waterfall.

Power Plant Calculations. *Three hours weekly, first half-year.* Associate Professor Waterfall.

Materials of Engineering. *Three hours class work and six hours laboratory, first half-year.* Professor Christie and Mr. Kouwenhoven.

Mechanical Laboratory. *Six hours weekly throughout the year.* Professor Christie and Mr. Kouwenhoven.

Heating, Ventilation and Refrigeration. *Three hours weekly, first half-year.* Professor Christie.

Seminary and Journal Meeting. *One hour weekly, throughout the year.* Professor Christie.

Steam Turbine Calculations. *Three hours weekly, second half-year.* Professor Christie.

Internal Combustion Engines. *One hour class room and six hours laboratory weekly, second half-year.* Associate Professor Smallwood and Mr. Doughtie.

Industrial Organization and Contracts. *Three hours weekly, second half-year.* Professor Christie.

Production Methods. *Three hours weekly, second half-year.* Mr. Kouwenhoven.

Advanced Mechanical Laboratory. *Six hours weekly, throughout the year.* Professor Christie.

Professor Christie was elected Chairman of the Power Section of the American Society of Mechanical Engineers for the year 1921-22 and has directed the work of the Section throughout the year, attending the Conventions of the Society at New York and Atlanta, Ga.

The Joint Committee on Code of Ethics of the National Engineering Societies, of which Professor Christie was Chairman, completed its work and has reported back to the constituent societies. The Code has been already adopted by one Society and is being voted on by another.

Professor Christie has also served on the following committees of the American Society of Mechanical Engineers: Power Test Code, Publication, Professional Sections and Baltimore Local Section, and on the Educational Committee of the American Gas Association.

Professor Christie presented a paper on "A National Policy in Engineering Education" before a joint meeting of the Society for the Promotion of Engineering Education and the American Society of Mechanical Engineers in New York last December. He also contributed a chapter on "A Proposed Code of Ethics for all Engineers" to the new book on "The Ethics of the Professions and of Business," being published by the American Academy of Political and Social Science, Philadelphia.

Professor Christie has made a special investigation of solid-injection Diesel engines for Baltimore interests. He is now engaged on a study of the economic possibilities of the low temperature carbonization of coal for a New York firm.

Professor Smallwood was engaged during the summer of 1921 in a consulting capacity by various individuals and companies. This work was mostly the investigation and testing of new devices for motive power. Some of the test results were published in *Power.*

The Pennsylvania Water and Power Company recently requested the University to conduct a series of tests in its boiler plant of fine anthracite coal carried down the Susquehanna River and deposited above the dam of the Company. This material is washed down from the culm banks and mine wastes of the Pennsylvania anthracite region, and about 1,000,000 tons appear to be now available. Our own plant was selected, since we have already conducted a number of experiments on the burning of low grade authracite screenings with successful results. In the experiments for the company referred to, very satisfactory results from the "River" coal were also obtained. The tests indicated that the coal could be burned in as high as 50-50 mixtures with bituminous coal and with relatively high economy. The low price of this so-called "River" coal, in conjunction with our tests, indicates a considerable commercial value. Mr. F. W. Kouwenhoven, of our

staff, acted in an advisory capacity on these tests, which extended through March, April and May. On the completion of the tests the Pennsylvania Water and Power Company presented to the University a new steam flow meter and orifice, which constitutes a valuable addition to our equipment.

Lieutenant-Commander L. N. Linsley, U. S. N., completed an experimental investigation on the critical break-down pressures in oil lubricated bearings. The results of this work were embodied in a dissertation for the degree of Doctor of Engineering, which was conferred upon him at the Commencement exercises in June, 1922.

In the design of the new University buildings, the question of ventilation has frequently arisen, and at the request of the consulting architects, through President Goodnow, experiments have been carried out to clear up some of the uncertainties. Valuable information was secured which may be applied to the design of the new laboratories and other buildings. These experiments were conducted by Walter L. Edel, graduate student.

During the year a new 50,000 pound Riehle Testing Machine, a bend-testing machine, and a Brinnel attachment were added to the equipment of the Testing Laboratory. A small Diesel engine, a CO_2 recorder, a flue gas temperature recorder, and other miscellaneous equipment was purchased for the Mechanical Laboratory during the year.

During the year professional services were rendered by members of the teaching staff to the following firms: Black & Decker Manufacturing Co., Consolidated Gas, Electric Light & Power Co., Yarnall-Waring Co., Philadelphia, John Wiley & Sons, Locke Insulator Co., Mt. Vernon-Woodberry Mills, Hunter Heating Co., and Richardson Brass Co.

Several trips of inspection were arranged for the Senior students to plants of special interest in and near Baltimore, as follows: Simpson & Doeller Co., Otto Duker & Co., Westport Power House, Bethlehem Steel Co., A. Weiskittel & Son Co., and American Sugar Refining Co.

LECTURES ON ENGINEERING PRACTICE

In accordance with the plan of foregoing years, a series of four lectures on Engineering Practice by engineers engaged in the practice of the profession were delivered, during the month of March. The support originally donated by Mr. J. E. Aldred for lectures of this character has been exhausted and as a consequence the number of lectures in the series was reduced from nine to four. The lectures were intended primarily for undergraduate students, but invitations were extended to a number of engineers not connected with the University, and many attended. The lectures were as follows:

March 8th—"Construction of the Catskill Water Supply for the City of New York, from an Engineering Standpoint." Mr. J. Waldo Smith, Chief Engineer, Board of Water Supply, New York City.

March 15th—"Some Results of the War on Engineering Research. Mr. C. E. Skinner, Manager, Research Deparment, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

March 22d—"Engineering Problems Involving Atmospheric Pressure." Mr. W. H. Carrier, President, Carrier Engineering Corporation, Newark, N. J.

March 29th—"Magnesium, Its Manufacture and Use." Mr. W. G. Harvey, Vice-President and Superintendent, American Magnesium Corporation, Niagara Falls, N. Y.

The foregoing lectures will be published in bound form, continuing the series of publications of the Aldred Lectures.

The following lectures on similar subjects were also delivered to the student body:

"The Caribou Hydro-Electric Plant in the Sierra-Nevada Mountains." Mr. A. A. Northrop, Stone & Webster, Boston, Mass.

"The Electrification of the Chicago, Milwaukee and St. Paul Mountain Sections." Mr. H. W. Williams, Chicago, Ill.

NIGHT COURSES FOR TECHNICAL WORKERS

While attendance at the Night School for Technical Workers was not so large as in former years, the men in attendance were better prepared and made greater progress than classes in other years. Several new courses were offered for the first time and were well received. The following courses were given:

Mathematics 1-N. Plane Trigonometry and the elements of Calculus. *Monday and Thursday evenings*, 7.30 to 9.30. Professor A. Cohen.

Chemistry 1 N. General Inorganic Chemistry. *Lecture on Monday evening*, 8 to 10, *and laboratory Friday evening*, 8 to 10. Professor Gilpin and Mr. Owens.

Chemistry 2-N. Quantitative and Qualitative Analysis. *Laboratory, Tuesday and Friday evenings*, 8 to 10. Dr. Beard and Dr. Whitner.

Chemistry 3 N. Organic Chemistry. *Lecture on Thursday evenings*, 8 to 10. *Laboratory on Tuesday or Friday evenings*, 8 to 10. Professor Gilpin and Dr. B. Neuhausen.

Civil Engineering 1-N. Theory of Structure. *Monday and Thursday evenings*, 8 to 10. Mr. T. F. Comber.

Civil Engineering 2-N. Structural Engineering. *Monday and Thursday evenings*, 8 to 10. Mr. J. T. Thompson.

Civil Engineering 3-N. Reinforced Concrete Construction. *Tuesday and Friday evenings*, 8 to 10. Mr. F. Fahm.

Electrical Engineering 1-N and 2-N. Elements of Electricity and Magnetism and Direct Current Machinery. *Monday and Thursday evenings*, 8 to 10. Mr. Louis.

Electrical Engineering 3 N. Elementary Alternating Current Theory and Machinery. *Tuesday and Friday evenings*, 7.30 to 9.30. Professor W. B. Kouwenhoven and Dr. Lee.

Mechanical Engineering 1-N. Machine Design. *Monday and Thursday evenings*, 8 to 10. Professor Waterfall.

Mechanical Engineering 2-N. Heat Engines. *Tuesday and Friday evenings*, 7.30 to 9.30. Professor Smallwood.

Mechanical Engineering 3-N. Power Plant Calculations. *Tuesday and Friday evenings*, 7.30 to 9.30. Professor Christie.

The enrollment in the Night Courses was 247, of whom a greater proportion than in any preceding year continued during the second half-year. A very encouraging feature was the enrollment in the advanced course Mechanical Engineering 3-N, of whom a large number were college graduates. There is an encouraging demand for additional advanced courses.

J. B. WHITEHEAD, *Dean.*

REPORT OF THE DEAN OF THE MEDICAL FACULTY

To the President of the University:

During the year ending September 30, 1922, the Medical School has been conducted along the usual lines, and the courses scheduled have been satisfactorily given. I am glad to report that the disarrangement incident to the war is gradually passing and that the conduct of the School is resuming its normal course.

The University is under great obligations to Dr. George Canby Robinson, Dean and Professor of Medicine in Vanderbilt University at Nashville, Tenn., who served as Acting Professor of Medicine during the year 1921-22, and played an important and acceptable part in reorganizing that department.

In April, Dr. Warfield T. Longcope, of New York, was offered and accepted the chair of Medicine, and assumed duty on July 1st. He has made but few changes in the department, the most important being the addition of Dr. Harold L. Amoss of the Rockefeller Institute and of Dr. Arthur L. Bloomfield of this University, with the rank of Associate Professors. With them in the Biological Division, and with Dr. Edward P. Carter in the Physiological Division, Dr. William S. McCann in the Chemical Division, Dr. Allen K. Krause in Tuberculosis, and Dr. Alan M. Chesney in Syphilis, he has assembled an unusually strong staff which gives every promise of carrying on the work of the department in a most efficient and satisfactory manner.

On September 9th the School suffered an irreparable loss in the death of Dr. William Stewart Halsted, who has been Surgeon-in-Chief since the opening of the Hospital, and Professor of Surgery since the organization of the Medical School, and who has brought the greatest fame to both institutions. Pending the choice of a successor, Dr. J. M. T. Finney has been requested to serve as acting head of the department.

I am glad to report that early in the year work was begun upon the new Pathological Laboratory and upon the Woman's Clinic. Construction is progressing rapidly, and the former building will probably be completed in March, the latter in June, 1923.

Pursuant to regulations formulated a year previously, the number of students in the incoming class was limited to seventy five, and this number of students was chosen from more than three times that many applicants.

Beginning with October, 1922, the tuition fees for all students have been advanced to $300., which from a financial point of view will compensate for the loss of income incident to the reduction in the number of students.

In 1921 the Advisory Board increased the entrance requirements in Chemistry, so that beginning with October, 1923, applicants for admission would be required to present evidence of having had three years' instruction in that subject, including a specified amount of work in each of its subdivisions. During the course of the past year, however, it was learned that numerous institutions of good standing either found it impossible to give such an amount of work to pre-medical students, or, considered, if it were done, that it would diminish the cultural value of the college course. Consequently, after communicating with the Deans and Professors of Chemistry in many of the more important colleges and universities, our regulation was rescinded, and only

two years' preparation in Chemistry was made obligatory, but it was stated that three years were desirable, and, other things being equal, that students presenting such preparation would receive preference.

Owing to a contribution of $9,000. from the Interdepartmental Social Hygiene Board, it became possible to effect a radical reorganization of the sub-department of Syphilis, and Dr. Alan M. Chesney was made Associate Professor of Medicine to direct its research work, while Dr. Albert Keidel will continue in charge of the practical work. Moreover, it was agreed that when the Government's subvention ceased, the University would continue to make sufficient appropriations to carry the work forward. This represents a great advance, and it is confidently expected that it will result in fruitful development in that important subject.

During the year a number of conferences were held at which the importance of a research department of Physics in the Medical School was considered, and after it had been recognized that the development of such a department would exert a fructifying influence upon the various departments of the School, it was decided to offer the post to a promising candidate. As he was unable to accept, the matter has since been in abeyance.

I take pleasure in reminding you of the generous gift of $5,000. by Mr. William Bingham, of Cleveland, for the alteration and equipment of the temporary Cardiographic Laboratory. The changes were promptly made, and Dr. Carter is now housed in greatly improved quarters.

I might also mention, as an evidence of the high regard in which the Medical School is held, the appointment of a number of its members to the Medical Faculty now being assembled at the University of Rochester. As the result of generous donations by Mr. George Eastman, the General Education Board, and others, the development of a university medical school of the highest type has been made possible, and the following members of our staff have been chosen to fill full-time professorships and to organize their respective departments: namely, Dr. George W. Corner, Anatomy; Dr. Stanhope Bayne-Jones, Bacteriology; Dr. Karl M. Wilson, Obstetrics and Gynecology; Dr. William S. McCann, Medicine; while Dr. George H. Whipple, the Dean and Professor of Pathology, is a graduate of this School and for many years was an Associate Professor of Pathology. Drs. Corner and Bayne-Jones will assume their new duties in the summer of 1923, and Drs. Wilson and McCann in 1924.

I regret to report the death, on April 15th, of Dr. Edward K. Dunham, of New York, whom we had long counted as one of the strong friends and supporters of this University.

Upon Commencement Day, June 13, the degree of Doctor of Medicine was conferred upon the following seventy-nine members of the fourth-year class:

W. W. Belford
A. H. Blakemore
A. Blalock
J. R. Blalock
M. L. Bronson
C. E. Buell, Jr.
C. R. Bugg
D. S. Burdick
J. F. Busby
W. A. Campbell, Jr.
R. K. Collins
G. R. Cousar
J. C. Crager
R. G. Craig
J. C. Cuneo
M. Cutler
D. Davis
A. S. Dean
L. Dooley
C. G. Drace
R. H. Durham
D. E. Eagle
S. W. Egerton
R. Elman
H. W. Evarts
O. O. Fisher
R. L. Fisher
L. B. Flinn
B. F. Freeman
F. W. Garber
C. A. Garrett
M. E. Goldblatt
A. M. Groseclose
C. R. L. Halley, Jr.
S. Halpern
P. M. Hamilton
T. R. Harrison
C. A. Heatly
R. M. Ivimey

E. B. Jarrett
L. B. Johnston
T. B. Jones
C. S. Keefer
F. B. Kindell
J. E. King
E. A. Kittredge
H. A. Klee
O. R. Langworthy
R. E. Lenhard
I. I. Levy
R. K. Lipmann
R. C. Lonergan
C. E. McGuigan
J. I. Margolis
I. D. Michelson
D. M. Moore
F. G. Moore
B. L. Moses
M. J. Moskowitz
B. Newberger, Jr.
J. E. Nowrey, Jr.
H. M. Powell
R. E. Prigosen
C. V. Riley
J. E. Sanner
W. J. Scott
W. E. Sisson
D. T. Smith
M. G. Smith
T. C. Smith
K. J. Steinmueller
H. W. Vance
C. W. Wainwright
W. H. F. Warthen
H. Wasserman
E. D. Weinberg
B. Wells
J. O. Wilke
F. J. Wimsatt

On January 3 the degree was conferred upon Samuel Herbert Hinton and on February 22 upon Ko-Chi Sun.

Maryland, Virginia and North Carolina Scholarships were awarded to the following six students: S. F. Marshall of the 2nd year, G. S. Cattanach and W. A. Strauss of the 3rd year, S. A. Anderson, A. W. Jacobsen and H. V. P. Wilson of the fourth year.

During the year the following new appointments, promotions and transfers were made, and the following resignations were accepted:

NEW APPOINTMENTS

Harold L. Amoss, Associate Professor of Medicine.
Robert T. Miller, Jr., Associate Professor of Surgery
Henricus J. Stander, Associate in Obstetrics.
Edwin C. White, Associate in Chemical Urology.
Francis H. Swett, Instructor in Anatomy.
Karl H. Martzloff, Instructor in Gynecology.
Wilmar M. Allen, Instructor in Obstetrics.
Ernesto de S. Campos, Instructor in Pathology.
Lawrence Getz, Instructor in Pathology.
John E. Walker, Instructor in Bacteriology.
Earl L. Burky, Instructor in Bacteriology.
Laurence G. Wesson, Instructor in Physiological Chemistry.
Leslie E. Luehrs, Instructor in Psychiatry.
Justina H. Hill, Instructor in Urology.
William A. Perlzweig, Instructor in Medicine.
Joseph B. Pincus, Instructor in Pediatrics.
Orthello R. Langworthy, Assistant in Anatomy.
Richard W. TeLinde, Assistant in Gynecology
George H. Gardner, Assistant in Gynecology.
Ko-Chi Sun, Assistant in Obstetrics.
Edwin C. Andrus, Assistant in Medicine.
Augustus R. Felty, Assistant in Medicine.
David T. Bowden, Assistant in Medicine.
Margaret Smith, Assistant in Pathology.
Gertrude F. McCann, Assistant in Pathology.
Frank B. Kindell, Assistant in Pathology.
Julian D. Hart, Assistant in Pathology.
Edwin D. Weinberg, Assistant in Pathology.
L. Emmet Holt, Jr., Assistant in Pediatrics.
Katharine Dodd, Assistant in Pediatrics.
A. Ashley Weech, Assistant in Pediatrics.
J. Graham Edwards, Assistant in Physiology.

Fred H. Allen, Assistant in Psychiatry.
Lawrence S. Kubie, Assistant in Psychiatry.
James P. Molloy, Jr., Assistant in Psychiatry.
Warfield M. Firor, Assistant in Surgery.
Cecil H. Bagley, Assistant in Surgery.
Guy W. Leadbetter, Assistant in Orthopedic Surgery.
William J. Orr, Assistant in Pediatrics.
Edgar E. Duncan, Assistant in Obstetrics.
Paul B. McCready, Assistant in Laryngology.
Raymond Sanderson, Assistant in Laryngology.
Arthur L. Hichew, Assistant in Clinical Orthopedic Surgery.
Louis F. Krumrein, Assistant in Clinical Medicine
Stafford Warren, Voluntary Assistant in Pathology.
Richard S. Lyman, Fellow in Medicine.
Edward J. Stieglitz, Fellow in Medicine.

PROMOTIONS

Robert S. Cunningham, from Associate to Associate Professor of Anatomy.
William S. McCann, from Associate to Associate Professor of Medicine.
Arthur L. Bloomfield, from Associate in Clinical Medicine to Associate Professor of Medicine.
Benjamin Kramer, from Associate to Associate Professor of Pediatrics.
Esther L. Richards, from Associate to Associate Professor of Psychiatry.
Albert Keidel, from Associate to Associate Professor of Clinical Medicine.
Wilburt C. Davidson, from Instructor to Associate in Pediatrics.
Leslie B. Hohman, from Instructor to Associate in Psychiatry
Phyllis Greenacre, from Instructor to Associate in Psychiatry.
Emil Novak, from Instructor to Associate in Clinical Gynecology.
Henry S. Willis, from Instructor to Associate in Medicine.
Ernest H. Gaither, from Instructor to Associate in Clinical Medicine.
J. Earl Moore, from Instructor to Associate in Clinical Medicine.
Mary V. Buell, from Assistant to Associate in Physiological Chemistry.
Watson W. Gray, from Assistant to Instructor in Obstetrics.
Alfred B. Hodges, from Assistant to Instructor in Medicine.
Francis R. Dieuaide, from Assistant to Instructor in Medicine.
Roger R. Hannon, from Assistant to Instructor in Medicine.
Elmer B. Freeman, from Assistant to Instructor in Clinical Medicine.
Leslie N. Gay, from Assistant to Instructor in Clinical Medicine.
Jacob Cohen, from Assistant to Instructor in Clinical Medicine.
Harry P. Smith, from Assistant to Instructor in Pathology.
Frank H. Boone, from Assistant to Instructor in Pediatrics.
Benjamin S. Neuhausen, from Assistant to Instructor in Physiology.
Louis Hausman, from Assistant in Psychiatry to Instructor in Experimental Neurology.
Curt P. Richter, from Assistant to Instructor in Psychobiology.
Harry H. Haggart, from Assistant to Instructor in Laryngology.
Leight M. Higgins, from Assistant to Instructor in Laryngology.
Frederick K. Bell, from Assistant to Instructor in Pharmacology.
Elliott H. Hutchins, from Assistant to Instructor in Clinical Surgery.
Israel W. Nachlas, from Assistant to Instructor in Clinical Orthopedic Surgery.
Stanley G. Ross, from Assistant to Instructor in Pediatrics.

TRANSFERS

Alfred C. Kolls, from Fellow in Medicine to Associate in Physiology.
Walter Hughson, from Instructor in Anatomy to Instructor in Clinical Anatomy.

RESIGNATIONS

Clyde G. Guthrie, Associate Professor of Medicine.
George J. Heuer, Associate Professor of Surgery.
Everett D. Plass, Associate Professor of Obstetrics.
D. Wright Wilson, Associate Professor of Physiological Chemistry.
James L. Gamble, Associate in Pediatrics.
Thomas M. Rivers, Associate in Bacteriology.
Mont R. Reid, Associate in Surgery.
Leo Brady, Instructor in Gynecology.
Friedman H. Cathrall, Instructor in Obstetrics.
Louis H. Braafladt, Instructor in Pathology.
Mary J. Hogue, Instructor in Bacteriology.
Horace G. Stewart, Instructor in Pediatrics.
Burr Carter, Instructor in Surgery.
Edwin N. Broyles, Instructor in Laryngology.
James R. Dunn, Instructor in Laryngology.
William D. Andrus, Instructor in Surgery.
J. Scott Willock, Instructor in Clinical Dermatology.
Henry Lee Smith, Instructor in Clinical Medicine.
Ernest L. Zimmerman, Instructor in Clinical Medicine.
Randolph T. Shields, Assistant in Anatomy.
Roger A. Siddell, Assistant in Obstetrics.
Ruth Loveland, Assistant in Medicine.
Charles C. McCoy, Assistant in Pathology.
Daniel C. Darrow, Assistant in Pathology.
Richard Dresser, Assistant in Pathology.
John Martinaglia, Assistant in Pathology.
Ralph K. Ghormley, Assistant in Orthopedic Surgery.

Of the Associate Professors, Dr. Guthrie resigned to become Medical Adviser to the Lawrenceville School, N. J., Dr. Huer to become Professor of Surgery in the University of Cincinnati. Dr. D. Wright Wilson to become Professor of Biological Chemistry in the University of Pennsylvania, and Dr. Plass to become Obstetrician-in-Chief to the Henry Ford Hospital, Detroit.

J. WHITRIDGE WILLIAMS,
Dean.

REPORT ON THE SCHOOL OF HYGIENE AND PUBLIC HEALTH

To the President of the University:

The fourth year of operation of the School of Hygiene and Public Health has been one of increasing prosperity and activity. The number of students has grown, the courses offered have been increased and modified to meet better the needs of the students and the conditions in the various departments have been most satisfactory as regards their main work of instruction and research, as well as in certain extra-mural activities of a more or less public character. The most important single event in the history of the school during the past session has been the generous gift made by the Rockefeller Foundation, which gives to the school a permanent endowment of five millions of dollars and a special fund of one million dollars for the purpose of erecting and equipping a suitable building for its offices and laboratories. It is a matter for sincere congratulation that the school has now an adequate endowment for its proper development, although attention may be called to the fact that the resources of the school have not been increased by the gift; it represents the capitalization of the annual budget of $250,000 which has been furnished to us heretofore by the Rockefeller Foundation. The fact, however, that the Foundation was willing to convert its annual support into a permanent endowment after a short period of three and a half years is a gratifying demonstration that the school has been successful and meets the approval of those who were mainly responsible for its inception.

The various departments of the school have carried out successfully the schedules announced in the annual catalogue and in addition have been very productive in research, as is indicated by the list of publications for the year given below. These technical publications represent the most important contributions that the school is making to the progress of public health, but they are hardly suitable for detailed description in this report. I desire, however, to call your attention to some of the more general investigations of a wider character and more immediately practical application that have been undertaken by some of the departments.

For now two years the departments of Epidemiology and Immunology have been collaborating in conjunction with the City Health Department in a study of Diphtheria in this city, with reference to the improvement of the methods of control. In six of the city wards all the cases of diphtheria reported to the City Health Department have been visited by members of the department of Epidemiology with the purpose of taking cultures and gathering detailed epidemiological material. About six hundred cases have been studied in this way in more detail probably than has been attempted elsewhere, and the material thus obtained, together with information furnished by the City Health Department for the other wards, and the past records of prevalence and mortality of diphtheria in the city will be used in the preparation of an extensive epidemiological report during the present summer. A second phase of the work has been concerned with an examination of the school population to determine the frequency of carriers of virulent diphtheria bacilli and the seasonal variation in the number of carriers. The gathering of cultures and epidemiological data has been done by the department of Epidemiology, while the laboratory work in determining the virulence has been undertaken by the department of Immunology. Certain members of the staff in each department have devoted nearly their whole time to this work. About 8000 school chil-

dren have been cultured, constituting probably the most extensive single study made of the carrier problem in diphtheria. Valuable data have been gathered in regard to seasonal variations and in regard to the relative infectivity of carriers of virulent organisms as compared with clinical cases of the disease. An interesting side of this work has been a special study of the immunity of negroes to diphtheria as indicated by the application of the Shick test. This work has been done in negro schools and the results will be interesting in relation to the fact that the mortality from the disease and probably the morbidity also is less among the negroes than the whites. As an outgrowth of these investigations the members of the departments have been led to undertake in certain schools the immunization of susceptible children by means of the toxin-antitoxin treatment. The results are encouraging, and, to carry further this practical application of the work, the school, in co-operation with the Baltimore City Health Department, has established during the months of June and July of this year a Diphtheria Immunization Clinic. This clinic will be opened at present only to the families of physicians of this city. It is proposed to make Shick tests to determine susceptibility and in cases of those children under seven years who are susceptible to immunize them with the toxin-antitoxin treatment. It is hoped that in this way the advantages of immunization against diphtheria will be brought to the attention of those most interested and best qualified to judge results and by this means the method of treatment will be given a wide application. It will be seen from this brief sketch that this combined work of the school and the City Health Department constitutes a serious and practical contribution to the better understanding and control of diphtheria in this city.

The Department of Biometry and Vital Statistics under a grant from the Commonwealth Fund is undertaking an intensive investigation of the genetic and environmental factors concerned in the etiology and epidemiology of tuberculosis in this country. So far there have been completed 376 case histories, involving detailed records of 78,309 different individuals. This investigation will require several years for its completion. In addition this department has been called upon quite frequently by individuals and institutions from all parts of the country for aid in solving their statistical problems.

The Department of Medical Zoology has undertaken several investigations of a general character. Doctors Hegner and Root spent the summer of 1921 in Porto Rico and Venezuela, making a study of tropical conditions and carrying out investigations in protozoology and entomology. Their work was greatly assisted by the co operation of the Institute of Tropical Medicine and Hygiene of San Juan and the University of Porto Rico. Under the joint auspices of the school and the International Health Board Dr. Cort, in the summer of 1921, directed an investigation on the prevalence and means of control of hookworm disease in Trinidad, B. W. I. Attention was directed especially to the etiology of the disease and to the factors influencing the life of the eggs and the larval stages of the worm in the soil. The results of these investigations are considered to be of great practical value and they are being published in a series of articles in the American Journal of Hygiene. This work will be continued during the present summer under the same auspices in Porto Rico. Dr. Root, in connection with an outbreak of malaria on the Eastern Shore of Maryland, has been investigating the conditions which determine the suitability of natural bodies of water as breeding places for malarial mosquitoes. Under a small grant from the school he will continue these investigations during the present summer.

In addition to giving the regular courses called for in the schedule the department of Medical Zoology offered a special intensive course of three weeks designed especially to suit the needs of Field Directors of the Inter-

national Health Board. During the past session this course was taken by 16 students who came to the school especially for this work.

The department of Public Health Administration made a comprehensive study of the facilities offered in Baltimore for the development of work in Child Hygiene. A preliminary report of this surevy has been made to the Trustees of the Thomas Wilson Sanitarium.

The department of Physiological Hygiene undertook to make an investigation of the efficiency of a new system of ventilation in one of the public schools of Baltimore. A report of the results obtained in regard to the air distribution, temperature, moisture and air currents was made to the proper authorities.

In the department of Chemical Hygiene especial attention may be called to the thorough study made of the dietary factors concerned in rickets and bone formation in general. This investigation undertaken in co-operation with the pediatrical department of the Hospital has extended over several years and has yielded important practical and theoretical results. The evidence at present indicates that there is a special antirachitic element, or so-called vitamin, present in certain fats, and that when this factor is absent or deficient the condition of rickets ensues.

The Washington County Demonstration Unit referred to in the last report has completed its first year of work. This Unit is located at Hagerstown and is now well organized with a Director who is attached to the Faculty of this school and a personnel of some 27 persons, including 12 nurses. The school has the privilege of sending its students to this Unit for short periods of time to take part in its practical work and to learn something of the administrative and field activities of a county health organization. In addition to its importance in furnishing us a much-needed opportunity for practical instruction to our students, this Unit will be of especial value to several departments in giving an organization through which interesting studies may be made in epidemiology, industrial hygiene, school hygiene and public health administration. The school contributed liberally to the initiation of the enterprise, but the pay of its personnel and the maintenance charges are met largely through other agencies. From the report of the Director, made to the State Department of Health, the distribution of expenses proposed for next year is as follows:—

U. S. Public Health Service	$15,155.00
State Department of Health	15,400.00
International Health Board	10,740.00
Washington County Public Health Association	6,495.00
The School of Hygiene and Public Health	2,000.00
Security Cement and Lime Company	1,500.00

Monthly reports of the field work and laboratory work of the Unit are made to the Secretary of the State Department of Health and by him are transmitted to the Director of the School.

The Journal of Hygiene established by the school for the publication of investigations in this field is now in its second volume. The expenses of publication of the Journal and a supplementary series of monographs are met in part from the appropriation made to the school by the Medical School out of its De Lamar fund. It is gratifying to report that the Journal has been successful from the start. The subscription list is growing steadily and scientific papers for publication are received not only from members of the school but from eminent workers in various parts of the world.

The third volume of "Collected Papers" will be issued this summer. These volumes consist of reprints of scientific papers published by members of the

school during the current year and constitute, therefore, an index of the research activity of the school. They are distributed gratuitously to libraries and hygienic institutes throughout the world. The volume for the present year will contain reprints of 72 scientific papers.

The series of public lectures in hygiene known as the DeLamar Lectures formed an interesting part of the exercises of the year. The lecturers and their subjects were as follows:—

J. W. SCHERESCHEWSKY, M. D.,
Assistant Surgeon-General, United States Public Health Service,
"The Morbid Changes Caused by Variations in Barometric Pressure."

ROBERT MCCARRISON, M. D., SC. D.,
Lieutenant-Colonel, Indian Medical Service,
"Faulty Food in Relation to Gastro-Intestinal Disorders."

S. JOSEPHINE BAKER, M. D.,
Director, Bureau of Child Hygiene, Department of Health, New York,
"The Place of Child Hygiene in a Public Health Program."

W. S. LEATHERS, M. D.,
Executive Officer, Mississippi State Board of Health,
"Fundamental Policies Involved in Public Health Administration."

PAUL A. LEWIS, M. D.,
Director, Henry Phipps Institute, Philadelphia,
"Natural Immunity to Tuberculosis."

EDWARD M. EAST, PH. D.,
Professor of Experimental Plant Morphology, Harvard University,
"The Population Problem in its Relation to Public Health."

CLEMENS PIRQUET, M. D.,
Professor of Diseases of Children, University of Vienna, Austria,
"Nutritional Treatment of Tuberculosis in Childhood."

EDWIN O. JORDAN, PH. D.,
Professor of Bacteriology, University of Chicago,
"Interepidemic Influenza."

ROGER I. LEE, M. D.,
Professor of Hygiene, Harvard University,
"The Physical Examination of Large Groups of Individuals:
Its Importance, Limitations and Opportunities."

ELLSWORTH HUNTINGTON, PH. D.,
Research Associate in Geography, Yale University,
"Climate, Health and Civilization."

JOSEPH BARCROFT, F. R. S.,
Fellow of King's College, Cambridge, England,
"Physiology of Life in the Andes."

OTTO R. EICHEL, M. D.,
Director, Division of Vital Statistics, State Department of Health, New York,
"The Interest of the Physician and the Social Worker in Vital Statistics."

G. W. MCCOY, M. D.,
Director, United States Hygienic Laboratory, Washington,
"Plague."

BRAYTON H. RANSOM, PH. D.,
Chief of the Zoological Division, Bureau of Animal Industry,
U. S. Department of Agriculture,
"The Hygienic Importance of Recent Discoveries on Ascariasis."

JOHN PAUL LOTSY, PH. D.,
Research Fellow, Dutch Society of Science, Holland,
"The Species-Concept in Evolution and Hybridization."

The Society of Hygiene held 8 meetings throughout the year. These meetings were well attended by the staff and students and outside members. The following reports of researches were presented and discussed:

"Hookworm Investigations in Trinidad"..... Dr. W. W. Cort. Mr. D. L. Augustine.
"Poisonous Mushrooms"..... Dr. W. W. Ford.
"Experiments in Epidemiology"..... Dr. H. L. Amoss.
"The cost of the reproductive effort measured from the date of conception: based on Maryland birth registration, and applying Pearson's formula for prenatal time"..... Dr. John S. Fulton.
"The resistance of different hosts to trypanosome infections"..... Dr. W. H. Taliaferro. Mrs. L. G. Taliaferro.
"Correlation Between Two General Functions"..... Dr. Lowell J. Reed.
"Physiology of Life in the Andes"..... Joseph Barcroft, F.R.S.
"Physical Exhaustion and Susceptibility to Pneumococcus Infection"..... Dr. R. A. Spaeth.
"The Classification of American Anopheles Mosquitoes"..... Dr. F. M. Root.
"The Action of Ultraviolet Light on Egg Albumin in Relation to the Isoelectric Point"..... Dr. Janet H. Clark.
"Some Observations on a Case of Rat-Bite Fever".. Dr. G. H. Robinson.
"Observations on the Distribution of Diphtheria Carriers in Baltimore"..... Dr. J. A. Doull.
"Use of the Original Diagnostic Culture in the Diphtheria Virulence Test"..... Dr. L. C. Havens.
"Observations on Single Cell Strains of B. Diphtheriae"..... Mr. H. M. Powell.
"Observations on two Dissimilar Diphtheria Toxins". Miss Ida W. Pritchett.
"The Effect of X-Ray on Reproduction in the Rat". Dr. Donald R. Hooker.
"A Simple Method for Measuring Metabolism in Small Animals"..... Dr. Arthur Louis Meyer.
"New Data on the Influence of Alcohol on the Expectation of Life of Man"..... Dr. Raymond Pearl.

The activity of the several departments of the school is well indicated by the following list of publications of the staff and students which have appeared since the last annual report:

I. Poisonous Mushrooms. By William W. Ford. *Peterson-Haines Text-book of Legal Medicine.*

II. The Etiology of rat-bite fever. By George H. Robinson. *American Journal of Hygiene*, vol. 2; *Proceedings of the Society of Hygiene.*

III. Method of plating anaerobes. By Henrietta Lisk. *American Journal of Public Health*, May, 1922.

IV. The use of the original diagnostic culture for the determination of the virulence of diphtheria bacilli. By Leon C. Havens and Horace M. Powell. *American Journal of Hygiene*, 1922, vol. 2, p. 234.

V. The relation of blood-platelets to the in vivo agglutination of bacteria and their disappearance from the blood stream. By Carroll G. Bull and Clara M. McKee. *American Journal of Hygiene*, 1922, vol. 2, p. 208.

VI. Effect of temperature upon the development of the eye of drosophila hydei. By Roscoe R. Hyde. *Proceedings of the American Society of Zoologists*, 1921; *Anatomical Record*, 1922.

VII. The domestic fowl as a source of hemolytic sera. By Roscoe R. Hyde. *Science*, May 19, 1922.

VIII. On the production of hemolysins and hemagglutinins in the domestic fowl. By Roscoe R. Hyde and C. E. Bailey. *American Journal of Hygiene*, 1922, vol. 2, p. 246.

IX. Production of hemolysins in the domestic fowl. By Roscoe R. Hyde. *Pro. American Association of Bacteriologists; Abstracts of Bact.*, 1922, vol. 29.

X. The newer knowledge of nutrition. Second edition. By E. V. McCollum, 1922.

XI. Studies on experimental rickets. IV. Cod liver oil as contrasted with butter fat in the protection against the effects of insufficient calcium in the diet. By E. V. McCollum, Nina Simmonds, P. G. Shipley and E. A. Park. *Proceedings of the Society for Experimental Biology and Medicine*, vol. 18, p. 275, 1921.

XII. Studies on experimental rickets. V. The production of rickets by means of a diet faulty in only two respects. By P. G. Shipley, E. A. Park, E. V. McCollum and Nina Simmonds. *Proceedings of the Society for Experimental Biology and Medicine*, vol. 18, p. 277.

XIII. Studies on experimental rickets. VI. The effect on growing rats of diets deficient in calcium. By E. V. McCollum, Nina Simmonds, P. G. Shipley and E. A. Park. *American Journal of Hygiene*, vol. 1, p. 492, July, 1921.

XIV. Studies on experimental rickets. VII. The relative effectiveness of cod liver oil as contrasted with butter fat for protecting the body against insufficient calcium in the presence of a normal phosphorus supply. By P. G. Shipley, E. A. Park, E. V. McCollum and Nina Simmonds. *American Journal of Hygiene*, vol. 1, p. 512, July, 1921.

XV. Studies on experimental rickets. VIII. The production of rickets by diets low in phosphorus and fat-soluble A. By E. V. McCollum, Nina Simmonds, P. G. Shipley and E. A. Park. *Journal of Biological Chem.*, vol. 47, p. 507, August, 1921.

XVI. Studies on experimental rickets. IX. Lesions in the bones of rats suffering from uncomplicated beri-beri. By P. G. Shipley, E. V. McCollum and Nina Simmonds. *Journal of Biological Chem.*, vol. 49, p. 399, December, 1921.

XVII. Studies on experimental rickets. X. Rickets and rickets-like disease produced in rats by deficient diets. By P. G. Shipley, E. A. Park, E. V. McCollum and Nina Simmonds. *Dental Cosmos*, p. 3, March, 1922.

XVIII. Studies on experimental rickets. XI. The prevention of the development of rickets in rats by sunlight. By P. G. Shipley, E. A. Park, G. F. Powers, E. V. McCollum and Nina Simmons. *Proceedings of the Society for Experimental Biology and Medicine*, vol. 19, p. 43, 1921.

XIX. Studies on experimental rickets. XII. Is there a substance other than fat-soluble A associated with certain fats which plays an important rôle in bone development? By E. V. McCollum, Nina Simmonds, P. G. Shipley and E. A. Park. *Journal of Biological Chem.*, vol. 50, p. 5, January, 1922.

XX. Studies on experimental rickets. XIII. The functions of the organic factor as exemplified by cod liver oil. By P. G. Shipley, E. A. Park,

E. V. McCollum and Nina Simmonds. *Transactions of the American Pediatric Society*, June, 1921.

XXI. Studies on experimental rickets. XIV. The prevention of the development of rickets in rats by sunlight. By G. F. Powers, E. A. Park, P. G. Shipley, E. V. McCollum and Nina Simmonds. *Journal of American Medical Association*, vol. 78, p. 159, January, 1921.

XXII. Studies on experimental rickets. XV. The effect of starvation on the healing of rickets. By E. V. McCollum, Nina Simmonds, P. G. Shipley and E. A. Park. *Johns Hopkins Hospital Bulletin*, vol. 33, p. 31, January, 1922.

XXIII. Studies on experimental rickets. XVI. A delicate biological test for calcium-depositing substances. By E. V. McCollum, Nina Simmonds, P. G. Shipley and E. A. Park. *Journal of Biological Chem.*, vol. 51, p. 41, March, 1922.

XXIV. Studies on experimental rickets. XVII. The effect of diets deficient in calcium and in fat-soluble A in modifying the histological structure of the bones. By E. V. McCollum, Nina Simmonds, May Kinney, P. G. Shipley and E. A. Park. *American Journal of Hygiene*, vol. 2, p. 97, March, 1922.

XXV. Studies on experimental rickets. XVIII. Is there more than one kind of rickets? By P. G. Shipley, E. A. Park, E. V. McCollum and Nina Simmonds. *American Journal of Diseases of Children*, vol. 23, p. 91, February, 1922.

XXVI. Studies on experimental rickets. XIX. The prevention of rickets in the rat by means of radiation with the mercury vapor quartz lamp. By G. F. Powers, E. A. Park, P. G. Shipley, E. V. McCollum and Nina Simmonds. *Johns Hopkins Hospital Bulletin*, vol. 33, p. 125, April, 1922.

XXVII. Cytamoeba bacterifera in the red blood cells of the frog. By R. W. Hegner. *Journal of Parasitology*, vol. 12, p. 157.

XXVIII. An analysis of the relation between growth and nuclear division in a parasitic infusorian, opalina sp. By R. W. Hegner and Hsiang-Fong Wu. *American Naturalist*, vol. 55, p. 335.

XXIX. The prevalence of intestinal protozoa and related organisms in Porto Rico. By R. W. Hegner. *Journal of the American Medical Association*, vol. 77, p. 1439.

XXX. The report of the results of an expedition to Trinidad for the study of hookworm disease. By W. W. Cort. *Science*, N. S., vol. 54, p. 595.

XXXI. A new human trematode from Japan. By W. W. Cort and Sadamu Yokogawa. *Journal of Parasitology*, vol. 8, p. 66.

XXXII. A preliminary report of the activities of infective hookworm larvae in soil. By W. W. Cort, D. L. Augustine and G. C. Payne. *Journal of the American Medical Association*, vol. 72, p. 2035.

XXXIII. Investigations on the control of hookworm disease. I. General introduction. By W. W. Cort. *American Journal of Hygiene*, vol. 1, p. 557.

XXXIV. Investigations on the control of hookworm disease. II. The description of an apparatus for isolating infective hookworm larvae from soil. By W. W. Cort, J. E. Ackert, D. L. Augustine and F. K. Payne. *American Journal of Hygiene*, vol. 2, p. 1.

XXXV. Investigations on the control of hookworm disease. III. A discussion of the finding of unsheathed hookworm larvae in the soil. By W. W. Cort, D. L. Augustine, J. E. Ackert, F. K. Payne and G. C. Payne. *American Journal of Hygiene*, vol. 2, p. 17.

XXXVI. Investigations on the control of hookworm disease. VI. A study of the effect of hookworm control on soil pollution and infestation in a

sugar estate. By W. W. Cort and G. C. Payne. *American Journal of Hygiene*, vol. 2, p. 107.

XXXVII. Investigations on the control of hookworm disease. VII. An epidemiologic study of hookworm disease in a cacao estate. By W. W. Cort and G. C. Payne. *American Journal of Hygiene*, vol. 2, p. 149.

XXXVIII. Variation and inheritance in size in trypanosoma lewisi. I. Life-cycle in the rat and a study of size and variation in "pure line" infections. By W. H. Taliaferro. *Proceedings of the National Academy of Sciences*, vol. 7, p. 163.

XXXIX. II. The effects of growing "pure lines" in different vertebrate and invertebrate hosts and a study of size and variation in infections occurring in nature. *Proceedings of the National Academy of Sciences*, vol. 7, p. 163.

XL. The human intestinal amoeba, iodamoeba williamsi, and its cysts. (Iodine cysts.) By W. H. Taliaferro and E. R. Becker. *American Journal of Hygiene*, vol. 2, p. 188.

XLI. The resistance of different hosts to trypanosome infections with especial reference to a new method of measuring this resistance. By W. H. and L. G. Taliaferro. *American Journal of Hygiene*, vol. 2, p. 264.

XLII. Giardia enterica; a parasitic intestinal flagellate of man. By Charles E. Simon. *American Journal of Hygiene*, vol. 1, p. 440.

XLIII. Investigations on the control of hookworm disease. VIII. Experiments on the migrations of hookworm larvae in soils. By D. L. Augustine. *American Journal of Hygiene*, vol. 2, p. 162.

XLIV. Investigations on the control of hookworm disease. IX. On the position of infective hookworm larvae in the soil. By D. L. Augustine. *American Journal of Hygiene*, vol. 2, p. 172.

XLV. Investigations on the control of hookworm disease. X. Experiments on the length of life of infective hookworm larvae in soils. By D. L. Augustine. *American Journal of Hygiene*, vol. 2, p. 177.

XLVI. Investigations on the control of hookworm disease. IV. The relation of the domestic chicken to the spread of hookworm disease. By J. E. Ackert. *American Journal of Hygiene*, vol. 2, p. 26.

XLVII. Investigations on the control of hookworm disease. V. The domestic pig and hookworm dissemination. By J. E. Ackert and F. K. Payne. *American Journal of Hygiene*, vol. 2, p. 39.

XLVIII. Investigations on the control of hookworm disease. XI. Vertical migration of infective hookworm larvae in the soil. (Preliminary report.) By Florence King Payne. *American Journal of Hygiene*, vol. 2, p. 254.

XLIX. Waskia intestinalis: Its cultivation and cyst formation. By Mary Jane Hogue. *Journal of the American Medical Association*, Vol. 77, p. 110.

L. The cultivation of trichomonas hominis. By Mary Jane Hogue. *American Journal of Tropical Medicine*, vol. 1, p. 211.

LI. A comparison of an amoeba, vahlkampfia patuxent, with tissue-culture cells. By Mary Jane Hogue. *Journal of Experimental Zoology*, vol. 35, p. 1.

LII. Note relative à l'action photodynamique de l'hématoporphyrine sur le fibrinogène. By W. H. Howell. *Archives Internationales de Physilogie*, vol. 18, p. 269.

LIII. An artificial nerve. By R. A. Spaeth. *Science*, vol. 54, 360.

LIV. Length of work day and industrial health. By R. A. Spaeth. *The Nation's Health*, vol. 4, p. 32.

LV. Physical exhaustion and susceptibility to pneumococcus infection. By R. A. Spaeth. *American Journal of Hygiene*, vol. 2, p. 320.

LVI. The relation between fatigue and susceptibility of rats toward a toxin and infection. By Ella H. Oppenheimer and R. A. Spaeth. *American Journal of Hygiene*, vol. 2, p. 51.

LVII. The physiological action of light. By Janet Howell Clark. *The Physiological Reviews*, vol. 2, p. 277.

LVIII. The action of ultra violet light on egg albumin in relation to the isoelectric point. By Janet Howell Clark. *The American Journal of Physiology*, vol. 61, p. 72.

LIX. The nature of secondary valence. Part III. Partition coefficients in the system water: ether. By Homer W. Smith. *The Journal of Physical Chemistry*, vol. 25, p. 605.

LX. The nature of secondary valence. Part IV. Partition coefficients in the system glycerine-acetone. By Homer W. Smith. *The Journal of Physical Chemistry*, vol. 25, p. 721.

LXI. The nature of secondary valence. Part V. Partition coefficients in systems containing water as one component with special reference to the absolute values of the series constants. By Homer W. Smith. *The Journal of Physical Chemistry*, vol. 26, p. 256.

LXII. The nature of secondary valence. Part VI. Summary and discussion. By Homer W. Smith. *The Journal of Physical Chemistry*, vol. 26, p. 349.

LXIII. The biology of death. IV. The causes of death. By Raymond Pearl. *Scientific Monthly*, vol. 12, p. 489.

LXIV. The biology of death. V. The inheritance of duration of life in man. By Raymond Pearl. *Scientific Monthly*, vol. 13, p. 46.

LXV. The biology of death. VI. Experimental studies on the duration of life. By Raymond Pearl. *Scientific Monthly*, vol. 13, p. 144.

LXVI. The biology of death. VII. Natural death, public health and the population problem. By Raymond Pearl. *Scientific Monthly*, vol. 13, p. 193.

LXVII. A statistical note on epidemic encephalitis. By Raymond Pearl. *Johns Hopkins Hospital Bulletin*, vol. 32, pp. 221-225, 1921.

LXVIII. Biometric data on infant mortality in the United States birth registration area, 1915-1918. By Raymond Pearl. *American Journal of Hygiene*, vol. 1, p. 419.

LXIX. The vitality of the people of America. By Raymond Pearl. *American Journal of Hygiene*, vol. 1, p. 592.

LXX. Experimental studies on the duration of life. I. Introductory discussion of the duration of life in drosophila. By Raymond Pearl and Sylvia L. Parker. *American Naturalist*, vol. 55, p. 481.

LXXI. A note on the inheritance of duration of life in man. By Raymond Pearl. *American Journal of Hygiene*, vol. 2, p. 229.

LXXII. Experimental studies on the duration of life. II. Hereditary difference in duration of life in line-bred strains of drosophila. By Raymond Pearl and Sylvia L. Parker. *American Naturalist*, vol. 56, p. 174.

LXXIII. The vital index of the population of England and Wales, 1838-1920. By Raymond Pearl and Magdalen H. Burger. *Proceedings of the National Academy of Sciences*, vol. 8, p. 71.

LXXIV. Seasonal fluctuations of the vital index of a population. By Raymond Pearl. *Proceedings of the National Academy of Sciences*, vol. 8, p. 76.

LXXV. Modern methods in handling hospital statistics. By Raymond Pearl. *Johns Hopkins Hospital Bulletin*, vol. 32, p. 184.

LXXVI. The significance of biometry and vital statistics to the science of medicine. By Raymond Pearl. *Nelson Loose-leaf Medicine*, vol. 7, p. 111.

LXXVII. Review of "The Friendly Arctic," by V. Stefansson. By Raymond Pearl. *Science*, N. S., vol. 55, March 24, 1922.

LXXVIII. On the correlation between any two functions and its application to the general case of spurious correlation. By Lowell J. Reed. *Journal of the Washington Academy of Sciences*, vol. 11, p. 449.

LXXIX. The general wihdrawal method of treating morphinism. A mathematical note. By John Rice Miner. *Johns Hopkins Hospital Bulletin*, vol. 32, p. 205.

LXXX. Note on a case of human inbreeding. By John Rice Miner. *American Naturalist*, vol. 56, pp. 188-189, 1922.

LXXXI. Note on the economic conversion factors of energy. By Alfred J. Lotka. *Proceedings of the National Academy of Sciences*, vol. 7, p. 192.

LXXXII. The general conditions of validity of the principle of Le Chaelier. By Alfred J. Lotka. *Proceedings of the American Academy of Arts and Sciences*, vol. 57, p. 21.

LXXXIII. Note on moving equilibria. By Alfred J. Lotka. *Proceedings of the National Academy of Sciences*, vol. 7, p. 168.

LXXXIV. A single graphic construction for Farr's relation between birth-rate, death-rate and mean length of life. By Alfred J. Lotka. *Quarterly Publication of the American Statistical Association*, vol. 17, p. 998.

LXXXV. The influence of age on fertility in swine. By Tage Ellinger. *Proceedings of the National Academy of Sciences*, vol. 7, p. 134.

LXXXVI. Four years' progress in public health organization in Ohio. By A. W. Freeman. *Journal of the American Medical Association*, vol. 77, No. 21.

LXXXVII. Organization of public health nursing in state boards of health. By A. W. Freeman. *The Public Health Nurse*, vol. 14, No. 3.

The total number of students of all kinds registered during the year was 141. These may be classified as follows:

Candidates for the degree of Dr. P. H.	20
Candidates for the degree of Sc. D. in Hygiene	31
Candidates for the Certificate in Public Health	11
Candidates for the degree of S. B. in Hygiene	4
Special students	75
Total	141*

The special students may be further classified as follows:

Special students, registered only in this school, and taking one or more courses for the whole or part of the year	25
Special students registered in the six weeks intensive course for public health officers	9
Special students registered in the three weeks intensive course in Medical Zoology	16
Students registered in the Philosophical Faculty who took one or more special courses	12
Students registered in the college course for teachers in the University who took a special course in Bacteriology and Physiological Hygiene	13
Total	75

* The statistics of enrollment appearing in the Registrar's report in later pages are based mainly on the *University Register* issued in January, and they do not account for the ten students registered later in the School of Hygiene.

It is evident from the last two items that the courses organized in the School of Hygiene and Public Health will be found useful to students pursuing courses in other faculties. If it were not for the unfortunate physical separation of the several schools of the University there is no doubt that this desirable interchange of students would become a prominent feature in the work of the University.

It is worthy of mention that no less than twenty-two of our students were sent to us directly through the International Health Board and the Rockefeller Foundation. Some of this group of students were experienced workers in the field of public health, who came to the school for training in special subjects; others were from foreign countries, Central and South America, Poland, Czechoslovakia, China, Siam, etc. They constituted a selected group of men brought to this country on fellowships offered by the two organizations mentioned for special training in public health methods. The methods and ideals developed in this school will be carried by these men to many foreign lands.

During the year degrees were conferred on recommendation of the Faculty as follows:

On Commemoration Day, February 20, 1922, two Doctors of Public Health and one Doctor of Science in Hygiene.

On Commencement Day, June 13th, 1922, six Doctors of Public Health, four Doctors of Science in Hygiene, six certificates in Public Health and four Bachelors of Science in Hygiene. The names of the recipients are printed at the end of the President's report.

W. H. HOWELL,
Assistant Director.

REPORT OF THE DIRECTOR OF PHYSICAL EDUCATION

TO THE PRESIDENT OF THE UNIVERSITY:

I have the honor to submit the following report as Director of Physical Education for the year 1921-1922.

Physical Education in this University has been conducted in a similar manner to last year except that details have been more efficiently executed and, therefore, a larger number of students benefited. Only the first and second year students are required to take Physical Training, except those in the Reserve Officers Training Corps. The rule passed last year allowing no student in the physical training class to be excused has given a great impetus to the class work, and the general attendance throughout the year has been very good. It is with the greatest difficulty that we can hold the interest of the students throughout because we lack the physical equipment so necessary for carrying out work of this character. We can say, even with the lack of indoor space and sufficient locker room facilities, we have carried the work throughout the year with efficiency and with benefit to the students.

The classes in Physical Training have been conducted by Major E. B. Garey and his assistants, Captains Paul and Atwater, and we owe a great deal to these gentlemen for the efficient manner in which they have carried on the work.

We have made 706 medical and physical examinations, only 249 of which were initial or first examinations, this being the freshman class only. The remaining number is made up of examinations of the second, third and fourth year R. O. T. C. students, numbering 148, and the balance is made up of examinations of those who have gone out for the athletic teams, numbering 309. Out of the initial examinations, 249 in number, there were twenty found with physical defects or about 8%. Of these, 5 were hernias, 6 heart murmurs, 4 organic heart disease, 3 serious eye defects, 1 hyperthoidism and 1 gunshot wound. In addition to these, we found 17 with more or less defective vision (refraction errors). All the individuals found with defects were advised just what could best be done to correct or alleviate their condition and a number thus advised, on recommendation, went through the clinics at the Hospital.

The general average of the physical examinations of the students this year was better than last year, as the men on an average attained a better standing on the physical tests than we have previously noted. As for instance, the average this year was about 500, whereas, in previous years, it has been very little over 400 and it may be noted that no individual is allowed on an athletic team unless his strength test attains at least 500. So there is no doubt in our minds that a better class of students physically reported to the University this year. We had our largest enrollment in the freshman class in Physical Training for this year which was 125, and in the second year there were 67. Owing to transfers and withdrawals from the University, the Physical Training Class for the first year, or Physical Education I, numbered 93 and in the second year, or Physical Education II, 67. There were 125 of the first year men to enter the R. O. T. C. and 75 of the second year men. The difference in our figures and those of the enrollment at the University are explained by the fact that 47 men from the Baltimore Polytechnic Institute received advanced standing and therefore, are not obliged to take Physical Training their second year. Two others of the first year class were given credit for work done in other institutions and 20 men were debarred from participating in physical exercise, owing to some physical defect.

We have endeavored to encourage all the men in the college to participate in some recreative sport and to foster this idea we allowed a man whose physical strength test is above the standard to substitute for some of his physical training class work such exercise as he would receive under the strict regime of an official athletic team. There were about 50 students of the first year class who availed themselves of this privilege and we find that the plan inures to the advantage of the individual as well as the collective interest of the teams.

The athletic teams have all been well supervised and the consensus of opinion seems to be that the caliber of the individual teams have been improved considerably over that of any previous year. We have had 309 members of the undergraduate department actively participating on the official teams of the University as follows: football 65, track 95, lacrosse 81, baseball 50, swimming 10 and tennis 8. In addition to these, we have a Rifle Team which was organized this year with an enrollment of 30. Altogether, we have had 50% of the undergraduates engaged in some recreative sport.

There were scheduled during the season 9 football games, 3 being played away; 13 track events, 10 being played away; 10 lacrosse games, 3 being played away; 17 baseball games, 4 being played away; 5 swimming meets, 4 away; and 5 tennis matches, 4 away. The Rifle Team played all their matches on the range in Gilman Hall.

The athletic teams have been managed and financed through the Homewood Company and the Varsity Club according to the agreement made two years ago with the University. A report of their activities will be made at the end of their fiscal year July 1.

Too much credit cannot be given to certain members of our Alumni who have been deeply interested in our athletic activities and who have given of their time and means to foster sports at this University, and we are indebted to these gentlemen who have done so well by us in carrying on their work through the Homewood Company and the Varsity Club. A good piece of work certainly has been done by them at some sacrifice, and now they have asked the University to take over their work as it stands today and carry it on as an integral part of the work of this Department. They have passed a resolution for the action of the Board of Trustees of this University, which it is hoped will be acted favorably upon by them and the work continued as an actual part of the University administration.

During inclement weather, the months of January, February and March, the physical training class met indoors and a course in Personal Hygiene was conducted. This is necessitated by the fact that we have no indoor space for conducting any part of the Physical Training work during bad weather.

We would suggest that a Committee be appointed by the University to look after the interest of the students in respect to obtaining a gymnasium, a cage and a natatorium, as we believe a committee so constituted could do something in an authoritative way for starting a movement to obtain these much-needed additions to our equipment.

RONALD T. ABERCROMBIE, M. D.,
Director.

REPORT ON MILITARY SCIENCE AND TACTICS

To the President of the University:

Since my last report the change of personnel in the Military Department has been as follows: Major B. A. Dixon and Captain A. W. Williams have been relieved and Captains Paul and Atwater have been assigned here for duty. Major Bailey in charge last year of the Medical Unit has been relieved and Major Riley assigned in his place. We have been promised the assignment of one more officer by the War Department and his arrival is expected at an early date.

At the beginning of the year we changed the method of theoretical and practical instruction. Heretofore, we have had one period in the class room and two periods of practical work, Tuesdays and Thursdays, from 4.15 until 6 o'clock. We found on the one hand that the students were not getting enough time in the class room and on the other hand were having to stay too late for drill on Tuesdays and Thursdays, as it was seldom that the students left the University on those days until about 6.10. In a word we were giving too much practical and too little theoretical instruction.

The past year we changed from one to two periods in the class room, reducing the time of practical instruction from 4 o'clock to 5.35 p. m., thus leaving sufficient time for the student to get home in time for dinner.

The extra period of class room work is devoted to a lecture given by a member of the Military Staff. The lecture covers ground to be given to the student the following week and it has been found to give the student a quicker insight into the work required of him. The results have demonstrated that the change was a desirable one.

In my last report I discussed the formation of the Military Committee appointed by direction of the Board of Collegiate Studies. This committee has been invaluable to the Military Department. It is composed of members of the faculty who take the greatest interest in the Military Department and there are now at the University three members of the faculty who are familiar with the essential phases of our work.

Their advice is of the greatest assistance to me, and, when the time comes for me to be relieved, they will be sufficiently familiar with the general course of events in the Department to have it continue with the policy that has been formulated.

The Engineer Unit was authorized and established last year. Due to the different requirements of the Infantry and Engineer Units, it was decided to admit to the Engineer Unit for the year 1921-22 only the first and second year men. This year the Juniors are included and next year men from all four classes will be included.

There is, as you probably know, a student organization called the Scabbard and Blade, a local chapter of a national organization, that is also of great value to the Military Department. It is composed entirely of student officers in the Military Department. Its purpose in general is to assist in the National Defense plans of the country and in particular to assist the Military Department at this institution.

We frequently have dinners at the Hopkins Club, having together the Military Committee, the members of the local chapter of the Scabbard and

Blade and all the members of the Military Staff. Having such direct touch with the faculty and student body, it is possible to get the point of view of each and govern our activities accordingly.

This year we are changing one of our drill days which has previously been on Tuesday to Monday, in order to accommodate the athletic activities of the University. It is the policy of the Military Department to excuse important members of the major athletic activities one day a week from military drills. We excuse them on Thursday. Monday is perhaps the least important athletic day of the week and as it was immaterial to us whether we had our drill on Monday or Tuesday, we made the change.

During the past year there were many conflicts with important lectures, particularly on Thursday. On frequent occasions I was asked by a considerable number of students to excuse them from military work in order to attend these lectures. It would help us very much if in the future lectures could be scheduled as far as may be practicable on Tuesdays, Wednesdays or Fridays, leaving Mondays and Thursdays free for military activities from 4 until 5.35 P. M.

The Military Department is having, I believe, a healthy development. Last year the numbers were as follows:

First Year Basic—		
Infantry	75	
Engineer	39	
Medical	11	
	—	125
Second Year Basic—		
Infantry	49	
Engineer	18	
Medical	13	
	—	80
First Year Advanced—		
Infantry	32	
Medical	10	
	—	42
Second Year Advanced—		
Infantry	28	
	—	28
Total		275

It is my unpleasant duty to inform you in this report that the Military Department did not attain the Distinguished List during the year 1921-22 under my administration. I assume full responsibility for this condition. I alone am to blame in the matter.

I have inaugurated a system of theoretical instruction at this University, which I believe to be sound. In a word my policy is to give a maximum of theoretical instruction with a minimum of drill.

This last year the War Department had a system of rating which gave but 25% to theoretical instruction, 25% to practical instruction and 50% to other matters.

The efficiency of this department would be greatly increased if it could be arranged to have all of the R. O. T. C. students of each of the four classes together for the lecture. Under the present plan our lecture and recitation schedules are made up after the students have been assigned to other classes. This results in the necessity in some cases of giving the same lecture many times during the week.

Some of the departments are scheduling classes after four o'clock. These classes prevent some men from attending R. O. T. C. practical instruction and others from attending Physical Education classes. These conflicts seriously impair the efficiency of these two departments.

Last year in my report I called attention to the need of a combined gymnasium and armory. As we are connected with the physical training work, the necessity of having better means of physical training for the entire student body is impressed upon me daily. As a considerable number of our students come from Baltimore, and as many of these are under-sized and not well developed, I feel that there are compelling reasons for developing greater facilities for physical work at the earliest practicable date.

E. B. GAREY,
Major, Infantry.

REPORT OF THE LIBRARIAN

TO THE PRESIDENT OF THE UNIVERSITY:

Herewith is submitted my fourteenth annual report on the Library, covering the year ended June 30, 1922.

There are two items in the year's record to be underscored; namely, the arrival of the Edward Revere Osler library and the utilization of our resources in three cases of nation-wide service.

The library, together with the fund of some $30,000 previously received, is the gift of Sir William and Lady Osler, as a memorial to their son who fell during the war. From these resources a Tudor and Stuart Club and Library are to be established and maintained. The Club membership is to be made up of the English Department, professors and their staffs, special students, collegiate and graduate, and other members of the University interested in literature, together with a certain number of honorary members. The library is to be a section of the departmental library in English, "the interest of the fund to be expended in the purchase of books relating to the periods and in the promotion of good fellowship and the love of literature among the members." The library of Edward Revere Osler, which serves as a nucleus of this collection, numbers 808 volumes, exclusive of ten other volumes yet to be dispatched. As a catalog of this collection will doubtless be published in due season under the auspices of the Club, no extended notice of it should here be given. It may be said, however, that this collection is for the most part of the Georgian period. Edward Revere Osler was an ardent fisherman and devoted to architecture. Hence there are twenty-four Izaak Walton items and thirty-nine other books on fishing. His own book-plate, made by himself, is in each of the volumes, and bears the double motif of fishing and architecture. Included in the library is also the English section of Sir William Osler's library, which was to go to his son. Among the special editions, it is interesting to find a good many of the originals of Shelley, the 1645 Milton poems, original editions of the *Paradise Lost* and *Paradise Regained*, original Keats, Donne's, Thomas Fuller, Gulliver's Travels, and a particularly interesting collection of Walt Whitman's magazine articles and newspaper cuttings sent by Whitman from 1876 up to the time of his death to Edward Dowden. It had been Sir William's intention to add very materially to the collection before it was shipped, but this intention was prevented by his death shortly after he had made the initial purchase, which was the first book bought for the memorial library, namely, the Golden Book of Marcus Aurelius, London, 1559. The Club and Library will be established in special quarters, duly equipped and tastefully embellished.

In Washington, during the year, there appeared three measures of concern to the users of foreign books, and it was our good fortune to be employed as the national instrumentality for safeguarding the interests of American science and scholarship. All these measures arose out of the somewhat troublous relations between publishers and printers. Fearful that under the depreciation of foreign exchange and the cheapness of foreign labor American printing and binding contracts might drift to Europe in considerable quantities, the Typographical and allied unions asked that in the framing of the new tariff measure virtually prohibitive duties should be laid upon incoming books. As, however, they were found not to be concerned with the admission or exclusion of bona fide foreign books, we succeeded in effecting a compromise satisfactory to them, without penalizing the importers, whereby books

in foreign languages and those in English published as much as twenty years ago should continue to come in free, while the duty upon English books of bona fide foreign origin should continue at fifteen per cent when imported by other than libraries, while that upon books in English of American origin should be placed at twenty-five per cent.

The second movement of the printers was in the direction of branding imported books to indicate foreign origin. There was legal ground for them to stand upon, for every tariff act from 1890 onward had contained a provision requiring that imported articles should be marked prominently and permanently to indicate country of origin, unless such marking damaged the goods. Heretofore the bona fide foreign imprint had been accepted as in compliance with the law. The Treasury Department issued a Decision in favor of the complainants, the effect of which was, in the practice at certain ports, to require the marking of all title-pages, no matter what the nature of the imprint. Upon appeal, however, these regulations were withdrawn as they affect libraries.

Finally, there has appeared in Congress a measure, now pending, which has for its main object the clearance of the difficulties in the way of the United States becoming a member of the International Copyright Union. Unfortunately, however, coupled with this proposal was one injected by the publishers which restricts the freedom of importation, always heretofore enjoyed by libraries, in cases where the American market has been assigned to an American representative. This measure has yet to come to hearing.

In all these instances the position of the American Library Association has received the endorsement of nearly a score of important national organizations, and the librarian has been their spokesman in Washington.

ACCESSION STATISTICS

Irrespective of binding, we received, of books and pamphlets, by purchase, 7200 volumes in 6968; by gift, 3490 volumes in 3464; by exchange, 10,431 volumes in 10,430; by U. S. Government deposit, 159 volumes; Maryland Geological Survey deposit, 75 volumes; J. H. U. dissertations in manuscript, 58; two copies each of 23 J. H. U. printed dissertations; 56 other publications of ours. Total, 21,256 pieces. In addition we received 177 maps (120 by purchase, 23 by gift, and 34 by exchange), 40 photographs, six charts, and one plate.

Of these receipts 10,151 were bound. The net accessions being 10,063 (through disposal of 88), the total number of bound volumes in the library on June 30, 1922, was 244,920.

PURCHASES

The most interesting purchase of the year was two series of John Stuart Mill letters. The one consisted of 43 autograph letters signed from Mill to Comte, running from Nov. 8, 1841, to May 17, 1847, and all written in French. These have been published. (Lettres inédites de John Stuart Mill à Auguste Comte, publiées avec les réponses de Comte et une introduction par L. Lévy-Bruhl, Paris, Felix Alcan, 1899. [The letter of July 18, 1845 is missing in our file]).

The other consists of a collection of letters written to Mill by some 125 to 150 different correspondents. These letters are contained in envelopes as they were originally preserved by Mill and most of them have rough copies, in Mill's autograph, of his replies. In a few cases the original letters to him have been removed, presumably by a former owner because of the value of the autograph. Mill's replies, running from 1829 to 1873, have been pub-

lished. (The letters of John Stuart Mill, edited, with an introduction, by Hugh S. R. Elliott, 2 v., London, Longmans, Green and Company, 1910).

These manuscripts were secured by an American firm this year during an auction sale at Sotheby's in London, where they were advertised as being sold by the executor of the estate of Miss Mary Taylor, grand-daughter of Mrs. Mill. How the letters to Comte came back into the possession of the family is not known, though the transfer was doubtless for purpose of publication.

To our selections from Sijthoff's phototypic reproductions of classical manuscripts we added Lucretius and Terence.

Among other acquisitions worth mentioning were the following:

In Semitics: Sets of Jüdische zeitschrift f. wissenschaft u. leben (Geiger), Zeitschrift f. demographie, and Vorderasiatische schriftendenkmäler d. k. Museen zu Berlin.

In History: Karte d. Deutschen Reiches.

In Chemistry: Fortschritte d. teerfarbenfabrikation. (Friedländer).

In Medicine: Archiv f. hygiene, Ergebnisse d. pathologie u. anatomie, Zeitschrift f. sexualwissenschaft.

In Hygiene: Biochemical journal, Entomological news, and Zeitschrift f. balneologie, klimatologie u. kurort-hygiene.

GIFTS

Aside from the Osler library above noticed, the University was the recipient of another striking gift of books this year. Mrs. A. J. Ulman, of Baltimore, presented her collection of the works of her brother, Henry Harrisse, the distinguished Americanist. The collection runs to eighty-three titles, thus constituting in number about forty per cent. of this prolific scholar's output of forty years. Measured by bulk and significance, his most important work, however, is here. These include the well known "Bibliotheca Americana Vetustissima" (issued in 1866, with additions in 1872); "Christophe Colomb, son origine, sa vie, ses voyages, sa famille et ses descendants," Paris, 1884, 2 v.—his most important contribution to Columbus literature; "The Discovery of North America," 1892; "Découverte et évolution cartographique de Terre Neuve et des pays circonvoisins, 1479-1501-1769," 1900; "Excerpta Columbiana," 1887; "John Cabot, the discoverer of North America, and Sebastian, his son," 1896—pronounced by Harrisse himself, in 1895, as his best of eighty-seven works. In the list is one volume of great rarity—the "Letters of Christopher Columbus describing his first voyage to the western hemisphere," New York, 1865, of which only ten copies were printed. The entire gift will be preserved in a case especially made for the purpose.

Of gifts by others, the following may be mentioned:

Armstrong, E. C. Les annales politiques et littéraires, 2 vols. and 96 nos.

Buchner, E. F. 32 volumes in education.

Buchner, Mrs. E. F. Journal of home economics, I-XI[1], 1909-1919.

Burlingame, E. W. *His* Buddhist legends translated, 1921.

Christie, A. G. 7 volumes in engineering.

District of Columbia. Health Department. Report of the health officer, 1896-1917 (exc. 1912).

Ember, A. 34 volumes in orientalia.

Goodnow, F. J. 181 miscellaneous items.

Gregory, J. H. 59 volumes and pamphlets, mainly on public health.

Hollander, J. H. 42 volumes and pamphlets in economics.

Henry Holt and Co. 19 of their current publications.

Kelly, H. A. 62 books about books.

MacCallum, W. G. 14 volumes, mostly in pathology.

Mackall, L. L. Varii historiae romanae scriptores. 1568. 4 v.; *his* Sir William Osler. 1922.

Mathews, E. B. 14 miscellaneous volumes.

Newsholme, Sir Arthur. 18 volumes of pamphlets.

Remsen, I. 31 miscellaneous items.

Welch, W. H. Pathological Society of London. Proceedings 1-6, 1846/47-1851/52; Transactions 4-58, 1853-97, *plus* Index 1-15, 16-25, 26-37, 38-50; seven other volumes.

Whitehead, J. B. U. S. Interstate Commerce Commission. Statistics of railways in the U. S. 1911-1919; eleven other volumes.

Wood, H. 29 German text-books.

ANALYSIS OF EXPENDITURES

I. Philosophical and Collegiate Departments:			
Books	$4,289.20		
Periodicals	4,160.17		
Maps	21.94		
Manuscripts	150.00		
Binding	4,624.63		
Equipment	692.20		
Cards	362.05		
Printing and supplies	313.01		
Postage and carriage	687.37		
Vacuum cleaning	300.00		
		$15,600.57	
II. Medical School:			
Books	$1,061.45		
Periodicals	2,014.99		
Binding	1,768.72		
Card cabinet	68.40		
Cards	153.10		
Printing	19.20		
Carriage and supplies	215.26		
		5,301.12	
III. School of Hygiene and Public Health:			
Books	$ 931.81		
Periodicals	1,140.17		
Binding	1,116.50		
Card cabinet	65.50		
Cards	81.13		
Carriage and supplies	161.24		
		3,496.35	
IV. School of Engineering:			
Books	$ 361.45		
Periodicals	434.39		
Binding	305.75		
Carriage and supplies	32.07		
		1,133.66	
			$25,531.70
Salaries			30,692.90
Total			$56,224.60

CATALOGING

The department was seriously handicapped this year by the necessity of interpolating several new and under-trained assistants who also could come only late to their positions, and by a six weeks' absence of one of our best

catalogers, who had suffered an injury. Once more the pamphlet volumes—97 of them—had to go to the shelves unanalysed. While experimentation on an improved device for the duplication of cards went forward steadily, complete and striking success was only attained after the close of the period here reported on.

The following table shows the record in detail:

Cards:		
Main entries (titles)	6,904	
Duplicate main entries	7,354	
Added entries	13,142	
Duplicate added entries	9,451	
Shelf list cards	4,179	
Source cards	1,308	
Cross references	764	
		43,102
Volumes (including 154 maps)		14,283

Cf. 47,268 cards and 16,231 volumes last year.

Of the *titles* handled, cards were received from the Library of Congress for 40%, and 3.3% from the Wistar Institute, while for the remaining 56.7% we ourselves prepared copy.

Of the 43,102 *cards* employed, 40.7% were printed by the Library of Congress, and 3.3% by the Wistar Institute, while 35.3% were printed on our multigraph, and the remaining 20.7% were typewritten.

In the Reading Room catalog, which aims to be complete for the entire University, 22,249 cards were added by the custodians. The total now is 543,777 cards.

In the Library of Congress depository catalog 19,424 cards, representing new entries, were filed. This took 238 hours.

CLASSIFICATION

In my last report, I indicated that Dr. Mattern, the Assistant Librarian, had, after finishing the Teutonic and Romance groups, made a start on Classics by handling generalia, journals, monographic series, philology, literary criticism, and the Greek language. This year Greek was completed by the classification of Greek Literature. Latin Language was also covered, leaving in this field, Latin Literature and Classical Archæology, which we hope to cover next year. Elsewhere there will remain Religion, Church History, Law, the Oriental languages and literatures.

As usual this work had to be done from manuscript schedules, since we long ago outran the subjects covered by the printed lists of the Library of Congress. This is, of course, a much more tedious operation, but we can hardly afford to await the conclusion of printing, since the schedules are held in manuscript quite a while before surrender to the printer.

Mr. Shules, the Chief Cataloger, supplemented this work in arrears with 43 titles, and 391 revisions. In the current accessions, he accepted the Library of Congress classification assigned on its cards for 758 titles, while he handled 2290 titles independently—a total of 3482 titles. (Cf. 2390 in 1918/19, 2415 in 1919/20, and 3465 in 1920/21.)

BINDING

Mr. A. C. Munzner reports having prepared 6106 volumes for local binding (cf. 3491 in 1918/19, 5113 in 1919/20, 6464 in 1920/21). Toward the end of the year we felt it safe once more to resume the ante-bellum custom of having German books bound before shipment.

Of the above 6106 volumes, 402 were rebindings. The cost of the whole was $6295.50, or $1.03 per volume. (Cf. 82 cents, 93 cents, 97 cents, $1.01,

$1.05, and $1.06, of the preceding six years.) We have thus passed the peak of high prices. This average is expected to be lowered once more during the coming year, owing to the introduction of an oversewing machine in the local bindery, as recommended by the Committee on Book-binding of the American Library Association. The product is at once more durable and economical. In our binding we keep fully abreast of this Association's exacting specifications.

During the past year we have installed a stock of binding dummies, or rubbings, which will hereafter spare us the necessity of sending pattern volumes out to accompany the year's periodicals.

INTER-LIBRARY LOANS

In the operation of the inter-library loan system, we borrowed 279 volumes, 7 sets of facsimiles and 2 manuscripts from the following institutions: Boston Athenæum (1), University of Chicago (1), Cleveland Public Library (1), Columbia University (8), Cornell University (5), Harvard University (40), University of Illinois (1 facsimile), Jewish Theological Seminary (4 v., 6 sets of facsimiles and 2 manuscripts), John Crerar Library (3), Pan American Union (1), Peabody Institute (2), University of Pennsylvania (3), Princeton University (3), U. S. Bureau of Standards (1), U. S. Department of Agriculture (7), U. S. Library of Congress (84), U. S. Surgeon-General's Office (113), Virginia State Library (1), Yale University (1).

We lent 199 volumes to the following institutions: Birmingham-Southern College (1), Bryn Mawr College (6), Camp Holabird (3), Camp Meade (3), University of Chicago (4), Cincinnati Public Library (1), University of Cincinnati (1), University of Colorado (1), Cornell University (2), Dartmouth College (1), Delaware Board of Education (1), E. I. du Pont de Nemours & Co. (3), Edgewood Arsenal (6), Evansville Public Library (1), Fort Howard (2), George Peabody College for Teachers (1), Gilman Country School (1), Goucher College (42), Harvard University (1), University of Kansas (1), Kittanniny High School (1), Marshall College (8), Maryland State Department of Education (2), University of Maryland (2), Michigan Agricultural College (1), University of Minnesota (3), Mississippi Agricultural College (1), Mount Holyoke College (1), National Aniline & Chemical Co. (1), New School for Social Research (11), University of North Carolina (6), Ohio State University (3), Pennsylvania State College (3), University of Pennsylvania (7), Philadelphia Free Library (1), Princeton University (11), Randolph-Macon Woman's College (1), Rockville High School (5), St. Louis University (2), University of South Dakota (14), Sweet Briar College (5), Tacoma Public Library (1), University of Tennessee (6), University of Texas (2), University of Toronto (2), Trinity College, Durham, N. C. (1), Union College (2), U. S. Department of Agriculture (2), Virginia Military Institute (1), University of Virginia (8), Western Maryland College (3).

Respectfully submitted,

M. L. RANEY,
Librarian.

REPORT ON THE JOHNS HOPKINS PRESS

(ABSTRACT)

TO THE PRESIDENT OF THE UNIVERSITY:

I submit herewith the report of the Johns Hopkins Press for the past year.

American Journal of Mathematics, edited by Professor Frank Morley, A. Cohen, Assistant Editor, and with the co-operation of Charlotte A. Scott, A. B. Coble and other mathematicians. Numbers 3 and 4 (152 pages octavo) completing volume xliii, 1921, were published.

American Journal of Philology, edited by Professor C. W. E. Miller, with the co-operation of Maurice Bloomfield, Hermann Collitz, Tenney Frank, W. P. Mustard, and D. M. Robinson. Numbers two, three and four (300 pages octavo) completing volume xlii, 1921, and two numbers (192 pages octavo) of volume xliii, 1922, have appeared.

American Journal of Psychiatry, formerly American Journal of Insanity, edited by Drs. E. N. Brush of Baltimore; J. Montgomery Mosher of Albany, N. Y.; Charles Macfie Campbell of Boston, Mass.; Charles K. Clarke of Toronto, Ontario, and Albert M. Barrett of Ann Arbor, Michigan. Volume 1 (Old series volume 78) was published during the year. It contains 732 pages octavo.

Hesperia: Schriften zur germanischen Philologie, edited by Professors H. Collitz and H. Wood, and *Schriften zur englischen Philologie*, edited by Professor J. W. Bright. No part appeared during the year.

The Johns Hopkins Hospital Bulletin. This is issued jointly by the Medical School and Hospital. Six numbers (194 pages quarto) completing volume xxxii, 1921, and six numbers (230 pages quarto) of volume xxxiii, 1922, have been published.

The Johns Hopkins Hospital Reports. No part appeared during the year.

The Johns Hopkins University Circular. Four numbers (626 pages octavo) completing volume xl, 1921 (728 pages octavo) and four numbers (670 pages octavo) of volume xli, 1922, have been issued. These have included College Courses for Teachers, 1921-22; Conferring of Degrees, June 21, 1921, and Directory of Summer Courses for 1921; Catalogue and Announcement for 1921-22 of the Medical Department; Report of the President of the University, 1920-21; University Register, 1921-22; Summer Courses, 1922; Catalogue and Announcement for 1922-23 of the School of Hygiene and Public Health; College Courses for Teachers, 1922-23.

The Johns Hopkins University Studies in Education, edited by Professor Edward F. Buchner. Number four, entitled "The Effect of the Physical Make-up of a Book upon Children's Selection" by Florence Eilau Bamberger, was published in March, 1922. It contains 170 pages octavo, with numerous illustrations and tables. Number five, entitled "A Measuring Scale for Free-Hand Drawing, Part 1—Representation" by Linus W. Kline and Gertrude L. Carey, 68 pages octavo and four large scales of drawings, was published in June.

The Johns Hopkins University Studies in Geology, edited by Professor Edward B. Mathews. This publication was started during the past year and two numbers have appeared. Number one entitled "The Geology of the Coro-

coro Copper District of Bolivia" by Joseph T. Singewald, Jr., and Edward W. Berry, was published in April, 1922, and number two entitled "The Geology and Paleontology of the Huancavelica Mercury District' by Edward W. Berry and Joseph T. Singewald, Jr., was published in May. The third number entitled "The Paleontology of the Zorritos Formation of the North Peruvian Oil Fields" by Edmund M. Spieker, is in the printer's hands.

The Johns Hopkins University Studies in Historical and Political Science. Two numbers (508 pages octavo) completing volume xxxix, 1922 (614 pages octavo) appeared during the year. Their titles are as follows: "The Rise of Cotton Mills in the South" by Broadus Mitchell, and "The International Molders Union of North America" by Frank T. Stockton.

Modern Language Notes, edited by Professors James W. Bright (Editor-in-Chief), Gustav Gruenbaum, William Kurrelmeyer and H. Carrington Lancaster. Two numbers (144 pages plus viii pages of bibliography) completing volume xxxvi, 1921 (528 pages plus xxxii pages of bibliography), and six numbers (384 pages plus xxiv pages of bibliography) of volume xxxvii, 1922, have been published.

Terrestrial Magnetism and Atmospheric Electricity, edited by Dr. L. A. Bauer. Volume xxvi, 1921, four numbers (156 pages octavo) and numbers 1 and 2 (88 pages octavo) of volume xxvii, 1922, were published during the year.

The J. E. Aldred Lectures on Engineering Practice, 1920-21, was published in October 1921. It includes three lectures each on Civil, Electrical and Mechanical Engineering, and contains 286 pages octavo and numerous illustrations. This terminates the series of Lectures to be published under the above title.

There is in press a volume containing four lectures, entitled "Lectures on Engineering Practice.

China At The Conference, A Report, by Professor W. W. Willoughby. This volume was published in May, 1922. It contains 435 pages octavo.

The R. O. T. C. Manuals, edited by Major Garey and several collaborators were published in four volumes during the year. These were issued under the following subjects: Freshman Course, First Year Basic; Sophomore Course, Second Year Basic; Junior Course, First Year Advanced, and Senior Course, Second Year Advanced. These volumes have been adopted by nearly all the R. O. T. C. units and by a number of secondary schools where military instruction is given. There were sold approximately 23,000 copies of the books.

There was also published volume one for the *Red Camp* of the *Red, White, and Blue Manuals.* It contains valuable information for use in the various Corps Areas of the Citizens' Military Training Camps.

There is in press for early publication a volume entitled "Vector Analysis and the Theory of Relativity" by Professor F. D. Murnaghan; also a volume entitled "Tables of $\sqrt{1-r^2}$ and $1-r^2$ for use in Partial Correlation and in Trigonometry" by Dr. John Rice Miner.

DISSERTATIONS PUBLISHED DURING THE YEAR

Following is a list of dissertations for the degree of Doctor of Philosophy, published during the year:

Bahlke, William Herbert: A Study of the Vapor Pressure of Aqueous Solutions of Lithium Chloride at 20° C.

Bau, Mingchien Joshua: The Foreign Relations of China. Part III, The Policy of Japan in China.

Bingham, Harold C.: Visual Perception of the Chick. (Degree not as yet conferred.)

Breit, G.: The Distributed Capacity of Inductance Coils.

Burton, J. M.: Honoré de Balzac and his Figures of Speech.

Castleman, Jr., Robert Allen: Magnetic Rotatory Dispersion in Transparent Liquids.

Davidheiser, Levi Yorgey: The Adsorption of Ammonia by Silica Gel.

Fawcett, Howard S.: The Temperature Relations of Growth in Certain Parasitic Fungi.

Havens, George R.: The Abbé Prévost and English Literature.

Hopkins, Hoyt S.: The Conditions for Conjugation in Diverse Races of Paramecium.

Johnston, Earl S.: Seasonal March of Climatic Conditions in a Greenhouse, as related to Plant Growth.

King, John Fitch: The Measurement of Dielectric Constants.

Kramer, Richard L.: The Catalytic Preparation of Mercaptans.

Lee, Frederick W.: The Electric Strength of Air under Continuous Potentials and as Influenced by Temperatures.

McCobb, Arthur Lewis: The Double Preterit Forms gie–gienc, lie–liez, vie–vienc in Middle High German.

Mitchell, Broadus: The Rise of Cotton Mills in the South.

Neuhausen, Benjamin Simon: A Study of the System Ammonia-Water as a Basis for a Theory of the Solution of Gases in Liquids.

Norcross, Wilbur Harrington: Experiments on the Transfer of Training.

Noyes, Bessie: Experimental Studies on the Life History of a Rotifer Reproducing Parthenogenetically (Proales Decipiens).

Piggot, Charles Snowden: Mangenese in the Catalytic Oxidation of Ammonia.

Trelease, Sam F.: The Relation of Salt Proportions and Concentrations to the Growth of Young Wheat Plants in Nutrient Solutions containing a Chloride.

Van der Lingen, Jan Stephanus: The Fluorescence of Mercury Vapor.

Warren, Howard C.: A History of the Association Psychology from Hartley to Lewes.

C. W. Dittus,
Manager, The Johns Hopkins Press.

REPORT OF THE REGISTRAR

To the President of the University:

I have the honor to submit the following statistics of the enrollment during the year 1921-22:

Academic Staff

The academic staff included 352 teachers. Of these 53 were engaged primarily in graduate instruction in the faculty of philosophy, 40 primarily in collegiate work, 17 chiefly in the engineering department, 201 in the department of medicine, 41 in the school of hygiene. In addition there were 25 lecturers, resident and non-resident; and 72 persons, not members of the regular teaching body, gave instruction in the college courses for teachers, the summer courses, the courses in business and in social economics, and the night courses for technical workers. Of the total teaching force of 449, women numbered 44.

Students

The enrollment of students in the regular courses included 1454, of whom 872 were residents of Maryland (659 of Baltimore), 517 came from 47 other states and territories of the Union, and 65 from 26 foreign countries. Of these students 701 pursued graduate courses—290 in the graduate school (including 90 women), 348 (women 51) in the department of medicine, 60 (women 13) in hygiene and public health, and 3 in engineering. The undergraduates consisted of 388 candidates for the degree of bachelor of arts, 230 for the degree of bachelor of engineering, 61 for bachelor of science in chemistry, and 32 special students. In the school of hygiene there were 4 candidates (3 women) for the bachelor's degree and 67 special students (4 women). In the college courses for teachers there were enrolled 1037 persons (835 women); in the summer courses of 1921 there were 949 (women 718); in business economics 627 (women 132); in the night technical courses 247 (women 5); in social economics 12 graduate and 15 special students (all women).

Summary of Enrollment, 1921-22

Faculty

President and Professors,	71
Clinical Professors,	7
Associate Professors,	46
Assistant Professors,	4
Associates,	77
Instructors and Assistants,	147
	352
Lecturers for the year,	25
Additional Instructors in College Courses for Teachers, Courses in Social and in Business Economics, Night Courses for Technical Workers, and Summer Courses,	72

Students

I.	GRADUATE SCHOOL OF ARTS AND SCIENCES:		
	1. Fellows by Courtesy,	5	
	2. Fellows:		
	Bruce Fellows,	2	
	Rayner Fellow,	1	
	Rogers Fellow,	1	
	Du Pont Fellows,	2	
	Vogeler Fellow,	1	
	Graffiin Scholar,	1	
	Peabody Scholar	1	
	3. Other Students following Graduate Courses:		
	Full-Time,	179	
	Part-Time,	97	
			290
II.	DEPARTMENT OF MEDICINE:		
	Candidates for the Degree of Doctor of Medicine,		348
III.	SCHOOL OF HYGIENE AND PUBLIC HEALTH:*		
	1. Candidates for Higher Degrees,	49	
	2. Candidates for the Bachelor's Degree,	4	
	3. Candidates for the Public Health Certificate,	11	
	4 Special Students,	42	
	5. Students in Intensive Courses,	25	
			131
IV.	COLLEGE OF ARTS AND SCIENCES:		
	1. College Graduates preparing for Medicine,	10	
	2. Candidates for the Bachelor's Degree,	388	
	3. Special Students,	16	
			414
V.	DEPARTMENT OF ENGINEERING:		
	1. Candidates for Higher Degrees and Special Graduate Students,	3	
	2. Candidates for the Bachelor's Degree:		
	a. College Graduates,	3	
	b. Undergraduates,	288	
	3. Special Undergraduate Students,	6	
			300
VI.	COLLEGE COURSES FOR TEACHERS:		
	1. Candidates for the Bachelor's Degree,	114	
	2. Special Students,	856	
	3. Students in Extension Courses,	67	
			1037
VII.	SOCIAL ECONOMICS:		
	1. Graduate Students,	12	
	2. Special Students,	15	
			27
VIII.	EVENING COURSES:		
	1. Business Economics,	627	
	2. Technical Subjects,	247	
			874
	Total receiving instructon, 1921 22,		3421
	Attendants on Summer Courses, 1921,		949
			4370
	Counted more than once,		498
	Net total,		3872

* See note at foot of page 110.

ENROLLLMENT BY YEARS

	Total *	Graduates	Undergraduates	
			Candidates for Degrees	Special
1876-77	89	54	12	23
1877-78	104	58	24	22
1878-79	123	63	25	35
1879-80	159	79	32	48
1880-81	176	102	37	37
1881-82	175	99	45	31
1882-83	204	125	49	30
1883-84	249	159	53	37
1884-85	290	174	69	47
1885-86	314	184	96	34
1886-87	378	228	108	42
1887-88	420	231 (Phil., 220; Med., 11)	127	62
1888 89	394	216 (Phil., 202; Med., 14)	129	49
1889-90	404	229 (Phil., 209; Med., 20)	130	45
1890 91	468	276 (Phil., 233; Med., 43)	141	51
1891-92	547	337 (Phil., 298; Med., 39)	140	70
1892-93	551	347 (Phil., 297; Med., 50)	133	71
1893-94	522	344 (Phil., 261; Med., 83)	123	55
1894-95	589	412 (Phil., 284; Med., 128)	126	51
1895-96	596	406 (Phil., 253; Med., 153)	149	41
1896 97	520	344 (Phil., 210; Med., 134)	144	32
1897-98	641	456 (Phil., 215; Med., 241)	152	33
1898 99	649	462 (Phil., 210; Med., 252)	163	24
1899 1900	645	469 (Phil., 185; Med., 284)	159	17
1900-01	651	473 (Phil., 168; Med., 305)	158	20
1901-02	694	530 (Phil., 172; Med., 358)	158	6
1902-03	695	532 (Phil., 187; Med., 345)	147	16
1903 04	715	556 (Phil., 202; Med., 354)	141	18
1904-05	746	563 (Phil., 195; Med., 368)	160	23
1905 06	720	530 (Phil., 162; Med., 368)	163	27
1906-07	671	504 (Phil., 158; Med., 346)	146	21
1907 08	683	518 (Phil., 171; Med., 347)	142	23
1908-09	731	562 (Phil., 187; Med., 375)	138	31
1909-10	821	595 (Phil., 188; Med., 407)	143	14
1910-11	916	625 (Phil., 210; Med., 415)	180	10
1911-12	1206	623 (Phil., 217; Med., 406)	170	9
1912 13	1090	600 (Phil., 215; Med., 385)	192 (A. B., 165; S.B.(E), 27)	8

* Including those enumerated in table of College Courses for Teachers, etc., and excluding duplicates.

	Total*	Graduates	Undergraduates: Candidates for Degrees	Undergraduates: Special
1913-14	1325	607 { Phil. 213; Med. 378; Eng. 16 }	249 { A. B. 170; S.B.(E) 79 }	14
1914-15	1413	637 { Phil. 235; Med. 383; Eng. 19 }	273 { A. B. 169; S.B.(E) 104 }	16
1915-16	1668	625 { Phil. 226; Med. 380; Eng. 19 }	303 { A. B. 175; S.B.(E) 128 }	21
1916-17	2667	637 { Phil. 249; Med. 371; Eng. 17 }	384 { A. B. 219; S.B.(E 165 }	13
1917-18	2232	552 { Phil. 157; Med. 390; Eng. 5 }	343 { A. B. 210; S.B.(E) 133 }	13
1918-19	1986	540 { Phil. 135; Med. 382; Hyg. 18; Eng. 5 }	614 { A. B. 350; B. Eng. 26 }	4
1919-20	3137	685 { Phil. 221; Med. 390; Hyg. 70; Eng. 4 }	662 { A. B. 350; B. Eng. & B.S.in Ch. 303; B.S.in Hyg. 9 }	33
1920-21	3486	652 { Phil. 242; Med. 359; Hyg. 45; Eng. 6 }	692 { A. B., 384; B. Eng. & B.S. in Ch. 300; B.S. in Hyg. 8 }	100 { A. & Sc. 9; Eng. 3; Hyg. 47; Soc.Ec. 41 }
1921-22	3871	701 { Phil. 290; Med. 348; Hyg. 60; Eng. 3 }	683 { A. B. 388; B. Eng. 230; B.S. in Ch. 61; B.S. in Hyg. 4 }	114 { A. & Sc. 26; Eng. 6; Hyg. 67; Soc. Ec. 15 }

The enrollment in the College Courses for Teachers and the other courses established from time to time since 1909 is given below. The figures for the Summer Courses are in each case for the Summer of the year first named.

	College Courses for Teachers	Summer Courses	Courses in Business Economics	Night Technical Courses and MarineEng.	Courses in Social Economics
1909-10	69				
1910-11					
1911-12	118	335			
1912-13	119	201			
1913-14	167	347 { Coll. 277; Med. 70 }			
1914-15	189	356 { Coll. 287; Med. 69 }			
1915-16	343	487 { Grad 65; Coll. 363; Med. 59 }			
1916-17		654 { Grad. 110; Coll. 485; Med. 59 }	499	208	
1917-18	350	570 { Grad. 102; Coll. 416; Med. 52 }	351	207	
1918-19	347	326 { Grad. 75; Coll. 251 }	228	157	
1919-20	633	422 { Grad. 89; Coll. 333 }	704	338	30
1920-21	769	462 { Grad. 97; Coll. 345; Med. 20 }	772	390	57
1921-22	1037	949 { Grad. 165; Coll. 784 }	627	247	27

* Including those enumerated in table of College Courses for Teachers, etc., and excluding duplicates.

The enrollment in the medical department has been as follows:

	Candidates for M.D.	*Drs. of Med.*	*Total.*		*Candidates for M.D.*	*Drs. of Med.*	*Total.*
1893-94	18	65	83	1908-09	297	78	375
1894 95	51	77	128	1909-10	334	73	407
1895-96	84	69	153	1910-11	351	65	416
1896-97	123	11	134	1911-12	355	51	406
1897-98	167	74	241	1912-13	351	34	385
1898 99	197	55	252	1913-14	360	18	378
1899-1900	211	73	284	1914-15	361	22	383
1900-01	209	96	305	1915-16	353	27	380
1901-02	229	129	358	1916-17	358	13	371
1902-03	256	89	345	1917-18	373	17	390
1903 04	276	78	354	1918-19	373	9	382
1904 05	291	77	368	1919-20	390	0	390
1905-06	293	75	368	1920-21	359	0	359
1906-07	263	83	346	1921-22	348	0	348
1907-08	277	70	347				

In the school of hygiene and public health the registration has been:

	Grad.	*Under-Grad.*	*Special.*	*Total.*		*Grad.*	*Under-Grad.*	*Special.*	*Total.*
1918-19	18	..	4	22	1920-21	45	8	47	100
1919-20	70	9	10	89	1921-22	60	4	67	131

Geographical Distribution

Students in the regular courses:

	From Maryland.	*From and Other States Countries.*			*From Maryland.*	*From and Other States Countries.*	
1876 77	59	-	- 30	1899-1900	262	-	- 383
1877-78	71	-	- 33	1900-01	270	-	- 381
1878 79	76	-	- 47	1901-02	273	-	- 421
1879 80	97	-	- 62	1902-03	283	-	- 412
1880 81	95	-	- 81	1903-04	294	-	- 421
1881-82	97	-	- 78	1904 05	312	-	- 434
1882 83	106	-	- 98	1905-06	304	-	- 416
1883-84	123	-	- 126	1906-07	257	-	- 414
1884-85	130	-	- 160	1907-08	267	-	- 416
1885-86	130	-	- 184	1908-09	311	-	- 420
1886-87	162	-	- 216	1909-10	286	-	- 466
1887-88	199	-	- 221	1910-11	337	-	- 478
1888-89	183	-	- 211	1911-12	337	-	- 465
1889-90	215	-	- 189	1912 13	358	-	- 442
1890-91	235	-	- 233	1913-14	436	-	- 420
1891-92	273	-	- 274	1914-15	487	-	- 439
1892 93	266	-	- 285	1915-16	491	-	- 458
1893-94	260	-	- 262	1916 17	578	-	- 455
1894-95	260	-	- 329	1917-18	464	-	- 441
1895-96	272	-	- 324	1918-19	695	-	- 459
1896-97	254	-	- 266	1919 20	808	-	- 569
1897-98	279	-	- 362	1920-21	801	-	- 587
1898 99	277	-	- 372	1921-22	872	-	- 582

Enrollment by Subjects

In the graduate and undergraduate courses during five years:

	1917-18	1918-19	1919-20	1920-21	1921-22
Mathematics	207	197	386	322	320
Physics and Astronomy	156	96	136	167	199
Chemistry	148	180	362	340	245
Geology and Mineralogy	58	52	115	111	111
Zoology, Botany, Plant Physiology	61	68	158	137	158
Greek	36	17	40	21	32
Latin	69	27	26	27	18
Classical Archæology and Art	20	8	34	38	61
Sanskrit and Comparative Philology	29	6	21	21	7
Semitic Languages	57	31	33	37	37
English	293	253	421	331	406
German	105	64	74	40	99
French, Italian and Spanish	197	233	313	266	313
History	72	105	154	105	247
Political Economy	113	159	272	293	255
Political Science	30	10	77	80	79
Psychology	...	47	65	145	119
Philosophy	83	60	126	93	87
Education	20	18	32	21	21
Engineering (Civil, Elec. and Mech.)	94	46	75	269	289

In the College Courses for Teachers:

	1909-10	1910-11	1911-12	1912-13	1913-14	1914-15	1915-16	1916-17	1917-18	1918-19	1919-20	1920-21	1921-22
Mathematics	9	15	6	..	6	..	..	6	..	..	..	1	28
Chemistry	..	10	..	..	6	..	20	10	19	14	22	17	19
Biology	1	4	..	..	..	..	..	1	..	4	..	1	2
Latin	3	..	6	4	6	..	..	..	..	7	13	..	..
Hebrew, etc	..	..	..	1	..	..	..	..	..	..	..	2	..
English Comp	29	28	36	26	27	27	49	44	38	19	53	34	58
English Lit	16	8	22	32	49	46	50	70	68	23	44	119	128
German	4	6	9	23	25	5	22	39	27	12	15	41	36
French	2	5	12	17	35	33	33	43	53	68	111	97	117
History	7	15	12	4	8	9	10	12	38	62	83	46	64
Education	..	14	21	21	21	43	73	121	93	89	173	274	590
Psychology	..	..	..	7	9	11	34	46	..	..	84	47	65
Political Economy	..	..	..	..	..	16	34	42	13	..	..	..	1
Hygiene	..	..	..	..	..	7	7	20	..	..	..	..	15
Italian	..	..	..	..	..	..	11	11	..	..	..	12	11
Spanish	..	..	..	..	..	..	6	18	29	36	46	41	41
Life Insurance	..	..	..	..	..	..	42	..	..	..	..	..	..
Biblical Archæology	..	..	..	..	..	..	..	3	2	..	..	..	3
History of Ancient East	..	..	..	..	..	..	..	7	5	..	6	9	5
History of Art and Archæol.	..	..	..	..	..	..	..	35	25	44	78	43	47
History of Israel	..	..	..	..	..	..	..	2	..	..	..	..	..
Old Test. Literature	..	..	..	..	..	..	..	3	4	..	2	5	2
Philosophy	..	..	..	..	..	..	..	2	26	35	24	47	28
Physics	..	..	..	..	..	..	..	1	..	..	..	1	2
Political Science	..	..	..	..	..	..	..	..	12	..	20	17	1
Drawing	..	..	..	..	..	..	..	..	1	..	..	..	1
Russian	..	..	..	..	..	..	..	..	..	8	11	23	..
Bible (A. V.)	..	..	..	..	..	..	..	..	..	..	2	3	3
Journalism	..	..	..	..	..	..	..	..	..	..	..	46	27
Greek	..	..	..	..	..	..	..	..	..	..	..	2	2
Chinese	..	..	..	..	..	..	..	..	..	..	..	..	5
Geology	..	..	..	..	..	..	..	..	..	..	..	..	1
Sanskrit and Comparative Philology	..	..	..	..	..	..	..	..	..	..	..	..	2

In the Summer Courses:

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922
Mathematics	23	8	9	16	19	12	11	10	13	..	27	17
Physics	14	11	7	13	27	20	8	..	..	14	..	..
Chemistry	25	29	41	28	39	40	27	27	35	38	42	30
Biology	59	9	19	18	15	16	30	15	34	24	36	27
Latin	22	9	12	9	6	7	14	6	6	..	..	..
English Composition	121	65	51	68	72	93	40	26	27	49	68	92
English Literature	48	39	37	49	35	53	32	34	33	50	65	92
German	33	24	20	20	46	41	24	6	11	15	30	23
French	26	26	15	27	29	27	42	56	67	51	66	83
Spanish	..	..	..	7	9	20	19	13	31	18	27	26
History	56	31	50	43	44	71	40	57	36	63	65	48
Education	172	95	148	135	245	387	313	156	206	229	639	483
Domestic Sci. and Art (Home Economics)	24	15	27	22	31	17	14	5	..	..	52	25
Manual Training	24	4	19	12	24	31	24	17	16	26	44	55
Politics	..	..	..	14	16	9	7	7	14	16	29	25
Playground, etc	..	..	..	..	16	14	..	10	..	..	..	..
Psychology	..	..	..	..	15	57	50	8	27	42	79	54
Geography	..	..	..	..	..	28	11	..	..	..	30	32
Economics	..	..	..	..	..	11	23	17	53	39	45	58
Penmanship	..	..	..	..	..	84	33	..	..	..	..	..
Fine Arts	..	..	..	..	..	..	34	30	40	..	..	..
Philosophy	..	..	..	..	..	..	16	20	43	24	30	21
Semitic Languages	..	..	..	..	..	..	17	4	..	..	..	..
Vocational Education	..	..	..	..	..	..	..	5	..	..	..	..
Red Cross Home Nursing	..	..	..	..	..	..	..	..	24	..	..	..
Class. Lit. and Hist	..	..	..	..	..	..	..	..	..	11	7	..
Journalism	..	..	..	..	..	..	..	..	..	48	20	21
Public School Music	..	..	..	..	..	..	..	..	..	..	90	73
Italian	..	..	..	..	..	..	..	..	..	..	..	17
Radio-Communication	..	..	..	..	..	..	..	..	..	..	..	10

Degrees Conferred

During the academic year degrees in course were granted to 312 candidates (including 47 women),—Bachelor of Arts, 79; Bachelor of Engineering, 45; Bachelor of Science, 17; Bachelor of Science in Chemistry, 14; Bachelor of Science in Hygiene, 4; Master of Arts, 21; Master of Civil Engineering 1; Doctor of Engineering (Mechanical), 1 (the first time); Doctor of Philosophy, 36; Doctor of Medicine, 81; Doctor of Public Health, 8; Doctor of Science in Hygiene, 5. Certificates in Public Health were awarded to 6 persons. The degree of Doctor of Laws, *honoris causa*, was conferred upon 3 persons.

Beginning in 1878 degrees have been granted as follows: Bachelor of Arts, 1636; Bachelor of Engineering (Bachelor of Science in Engineering, 1915-18), 207; Bachelor of Science in Chemistry, 34; Bachelor of Science, 62 (women 42); Bachelor of Science in Hygiene, 9 (women 6); Master of Arts, 161 (women 61); Master of Engineering, 2; Doctor of Engineering, 1; Doctor of Philosophy, 1193 (women 46); Doctor of Medicine, 1763 (women 179); Doctor of Public Health, 25 (women 1); Doctor of Science in Hygiene 7 (women 3). Individuals receiving degrees number 4638 (including 333 women). Certificates of proficiency in applied electricity were awarded to 91 persons from 1889 to 1899. Certificates in public health have been given to 17 persons, beginning in 1920. Honorary degrees have been conferred as follows: Doctor of Laws, 51; Doctor of Philosophy, 1; Master of Arts, 10.

Summary of Degrees Conferred

	A. B.	*Ph. D.*	*M. D.*		*A. B.*	*Ph. D.*	*M. D.*
1877-78	..	4	..	1893 94	41	34	..
1878 79	3	6	..	1894 95	37	47	..
1879 80	16	5	..	1895 96	37	36	..
1880-81	12	9	..	1896 97	36	42	15
1881-82	15	9	..	1897 98	49	36	22
1882-83	10	6	..	1898 99	38	42	33
1883-84	23	15	..	1899 1900	46	35	43
1884 85	9	13	..	1900 01	43	30	53
1885 86	31	17	..	1901 02	47	17	57
1886-87	24	20	..	1902 03	46	27	49
1887 88	34	27	..	1903 04	37	31	45
1888 89	36	20	..	1904-05	33	35	54
1889 90	37	33	..	1905-06	48	32	85
1890-91	51	28	..	1906 07	47	35	76
1891-92	41	37	..	1907-08	47	28	63
1892 93	40	28	..				

	A. B.	*Ph. D.*	*M. D.*	*A. M.*	*B. Eng.*	*B. S.*	*D. P. H.*	*D. S. Hyg.*	*B. S. Hyg.*	*B. S. Chem*	*M. Eng.*	*D. Eng.*
1908-09	37	27	53	4	..	..	..	..	..	..	..	..
1909-10	14	25	69	3	..	..	..	..	..	..	..	..
1910 11	31	28	85	11	..	..	..	..	..	..	..	..
1911-12	37	32	85	5	..	..	..	..	..	..	..	..
1912-13	36	32	76	11	..	..	..	..	..	..	..	..
1913-14	52	30	91	13	..	..	..	..	..	..	..	..
1914-15	35	31	89	12	3	..	..	..	..	..	..	..
1915-16	27	37	82	13	12	3	..	..	..	..	..	..
1916-17	44	44	92	13	37	3	..	..	..	..	..	..
1917-18	47	12	87	13	26	8	..	..	..	..	..	..
1918-19	39	12	93	9	18	4	1	..	..	..	..	..
1919-20	66	31	93	12	28	13	2	1	1	8	..	..
1920-21	78	32	92	21	38	14	14	1	4	12	1	..
1921-22	79	36	81	21	45	17	8	5	4	14	1	1
	1636	1193	1763	161	207	62	25	7	9	34	2	1

Thomas R. Ball,
Registrar.

REPORT ON THE BUREAU OF APPOINTMENTS

To the President of the University:

I respectfully submit the following report of the activities of the Bureau of Appointments for the year ending June 30, 1922.

The nature of the applications to the Bureau for teachers in schools and colleges seems to indicate that the scarcity caused by war and unusual business opportunities has been pretty generally supplied, and that normal conditions are being restored. Inquiries for teachers of English, Romance Languages, mathematics, and history continue to be most numerous. The Bureau is able to report a larger percentage of appointments resulting from its recommendations and an increased registration.

Applications for the part-time services of students have increased since last year. The difficulties of self-supporting students make it increasingly clear that in many cases it would be better for a man to devote his time wholly to one pursuit. The creation of a loan-fund from which a student of high ability might borrow, without other assets than character and industry, would be a most welcome benefaction.

The Bureau continues, in so far as its resources permit, to give counsel about vocations, and to collect information that may be of service to students in the selection of a life-work.

I append tables showing the number and the nature of applications to the Bureau and the results, so far as they have been ascertained. A table showing the proposed vocations of freshmen is included.

APPLICATIONS IN GENERAL

Employes	*Applications*	*Recommendations*	*Appointments Reported*
Teachers	172	69	16
Tutors	34	54	23
Dean of women	1	1	
Camp councillors	4	1	
Secretaries or clerks	27	30	18
Canvassers	12	38	5
Trained nurse	1		
Salesmen	10	2	
Business agents	36	36	2
Companions	5	4	3
Matron	1		
House cleaners	7	7	5
Domestic employes	2	1	
Student assistants	2	1	1
Paid Sunday School teachers	3	3	3
Agents to sell on commission (number inquiries received)	160		
Applications for a number of persons: Clerks in U. S. Post Office			30
	477	247	106

APPLICATIONS FOR TEACHERS

Subjects	*Number Required*
Accounting	1
Astronomy	1
Athletics and Physical Training	4
Biology	12

Subjects	*Number Required*
Botany	3
Business Administration	3
Chemistry	6
Commerce and Finance	1
Economics	10
Education	10
Elementary subjects	17
Engineering	1
English	27
Geology	1
German	2
Greek	1
History	17
Industrial Arts	1
Latin	7
Mathematics	14
Medicine	1
Modern Languages	5
Philosophy	1
Physics	6
Political Science	6
Psychology	6
Romance Languages	25
Science	1
Sociology	3
	193

REGISTRATION

Total previous registration for full-time employment		168
New registration:		
For part-time employment	113	
For full-time employment	82	
Graduate students	23	
Graduates and former students	29	
Unclassified	30	
	195	

PROPOSED FUTURE VOCATIONS OF FRESHMEN, 1921-22

Medicine (Surgery 16)		57
Chemistry		20
Business		23
Engineering:		
Electrical	22	
Mechanical	16	
Civil	13	
Mining	2	53
Law		18
Teaching		2
Architecture		1
Theology		4
Literary work		2
Agriculture		2
Interpreting		1
Art		1
Diplomatic service		1
Banking		1
Military service		1
		187

JOHN C. FRENCH,
Director.

REPORT ON THE YOUNG MEN'S CHRISTIAN ASSOCIATION

To the President of the University:

I respectfully submit the following report of the activities of the Young Men's Christian Association for the year ending July 1st, 1922.

New Students. This work may be summarized under three heads:

1. Over three hundred rooming and boarding places were inspected and listed for the convenience of new students and members of the faculty. It was found that this number of places was more than sufficient.

2. A reception is held the first Friday after the opening of the University for all new students, and it is a welcome and introduction to the different phases of student life.

3. The Y. M. C. A. Handbook, altho prepared especially for the freshmen, is welcomed by all the students. Also, the Y. M. C. A. office for the first few weeks of the year is virtually an information bureau for the new members of the University.

Church Relations. At the time the Handbook is given out, the students are asked to fill in a religious census card, so that our organization may help in connecting the students with the different churches in town. The hearty co-operation of the Baltimore churches is encountered in this work.

Bible Study. The Wednesday Bible classes have been led this year by Chaplain Reynolds, Rev. J. J. Coale, and Rev. L. W. McCreary. Under their leadership the first part of Genesis was studied the first part of the year, and "The Social Principles of Jesus" by Rauschenbusch the second half-year. These courses proved to be very helpful, and had a total attendance of over four hundred.

Foreign Students. At the early part of the year an informal dinner was held at the Hopkins Club for the foreign students of the University. Several members of the faculty who are interested in the Y. M. C. A. were present and helped to make this a memorable occasion for the guests. We try to work these students into the activities of the organization during the year.

Deputation Team. During the year approximately forty meetings were conducted by Hopkins students in and near Baltimore. Most of these meetings were led by the deputation team, and the total number addressed was over twenty-five hundred.

Student Friendship Fund. The Y. M. C. A. at this University, acting as the local representative of the World's Student Christian Federation, forwarded four hundred dollars to the relief of the needy students of Central Europe.

Conferences. Delegates from the Y. M. C. A. at Hopkins are sent to the Silver Bay Students' Conference, and to the Student Volunteer Conference of Maryland. Twelve students were sent to the former and also Dr. R. V. D. Magoffin as the faculty representative; these students were sent not merely to represent Hopkins, but that their own Christian life might be stimulated and that they might better carry on the work of the Y. M. C. A. at Hopkins.

Other Activities. The lost and found bureau has continued its services to the members of the University. A piano, Victrola, magazines, and games have afforded entertainment to the students, altho the crowded condition and

lack of equipment of the Student Activities Building is most unfortunate. Under the leadership of the Y. M. C. A. a new piano was purchased by the undergraduate organizations for the assembly hall in the Civil Engineering Building.

The general policy of the Y. M. C. A. this past year has been to strengthen its position as a Christian organization on the campus, especially as there is no other part of the University, official or unofficial, promoting this purpose. Because of this policy our energies have been devoted more to the students on the campus, even at the expense of the community work which might well be done. It is our hope that the University will give its official approbation to religious work by inaugurating chapel services on the campus.

CHARLES S. SYDNOR,
General Secretary.

DEGREES CONFERRED, 1921-22

Doctor of Laws
(Honoris causa)

Calvin Coolidge, Vice-President of the United States.
Ferdinand Foch, Marshal of France.
Martha Carey Thomas, recently President of Bryn Mawr College.

Doctor of Philosophy

Earle Herbert Barclay, of Virginia, Ch. E., University of Virginia, 1916. Chemistry, Physical Chemistry, and Physics. Dissertation: A Study of the Permutite Metathesis with Silica Gel.

Leslie Carrington Beard, Jr., of Maryland, A. B., Johns Hopkins University, 1919. Chemistry, Physical Chemistry, and Bacteriology. Dissertation: A Study of the Vapor Pressure of Aqueous Solutions of Cane Sugar at Twenty-five Degrees.

Grace Hadley Beardsley, of Maryland, A. B., Vassar College, 1917, A. M., Johns Hopkins University, 1921. Archaeology, Latin, and Greek and Roman History. Dissertation: The Ethiopian in Greek and Roman Civilization.

Frederick Sumner Brackett, of California, A. B., Pomona College, 1918. Physics, Applied Mathematics, and Dynamic Geology. Dissertation: Visible and Infra-Red Radiation of Hydrogen.

William George Brombacher, of Illinois, A. B., Lake Forest College, 1915. Physics, Applied Mathematics, and Dynamic Geology. Dissertation: Detecting Efficiency of the Resistance-Capacity Coupled Amplifier to 6000 Meters.

Arthur Bennett Brown, of South Carolina, A. B., Charleston College, 1918. Chemistry, Physical Chemistry, and Mathematics. Dissertation: The Catalytic Amination of Alcohols.

Walter Lynn Cheney, of the District of Columbia, A. B., Oberlin College, 1913, A. M., University of Nebraska, 1915. Physics, Mathematics, and Dynamic Geology. Dissertation: Magnetic Properties of a Series of Pure Iron-Carbon Alloys as Affected by Heat Treatment and Carbon Content.

Levi Yorgey Davidheiser, of Pennsylvania, A. B., Ursinus College, 1904. Chemistry, Physical Chemistry, and Mathematics. Dissertation: The Adsorption of Ammonia by Silica Gel.

Alice Jouveau DuBreuil, of Maryland, A. B., Cornell University, 1906, A. M., Johns Hopkins University, 1913. English, French, and Philosophy. Dissertation: A Contribution to the Study of the Progress of Democratic Ideas in the American Novel.

James Brian Eby, of Maryland, A. B., Johns Hopkins University, 1918. Geology, Paleontology, and Physical Chemistry. Dissertation: The Geology and Coal Resources of the Coal-Bearing Portions of Wise and Scott Counties, Virginia.

William Smith English, Jr., of New Jersey, B. S. in Chem. Eng., University of Pennsylvania, 1918. Chemistry, Physical Chemistry, and Mineralogy. Dissertation: The Oxygen Pressures over Mixtures of Manganese Dioxide and other Metallic Oxides with Reference to Catalysis.

Harry Thomas Folger, of Maryland, A. B., Indiana University, 1917. Zoology, Chemistry, and Botany. Dissertation: A Quantitative Study of the Response in *Amoeba* to Sudden Increase in Illumination.

Carroll Eiker French, of Illinois, A. B., Monmouth College, 1916. Political Economy, Political Sci-

ence, and Psychology. Dissertation: The Shop Committee in the United States.

Samuel Wood Geiser, of Iowa, A. B., Upper Iowa University, 1914. Zoology, Plant Physiology, and Paleontology. Dissertation: Sex-Ratios and Spermatogenesis in the Top-minnow, *Gambusa Affinis*.

William Frederick Gericke, of California, S. B., Iowa State College, 1912, M. S., University of California, 1915. Plant Physiology, Physical Chemistry, and Physiological Chemistry. Dissertation: Some Relations of Maintained Temperature to Germination and the Early Growth Rate of Wheat in Nutrient Solutions.

Raleigh Gilchrist, of Montana, A. B., University of Montana, 1915. Chemistry, Physical Chemistry and Physics. Dissertation: The Preparation of Pure Osmium and the Atomic Weight of Osmium.

Lily Dexter Greene, of Missouri, Ph. B., De Pauw University, 1893, A. M., Boston University, 1902. Sanskrit, Pali, and Philosophy. Dissertation: Indic Flora in Sanskrit Lyric Poetry and Drama.

Frank Vivian Grimm, of Missouri, B. S., Tarkio College, 1918. Chemistry, Physical Chemistry, and Mathematics. Dissertation: The Dielectric Constant of Organic Liquids at the Boiling Point.

Clayton Morris Hall, of Maryland, A. B., Johns Hopkins University, 1918. Latin, Archaeology, and Greek. Dissertation: Nicolaus of Damascus' Life of Augustus.

William Samuel Hoffman, of Maryland, A. B., Johns Hopkins University, 1918. Chemistry, Physical Chemistry, and Mathematics. Dissertation: Reactions of Anthraquinone Sulphonic Acids with Mercaptans.

Elmer Rhodes Hoke, of Maryland, A. B., Franklin and Marshall College, 1913, A. M., Johns Hopkins University, 1920. Education, Psychology and Philosophy. Dissertation: The Measurement of Achievement in Shorthand.

Roy Edward Hoke, of Pennsylvania, A. B., Franklin and Marshall College, 1916. Education, Psychology, and Philosophy. Dissertation: The Improvement of Speed and Accuracy in Typewriting.

James Scott Long, of Maryland, Ch. E., Lehigh University, 1915. Chemistry, Physical Chemistry, and Physics. Dissertation: The Adsorption of Butane by Silica Gel.

Johannes Mattern, of Maryland, Universities of Münster and Bonn. Political Science, Philosophy, and Education. Dissertation: The Employment of the Plebiscite in the Determination of Sovereignty.

Robert Graff Merrick, of Maryland, A. B., Johns Hopkins University, 1917. Political Economy, Political Science, and Psychology. Dissertation: The Commercial Credit Company.

Meta Helena Miller, of Maryland, A. B., Goucher College, 1917, A. M., Johns Hopkins University, 1919. French, Spanish, and Italian. Dissertation: Chateaubriand and English Literature.

Tomio Nakano, of Japan, A. B., Waseda University, 1916. Political Science, History, and Political Economy. Dissertation: The Ordinance Power of the Japanese Emperor.

William Ruggles Norris, of South Carolina, B. S., Davidson College, 1914. Chemistry, Physical Chemistry, and Mathematics. Dissertation: The Vapor Pressure of Aqueous Solutions of Sodium Chloride at 20° C.

Lawrence Hall Opdyke, of New Jersey, B. S., Rutgers College, 1913, A. M., Columbia University, 1916. Chemistry, Physics, and Mathematics. Dissertation: Adsorption of Vapors by Silica Gel by a Dynamic Method.

Lawrence Melville Riddle, of Maryland, A. B., Johns Hopkins University, 1908, and A. M., 1911. French, Spanish, and English. Dissertation: The Genesis and Sources of Pierre Corneille's Tragedies from *Médée* to *Pertharite*.

Joseph Kent Roberts, of Virginia, A. B., Emory and Henry College, 1910, A. M., Johns Hopkins University, 1915. Geology, Paleontology, and Biology. Dissertation: The Triassic of Northern Virginia.

Ovid Rogers Sellers, of Missouri, A. B., University of Chicago, 1904. Old Testament, Egyptology, and History of the Ancient East. Dissertation: The Book of Joel.

Charles Coleman Thach, Jr., of Alabama, S. B., Alabama Polytechnic Institute, 1912. History, Political Science, and Political Economy. Dissertation: The Creation of the Presidency, 1775-1789: A Study in Constitutional History.

William Robert Waldron, of New Jersey, A. B., Cornell University, 1917. Chemistry, Physical Chemistry, and Mathematics. Dissertation: The Influence of Sulphur on the Color of Azo Dyes.

Warren Reed West, of the District of Columbia, A. B., George Washington University, 1918. History, Political Science, and Political Economy. Dissertation: Contemporary French Opinion on the American Civil War.

Carol Van Buren Wight, of Massachusetts, A. B., Johns Hopkins University, 1919, and A. M., 1921. Latin, Greek, and Classical History. Dissertation: Caius Asinius Pollio.

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DOCTOR OF MEDICINE

William Wiess Belford, of Texas, A.B., Southwestern University, 1918.

Arthur Hendley Blakemore, of Virginia, S. B., William and Mary College, 1918.

Alfred Blalock, of Georgia, A. B., University of Georgia, 1918.

Joseph Rogers Blalock, of North Carolina, A. B. and A. M., Wake Forest College, 1918.

Margaret Lathrop Bronson, of Connecticut, A. B., Vassar College, 1908.

Charles Elbert Buell, Jr., of Michigan, A. B., University of Michigan, 1918.

Charles Richard Bugg, of Virginia, A. B., Hampden-Sidney College, 1916.

Dorothy Saunders Burdick, of Maryland, A. B., Mount Holyoke College, 1918.

James Ford Busby, of Iowa, S. B., Grinnell College, 1918.

William Armistead Campbell, Jr., of Colorado, A. B., Colorado College, 1918.

Ralph Kable Collins, of Colorado, A. B., University of Kansas, 1919.

George Richard Cousar, of South Carolina, A. B., Presbyterian College of South Carolina, 1917.

Jay Cecil Crager, of Texas, A. B., University of Texas, 1918.

Robert Glenn Craig, of North Carolina, A. B., Washington and Lee University, 1917.

Joseph Charles Cuneo, of New Jersey, S. B., Princeton University, 1917.

Max Cutler, of Georgia, S. B., University of Georgia, 1919.

David Davis, of the District of Columbia, A. B., George Washington University, 1917.

Archibald Sweetland Dean, of Maine, S. B., Bowdoin College, 1918.

Lucile Dooley, of Tennessee, A. B., Randolph-Macon Woman's College, 1905, A. M., University of Tennessee, 1915, Ph. D., Clark University, 1916.

Claude Garrison Drace, of Missouri, S. B., Vanderbilt University, 1918.

Robert Harris Durham, of North Carolina, A. B., Trinity College, 1918.

Daniel Eugene Eagle, of North Carolina, A. B., University of North Carolina, 1917.

Stuart Wilson Egerton, of Maryland, A. B., Johns Hopkins University, 1918.

Robert Elman, of New York, S. B., Harvard University, 1919.

Helen Wardner Evarts, of Massachusetts, A. B., Vassar College, 1917.

Otto Orren Fisher, of Florida, A. B., Miami University, 1909.

Ralph Lee Fisher, of North Carolina, A. B., Trinity College, 1918.
Lewis Barr Flinn, of Delaware, A. B., Princeton University, 1918.
Benjamin Franklin Freeman, of Texas, A. B., Baylor University, 1918.
Frank Webster Garber, of Michigan, A. B., University of Wisconsin, 1917.
Charles A. Garrett, of Texas, A. B., Baylor University, 1918.
Myron Everett Goldblatt, of Maryland, A. B., Clark College, 1915.
Andrew Muncy Groseclose, of Virginia, A. B., Roanoke College, 1918.
Charles Robert Lee Halley, Jr., of Wyoming, A. B., University of Missouri, 1918.
Samuel Halpern, of New Jersey, A.B., Columbia University, 1918.
Paul Myron Hamilton, of Colorado, A. B., Colorado College, 1918.
Tinsley Randolph Harrison, of Alabama, A. B., University of Michigan, 1919.
Clyde Alexander Heatly, of New York, A. B., Union College, 1918.
Samuel Herbert Hinton, of Georgia, A. B., Emory University, 1916.
Rhoda Muriel Ivimey, of New York, A. B., Barnard College, 1911.
Edwin Bosley Jarrett, of Maryland, A. B., Johns Hopkins University, 1918.
Lloyd B. Johnston, of South Dakota, S. B., Huron College, 1915.
Thomas Banford Jones, of New York, A. B., Hamilton College, 1918.
Chester Scott Keefer, of Pennsylvania, S. B., Bucknell University, 1918.
Frank Bergner Kindell, of Ohio, A.B., Oberlin College, 1915.
James Edward King, of Texas, A. B., Southern Methodist University, 1918.
Elizabeth Amanda Kittredge, of Massachusetts, A. B., Vassar College, 1912, A. M., Columbia University, 1913.
Harry Aaron Klee, of Pennsylvania, A. B., Washington and Jefferson College, 1918.
Orthello Richardson Langworthy, of New York, A. B., Colgate University, 1918.
Raymond Earl Lenhard, of Maryland, A. B., Johns Hopkins University, 1918.
Isidore Irvin Levy, of Maryland, A. B., Johns Hopkins University, 1918.
Robert Korn Lippman, of New York, S. B., Columbia University, 1918.
Robert Colnon Lonergan, of Illinois, A. B., Syracuse University, 1918.
Cletus Edmund McGuigan, of Maryland, A. B., Johns Hopkins University, 1918.
Jacob Isaac Margolis, of New York, Ph. B., Yale University, 1918.
Israel David Michelson, of Maryland, A. B., Johns Hopkins University, 1918.
Dorothea May Moore, of Massachusetts, A. B., Bryn Mawr College, 1915.
Frank Guy Moore, of New York, A. B., Hamilton College, 1918.
Bessie Louise Moses, of Maryland, A. B., Goucher College, 1915.
Morris Jacobi Moskowitz, of New York, S. B., University of Rochester, 1918.
Bernhard Newburger, Jr., of Kentucky, A. B., University of Missouri, 1918.
Joseph Edward Nowrey, Jr., of New Jersey, A. B., University of Southern California, 1917.
Henry Miller Powell, of Virginia, A. B., Roanoke College, 1917.
Rosa Elizabeth Prigosen, of New York, A. B., Adelphi College, 1916.
Cathryn Vedalia Riley, of the District of Columbia, A. B., Wellesley College, 1912, S. B., Cornell University, 1916, A. M., Johns Hopkins University, 1916.
J. Everett Sanner, of Maryland, A. B., Johns Hopkins University, 1918.
William John Scott, of Virginia, A. B., Hampden-Sidney College, 1915, A. M., University of Virginia, 1917.
William Eyre Sisson, of Rhode Island, A. B., Brown University, 1918.
David Tillerson Smith, of South Carolina, A. B., Furman University, 1918.
Margaret Gladys Smith, of Pennsylvania, A. B., Mount Holyoke College, 1918.
Thomas Cook Smith, of Georgia, S.B., Emory University, 1917.
Karl Joseph Steinmueller, of Mary-

land, A. B., Johns Hopkins University, 1914.

Ko-Chi Sun, of China, A. B., Johns Hopkins University, 1918.

Harry Wellington Vance, of West Virginia, A. B., West Virginia Wesleyan College, 1918.

Charles William Wainwright, Jr., of Maryland, A. B., Western Maryland College, 1914.

William Horace Franklin Warthen, of Maryland, A. B., Johns Hopkins University, 1919.

Harry Wasserman, of Maryland, A. B., Johns Hopkins University, 1918.

Edwin David Weinberg, of Maryland, A. B., Dickinson College, 1917.

Beulah Wells, of Ohio, A. B., Vassar College, 1909.

Julian Otto Wilke, of California, A. B., University of Southern California, 1917.

Florence Josephine Wimsatt, of the District of Columbia, A. B., Trinity College (D. C.), 1916.

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DOCTOR OF PUBLIC HEALTH

Rufino Abriol, of the Philippine Islands, M. D., University of Illinois, 1913, D. T. M., University of the Philippines, 1916, C. P. H., Johns Hopkins University, 1921. Essay: Correlation of Death-Rates from Certain Diseases and Certain Economic and Housing Factors in the Philippine Islands.

Antonio Luiz de Barros Barreto, of Brazil, B. Sc. e Lett., Gymnasio of Pernambuco, 1910, M. D., Faculdade de Medicina, Rio Janeiro, 1917. Essay: The Action of X-ray on Basal Metabolism.

Frank Edward Coughlin, of Pennsylvania, S. B., Lafayette College, 1920, M. D., University of Michigan, 1921. Essay: The Schick Test in the Negro.

Enrique Enciso-Ruiz, of Colombia, B. Ph. e Lett., Colegio Mayor del Rosario, 1911, M. D., Faculdade de Medicina, Bogota, 1919. Essay: Health Organization in Colombia.

Morrill Leonard Ilsley, of the District of Columbia, A. B., Colby College, 1917, M. D., Johns Hopkins University, 1921. Essay: A First Study of the Relations between Percentage of Illiteracy and Death Rate in American Cities.

John William Meehan, of Nebraska, A. B., St. Mary's College, 1904, M. D., Creighton University, 1908. Essay: The Value of Isolation in Controlling the Spread of Pneumonia.

Robert Hickman Riley, of Maryland, S. B., University of Oklahoma, 1909, and M. D., 1913. Essay: The Significance of Renal Carriers in the Spread of Typhoid Fever, Reports of Epidemics and Suggestions for the Control of Carriers.

Charlotte Condict van Winkle, of New Jersey, A. B., Smith College, 1914, M. D., Johns Hopkins University, 1921. Essay: A Study of Infant Mortality in Baltimore.

(8)

DOCTOR OF SCIENCE IN HYGIENE

Hobart William Cromwell, of Indiana, A. B., Indiana State Normal School, 1917. Dissertation: A Study of the Hemolytic Antibody-Antigen Combination.

Ethel May Kinney, of Kansas, A. B., University of Kansas, 1918. Dissertation: A Study of the Physiological Effects of Strontium.

John Rice Miner, of Baltimore, A. B., University of Michigan, 1913. Dissertation: Suicide and its Relations to Climatic and other Factors: A Statistical Study.

Edith Evelyn Nicholls, of Massachusetts, A. B., Smith College, 1919. Dissertation: A Study of the Spontaneous Activity of the Guinea Pig.

Ida Williams Pritchett, of Maryland, A. B., Bryn Mawr College, 1914. Dissertation: Pathological Effects of Diphtheria Toxin in the Guinea Pig, with Special Reference to a Lesion of Sowman's Capsule.

(5)

DOCTOR OF ENGINEERING

LEONARD NOEL LINSLEY, of Maryland, M. S., Columbia University, 1916. Mechanical Engineering, Steam Turbine Design, and Advanced Surveying. Dissertation: An Investigation of the Critical Bearing Pressures causing Rupture in Lubricating Oil Films.

MASTER OF ARTS

Violet Tenny Babcock, of New York City, A. B., Vassar College, 1920. Political Economy. Essay: A Study of One Hundred Cases of Dependence Consequent upon Unemployment.

Frances Elizabeth Baldwin, of Maryland, A. B., Goucher College, 1920. History. Essay: Sumptuary Legislation and Personal Regulation in England under the Tudors.

Helen Barton, of Maryland, A. B., Goucher College, 1913. Mathematics. Essay: The Fundamental Theorem of Algebra.

Thomas Morris Berry, of Maryland, B. S. in Chem., Johns Hopkins University, 1920. Chemistry. Essay: The Friedel and Crafts Reaction.

Mildred Elizabeth Day, of Maryland, A. B., Goucher College, 1921. Psychology. Essay: Age Differences in Mental Reactions as Related to Certain Physiological Characteristics.

Ryland Newman Dempster, of Maryland, B. S. in Eng., Johns Hopkins University, 1918. Education. Essay: Coordination of Preparatory Training to Work in College as Based on Students' Records.

Hilda North Dulac, of Maryland, A. B., George Washington University, 1920. Archaeology. Essay: Old Age and Late Maturity in Greek Art.

Idella Virginia Duvall, of Maryland, A. B., Randolph-Macon Woman's College, 1920. Political Economy. Essay: A Study of Mother's Pensions in the United States with Especial Reference to Maryland.

James Bancroft Eppes, of Maryland, B. S., University of Georgia, 1907. Mathematics. Essay: Singular Integrals of Partial Differential Equations of the First Order.

Philip Frederick Gottling, of Maryland, B. E., Johns Hopkins University, 1919. Physics. Essay: The Structure of the Atomic Nucleus.

Frieda Kenyon, of New York, B. S., Barnard College, 1918. Physics. Essay: Isotopes from the Physical Standpoint.

Raphael Levy, of Baltimore, A. B., Johns Hopkins University, 1920. French. Essay: The Old French Translation of the Astrological Works of Abraham Ibn Ezra—A Study of its Vocabulary.

Mary Louise Mall, of Maryland, A.B., Bryn Mawr College, 1920. Physiological Chemistry. Essay: The Gravimetric Determination of Phosphorus in Organic Compounds.

Elizabeth Morrissy, of Wisconsin, A. B., Beloit College, 1908. Political Economy. Essay: Graft in the Building Trades.

Louis Hastings Naylor, of Maryland, A. B., Johns Hopkins University, 1917. French. Essay: Virgile et Chateaubriand: Etude de l'influence virgilienne sur les premiers ouvrages de Chateaubriand.

Mary Buck Rowe, of Maryland, A. B., Randolph-Macon Woman's College, 1918. French. Essay: Studies in *Huon de Bordeaux*.

Nina Simmonds, of Wisconsin, B. S., University of Wisconsin, 1915. Bio-Chemistry. Essay: The Biological Analysis of Vegetarian Diets.

Charles Hannord Skalet, of Minnesota, A. B., Luther College, 1919. Archaeology. Essay: Chapters in the History of Ancient Sicyon.

Samuel Walter Sparks, of Maryland, A. B., Washington College, 1909. Education. Essay: First-Year Latin Vocabulary Scales and their Diagnostic Value.

Walter White Steffey, of Virginia, A. B., Emory and Henry College, 1913. Physics. Essay: The Experimental Verification of the Theory of Relativity.

Madeleine Philbrick Weeks, of New Hampshire, A. B., Smith College, 1915. History. Essay: Early Colonial Interest in Shipping.

MASTER OF CIVIL ENGINEERING

GUY LEE BRYAN, JR., of Maryland, B. S. in Eng., Johns Hopkins University, 1917. Essay: Waterproofing Dams: A Study of the Advantages of Making the Back Face of a Dam Impervious to Water.

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Miguel B. Afable, of the Philippine Islands.
Aaron John Askin, of Maryland.
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Benjamin Szold Levin, of Maryland.
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Edgar Gillmore Platt, of Maryland.
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Jacob Ravidowitz, of Palestine.
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Benjamin Rones, of Maryland.
Ernest Carl Henry Roschen, of Maryland.
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Harry Horton Steck, of Maryland.
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Warren Viessman, of Maryland.
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Albert Boerner Williams, of Maryland.
Isadore Morris Zeskind, of Maryland.

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John Carey Taylor, of Maryland.
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(17)

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Wilton Cope Harden, of Maryland.
Norman Edward Lemmon, of Delaware.
James Anderson McComas, of Maryland.
Joseph Abraham Naviasky, of Maryland.
A. Hamilton Silesky, of Maryland.
Joseph Camillus Thompson, Jr., of Maryland.
Robert J. R. Whittington, of Maryland.

(14)

BACHELOR OF SCIENCE IN HYGIENE

Margaret von Torney France, of Maryland, A. B., Bryn Mawr College, 1919.
Martin Frobisher, Jr., of New Jersey.
Olive Cushing Smith, of Maryland.
Jean Chiron Snyder, of Ohio, A. B., Wellesley College, 1918.

(4)

CERTIFICATE IN PUBLIC HEALTH

William Lockwood Thornton Goodison, of North Dakota, M. D., Jefferson Medical College, 1909.
Jose Guerrero, of Nicaragua, B. Sc. e Lett., National Institute of Occidente, 1912, M. D., University of Michigan, 1919.
William Warren Knipmeyer, of Indiana, A. B., University of Missouri, 1917, M. D., Washington University, 1919.
Thomas John le Blanc, of Michigan, A. B., University of Michigan, 1917, and M. S. P. H., 1920.
Ottokar Slanina, of Moravia, M. D., University of Vienna, 1909.
Czeslaw Wroczynski, of Poland, M.D., University of Saratow, 1915.

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NOVEMBER, 1922

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