

TWELFTH  
ANNUAL REPORT

OF THE PRESIDENT OF THE

Johns Hopkins University

Baltimore, Maryland

1887

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# REPORT.

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TO THE TRUSTEES OF THE JOHNS HOPKINS UNIVERSITY:—

*Gentlemen:*

In the last report of the Johns Hopkins University, full details were given of the progress that had been made during the first ten years of instruction. The eleventh year closed on the 1st of September, 1887. During its progress the number of teachers has been slightly enlarged; the number of students has considerably increased; a new department of instruction, Pathology, has been initiated; a Physical Laboratory, the largest and costliest building yet erected for the University, has been completed and occupied; a building has been set apart for the Petrographical Laboratory; an Astronomical Observatory for the instruction of students has been equipped; a new Fellowship has been founded by the gift of a generous individual.

We had the honor of being invited as an academic body to participate, by delegate, in the historical festival of August, 1886, which commemorated the foundation of the University of Heidelberg, five hundred years ago; in that of November, 1886, which celebrated the establishment of Harvard College, two hundred and fifty years ago; in that which was held in New York, April 13, 1887, the centenary of the reorganization of Columbia College; and in that of June, 1887, which marked the beginning of the University of Michigan, fifty years ago. It is a pleasure to extend to all these institutions the respectful congratulations of this university.

The academic staff included during the year fifty-one teachers, five of whom were non-resident lecturers. The number of students enrolled during the year was three hundred and seventy-eight, of whom one hundred and sixty-two were residents of Maryland, and one hundred and ninety-seven came here from thirty-three other States of the Union, and nineteen from foreign countries. Among the students were two hundred and twenty-eight already graduated, coming from one hundred and one colleges and universities; there were one hundred and eight matriculates (or candidates for the degree of Bachelor of Arts); and there were forty-two admitted as special students, to pursue courses of study for which they seemed fitted, without reference to graduation. The attendance upon the public lectures averaged one hundred and sixty-five. The degree of Bachelor of Arts was conferred upon twenty-four candidates; and twenty candidates were promoted to the degree of Doctor of Philosophy.

The following table indicates the enrolment of students in each year since the University was opened in the autumn of 1876 :—

	Total Enrolled.	Matriculates.	Non-Matriculates.	Graduates, (incl. Fellows.)	Average Attendance at Public Lectures.
1876-77	89	12	23	54	60
1877-78	104	24	22	53	84
1878-79	123	25	35	63	96
1879-80	159	32	48	79	113
1880-81	176	37	37	102	186
1881-82	175	45	31	99	137
1882-83	204	49	30	125	148
1883-84	249	53	37	159	122
1884-85	290	69	47	174	212
1885-86	314	96	34	184	115
1886-87	378	108	42	228	165

The attendance upon the courses given in some of the principal subjects has been as follows during the last five years :

	1882-83.	1883-84.	1884-85.	1885-86.	1886-87.
Mathematics, . . . . .	35	37	75	53	76
Physics, . . . . .	50	56	80	57	73
Chemistry, . . . . .	49	51	76	94	118
Mineralogy, . . . . .			41	62	24
Biology, . . . . .	30	47	44	51	65
Pathology . . . . .					25
Greek, . . . . .	44	41	41	43	48
Latin, . . . . .	41	48	64	75	72
Sanskrit, etc., . . . . .	8	10	25	37	37
Shemitic Languages, . . . . .		13	13	16	14
German, . . . . .	50	63	107	116	113
French, Italian, etc., . . . . .	31	31	63	64	60
English, . . . . .	45	50	68	56	90
History and Political Science, . . . . .	64	88	109	100	135
Psychology, Ethics, etc., . . . . .	47	28	44	82	65

During eleven years, eleven hundred and two individuals have been enrolled as students, of whom four hundred and ninety-four have come from Maryland (including three hundred and eighty-five from Baltimore), and six hundred and eight from forty-eight other States and countries. Of this number six hundred and fifty-five persons pursued courses as graduate students, and four hundred and forty-seven as collegiate students.

Since degrees were first conferred, in 1878, one hundred and forty-three persons have attained the Baccalaureate degree, and one hundred and four have been advanced to the degree of Doctor of Philosophy.

The present time seems to be favorable for a re-statement of the opportunities for advanced study which are here afforded. It is well known that by university courses we mean

those which are provided for advanced and graduate students, and by collegiate courses those designed for undergraduates. For the latter seven parallel courses are laid down, one of which represents the traditional classical training, and the others are modifications which afford a training adapted to various scientific pursuits, or are introductory to certain professional courses. The graduate instruction is carried on largely by the agency of laboratories and seminaries, the former for the prosecution of experimental work, the latter for the study of language, literature, history, and philosophy.

The following statements are generally made in the language which has been employed in their annual reports by the heads of departments to indicate the methods they follow and the results they desire to place on record. This will account, in part, for the diversity of form in which the facts are presented.

The plan of the Greek Seminary, Professor GILDER-SLEEVE, *Director*, is based on the continuous study of some leading author or some special department of literature, chiefly with reference to the literary form.

The Seminary consists of the director, fellows, and scholars, and such advanced students as shall satisfy the director of their fitness for an active participation in the work by an essay, a critical exercise, or some similar test of attainments and capacity. All graduate students, however, may have the privilege of attending the course.

Each regular member is required to take his turn as interpreter, critic, analyst, and special fields of research are assigned according to progress or bent. It may be added that while the Seminary demands a large portion of the student's time, the requirements are not so great as to preclude independent

study in other directions, and care is taken so to direct his private reading that in the usual period of preparation for the higher degree a comprehensive knowledge of Greek literature and Greek life may be gained.

By these arrangements the students are brought into closer relations with the professor and encouraged to perform more independent work and engage in more extended experiments than would be possible on a system of mere recitation or the simple hearing of lectures.

During the past year the centre of work was Aristophanes. "The Frogs" was interpreted by the members in turn, and all the plays of Aristophanes were analyzed and introductory lectures prepared by different members of the seminary. Among the special studies may be noted:

Parody and paratragedy in Aristophanes.

Repetitions in Aristophanes.

Use of the imperative in Aristophanes.

The Peloponnesian war in Aristophanes.

Article in Aristophanes.

The attitude of Euripides towards nature.

The *λόγος δικανικός* in Euripides.

Studies have been continued from a previous year, viz., 'Metaphors and similes in Plato' and 'The *ἔπαξ λεγόμενα* of Plato,' and one of the members of the seminary has taken in hand the Pindaric dialect.

In connection with the work of the Seminary, Professor Gildersleeve gave fifteen lectures on Greek Metres with especial reference to Aristophanes, and Professor J. H. Wright six lectures on the Greek Theatre.

Besides the Seminary course proper, Professor Gildersleeve delivered thirty-six lectures on the Greek Tragic Poets, Aeschylus, Sophocles, and Euripides, with illustrative readings, and eighteen on Hermeneutics and Criticism (Blass being the text-book), conducted twenty exercises in translating at dictation from Greek into English and English into Greek, and

held a series of some ten conferences with undergraduate students on the leading topics of Greek Syntax.

Dr. Herbert Weir Smyth conducted a course, weekly throughout the year, on Ionic poetry, with special reference to the development of the Ionic dialect.

Lectures were given on the Doric and Aeolic dialects; Iliad I 1-42 was subjected to a critical examination (13 recitations); and portions of the fragments of Callinus, Archilochus, Simonides Amorginus, Mimnermus, Theognis, Hipponax, and Anacreon were made the subject of interpretation.

The subjects to which attention has been given during the last decennium are these:

1878-79. Lucian.	1883-84. Greek Historians.
1879-80. Aristophanes.	1884-85. Attic Orators.
1880-81. Attic Orators.	1885-86. Plato.
1881-82. Plato.	1886-87. Aristophanes.
1882-83. Aristophanes.	1887-88. Greek Historians.

The Seminary meets in a room especially devoted to its purposes, where the classical library is arranged and opportunities are afforded for quiet study during the day and evening. Its library includes the principal Greek and Latin texts, commentaries, etc., and every year the newer books which are important for the year's study are provided.

The Latin Seminary, Professor WARREN, *Director*, is conducted on a plan similar to that of the Greek Seminary.

The subjects treated during a series of years have been as follows:

1882-3. Cicero.
1883-4. Terence.
1884-5. Roman Satirists, especially Horace and Juvenal.
1885-6. Roman Historians, especially Livy and Tacitus.
1886-7. Vergil.
1887-8. Terence.

During the past year two weekly sessions were held,—Vergil being the author studied. Select portions of the

Bucolics, Georgics, and Aeneid were made the subject of critical interpretation by the members of the seminary, and papers were read by them embodying the results of special studies. Among the subjects thus treated may be noted :

Cacemphaton in Vergil and in the so-called Minor Poems; the characteristics of the poet Juvencus, and the extent of his dependence upon Vergil; Servius' treatment of figures in Vergil; the influence of Vergil upon the syntax of Livy; the critical value of the Vergilian citations found in Nonius Marcellus and of those found in Macrobius; the relation of Valerius Flaccus to Vergil; the use of *ad* in Vergil; the position of adverbs in Vergil; Vergil's use of contracted verb-forms; the genuineness of the Copa—of the Culex—of the Ciris—of the Moretum. Some metrical statistics for all the books of the Aeneid were also collected.

In connection with the work of the Seminary, Dr. Warren gave, during the first half-year, a course of weekly lectures on topics connected with Vergil and the early period of Roman Epic Poetry. He also held a course of weekly readings in Macrobius. In the second half-year, he gave a course of weekly lectures in Latin Paleography with practical exercises in reading fac-smiles of Manuscripts, and once a week conducted a conference on Latin Syntax.

Henceforward the more advanced instruction in Vedic Sanskrit will be given under seminary organization (of which Professor BLOOMFIELD will be the Director), weekly, through the year. The subject of the work for 1887-88 will be *The literature of the Atharva-Veda*. The order of themes treated will be somewhat as follows :

1. The position of the Atharvan in Vedic literature.
2. Survey of the contents of the published form of the Veda.
3. The *çākhās*, or schools of the Atharva-Veda.
4. The ritual of the Atharvan.

Dr. Bloomfield has at present in his possession, as loans from the British government in India and from native scholars, about twenty MSS. bearing upon the ritual practices of the

Atharvan. These are open to inspection and study, and afford a somewhat unusual opportunity for handling native materials, before they have passed through scholarly criticism. Some of these texts are to be edited by members of the seminary.

The work of the seminary will be supplemented by courses of reading in the *Hitopadeṣa* and *Manu*, by an introduction to the *Rig-Veda*, and by practical exercises in grammar and prose-writing.

In Comparative Philology the work will be two-fold. First, a course in the general principles of linguistic science, together with an exposition and criticism of modern methods in scientific grammar. Secondly, a comparative study of Indo-European accentuation, with special application to the accent of Greek. The latter course is carried on under seminary organization with discussions and contributions by the members.

The following courses were conducted by Dr. Bloomfield during the past year :

1. The advanced work in Vedic Sanskrit was devoted to the systematic study of selected hymns of the *Rig-Veda*. It was introduced by a short course of lectures, in which the position of the *Rig-Veda* in the literature of India was sketched, and in which the value of native and modern work bearing upon the *Rig-Veda* was defined. The study of the text was accompanied by a careful analysis of the metres, by explanation of the accentuation, and by constant comparison of the phonology, forms, and syntax of the Vedic with the corresponding facts of the classical language.

2. A second class in Sanskrit was conducted during the first half-year through a rapid course of reading, which embraced all the selections from the *Hitopadeṣa* and *Kathāsaritsāgara*, contained in Lanman's reader. During the second half-year the same class was introduced into the elements of the Vedic dialect. The result aimed at throughout was to furnish the students with such a reading knowledge of the Vedic dialect, as would enable them to make good progress by themselves hereafter.

3. The elementary course in Sanskrit was conducted upon the basis of Perry's Sanskrit Primer. The work divided itself into two distinct parts, namely: (1) The acquisition of Sanskrit Grammar; (2) Sanskrit prose writing. The students were brought face to face from the start with the language, learning its structure and laws not in the abstract only, but as illustrated by material of the language, and still further by being taught to

imitate in writing models derived from the best literature. Towards the end of the year the *Nala* was read and analyzed.

4. A course in the General Principles of Comparative Philology was carried on throughout the year. It embraced on the one hand an encyclopaedic introduction into the entire domain of linguistic science, on the other a systematic discussion of the leading principles which are applied by modern science in historical and comparative investigations in language. The course was introduced by twelve lectures in which were treated: the doctrine of phonetic laws; the character, scope and subdivisions of analogy; the present position of the doctrine of agglutination; the questions attaching themselves to the subdivision of families of languages and the relationships of dialects, etc. During the remainder of the year Professor Whitney's 'Language and the Study of Language' was made the basis of instruction, and the book was constantly supplemented by lectures and systematic criticisms.

5. A course in the Comparative Grammar of Greek Inflections. This was initiated by a course of ten formal lectures, whose aim was to exhibit the precise degree of certainty, which attaches itself to the most important theory of Indo-European language-history, namely, the theory of agglutination. It was shown that there are grave difficulties in the way of its practical application, but that on the whole it afforded the only satisfactory account of the forms of the Indo-European word-material in historical times. The rest of the course was carried on upon the basis of Brugmann's Greek Grammar and under seminary organization. The special subjects treated were: the origin and form of the personal inflectional elements, and the formation of the present and aorist systems.

A synopsis of the courses offered during recent years (1881-87) will serve to exhibit the scope of the instruction :

- Rig-Veda and Introduction into the Vedic language (four times).
- Atharva-Veda, with the Kāuṣika-sūtra and other ritualistic literature.
- Selections from the Brāhmaṇas (twice).
- Comparative study of the Gṛhya-sūtras.
- Āçvalāyana's Gṛhya-sūtras.
- Kāuṣika-sūtra and its commentary by Dārila (in the manuscripts).
- The law-book of Manu.
- The law-book of Yājñavalkya.
- Selections from the Itiupadeṣa (three times).
- Selections from the Kathāsaritsāgara (five times).
- Çakuntala and an Introduction into Prākṛit (twice).
- Elementary course, grammar and Nala (six times).
- Practical exercises in Sanskrit prose-writing (twice).
- General Principles of Comparative Philology (four times).
- Lectures on the Theory of Agglutination (twice).
- Comparative Study of Indo-European Vocalism (twice).
- Comparative Grammar of Sanskrit and Zend.
- Comparative Phonology of Greek.

Historical and Comparative Study of Greek Accent.  
 Comparative Study of Greek Inflection (twice).  
 Lectures on the Greek guttural series of Consonants.

In the Shemitic Seminary, Professor HAUPT, *Director*, instruction is provided in Hebrew, Biblical Aramean, Syriac, Arabic, Ethiopic, etc., and in Assyriology in its various branches (Assyro-Babylonian and Sumero-Akkadian) for four classes of students:

(a). Students of theology wishing to obtain a thorough acquaintance with the sacred tongue and its sister idioms as a means of elucidating Scripture and problems of the comparative history of religion.

(b). Students of linguistics intending to make comparative grammar of the Shemitic languages their specialty.

(c). Students of Oriental history and archæology desirous of drawing directly from the original sources.

(d). Persons looking for instruction in the living Oriental languages (as modern Arabic or Amharic) for practical purposes.

In these various courses, the seminary method is followed throughout, the student being from the first brought face to face with the several idioms, without long theoretical introductions. Special stress is laid on a thorough grammatical training, imparted in connection with the minute philological analysis of some selected text in the respective languages, printed grammars serving only for occasional references.

A special room has been set apart containing a well equipped working library for all the branches of Oriental research, and some advanced students are usually present to help on the preparations for the recitations conducted by the Director of the Seminary and to furnish any other aid that may be desired. Cyrus Adler, Ph. D., lately Fellow, is the assistant of Dr. Haupt.

In the organization of the Shemitic Seminary in 1883, the work was arranged for a course of three years and embraced the principal Shemitic languages. The centre of the work was the Old Testament, special stress being laid on the critical study of Hebrew texts and the Cuneiform inscriptions bearing on the Scriptures.

The work of the fourth year, during the session of 1886-7, was as follows :

Fifteen different courses were given, eight by Professor Haupt and the rest by the Fellows in Shemitic, Dr. Cyrus Adler and Mr. Edgar P. Allen, under the supervision of Professor Haupt. During the month of January a special course in Assyriology was given. The regular Shemitic courses (elementary Hebrew excepted) were interrupted for that period and the time exclusively devoted to the study of the cuneiform inscriptions.

In the Hebrew course for beginners, the book of Ruth was read, the sounds and forms of the sacred tongue being thoroughly studied in connection with a minute philological analysis of the Hebrew text in Baer-Delitzsch's edition. The grammar used was Dr. Mitchell's translation of Gesenius-Kautzsch.

In the Critical interpretation of selected Psalms, fifty-four Psalms were read, some wholly, some in part, the chief aim being to introduce the students into the system of Hebrew syntax and to familiarize them with the vocabulary and the style of the Psalter. The work centered about the critical study of Psalms 137, 138, 3, 11, 13, special stress being laid on textual criticism and investigation concerning date and authorship.

In Biblical Aramean, the essential elements of the grammar were acquired after the paradigm-tables in the Baer-Delitzsch edition of *Libri Danielis, Ezrae et Nehemiae* with constant reference to E. Kautzsch's *Grammatik des Biblisch-Aramäischen*, after which the reading of the Aramean portions of the book of Daniel was entered upon. Exegetical and critical problems were fully discussed, above all the mysterious oracle Daniel v, 25: *Mene mene teqel u-pharsin* meaning "there has been counted a mina, a shekel and half minas," the half minas (*parsin*) alluding to the division of the empire between the Medes and Persians, the mina (*mēnē*) referring to Nebuchadnezzar, followed by the sheqel (*tēqēl*) the sixtieth part of the mina, symbolizing Belshazzar, the unworthy successor of the great Babylonian king.

These three courses in Old Testament Philology were supplemented by exercises in Hebrew Grammar, especially the study of the paradigms, and sight-reading of both pointed and unpointed texts.

Altogether seven hours weekly were devoted to the study of the Bible.

In Arabic a new course for beginners was given. The forms were studied after the *Paradigmen der arabischen Schriftsprache* edited under the auspices of the Imperial Oriental Academy of Vienna and the syntax was taught by

means of written exercises consisting in the translation of selected sentences from English into Arabic. The Third Voyage of Sindbad the Sailor from the Arabian Nights was read from beginning to end. The language was chiefly studied from a comparative point of view, constant regard being paid to the points of agreement and disagreement with the sister idioms.

Assyriology was the centre of the work. During the month of January no less than twenty-one hours weekly were devoted to the study of the cuneiform texts. Two hours daily individual instruction in the elements of Assyrian script and language was given by the Fellows in Shemitic assisted by other advanced students of Assyriology, and Professor Haupt delivered a course of twenty lectures on Comparative Assyrian Grammar in which after a general introduction the following subjects were specially treated: dialectical differences between Assyrian and Babylonian; relation of Assyrian to Ethiopic; chief peculiarities of Assyrian; the E-vowel; the Sibilants; spiration of the *נ* in Assyrian; labial nasal and labial spirant; absence of a consonantal *h* and *v* in Assyrian; assimilation; etc., etc. In addition to these twenty lectures, Professor Haupt conducted ten exercises in reading the cuneiform syllabaries and extracts from the Annals of Sardanapalus.

In the regular Assyrian course carried on through the year, a complete survey of Assyrian Grammar was given with special reference to the nominal formations, and the following texts in Delitzsch's *Assyrische Lesestücke* were read and explained; (1) the 380 numbers of the great syllabary *S*<sup>o</sup> followed by the syllabaries *S*<sup>b</sup><sub>1</sub> and *S*<sup>b</sup><sub>2</sub> as well as the great four-columned syllabary *S*<sup>o</sup>, ll. 1-334 and the smaller fragments of the class *S*<sup>o</sup>; (2) From the Annals of Shalmaneser II (860-824 B. C.): his victory over Hazael of Damascus; (3) From Istar's Descent to Hades: her arrival at the gates of the under-world; (4) From the Annals of Assurbanipal (668-626 B. C.): the second Elamitic campaign and conquest of Susa; (5) From the broken hexagonal prism of Esarhaddon (681-668 B. C.): Esarhaddon's victory over his parricidal brothers; (6) Three Hunting Inscriptions of Assurbanipal; (7) Three Astronomical Reports; (8) The Assyrian Version of the Sumerian Family Laws; (9) The first fragment of the Babylonian cosmogonical series, K. 5419; cf. Friedrich Delitzsch, *Assyrische Lesestücke*, 3rd edition, Leipzig, 1885, pp. 53-79; 93, B, 1; 100, 3; 113-114, 5; 117, 7; 118-121, 9; 121, 10; 122, 11; 130-132, 2, a, column b.

During the first half-year only two hours weekly could be devoted to the study of Assyrian; but after the special course in January the number was increased to four, two additional hours being added to the regular classes.

The languages of Southern Europe are grouped under the general title of Romance languages and literature. Elementary instruction is given in French, Italian, Spanish, and Portuguese. Higher and advanced instruction is given as else-

where by the seminary methods under the direction of Professor ELLIOTT, assisted by Dr. Todd and Dr. F. M. Warren. In 1886-7, the Seminary work centred on the *Serments de Strasbourg* and the *Cantilène de Sainte Eulalie*, for both of which MS. fac-similes were used. The characteristics of these manuscripts, their speech peculiarities (phonetic and morphological) in their relation to the Classic and Low Latin and to the later Old French as well as to the modern language, their dialect and the extensive critical apparatus belonging to the two texts, formed the bulk of material with which the Seminary was occupied. In addition to this course, followed by the most advanced students only, a meeting was held once a fortnight in which all special students of this department took part. The exercises here consisted in the reading of original papers bearing upon linguistic and literary subjects, of extracts of important articles in Romance journals, of general reports on the journals themselves, of reports on recent publications received and on any suggestive correspondence, of a professional nature, that might be presented.

Special courses in Italian, Spanish, Old Provençal, Catalan, and Roumanian were conducted by Dr. Todd: in Italian, a careful study was made of Leopardi's poetry, and Dante's *Inferno* was interpreted in a series of public readings; in Spanish, numerous selections from modern authors were given; in Old Provençal, the *Poème sur Boèce* and other works were read; in Catalan, the *Cronaca de Ramon Muntaner* was interpreted.

The following courses of lectures continued through the year:

- I. On Language, by Mr. Elliott,
  - (a) Italian Dialects, (b) Modern French Phonetics, (c) Comparative Romance Phonology, (d) Old French Syntax, (e) History of Romance Studies in Europe;

## II. On Literature, by Dr. F. M. Warren,

(a) Old French Literature, treating the origins of epic poetry and its history to its final extinction in the XVth century, also, the sources and history of the Breton Cycle and of the Liturgical drama; (b) Italian Literature, discussing the history of Italian literature from its beginnings to the revival in the XVIIIth century.

Instruction in the Teutonic group of languages has been given by Professor WOOD, with the coöperation of Dr. Browne, Dr. Bright, Dr. Goebel, Dr. Learned, and Dr. Egge. Elementary instruction has also been given in German, Anglo-Saxon, and English. The statements given below exhibit the higher work.

Professor Wood gave the following advanced courses in German:

In the Teutonic Seminary the subject of Low German, begun in the course for 1885-86, was continued. During the first half-year Lauremberg's *Scherzgedichte* (seventeenth century) were read, and the smaller contemporary poems in Lappenberg's edition were taken up. There were also private readings in Modern Low German (Plattdeutsch). During the second half-year Franck's *Mittelniederländische Chrestomathie* (Leipzig, 1883) was used.

The particular aim of the two years' course in Low German was to take advantage of the position of that language, midway between English and German, for supplying the links and steps of transition between the two latter, both in phonology and morphology. The study thus became a part of the course in Comparative German Grammar, and an application of the principles of the latter in a special field. In addition, the value of Low German for clearing up the history of many English words was particularly dwelt on and illustrated.

Lists of exceptions to the law of progression of mutes were made, and as far as possible sub-categories of consonant change were formulated. The literature represented by the works read was compared with High German and English productions of the same periods.

In the course in *Gothic*, Braune's Grammar and Bernhardt's *Vulfila* were used. During the second half-year recent dissertations and monographs on Gothic grammar and syntax were reviewed and reported on by the members of the class, as a part of the work.

In *Old Norse* the elder Edda was studied, and the following parts read: The Helgi lays, *Grímnismál*, *Völuspá*.

The course in *Middle High German* was introduced by eight public lectures, given in January and February, on the *Nibelungen Lied*. The poem was then taken up in class work, and the following *Aventiuren* read: 1-3, 5-7, 9, 10, 14-16, 27, 28.

Lectures on *Comparative German Grammar* were given twice weekly through the year. The course in *Beowulf*, begun 1885-6, was continued, and verses 1889 to the end were read. The whole of *Beowulf* having been read critically with this class in 1884-85, a good translation of the poem was the principal object aimed at in this course. Careful renderings of assigned passages were made by different members of the class, on Elizabethan poetical models, in prose and in alliterative verse. Sievers' metrical categories for Anglo-Saxon were tested for modern English.

A private meeting of advanced students in Teutonic was held weekly, first half-year, and bi-weekly, second half-year. The contents of recent journals were reported on and discussed, and the following original papers were read:

- The use of *an* in Anglo-Saxon, particularly in Beowulf.
- The conjunction *man* in Low German.
- Geweorðan* as an impersonal verb in Anglo-Saxon.
- The meaning and use of *werðan* in the Germanic languages.
- Romance metrical forms in German and English poetry.
- Note on Shakespeare's use of the term: *horn-mad*.
- Dialectical forms in the English of Bedford Co., Virginia.

The work of the English Seminary was conducted by Dr. Bright, in two sections. The subjects for the fortnightly meetings were reports on journals and original contributions by the students. The weekly meetings were devoted to the period known as the Romantic Movement in English Poetry. Papers were presented on Cowper, Crabbe, Chatterton, Churchill, Coleridge, Blake, Erasmus Darwin, Wordsworth, Byron, Shelley, Keats, and Lamb.

A course of lectures at the beginning of the year by Dr. Bright, on Anglo-Saxon versification, was followed by a critical study of the text of the *Andreas*, and the cursory reading of the *Elene* and the *Juliana* (twice weekly throughout the year). For detailed philological work the Vespasian Psalter (Sweet's Oldest English Texts) was employed. In a course of weekly lectures an introduction to the more special features of Anglo-Saxon Grammar was given, and students beginning the course met weekly for the reading of the prose of Aelfric and of Wulfstan. The general principles of Phonetics were also treated in a course of weekly lectures extending through the year.

A class, under the guidance of Dr. Browne, studied the Elizabethan literature, both prose and verse, from Surrey and the early lyrists to the post-Shakespearean drama; and also the literature of the fourteenth century, as illustrated by Chaucer, Langland, and Wyclif. A course of lectures on the literature of the eighteenth century, with readings, was also given.

Dr. Browne also conducted a course of study of the early Scottish poets, consisting of readings by the class, with historical and critical illustrations. The authors studied were Barbour, Wyntoun, James I., Henryson, Holland, Henry the Minstrel, Dunbar, Douglas, and Lyndsay.

For those beginning the study of Anglo-Saxon, a class was conducted by Mr. Egge, in Sweet's *Anglo-Saxon Reader*. The beginners in Middle English formed a class, conducted by Mr. Egge, in Morris's *Specimens I*.

Chaucer's *Prologue* and *Knights Tale*, Shakespeare's *Macbeth*, and part of Milton's *Paradise Lost* were read in undergraduate classes, under the guidance of Dr. Browne.

The instruction in Historical and Political Science is under the direction of Professor ADAMS, aided by Professors Emmott and Ely, and Dr. Jameson. It consists (1) of systematic class-work, comprising lectures by instructors and exercises by students, and (2) original investigations by both instructors and students, who report their studies for general discussion in an organized society called a Seminary of History and Politics.

1. *Class-work.* Dr. Adams has met twice a week throughout the year a class of thirty-seven graduate students for a systematic and progressive study of Germanic Institutions. Beginning with the early German tribes, he traced the development of social, economic, military, political, and religious institutions among the Franks, Goths, Lombards, Vandals, Alamanni, Frisians, and Anglo-Saxons. He also showed how English institutions were transmitted to America in some of their simpler and purer Germanic forms. In connection with the lectures were frequent oral and written examinations of the class upon topics treated by the lecturer,

and upon the general history of Germanic peoples within assigned periods.

Dr. Ely pursued a similar method of combined instruction and training with a class of twenty-three graduates. He lectured three hours a week throughout the year upon Money and Banking, and required written exercises from members of the class upon such subjects as German Banking, the English Public Debt, the First United States Bank, Alexander Hamilton as a Political Economist, Gallatin as a Financier, and the Sub-Treasury System of the United States. Some of these essays, which were discussed in the class, may lead to more original investigations, to be reported in the seminary.

Mr. Emmott lectured twice weekly to twenty-three graduate and advanced students, upon the History and Principles of the Roman Law. He considered the nature of the early Roman State and the development of its laws and institutions. The course laid foundations for the study of Roman Politics as well as of Roman Law. Practical exercises in the analysis and exposition of the Institutes of Justinian, in which the students took part, accompanied this course on historical jurisprudence.

Dr. Jameson lectured once a week to a company of twenty-three graduates upon the Principles of Modern Historical Criticism. Practical illustrations were continually employed and members of the class undertook the exposition of instructive specimens of critical investigation.

2. *Seminary of History and Politics.* This is an organized society embracing all the instructors and thirty-two graduate students in the department of historical and political science, for the purpose of promoting original research. For several years the attention of the Seminary has been chiefly devoted to American Institutional History (more especially

in lines of local and municipal government) and American Economic History. Some of the results have been published in the *University Studies*, 1883-87. During the past year the subject of American Educational History, with respect to Colleges and Universities, has been given special prominence by Dr. Adams, who presented a series of papers, based upon original study and relating to Harvard, Yale, Michigan and Cornell Universities, William and Mary, and various other American colleges. These papers have recently been published by the Bureau of Education, as Circulars of Information, Nos. 1, 2, 1887. The latter is described in the *University Circulars*, No. 62, January, 1888.

Dr. Ely, associate professor in political economy, read to the seminary a series of three economic studies upon the special subject of "Corporations," a series since published in *Harper's Magazine*, in 1887, as were his three articles on "Railways" the year before.

Dr. Jameson presented to the seminary successive chapters of an historical and economic study, entitled "Willem Usseliux, Founder of the Dutch and Swedish West India Companies," since published as Paper No. 3, Vol. II., by the American Historical Association, pp. 234. This paper was based upon original manuscript materials derived by Dr. Jameson from Dutch, Swedish, Russian, French, and German archives, from which copies were obtained by correspondence.

Besides these contributions by instructors to the seminary proceedings, various papers were contributed by students in the same general field of American institutions or American economics. Three of these studies have been published: A. G. Warner's monograph on Coöperation in the West (Publications of the American Economic Association, Vol. II, No. 1); T. K. Worthington's "Historical Sketch of the Finances of

Pennsylvania" (Publications of the American Economic Association, Vol. II, No. 2); and H. B. Gardner's article on "Taxation in the United States," which will appear in a supplementary volume of the American edition of the Encyclopaedia Britannica.

The instruction in Mathematics and Astronomy has been under the guidance of Professor NEWCOMB.

In Mathematics, the following courses were given:—  
by Professor Newcomb:

Theory of Special Perturbations. *Twice weekly, first half-year.*  
History of Astronomy. *Twice weekly in March and April.*  
Computation of Orbits. *Twice weekly in May.*  
Seminary. *Weekly, first half-year.*

by Dr. Story:

Seminary. *Weekly, through the year.*  
Introductory Course for Graduates. *Daily, through the year.*  
Quaternions. *Three times weekly, through the year.*  
Advanced Analytical Geometry. *Twice weekly, through the year.*  
Conic Sections. *Twice weekly, through the year.*

by Dr. Craig:

Theory of Functions. *Three times weekly, first half-year.*  
Hydrodynamics. *Three times weekly, first half-year.*  
Abelian Functions. *Twice weekly, through the year.*  
Linear Differential Equations. *Twice weekly, second half-year.*  
Theoretical Dynamics. *Three times weekly, second half-year.*  
Differential Equations (Major Course). *Twice weekly, through the year.*

by Dr. Franklin:

Problems in Mechanics. *Twice weekly, through the year.*  
Solid Analytic Geometry. *Three times weekly, second half-year.*  
Advanced Algebra, Preparation for Calculus, Differential and Integral Calculus (Elementary Course). *Three times weekly, through the year.*  
Differential and Integral Calculus (Special Class). *Three times weekly, first half-year.*  
Trigonometry. *Three times weekly, first half-year.*  
Analytic Geometry (Elementary). *Three times weekly, second half-year.*

by Mr. Barcroft:

Theory of Equations. *Three times weekly, first half-year.*

The papers below named were read before the Mathematical Society :—

E. W. DAVIS.—Some Theorems in Analysis Situs; Geometrical Representation of Totients; Classification of Polyhedra.

F. FRANKLIN.—Two Proofs of Cauchy's Theorem; Notes.

S. NEWCOMB.—Some Points on Klein's Memoir on the Icosahedron.

M. T. PEED.—On the Determination of Conics by the Signs of the Coefficients in the General Equation.

W. E. STORY.—Systems of Unicursal Curves.

Four numbers, making the Ninth Volume of the *American Journal of Mathematics* have been issued during the year. Professor Sylvester's Lectures on Reciprocants, begun in the eighth volume, form a large part, (144 pages), of the volume. Professor Cayley contributed an important memoir on the Transformation of Elliptic Functions, and Professor Greenhill one on Wave Motion.

The tower at the southeast corner of the new Physical Laboratory is surmounted by a revolving dome containing an equatorial telescope of nine and a half inches aperture. The dome and the mounting of the telescope were supplied by Messrs. Warner and Swasey of Cleveland. The objective is by Dr. Charles S. Hastings. An account of his experiments in the construction of telescope objectives and of his labor in making the objective now owned by the University was drawn up by Professor Hastings and printed in the *Johns Hopkins University Circulars* No. 19, November, 1882.

The equatorial is supplied with six negative eye pieces and one low-power positive eye piece of the Gundlach pattern, and one combination sun and diagonal prism. There is also provided a micrometer with a position circle and three positive eye pieces. The column is of iron, and contains the driving clock near the top, the clock being protected by plate glass doors. The interior of the column also serves for the clock weights and for a cupboard to hold eye pieces and other accessories. Handles below the polar axis and on the declination axis enable the observer to set the

telescope while reading the circles. The circles are graduated on silver on the face and are read by verniers, while on the edge are coarse graduations and large figures for approximate setting. The tangent wheel or worm gear is a complete circle, instead of a segment, so that it never "runs out." The eye end of the tube has a special provision for attaching a spectroscope or other physical instrument. The finder is of three inches aperture and forty-two inches focus.

A small meridian circle, with collimators, mercury basin and other appliances, is being constructed by Messrs. Fauth & Co. of Washington.

The telescope of the meridian circle is of three inches aperture. The circle is divided to five minutes of arc and is read by two micrometer microscopes to single seconds. The collimators are of two inches aperture, and the whole instrument is to be so arranged that the student can make the delicate determinations of errors of divisions, flexure, etc., which have to be considered in fundamental work with the largest and finest instruments.

A portable reflecting circle has been presented to the University by Hon. George W. Dobbin. To this may be added the older instruments of the University, including a small transit instrument, clock, chronometer, etc.

By the addition of these new instruments, the University is now enabled, for the first time in its history, to offer courses in Astronomy sufficiently complete to justify qualified students in choosing it as a principal subject, leading to the Doctor's degree. The courses proposed for the first year are named below. The courses in subsequent years will include the theory of orbits in its various ramifications, celestial mechanics, geodesy, and spectroscopy and other branches of physical research, but may be varied to suit the special tastes of the student.

The direction of this department of study is entrusted to Professor SIMON NEWCOMB, who has announced the plans of instruction for the current year:

A course in Spherical and Practical Astronomy.

*Twice weekly through the year.*

Intended to include such practice in astronomical observations with the equatorial telescope, meridian circle, transit instrument, and sextant as will give the student a practical acquaintance with the use of those instruments. It will also include practice in the reduction of observations and other astronomical computations, including the applications of the method of least squares.

A course in Dioptrics and the Theory of Measuring Instruments.

*Twice weekly, second half-year.*

The principal subjects being: the dioptrics and mechanism of the eye, the telescope and the spectroscope; the principles of linear and angular measurements, including the determination of errors of division; the use of the collimator, spirit level, etc.

Professor Newcomb will also conduct an Astronomical Seminary for the study of the history and literature of Astronomy. The work will consist largely in an examination of the leading works of the great masters of the subject, ancient as well as modern, including a study of the methods by which astronomy has been perfected, and of the present state of the various branches of the science. The members will be encouraged to communicate the results of any researches they may undertake.

A new Physical Laboratory, to which reference has been made in previous reports, has within the year been completed, equipped, and occupied. The public were invited to inspect the building on the twenty-second of February, 1887. A few weeks later a company of gentlemen, including the Professors of Physics in several leading universities and colleges, and other gentlemen interested in the practical applications of electricity and magnetism came here by invitation; and after an address from the Director, Professor ROWLAND, explaining the arrangements and apparatus, were invited to examine the building and the instruments which it contains.

Some of the points which are of interest to the public may be here brought forward. The Laboratory is placed on the corner of Monument and Garden streets; it is built of brick, with sandstone facings, and its exterior dimensions are one hundred and seventeen feet by seventy-one and-a-half. The cost of the structure, including the land, furniture, gas-fitting, steam-heating, steam-power, and astronomical dome (but not including large amounts previously paid for instruments and apparatus, and not including the dynamos, nor the telescope), stands in the books of the Treasurer \$174,765.86. This sum is probably larger than the Trustees would have found it expedient to expend on the physical department, considered by itself, but arrangements have been made to group under one roof the teachers and scholars devoted to several related branches, namely, the sciences of mathematics, astronomy, and physics. Accordingly, working-rooms for investigation, class-rooms for instruction, a department library, a public lecture room, studies for professors, a shop for the making and repair of instruments, and an astronomical tower,—beside other important minor rooms have been provided. For the present, a part of the building is also devoted to psychophysics. The Chairman of the Building Committee was Mr. J. Hall Pleasants, and the architects were Messrs. Baldwin and Pennington, of Baltimore. The mechanism of the dome and the mounting of the telescope are the work of Messrs. Warner and Swasey, of Cleveland.

The architects have furnished the following statement in respect to its construction.

The building measures on the outside 71 feet 6 inches on Monument street and 117 feet on Garden street. It is faced with sand brick, laid in black mortar, and trimmed with Dauphin county sandstone. The main entrance, on Monument street, is reached by a broad and easy flight of Potomac stone steps to a large vestibule, the opening of which is a stone arch, with large pilasters and carved caps on either side, in the Roman-

esque style. On the Monument street front is an iron balcony, to be used for experiments on solar light. There are four stories, besides the basement, an attic floor and a cupola.

In the construction of the building the plans of other important laboratories were consulted. In addition to the requisite arrangements for instruction, there are special facilities for research, especially in electricity and magnetism and in spectrum analysis, and for the photographic study of physical phenomena of all kinds.

On account of the magnetic investigations to be conducted here, it was necessary to have as little iron used in the building as possible, and in most of it no iron at all. The boilers for heating and giving power to the engines are located in the cellar of a house on the south side of Monument street, and steam is conveyed from thence through a tunnel under Monument street to the engine and radiators, which are in the basement of the laboratory building, the entire building being heated by indirect radiation.

Under the basement and located under the centre of the building are constructed four vaults having double doors and close glass lanterns and so arranged as to give a temperature as nearly even as possible, for certain delicate experiments. Here, also are located the machines for ruling the concave gratings.

The basement is mostly of fire-proof construction, having brick arched ceilings and asphalt floors. Here are located the engine and power room, dynamo room, battery room, photometric room, carpenter's shop, workshops, and special rooms for measurements in electricity and magnetism, and laboratories for furnace work.

On the first floor, entering from Monument street to the right, are laboratories for heat and thermometric investigations; to the left is the general lecture room, the walls of which are finished in brick in its natural color. North of this room is the lecturer's apparatus room and the elevator. Across the east wall and over the lecturer's table is a small gallery from which apparatus may be suspended when necessary. On this floor are also rooms for electricity, magnetism, electrical testing and balances, electrometer and apparatus rooms.

The second floor is taken up by the director's study and library, mathematical lecture rooms, study and apparatus rooms, and the general library.

On the third floor are class rooms, elementary laboratories, work rooms, and diffraction room.

On the fourth floor are the spectrometer room and apartments for investigations in light and psycho-physics, draughting rooms, photograph, developing, emulsion, enlarging, concave grating, and spectroscope rooms.

The fifth floor will be used for the investigation of the velocity of light, and for battery and storage rooms. On the roof is a platform for open air experiments. The dome of the astronomical observatory surmounts the tower on the southeast corner of the building.

The entire building is built in what is called "mill," or slow-burning construction, in which heavy beams and thick floors take the place of the

ordinary joists and laths. The walls are all in brick and painted, no plaster being used in the building, except on some of the temporary partitions. The laboratory is the first building constructed on this principle in this city.

The equipment of the building includes:—

1. Apparatus adapted to the prosecution of investigation in every department of physics, the collection being particularly rich in instruments of precision for exact measurement in light, heat, and electricity and magnetism.

2. Well determined copies of the various physical standards of length, mass, and of the units employed in electrical measurements as well as thermometric standards, with the necessary apparatus for exact comparison with these and for the construction and testing of other secondary standards.

3. A good collection of instruments adapted to demonstrations and illustrations before the students of general physics.

4. A number of instruments adapted to the training of beginners in physics, in the habits of observation, manipulation and measurement.

The laboratory has been open daily for the prosecution of study and research, under the direction of Professor ROWLAND, assisted by Dr. Kimball, Dr. Duncan and Dr. Perkins.

The following courses have been given during the year :

**Professor Rowland :**

Lectures on Electricity and Magnetism. *Four and five times weekly through the year.*

**Dr. Kimball :**

First year's course in General Physics. *Daily, through the year.*

Second year's course, consisting of lectures on Mechanics, Elementary Thermodynamics, Electricity and Magnetism, Sound, and the Wave Theory of Light. *Daily, through the year.*

**Dr. Duncan :**

Lectures and Problems in Electricity and Magnetism. *Three times weekly, through the year.*

Sound. *Twice weekly, second half-year.*

Dr. Perkins :

Laboratory Work of the undergraduate students. *Through the year.*

Besides the regular work of instruction, the following researches have been carried on :

On the relative wave length of the lines of the solar spectrum; about 450 lines have been measured as standards, and more than 1500 lines in the red and yellow.

Determination of the absolute wave length of light.

Determination of the rotation of the sun by displacement of lines in the spectrum.

On the spectrum of hydrogen under various conditions.

Chemical action in a magnetic field.

Determination of the magnetic moment of short, straight magnets in absolute measure for given currents.

On the magnetic action of displacement currents in dielectrics.

The electromotive force required to produce sparks in different gases.

A new and improved dividing engine for ruling gratings has been finished.

Advanced students have taken part with the instructors in weekly meetings for the discussion of the current physical journals.

The erection of the new building, and the addition to the staff of a special instructor, Louis Duncan, Ph. D., make it possible to give a prolonged course in Applied Electricity. This is intended for advanced students, who have already completed their general education, and who are willing to devote two years to the study of Electricity and of subjects connected with it. A knowledge of Mathematics through the differential and integral calculus is necessary, and the instructor must be satisfied that the student is otherwise in a position to benefit by the course. An acquaintance with French and German is most desirable.

While a knowledge of the theory is important in every branch of applied science, this is especially the case with Electricity, in which the applications increase so rapidly, and

the practice so frequently changes, that without sound theoretical knowledge it is impossible to keep abreast of the advance of improvement, or even to understand the inventions which are daily made public. Yet theoretical knowledge is unfruitful without knowledge of the means of its application, such as can only be obtained by experimental work.

The course, then, is intended to teach the theory of Electricity with a special view to its practical application, to familiarize the student with electrical instruments and methods of experiment, and to give him a knowledge of the theory and practice of those applications that are in successful use and with which he will probably work.

The lectures for the first year are intended to give clear physical ideas of general principles, with the mathematical interpretation necessary to enforce and apply them.

The laboratory work will include measurements of resistance, current, potential, capacity, etc., with voltameter and calorimeter work, and the student will be familiarized with the instruments used in electrical measurements, galvanometers, electro-dynamometers, resistance coils, condensers, etc. On finishing this work, the student will be given experiments, such as the construction and measurement of standard cells, the determination of the magnetism of iron, the determination of specific inductive capacity, etc., which will bring into use the methods he has already studied.

Besides the work in Electricity, lectures on Mathematics and such other subjects as the student requires, will be given.

There will be a weekly meeting for the purpose of discussing articles of interest appearing in the electrical journals.

In the second year, will be given the theory of dynamos, motors, the transmission and distribution of energy, the telegraph, the telephone, storage batteries, etc.

The laboratory work will include the tests and running of dynamos and motors, the efficiency and practical working of secondary and primary batteries, photometer work, testing of telegraph lines, experiments on the electrical transmission of energy, telephone work, etc., with such original investigations as the student is able to undertake. There will be a weekly meeting for the discussion of the current literature of the subject.

The student will have time for other selected courses, and in either the first or the second year of this course he must take the second year's undergraduate course in general physics or its equivalent.

At the end of the course an examination will be held, and on passing it the student will be given a certificate stating that he has taken the course in Applied Electricity and has passed the required examinations.

The Chemical Laboratory, Professor REMSEN, *Director*, is a three-story building which has been recently enlarged and re-arranged, and affords good facilities for about one hundred and twenty laboratory students. There were one hundred and eighteen workers during the last year.

The usual courses of lectures and practical instructions have been given, and the advanced students have been encouraged to engage in investigation.

Those who have completed the full courses in General Chemistry, including from two to three years' work in qualitative and quantitative analysis and about a year's work in making difficult and instructive preparations, were encouraged to undertake the solution of original problems.

The following investigations have been completed during the year. Others are in progress.

- The decomposition of diazo-compounds with alcohol.
- Sulphon-fluoresceïn and its derivatives.
- Studies on the constitution of benzoic sulphinide.
- Amido-o-sulpho-benzoic acid and its derivatives.
- A new method of estimating sulphur in organic compounds.
- A new method of estimating butter in milk.

The results of most of these investigations have appeared in the *American Chemical Journal*. Some of them have been brought before the Johns Hopkins Scientific Association at its regular meetings.

The Fellows and other advanced students have met with the instructors twice a week during the year for the purpose of keeping abreast of the current chemical literature. The important journals have been carefully read, and full reports of the various articles have been made.

These students have been often called upon to treat important chemical questions in a broad way, going to the original sources and presenting the results in a complete form. In most cases the topics so investigated have been connected with the experimental work going on at the time; but other questions also have been elaborated in this way which bore less directly on the current studies. In several cases carefully written reports of the results obtained have been prepared. The excellent library of chemical books and journals which is accessible to the students in the laboratory, at all reasonable hours, has greatly facilitated the execution of this very desirable literary work.

Early in the year subjects were assigned to the Fellows and others for the preparation of lectures on various chemical topics treated historically; and eleven such lectures were the result. These were prepared from a careful study of the original articles in the journals, and were not borrowed from books on the history of chemistry. Full abstracts of most of

these lectures, furnished with complete references to the articles consulted, are to be prepared and preserved in the chemical library. The lecturers and their subjects were as follows :

- Mr. W. R. Orndorff on The History of Investigations on the Constitution of the Carbohydrates;
- Mr. C. W. Hayes on Mass-action;
- Mr. W. A. Hedrick on The History of Alizarin;
- Mr. R. N. Brackett on Ladenburg's Investigations on the Alkaloids;
- Mr. J. H. Kastle on The Lactones;
- Dr. C. L. Reese on Researches on Petroleum;
- Mr. C. J. Bell on The Le Bel and van't Hoff Hypothesis;
- Dr. E. Renouf on The History of Ether;
- Mr. A. F. Linn on Victor Meyer's Researches on the Acetoximes and Aldoximes;
- Mr. F. Lengfeld on The Ptomaines;
- Mr. A. R. L. Dohme on The Researches of Hofmann and Würtz on substituted Ammonias.

Six numbers of the *American Chemical Journal* have appeared within the year.

The Biological Laboratory is an independent building of three stories, affording ample accommodations for one hundred students. During the academic year it was open for eight hours, five days weekly, for the prosecution of advanced study and research and for practical instruction in connection with class lectures,—the work being under the guidance of Professor MARTIN, the Director, with the aid of Dr. Brooks, Dr. Howell, Dr. Andrews, Dr. Barton, and other instructors.

During the year original investigations have been made in regard to the following subjects :

- The mode of action of pepton in checking the coagulation of blood.
- The influence upon the mammalian heart and blood vessels of cocain and atropin.
- The histological structure of the cerebro-spinal centre of the frog.
- The so-called "suction-pump" action of the heart.
- The phenomena of the "knee-jerk."
- The physiological anatomy of the knee joint of the frog.

The influence of temperature changes upon the irritability and contractility of muscle.

The specific energy of the nerves of taste.

The influence of weak and strong stimulation of the recurrent laryngeal nerves on the movements of the vocal chords.

The formation of the germ layers in *Loligo*.

The development and histology of certain Crustacea.

The histology of *Medusæ*.

The development of *Limulus*.

The embryology of insects and arachnids.

The results of most of the above researches have already been published. Preliminary notices of the results of other investigations have been printed in the *University Circulars* and elsewhere.

In connection with the regular class instruction, first year students studied a number of typical fungi, green plants, and animals; the skeletons of about twenty selected vertebrates; and the development of the chick in the egg. In the spring there were fifteen practical lessons in the elements of systematic and descriptive botany. Second year students studied the histology of the tissues and organs of the higher vertebrata (especially man): the physiological properties and functions of the tissues and organs; the physiology of digestion; the chemistry of bile, urine, etc. The cat was thoroughly dissected by the second year students, and about twenty-five other selected invertebrate and vertebrate types examined.

Professor Martin lectured once a week throughout the session on selected topics in Physiology. Among the subjects treated were: Recent advances in vegetable physiology; the physiology of reproduction, pregnancy and parturition; the physiology of the heart; oxidations in the body, their seat and exciting causes; the phenomena of electrotonus.

From October until the end of February Dr. W. K. Brooks lectured once a week on Morphological Problems, especially Heredity; and once a week on "The Cœlenterata."

Special courses were given as follows:

Professor Martin; four lectures on the Theories as to the Intimate Structure of Organized Matter.

Dr. W. H. Howell; four lectures on the Physiology of Secretion.

Mr. J. P. Campbell; two lectures on the Influence of Pepton on the Coagulation of the Blood.

Dr. H. G. Beyer; one lecture on the Laboratory Study of Drugs.

Dr. W. P. Lombard; one lecture on the "Knee-jerk" Phenomenon.

Mr. H. V. Wilson; two lectures on the Ctenophora, and two on Metschnikoff's "Entwicklungsgeschichte."

Mr. F. H. Herrick; two lectures on the Compound Eyes of Crustacea.

Most of the advanced work was carried on individually, and not in class, each worker taking up some special topic for study under the immediate direction of some one of the instructors. In addition to the original researches already enumerated, certain graduate students have in this manner carried on advanced study in various directions.

The Journal Club met weekly until the end of February, physiological and morphological papers being reported and discussed in alternate weeks. After the beginning of March, the club met once a fortnight to consider recent physiological publications.

The Physiological Reading Club met once a week. During the year it read Schwann's "Microscopical Researches into the Accordance in the Structure and Growth of Animals and Plants;" and translated from Haller's *Elementa physiologiae* the greater part of the section *Motus musculorum phaenomena*.

The Morphological Reading Club met once a week until the end of February, to read and discuss the essay of Agassiz on "Classification."

During the session there were published Nos. 8 and 9, completing Vol. III of the "*Studies from the Biological Laboratory*," and No. 1 of Vol. IV.

The Marine Laboratory was stationed in 1887 at Nassau in the island of New Providence. Dr. W. K. BROOKS, the

Director, sailed for Nassau in the month of February and remained there until July. Eleven collaborators were associated with him. The report will be found in the appendix.

Ten years have now passed since the organization known as the Chesapeake Zoölogical Laboratory began its operations. Its work has been carried on at the following stations:

1878. Fort Wool, Va.	1883. Hampton, Va.
1879. Crisfield, Md.	1884. Beaufort, N. C.
1880. Beaufort, N. C.	1885. Beaufort, N. C.
1881. Beaufort, N. C.	1886. Green Turtle Cay, Abaco.
1882. Beaufort, N. C.	1887. Nassau, New Providence.

The published results of the work at the seashore from 1879 to 1886, include ninety-nine titles. They have been printed in the following journals: Studies from the Biological Laboratory; University Circulars; American Naturalist; American Journal of Science; Memoirs, Boston Society of Natural History; Zoölogischer Anzeiger; Quarterly Journal of Microscopical Science, London; Proceedings and Philosophical Transactions of the Royal Society, London. Thirty-four of them are books or illustrated papers; sixteen of them were originally published in England or Germany; and translations or abstracts of forty-six of them have appeared in the zoölogical journals of England, France, or Germany. One of the papers has received the medal of the first class of the *Société d'Acclimatation* of Paris, and another was, in 1883, awarded one of the Walker prizes of the Boston Society of Natural History. The following papers may be mentioned:

- The Development of Lucifer, by W. K. Brooks.
- The Development of Renilla, by E. B. Wilson.
- The Life History of the Hydro-Medusae, by W. K. Brooks.
- The Stomatopoda of the Challenger Collection, by W. K. Brooks.
- Observations on the Embryology of Insects and Arachnids, by A. T. Bruce.

The Embryology of *Limulus*, by W. K. Brooks and A. T. Bruce.  
The Early Stages in the Development of *Balanoglossus*, by W. Bateson.  
The Development of the American Oyster, by W. K. Brooks.

This paper, which gives the first published account of the reproduction of our oyster, has furnished the basis for all the experiments which have been carried on during the last five years in oyster propagation.

More than fifty individuals have been enrolled as workers in the laboratory, and the average attendance has been eleven persons in each year. In the *Johns Hopkins University Circulars*, No. 54, for December, 1886, a report of the zoölogical work of the university, 1878-86, is given by Dr. Brooks.

The instruction in Psycho-physics under the direction of Professor G. STANLEY HALL, is now given in rooms appropriated to this purpose in the Physical Laboratory,—to which a large number of instruments, purchased and made for the university, have been removed.

The appointment of H. H. Donaldson, Ph. D., as an Associate in Psychology, will increase the efficiency of the work proposed. During the interval which has passed since he received the degree of Doctor of Philosophy he has continued his studies under favorable opportunities at home and in Europe, and he returns to the service of the university well prepared to advance the branch of science to which he is devoted.

The publication of a Journal of Psychology under the editorial care of Professor Hall will be referred to in another place.

The lectures of Professor Hall, as now arranged, consist of three courses, each extending over three years.

In Psychology, the first year's work is devoted to the general properties of the nervous substance, psycho-physics of the special senses, their defects, and the theory of knowledge, and coincides largely with the field covered by Ladd's Psy-

chology. Thorough preparation in this part of the course is of fundamental importance for the modern psychologist, and unless it is well done his future work is on an insecure basis.

The work of the second year includes perception of time and space, the time-sense, psycho-physic law, mental images (morbid and normal) and their associations, and the leading topics in morbid psychology.

The topics of the third year include reflex-action, instinct, psycho-genesis, the psychology of problems of language, myth, custom and belief, anthropologically considered, hypnotism, and the psychological side of systems of philosophy and ethnic religions. This work is supplemented by directions for special reading on each topic, illustrative apparatus, and by psychological clinics at the neighboring asylum on aphasia, illusions and hallucinations, epilepsy, mania, hysteria, etc.

The lectures in historical and ethical psychology also extend over three years. The first year is devoted to the Greek philosophy; the second ends with Hegel; and the third is devoted to contemporary writers. The work is not confined to the field commonly called the history of philosophy, but attention is given to material from the history of science, of medicine, and of education. Mainly, however, the course, except in the last part of the third year, coincides with the standard text-books in the history of philosophy. The material is treated objectively and from a psychological standpoint. A weekly seminary is held in connection with this course.

The educational lectures of the first year are historical. Those of the second year are devoted to the problems of primary and intermediate and those of the third to special chapters in the field of higher education. Among the topics of the present third year are *e. g.*, general vs. special education; chairs of pedagogy in this country and Europe; educa-

tional endowments; school legislation; the relation between science and the State; the organization and operation of learned societies and scientific and other academies; the constitution and methods and history of European universities from the Renaissance; the educational value of philosophical systems; professional schools of law, medicine, theology, technological and industrial schools; the French, English, German and American school and college systems in their method and idea; the development and nature of student life; history and theory of examinations and degrees; and academic festivals and traditions. A guide-book to the literature of the chief topics of this course was published in 1886, entitled *Bibliography of Education*, pp. 298.

Dr. Donaldson gives two courses—one on the histology of the senses, the other on that of the central nervous system. These courses and those of Dr. Hall coincide and supplement each other.

Both courses include laboratory work for practice, in addition to the opportunities for special original research offered in the experimental and histological fields.

In connection with these courses an evening seminary is held weekly through the year.

A four-story building (No. 610 N. Howard Street) has been set apart by the Trustees as a laboratory for the study of geology and mineralogy, and a large part of the collections of the University have been transferred to that place. The work of Professor WILLIAMS in mineralogy and inorganic geology is to be supplemented by the assistance of Dr. W. B. Clark, a recent graduate of the University of Munich, who will direct work in historical geology and palæontology, as well as undertake the formation of a collection of typical fossils.

The advanced mineralogical course embraces lectures (throughout the year) on crystallography, on optical and general physical mineralogy, and on the description of mineral species. Abundant opportunity is also given to students for forming a practical acquaintance with the minerals treated of in these lectures. For such as desire to devote more time to this subject, facilities and instruction are offered in crystal-measuring, calculation, drawing, and projection, as well as in the practical determination of the optical and other physical constants of crystals.

The course in inorganic geology embraces lectures on petrography and dynamical geology. In these the methods and aims of the recent work on the crystalline rocks are treated in considerable detail. The system of classification followed for the massive rocks is essentially that of Rosenbusch. These lectures are, however, principally intended to guide and supplement the laboratory work in petrography, which is carried on daily from 9 a. m. to 5 p. m. Students are thus made practically acquainted with the modern methods of rock study.

Dr. Clark will supplement the instruction in inorganic geology by a brief course of lectures on historical geology.

After students have become familiar with the methods of petrographical investigation by the study of typical and described material, they are encouraged to undertake original work. The results of a number of such investigations, which have been carried on in the Petrographical Laboratory, have already been published and others are now in progress. Since the extreme importance of field work in connection with the laboratory study of rocks is fully appreciated, the unusually interesting and varied area of crystalline rocks occurring near Baltimore has been divided into sections five

miles square, as described in the *Johns Hopkins University Circulars No. 59*. One of these sections or sheets may be assigned to a student for study, and his results, in the form of a very detailed geological map accompanied by complete descriptions of the rocks, microscopical and otherwise, may be presented as a doctor's thesis. The weekly journal meetings, for the purpose of acquainting advanced students with current geological literature, form an integral part of this work.

The nucleus of the mineral cabinet is a collection made by Professor O. D. Allen, of the Sheffield Scientific School, New Haven. The cabinet has been increased by the Root Collection, from Clinton, N. Y., and by numerous gifts and purchases. In the possession of the University and in the private collection of Dr. Williams, there are now about 2,500 microscopic rock-sections and 3,500 hand specimens. These represent very carefully selected material from the most thoroughly studied localities of both Europe and America. Many of them form suites of type-specimens valuable for study and comparison; among those belonging to the University may be named:

- Stüertz collection of typical European rocks, described by Rosenbusch;
- Hitchcock collection of New Hampshire rocks, described by Hawes;
- Collection of European rocks made by Mr. E. Sanger;
- Collection of Baltimore County rocks, described by Dr. Williams;
- Collection of Crystalline Rocks from the Lake of the Woods region, made and presented by Mr. A. C. Lawson, of the Geographical Survey of Canada.

The University is under obligations to the following persons for recent donations to the mineralogical and geological collections.

- Mr. Wm. Glenn.* Suite of minerals.
- Mrs. A. R. Marvin.* Suite of type specimens collected by Professor Marvin on Keweenaw Point, Lake Superior.
- Mr. A. C. Gill.* Suite of rocks from Yellowstone National Park.
- Mr. W. H. Hobbs.* Suite of eruptive rocks from Eastern Massachusetts.

The geological and mineralogical library is furnished with the principal books of reference and journals and is kept in Dr. Williams' study, opening out of the petrographical laboratory. The fine geological library at the Peabody Institute supplements that in the possession of the University, especially in palæontology. The University owns a large goniometer, several microscopes made especially for rock study, apparatus for making separations of rock constituents and for preparing rock-sections. It also owns the more important pieces of apparatus for work in physical mineralogy, together with a complete suite of wooden and glass crystal models.

An excursion map of Baltimore and its Neighborhood for the use of workers in the field; and a Note on the Minerals in the Neighborhood of Baltimore, by Dr. G. H. Williams have been published. Bulletin No. 28, U. S. Geological Survey, containing colored plates and a map, gives extended petrographical studies of many of the rocks near Baltimore.

The following investigations have been carried on in microscopical petrography:

Of the crystalline rocks of Baltimore and Harford Counties, Md., by Dr. Williams.

Of the eruptive and metamorphic rocks of the "Cortlandt Series" from Peekskill, N. Y., by Dr. Williams.

Of the ancient greenstones and associated acid rocks from the Menominee iron region, Mich., and from the neighborhood of Marquette on Lake Superior, by Dr. Williams.

Of the Laurentian ("Kewatin") rocks occurring near Rainy Lake, northwest of Lake Superior, by Mr. Lawson.

Of the contact rocks of Pigeon Point, Minnesota, by Dr. Bayley.

Of the serpentine of Syracuse, N. Y., by Dr. Williams.

Of the serpentine of "Soldiers' Delight," Balto. Co., Md., by Mr. Gill.

Of the volcanic rocks (phonolites and basalts) occurring on the island of Fernando de Noronha off the coast of Brazil. These were collected by Professor J. C. Branner, State Geologist of Arkansas, by whom they were sent to the University for investigation, by Dr. Williams and Mr. Gill.

On the regular field excursions much additional information has been gathered relative to the distribution of the crystalline rocks about Balti-

more, and a large number of carefully catalogued mineralogical and petrographical specimens, illustrative of the geology of the immediate neighborhood, has been added to the University collection.

Journal meetings, at which the more advanced students have reported upon the contents of all the leading mineralogical and geological journals, have been held weekly.

The Pathological Institute of the Johns Hopkins University was opened in October, 1886, under the direction of Professor WELCH. By permission of the Trustees of the Johns Hopkins Hospital the use of the Pathological Building of the Hospital was granted to the University. The structure is of two stories, well lighted and arranged, and includes ten rooms, in addition to the autopsy theatre.

Certain rooms are devoted to work in pathological histology and to pathological demonstrations, others to bacteriological work, and others to experimental pathology. Rooms are also equipped for microscopical photography. The museum is already supplied with a large number of valuable pathological specimens.

The laboratory is well supplied with apparatus for teaching and for investigation in all branches of pathology. There is a large collection of material for studies in both human and comparative pathology. Facilities are afforded for special work in experimental pathology. The bacteriological laboratory is equipped with all the apparatus required by the modern methods in this important department of investigation. The laboratory possesses a large collection of cultures of the most important and interesting pathogenic micro-organisms.

A fellowship in pathology, yielding five hundred dollars and free tuition, is awarded annually. Application should be made prior to May 1, in accordance with the regulations of the Academic Council printed in the University Register and in the special circular relating to fellowships.

The following courses of practical work are conducted in the Pathological Institute during the academic year :

1. *Pathological Histology.* This course embraces the study of subjects in general pathology such as inflammation, thrombosis, tumors, etc., and of the special pathological histology of all of the organs and tissues of the body. Each student is expected to stain and mount, and, as far as practicable, to cut the microscopical sections.

2. *Bacteriology.* In this course students are instructed in the methods of cultivating bacteria, more especially in the methods employed by Koch, and are also given opportunity to study the characters, morphological and biological, of the bacteria and fungi, particularly of those relating to disease. The methods of making bacteriological examinations of air, water, etc., are taught.

3. *Demonstrations in Pathological Anatomy.* Ample material for the demonstration of fresh pathological specimens is obtained from the Bay View Asylum and other sources in the city.

4. *Method of making Post-Mortem Examinations.* Until the opening of the Johns Hopkins Hospital this course will be held in the autopsy room of the Bay View Asylum, where a number of post-mortem examinations are made weekly by the associate in Pathology.

The resources of the Pathological Institute are open to those who are prepared to engage in special research in any department of pathology—experimental, histological, or bacteriological. In view of the increasing importance of the subject, especial attention is given to the collection and study of material in comparative pathology.

The arrangements which were made in December, 1886, with the Trustees of the Bay View Asylum have proved sat-

isfactory. Drs. J. C. Thomas, W. T. Councilman, and H. M. Thomas were designated by the University and appointed by the Trustees of the Asylum as visiting physicians to the Insane Department. To coöperate with these, Professor G. S. Hall was appointed as an expert in the management of insane asylums. Dr. J. C. Hemmeter was appointed and is now serving as an interne to succeed previous appointees of the university, Drs. Noyes and Brewer. On the one hand these arrangements open to the medical and psychological departments of the university opportunities for the clinical study of an interesting and important class of diseases, and on the other hand experience has shown that the connection of the university with the Bay View Insane Asylum has in various ways benefited that institution. Competent and conscientious medical attendance has been provided, a better class of nurses has been secured, and by private benevolence (which received its impulse from members of the university), not a little has been added to the comfort and well-being of the inmates of the Asylum.

Within the year the regulations for conferring the degree of Doctor of Philosophy have been modified. The principal changes are those requiring a preliminary examination by a committee of the Board of University Studies and those requiring the printing of the thesis. The committee reports whether the diploma submitted is satisfactory; whether the candidate is able to translate French and German into English; in case deficiencies in his previous training appear, whether they are such as he should be required to make up, or whether the committee discourage the continuation of his studies with reference to a degree; whether the committee approves the combination of studies which the candidate pro-

poses to offer at his final examination; and the name of an adviser for the candidate, with whom he must from time to time consult. As to the theses, the regulations are as follows:

“The thesis must be written on a theme approved by the adviser of the candidate, and must be completed, and submitted through him to the Board, at least four weeks before the written examinations are held, unless the adviser requests that for reasons satisfactory to the Board, an exception be made. The thesis must be legibly written, and paged and bound according to a prescribed form, which can be seen in the Library. A biographical sketch of the author shall be appended to the thesis;

“The Board shall designate two members of the academic staff as referees, who shall present a written report on the thesis,—said report to be filed;

“The candidate shall print the thesis in full or in part, and if in part, to the extent of not less than twenty-four octavo pages, under the supervision of his adviser, within one year of the time when the degree is conferred, and shall present one hundred and fifty copies of the work to the University;

“If the thesis has not already been printed, a deposit of \$50, to insure its printing within the specified period, shall be made by the candidate at the Treasurer’s office, before the degree is conferred. This deposit shall be returned to him when the printed copies are presented to the University.”

Twenty-four undergraduates have come forward to the Baccalaureate degree during the year, namely:—

Edward Carey Applegarth, Baltimore.  
 Richard Howard Bayard, Baltimore.  
 Herbert Maxwell Brune, Baltimore.

Charles Edward Coates, Jr., Baltimore.  
 William Roswell Cole, Baltimore.  
 Paul Joseph Dashiell, Charlotte Hall.  
 George Peter Dreyer, Baltimore.

- Edward Duffy, Jr., Baltimore.  
 James Clark Fifield, Nebraska.  
 Julius Friedenwald, Baltimore.  
 Douglas Huntly Gordon, Baltimore.  
 Jay Caesar Guggenheimer, Baltimore.  
 Charles Homer Haskins, Pennsylvania.  
 George Lincoln Hendrickson, Indiana.  
 Franz Otto Karl Hoffmann, New York City.  
 Robert Milligan McLane, Jr., Baltimore.
- Robert William Rogers, Philadelphia.  
 Walter Bell Scaife, Pennsylvania (*extra ordinem*).  
 Albert Henry Smyth, Philadelphia (*extra ordinem*).  
 Henry Oliver Thompson, Baltimore.  
 Benjamin Simon William Tuska, New York City.  
 Robert William Henry Weech, Washington, D. C.  
 Edward William Willis, Baltimore.  
 Henry Firey Wingert, Hagerstown.

Twenty candidates, who had presented the requisite theses and had passed the examinations successfully, were made Doctors of Philosophy, namely:—

Cyrus Adler, of Philadelphia, Pa., A. B., University of Pennsylvania, 1833. *Subjects*: Assyriology, South Shemitic Languages, and Philosophy. *Thesis*: The Annals of Sardanapalus: a double transliteration, translation, commentary, and concordance of the cuneiform text.

Ethan Allen Andrews, of New York City, Ph. B., Yale College, 1831. *Subjects*: Animal Morphology, and Animal Physiology and Histology. *Thesis*: The Annelida Polychaetae of Beaufort, N. C.

Albert Clayton Applegarth, of Baltimore, A. B., Johns Hopkins University, 1884. *Subjects*: History, Political Economy, and International Law. *Thesis*: "The Holy Experiment," or the Society of Friends in Pennsylvania, 1682-1776.

David Barcroft, of Berkeley, Cal., Ph. B., University of California, 1882. *Subjects*: Mathematics, Astronomy, and Psychology. *Thesis*: On the Forms of Plane Quintic Curves.

Henry Gustav Beyer, of Washington, D. C., M. D., Bellevue Hospital Medical College, 1876; Passed Assistant Surgeon, U. S. N.; M. R. C. S. (London). *Subjects*: Animal Physiology and Histology, Chemistry, and Animal Morphology. *Thesis*: Direct Action of Atropin, Homatropin, Hyoscine, Hyoscyamine, and Daturine on the Heart of the Dog, Terrapin, and Frog.

Richard Newman Brackett, of Charleston, S. C., A. B., Davidson College, 1883. *Subjects*: Chemistry, Mineralogy, and Geology. *Thesis*: On the Ethers of Benzoic Sulphinide. *Am. Chem. J.* 12. 1887.

Henry Crew, of Wilmington, Ohio, A. B., Princeton College, 1882. *Sub-*

jects: Physics, Mathematics, and Chemistry. *Thesis*: On the Period of Rotation of the Sun as determined by the Spectroscope.

Albert E. Egge, of Decorah, Iowa, A. B., Norwegian Luther College, 1879. *Subjects*: Teutonic Languages, and History. *Thesis*: Scandinavian Influence on English.

John Charles Fields, of Hamilton, Ontario, A. B., University of Toronto, 1834. *Subjects*: Mathematics, Astronomy, and History of Philosophy. *Thesis*: Symbolic Finite Solutions and Solutions by Definite Integrals of the Equation  $\frac{d^ny}{dx^n} = x^my$ .

Andrew Fossum, of Elon, Iowa, A. B., Norwegian Luther College, 1882. *Subjects*: Greek, Latin, and Sanskrit. *Thesis*: The *ἅπαξ λεγόμενα* of Plato.

Richmond Harding, of North Carolina, A. B., Davidson College, 1880. *Subjects*: Latin and Greek. *Thesis*: The Orator Dinarchus.

Charles Willard Hayes, of Hanover, Ohio, A. B., Oberlin College, 1883. *Subjects*: Chemistry, Mineralogy, and Geology. *Thesis*: On Sulphonfluorescein and some of its Derivatives.

William Adam Hedrick, of Georgetown, D. C., A. M., Columbian University, 1884. *Subjects*: Chemistry, Physics, and Mineralogy. *Thesis*: Para-amido-ortho-sulpho-benzoic Acid and some of its Derivatives.

Frank Gaylord Hubbard, of Oswego, N. Y., A. B., Williams College, 1880. *Subjects*: English, German, and Old Norse. *Thesis*: The "Blooms" of King Alfred.

George Benjamin Hussey, of East Orange, N. J., A. B., Columbia College, 1884. *Subjects*: Greek, Latin, and Sanskrit. *Thesis*: The Metaphors and Similes of Plato.

James Hervey Hyslop, of Northampton, Mass., A. B., University of Wooster, 1877. *Subjects*: History of Philosophy, Ethics, Psychology, and Political Economy. *Thesis*: The Problem of Space.

Marion Dexter Learned, of Dover, Del., A. B., Dickinson College, 1880. *Subjects*: Teutonic Languages, Old Norse, and French. *Thesis*: The Pennsylvania German Dialect.

William Ridgely Orndorff, of Baltimore, A. B., Johns Hopkins University, 1884. *Subjects*: Chemistry, Mineralogy, and Geology. *Thesis*: The Reaction between Diazo-compounds and Alcohol.

Daniel Richard Randall, of Annapolis, Md., A. B., St. John's College, 1883. *Subjects*: History and Political Science. *Thesis*: A Puritan Colony in Maryland.

Frederick Morris Warren, of Durham, Me., A. B., Amherst College, 1880. *Subjects*: Romance Languages and History. *Thesis*: The World of Corneille.

For the purpose of encouraging the graduate students to engage in literary work, a friend of the University gave the

sum of two hundred dollars to be awarded in two equal prizes. The competition was open to any Bachelor of Arts in residence during the academic year, provided that he had not been admitted to a Fellowship or to the degree of Doctor of Philosophy. The trustees added to this prize the promise of free tuition for the next academic year.

The candidates were required to submit examples of their literary work to a committee consisting of Messrs. Gildersleeve, Browne and Wood, by whom the award was made. The prizes were won by Richard E. Burton, and James Cummings,—and honorable mention was made of John H. T. McPherson, Benjamin F. Sledd, and William K. Williams.

The use of the gymnasium has fully justified the outlays which have been expended upon it. The Director, Dr. HARTWELL, continues to take the measurements of all students who apply to him, and to advise them in respect to regimen and the exercises in which they should engage. He has made within the past year two hundred and thirty-six physical examinations. In one hundred and two cases the individuals were examined by him for the first time. Toward the close of the annual session the services of Mr. H. Nissen, of Washington, who is well acquainted with the various methods of training the body which have been reduced to a system in Sweden and Germany, was invited to give a course of lessons to our students. The results of this trial were so satisfactory that his services are engaged for another year.

By the removal of the classes in Latin and Greek to the new rooms provided for them, a considerable space near to the gymnasium has been set free, and will be devoted to various purposes which will contribute to the convenience and comfort of the students. Suitable rooms are set apart for

study, conversation, and luncheon,—and the space allotted to dressing-rooms has been enlarged.

Various public assemblies and social gatherings were held during the year. At the opening of the session an address was delivered in the gymnasium by Professor Wright. On the twenty-second of February, an address was delivered by the President, and also one on the relation of mathematics to the progress of the other branches of science by Professor Newcomb. The alumni of the university, with invited guests, dined together at the St. James Hotel, and in the evening of the same day the annual social assembly was held in the Physical Laboratory. This new building was again thrown open to the public April 22, when a large number of Professors of Physics from other institutions were present. At the close of the session, June 14, 1887, the degrees of Doctor of Philosophy and Bachelor of Arts were conferred, the scholarships and fellowships were announced, and a reception was given to the friends of the graduating classes. On the seventeenth of February, and again on the third of March, the officers and students of the university were invited by Mr. Wm. W. Spence, to a social reception, in which they met many ladies and gentlemen of Baltimore. The Modern Language Association held its fourth annual meeting here December 28, 1886, and were entertained in the evening by Mr. D. L. Bartlett.

The Library continues under the direction of Dr. W. HAND BROWNE, Librarian, who reports that the additions during the year which extended from June 1, 1886, to June 1, 1887, were 1,253 bound volumes. The total number of bound volumes belonging to the University is now 31,700. The

Peabody Library (now numbering 90,000 books) grows more, and more valuable as it increases in size, and as its contents are made better known by the publication of its catalogue. We are under constant obligations to the Provost, Dr. Morison, and the Librarian, Mr. Uhler, for the efforts which they make to render the library serviceable to members of the university as well as to the public.

The list of periodicals regularly received in our Library continues to increase by subscription and exchange, and it now includes nine hundred titles,—among which will be found the chief scientific journals and transactions of the world. Nearly three hundred volumes have been presented to the Library within the year. More than half of these were the gift of Mr. Thomas K. Worthington, a graduate student, most of them books relating to the science of medicine, from the library of his father, the late J. H. Worthington, M. D., of Philadelphia.

Special notice should also be made of a collection of books and pamphlets relating to the history, legislation and administration, of the Helvetian Republic, presented by the government of that State, through the Swiss Minister now residing in Washington, Hon. Emile Frey.

The Library has also received from the Dowager Lady Vernon a copy of the magnificent work on Dante, published by the late Lord Vernon, in three quarto volumes, with a fourth volume containing the reprints of the first four editions of the *Divina Commedia*.

The New Book Department and the Publication Agency have been under the direction, as heretofore, of Mr. N. Murray.

A course of ten lectures on the Antiquities of Rome and especially on the recent work of Roman Archæologists, was.

delivered before the university, in one of the halls of the Peabody Institute, during the month of January, 1887, by Signor Rodolfo Lanciani, a Professor in the University of Rome, and a member of the Royal Archæological Commission.

The subjects of the lectures were as follows :

- I. The Foundation and Pre-historic Life of Rome.
- II. The Fora and Parks of Ancient Rome.
- III. The Public Libraries of Ancient and Mediaeval Rome.
- IV. The Tiber and Maritime Trade of Rome (quays, wharves, emporium, Ostia, *Portus Augusti*, treasures of the bed of the river).
- V. The Police and Garrison of Rome.
- VI. The Palace of the Cæsars.
- VII. The House of the Vestals.
- VIII. The House of the Vestals (continued).
- IX. The Bronze Statues of Rome, especially those lately discovered.
- X. The Campagna (aqueducts, etc.).

The other lectures during the year, that were open to the public, were given in Hopkins Hall, viz. :—a single lecture by the Rev. Mandell Creighton, LL. D., delegate from Emmanuel College, Cambridge, to the celebration at Harvard University,—Subject: The Rise of the European Universities; a single lecture by the distinguished naturalist, Alfred Russell Wallace, Esq., of London, on Island Life; and one on Recent Observations in Alaska, by Professor William Libbey, of Princeton. Professor J. H. Wright delivered three lectures on the Epochs of Greek Art; Professor Frothingham, of Princeton College, three lectures on Babylonian and Assyrian Art; and Dr. Cyrus Adler, one lecture on Assyriology in its relations to Biblical study. Dr. Jaméson, Associate in History, gave four lectures on the history of Historical Writings in America. Dr. Wood, Associate Professor in German, gave eight lectures on the Niebelungen Lied. Dr. Goebel, Instructor in German, eight lectures (in the German language) on the German Literature of the Nineteenth Century, and

Dr. Todd, Associate in Romance Languages, gave a series of weekly readings in the *Divina Commedia* of Dante, during the months of December, January, February and March. Dr. Hartwell gave two lectures on Physical Training. Dr. Welch, Professor of Pathology, gave a course of nine lectures on the Pathology of Fever to the medical men of Baltimore.

The publications which have appeared under the auspices of the university, during the last twelve months are as follows.

The *Journal of Mathematics* edited by Professor Newcomb and Associate Professor Craig has reached its tenth volume, and an index to its contents is in preparation. A portrait of Professor Sylvester, the originator of the journal and its editor from 1878 to 1884, has been given to subscribers, and a portrait of M. Hermite of Paris, one of the most distinguished contributors, is in preparation. The *Journal* continues to be the repository of original memoirs in the most advanced branches of pure mathematics. The *American Journal of Philology*, edited by Professor Gildersleeve, has nearly finished its eighth volume, and the *American Journal of Chemistry*, edited by Professor Remsen, has completed its ninth volume. Of the *Biological Studies* edited by Professor Martin and Dr. Brooks, the third volume has been completed within the year, and two numbers of volume four have been issued. The papers in *Historical and Political Science* have appeared at frequent intervals under the direction of Professor Adams. The fifth series is nearly completed, and the sixth volume almost prepared for publication. Several numbers of the first and second series have been reprinted. Three extra volumes have been published,—including a study of the Republic of New Haven (1638-1887), by Dr. C. H. Levermore; a his-

tory of the municipal development of Philadelphia (1681-1887), by Messrs. W. P. Allinson and Boies Penrose; and a narrative of the events in Baltimore, April 19, 1861, by Hon. George Wm. Brown.

The sixth volume of the Johns Hopkins University Circulars, making a quarto volume of one hundred and thirty-three pages, and giving current details in respect to the progress of the work of the university in all its departments, was completed in August, 1887.

The Modern Language Notes, which are published by the managing editor, Professor Elliott, and to which the university has not given any stipend, have reached the conclusion of the second volume, each volume having eight numbers.

The American Journal of Psychology, under the control of Professor G. Stanley Hall, begins the first volume in November, 1887. According to his announcement the Journal will contain:

I. Original contributions of a scientific character. These will consist partly of experimental investigations on the functions of the senses and brain, physiological time, psychophysic law, images and their association, volition, innervation, etc.; and partly of inductive studies of instinct in animals, psycho-genesis in children, and the large fields of morbid and anthropological psychology, not excluding hypnotism, and the field vaguely designated as that of psychic research; and lastly, the finer anatomy of the senses and the central nervous system, especially as developed by the latest methods of staining, section, etc.

II. Papers from other journals. Articles of unusual importance will be translated from other languages, or even reprinted from other publications, in full or in abstract, if not generally accessible.

III. Digests and reviews. An attempt will be made in each number to give a conspectus of the more important psychological literature of the preceding three months, and to review significant books, bad as well as good.

While articles of unusual importance in the field of logic, the history of philosophy, practical ethics and education will be welcomed, the main object of the Journal will be to record the progress of scientific psychology, and special prominence will be given to methods of research.

Among the readers whose studies the editor will bear in mind are these: teachers of psychology in higher institutions of learning; biologists and

physiologists; anthropologists who are interested in primitive manifestations of psychological laws; and physicians who give special attention to mental and nervous diseases. The advancement of the science will be constantly kept in view, and the journal will be a record of the progress of investigations.

The journal will also contain many digests and critiques of current psychological literature, both books and articles.

It will thus be seen that the object of the journal is to record the psychological work of a scientific, as distinct from a speculative character, which has been so widely scattered as to be largely inaccessible save to a very few, and often to be overlooked by them. Several departments of science, sometimes so distinct from each other that their contributions are not mutually known, have touched and enriched psychology, bringing to it their best methods and their ripest insights. It is from this circumstance that the vast progress made in this department of late years is so little realized, and the field for such a journal, although new, is already so large.

A fac-simile of the famous Bryennios manuscript of the Teaching of the Apostles is about to be printed under the editorial care of Professor J. Rendel Harris, now of Haverford College. It will include ten autotype plates, and one hundred and ten quarto pages of text and commentary. The circumstances which have led to this publication have thus been described in a note to be prefixed to the volume:

In behalf of the Johns Hopkins University under whose auspices the following pages appear, a few words of acknowledgment are due to those who have contributed to the publication.

In common with the world of scholars we owe our thanks first to Bishop BRYENNIOS, Metropolitan of Nicomedia, the discoverer of the manuscript, and the original editor of the printed text, which was published in 1883.

In September, 1884, the Rev. C. R. Hale, D. D., then of Baltimore, and now Dean of the Cathedral at Davenport, Iowa, addressed a letter to the President of the University, proposing to visit Constantinople and to make an effort while there to secure for publication photographic copies of the pages of the *Didache*. An official letter was accordingly sent to him authorizing him thus to act as our representative. He also carried with him letters of introduction to the Patriarch of Jerusalem from the Patriarch of Alexandria and from the Secretary of the Holy Synod of Russia. Upon reaching Constantinople he was taken by the Librarian of the *Hellenic Philological Syllagos* to see the library of the most Holy Sepulchre, attached to the residence of the Patriarch, where the *Didache* was then kept, and after some hesitation, the Archimandrite in charge permitted him to take pho-

tographs of three pages of the so-called Bryennios manuscript. Reproductions of these pages were published in Baltimore in March, 1885, under the editorial supervision of Mr. J. Rendel Harris, at that time holding among us the chair of New Testament Greek and Palæography.

A little later Dr. Hale wrote us from Jerusalem that he had seen the Patriarch, who consented that photographs of the entire work should be taken for publication in Baltimore. It had been already determined by His Blessedness to bring the manuscript from Constantinople to Jerusalem, and consequently it was evident that there would be some delay in the fulfilment of his promise. But early in 1887, after the manuscript had been received in Jerusalem, the United States Consul in that city, Henry Gillman, Esq., who had been hospitably received by the Patriarch, was authorized by him to proceed with the undertaking. The photographs were accordingly made, and as soon as they were received in Baltimore were placed in the hands of Professor Harris, the result of whose critical studies is now submitted to scholars.

Grateful acknowledgments are therefore due to His Blessedness, NICODEMUS, Patriarch of Jerusalem, for the enlightened spirit which led him to grant our request and enable us to give to the world an exact reproduction of this valuable manuscript; to the Rev. Dr. HALE for the original suggestion of this publication and for a personal presentation of our request to the Patriarch; to the United States Consul in Jerusalem, HENRY GILLMAN, Esq., for his careful supervision of the photographic work, and for the skill and courtesy with which he carried on all the later negotiations; and to the Editor, Professor HARRIS of Haverford College, for his care in bringing out this volume.

Dr. W. H. Browne, Librarian of the University, has prepared for his classes in the History of English Literature a volume of selections from the Early Scotch Poets (fifteenth and sixteenth centuries), with a glossary,—the texts having hitherto been virtually inaccessible to the ordinary student of literature. The pages were printed by the papyrograph process.

For the use of students in the Chemical Laboratory Dr. Renouf has translated and printed, at the request of Professor Remsen, the notes of Professors Volhard and Zimmermann, on Experiments in General Chemistry, and Introduction to Chemical Analysis.

A description of the photograph of the Normal Solar Spectrum, prepared by Professor Rowland, is given in the *University Circulars*, Nos. 45, and 46.

Three morphological memoirs by Dr. W. K. Brooks and one by Dr. E. B. Wilson, previously printed, have been collected and published in a quarto volume, entitled *Selected Morphological Monographs: Vol. I.* The titles of the papers are these:

1. Lucifer: a Study in Morphology,—with eleven plates.
2. The Development of Renilla,—with sixteen plates.
3. The Life-history of the Hydro-Medusae: a discussion of the origin of the medusae and of the significance of metagenesis,—with eight plates.
4. Report on the Stomatopoda,—with fifteen plates.

Under the editorial direction of Associate Professor Brooks, the thesis presented by Dr. Adam T. Bruce for the Doctor's degree has lately been prepared for publication. It contains fifty pages and seven plates, and is issued, as a memorial volume, by his friends in Princeton and Baltimore.

A second edition, with additions and emendations, of the excursion map of Baltimore and its Neighborhood has been issued.

A guide to the mineral localities of the Baltimore region has been prepared by Dr. G. H. Williams, and published in a small pamphlet of which an account is given in the *University Circulars* for August, 1887.

Dr. Adam T. Bruce, Instructor in Osteology and Mammalian Anatomy, died on the 9th of February, 1887. He had begun a journey around the world in the hope of recovering his health, and had gone as far as Egypt when he succumbed to an attack of fever. Dr. Bruce graduated in Princeton as Bachelor of Arts in 1881, and remained there two years as a graduate student and instructor. In 1883 he was elected a Fellow of this university, and appointed a Fellow by Courtesy in 1885. He received the degree of Doctor of Philosophy in June, 1886, and was at once appointed an

instructor in the subjects to which he had given special attention. He left an important monograph on the "Germ Layers of Insects and Arachnids," to which reference is made above.

Not long after his death, his mother, Mrs. A. T. Bruce, of New York, presented to the Trustees of the Johns Hopkins University the sum of ten thousand dollars (\$10,000), for the purpose of founding a Fellowship in Biology, to perpetuate the memory of her son. The donor expressed a wish that in the bestowal of the Fellowship, preference should be given to students in Morphology, and that the candidates should be those who have already held Fellowships in the university. The gift was gratefully accepted by the Trustees, and an appointment to the Fellowship will be made in 1888.

The following additions have been made to the Academic Staff.

To the position which was vacated by the death of Professor Morris, Professor John H. Wright was called from Dartmouth College, and he entered upon his duties at the beginning of the last year, when he delivered an address (Oct., 1886) on "The College in the University and Classical Philology in the College." Not long afterwards he was invited to Harvard College and accepted the invitation, offering his resignation to the Trustees of this university in January, 1887. He remained in service until the close of the academic year.

Dr. Richard T. Ely, Associate in Political Economy, has been made Associate Professor, and Dr. H. H. Donaldson, a former Assistant in the Biological Department, has been appointed an Associate in Psychology.

The persons below named have been appointed special instructors for the ensuing year: in the Shemitic Languages,

Cyrus Adler, Ph. D., lately a Fellow ; in Palæontology, William B. Clark, Ph. D. (Munich, 1887) ; in Physics, Henry Crew, Ph. D., lately a Fellow ; in Osteology, E. A. Andrews, Ph. D., lately a Fellow ; in Pathology, B. M. Bolton, M. D. ; in English, F. G. Hubbard, Ph. D., lately a Fellow.

The gentlemen below named have been designated as Readers for the current year in the subjects named : in Social Statistics, E. R. L. Gould, Ph. D., now attached to the Bureau of Labor, Washington ; in Administration, Woodrow Wilson, Ph. D., Associate Professor in Bryn Mawr College ; in Greek Literature, H. W. Smyth, Ph. D. ; and in Greek Archæology, with special reference to the History and Topography of Athens, Dr. J. R. Wheeler, late of the American School at Athens.

The various societies to which reference has been made in former years continue to be important auxiliaries in the work of the University. Abstracts of some of the principal papers submitted to them have been printed in the *University Circulars*.

In conclusion, I have only to add that in reviewing the year, I see no diminution in the zeal or fidelity with which the work of the University has been carried on. Year by year our responsibilities and our opportunities are enlarged ; and year by year we have the encouragement of seeing the young men who are here trained go forward to stations of usefulness and honor. For the constant support of my colleagues in the academic staff, and for the consideration of the Trustees, I am personally most grateful. To their hearty coöperation during the past twelve years the University owes its position in the community of science and letters.

D. C. GILMAN.

BALTIMORE, December 5, 1887.

## APPENDIX.

### A. REPORT OF THE CHESAPEAKE ZOOLOGICAL LABORATORY.

SESSION OF 1887.

*To the President of the Johns Hopkins University:*

*Sir:*—In accordance with your request I have the honor to submit the following report of the tenth session of the Marine Laboratory of the Johns Hopkins University.

The laboratory was in session under my direction in two dwelling houses which were rented for the purpose, on the Island of New Providence, about three miles from the town of Nassau, from March 1 to July 1, and it was occupied for a month longer by several members of the party. This consisted in all of twelve persons, eight of whom were advanced investigators under my guidance, while four were younger men who accompanied Dr. Dolley of the University of Pennsylvania and pursued more elementary studies under his direction.

The list of members is as follows:

W. K. BROOKS, Ph. D., *Associate Professor of Morphology, J. H. U., Director.*  
Julius Nelson, S. B., *Fellow by Courtesy, J. H. U.*  
H. V. Wilson, A. B., *Fellow, J. H. U.*  
H. T. L. Fernald, S. B., *Graduate Student, J. H. U.*  
F. H. Herrick, A. B., *Graduate Student, J. H. U.*  
A. H. Jennings, Baltimore.  
J. P. McMurrich, Ph. D., *Professor of Zoology, Haverford College, Pennsylvania.*  
C. S. Dolley, M. D., *Instructor in Biology, University of Pennsylvania.*  
M. J. Greenman,  
A. L. Lamb, *J. H. U.,*  
E. P. Marshall, Jr.,  
C. F. Nassau,

} *Members of Dr. Dolley's party.*

Among the scientific results of our season's work the following may be mentioned.

The growth of the coral polyp from the egg, the history of its development, and of the early stages in the deposition of the calcareous skeleton, is a subject which is almost untouched, and a residence on a coral island awakened in us all a desire to accomplish something in this field.

Mr. H. V. Wilson has succeeded perfectly in doing so, and has given, for the first time, a complete history of the growth of a coral polyp. Very soon after he reached Nassau he obtained an abundant supply of eggs from a small species of coral which occurred in abundance close to the laboratory. Subsequent examination showed that this is the only species which is in reproductive activity during the months which we spent at Nassau, and also that he had barely caught this species just at the end of its season of reproduction.

The eggs and embryos lived and prospered in aquaria, however, and he succeeded in rearing them and spent the season in studying and drawing the various stages, and in preparing specimens for more exhaustive study by means of sections. He has spent the last five months in working upon the material which he brought home, and his work is now finished and ready for publication, so far as this is possible while the method of publication is undecided.

An abstract, which is now in press, will appear in the next *University Circular*, and I hope that his illustrated memoir will be published some time this year. One of his most interesting results relates to the origin of the mesenteric filaments.

The work which Dr. E. B. Wilson carried on some years ago at Beaufort, and afterwards at Naples, showed that two of the filaments of the Alcyonarian polyps are ectodermal in their origin, and Mr. H. V. Wilson shows that this is true of all the filaments of the coral polyps.

Most of my own time was spent in adding to my notes on the Medusae of our southern coast, upon which I have been engaged for about five years. I found the vicinity of Nassau by far the richest field which I have ever visited, for while the number of species is not very great, nearly all of them are either new to science or else very imperfectly known. This is in part due to the fact that the marine fauna of the West Indies is almost entirely a new field, which has been skimmed by collectors but never carefully studied; but chiefly to the fact that Nassau is almost the only place on our coast south of New England, which presents the proper conditions for this work. There is no other spot where the student can work upon land within reach of the deep water. At Nassau water half a mile deep is found within three miles, and it is therefore possible to bring these delicate organisms to the laboratory alive, and to rear them and trace them through their various changes.

Our knowledge of the oceanic medusae is almost entirely due to the researches which Haeckel has carried on for many years at the Canary Islands, Ceylon, and other favorable places in the old world. What little knowledge we have of those which inhabit our side of the Atlantic consists almost entirely of fragmentary notes which have been made from time to time upon chance specimens.

Most of the Nassau forms are new to science; many of them are the types of new genera, and others furnish the material for the thorough study of forms which have been described from solitary and mutilated specimens. I

was able to study several stages in the life of all the most interesting species, and in addition to their novelty they present many features of general scientific interest, and throw light upon obscure problems. For example, one medusa, found in abundance at Nassau, is a new *Oceania*, which produces hydras by budding, and thus furnishes an exception to what has always been regarded as a fundamental law of reproduction. Larvae which bud off other larvae, and larvae which bud off adults, and adults which bud off adults, are all common enough, but animals which are produced by asexual processes, have never been known to pass through any stage of development which has already been passed by the parent organism. The asexual children start at the stage of development which the parent has reached, and complete only so much of the life history as lies before the parent. This is so generally true that it has been regarded as a general law of reproduction, and the *Nassau Oceania* is the only known exception. In this species the hydroid colony increases asexually and buds off new hydranths, and also blastostyles or specialized hydranths. Each blastostyle produces medusa buds which are, at first, inclosed with the blastostyle in a chitinous gonotheca, from which the medusae ultimately escape into the water. There soon grow out from each of the four reproductive organs of the free medusae, four tubular processes, two on each side, at the points where the reproductive organ passes into the unspecialized radial canal. These processes become inclosed in sheaths of perisarc, and soon become converted into mouthless hydras, or blastostyles, each inclosed in a gonotheca, which, except for the absence of annulations, is similar to that of the hydroid colony. Medusa buds now appear upon the blastostyle, increase in size, and ultimately escape from the gonotheca into the water. I am now preparing for the *Studies* from the Biological Laboratory an illustrated account of this remarkable life history.

The fauna of Nassau is equally rich in other groups of animals. Professor McMurrich, who has spent two seasons in studying the sea anemones of Beaufort, continued this work at Nassau, and he informs me that, of the nineteen species which he obtained there, eighteen were new to science.

Mr. Herrick has been engaged for three years in completing a line of research which I began several years ago at Beaufort; the exhaustive study of the embryology, anatomy, systematic zoölogy and habits of the crustacean genus, *Alpheus*; and he has found these animals in unexampled abundance and variety at Nassau. Before his visits to the Bahama Islands only fourteen species of the genus had been described from North America, and of these only four or possibly five occur on our Atlantic coast, and before we undertook the work nothing whatever was known about any of them except the very little which can be learned from museum specimens. Mr. Herrick has traced the entire life history of fourteen species of which eight or nine are new to science, as is all his work on their embryology, metamorphoses, and habits.

The genus is one of the most abundant and characteristic representatives of the fauna of coral islands, and on the margin of the little bay in front of

our laboratory at Nassau, he found nearly as many species as had previously been known from the whole North American continent. As abstracts of some of the more interesting points are now in press, and are to be published in the next *University Circular*, it is unnecessary to give a detailed account of this long and exhaustive research, which has occupied us for four years; but one or two points are especially noteworthy. The early stages in the life of two related species are usually more alike than their adult forms, and embryology is therefore the best index of systematic affinity, but I pointed out in 1882 that this does not hold true of the two species of *Alpheus* which are found at Beaufort, for one hatches from the egg in a form which is quite different from the adult, and passes through a long metamorphosis. This metamorphosis is absent, or nearly so, in the other species, which hatches essentially like the adult. Mr. Herrick has found a third species, with the metamorphosis still more abridged, and he has shown that the abridgment is an adaptation to a parasitic life. The species with a complete metamorphosis is non-parasitic; the one with it completely absent, completely parasitic, and the one with it abridged, semi-parasitic. The young of an ordinary crustacean lives under conditions which are unlike those of its adult life; its larval stages adapt it for its larval life, and its adult form fits it for its adult life. In the case of the parasitic species of *Alpheus*, however, the young, immediately after birth, are placed under exactly the same conditions, and have the same wants, habits, and surroundings as their parents. It is therefore advantageous to them to drop their metamorphosis and to assume their final form as quickly as possible.

Another interesting point which has been made out by Mr. Herrick is that the parasitic species present remarkable color-variations which are adaptations to their mode of life. The monograph on the genus *Alpheus* has occupied us for four years, and it is therefore a pleasure to state that it is now completed, so far as the actual research is concerned, and that the preparation of the plates will be commenced as soon as the manner in which they are to be engraved and published is decided.

At Green Turtle Key, a year ago, we were so fortunate as to obtain, by an odd chance, an abundant supply of the eggs of *Anolis*. The children of the island occasionally brought to us for sale little eggs, like birds' eggs, but hardly larger than large shot. We found on examination that they were the eggs of a little lizard, *Anolis*, and upon questioning the children, learned that they obtained them from the shell-heaps upon the beach. The common conch is an important part of the food of the natives, and there were hundreds of tons of the broken spiral shells of these molluscs lying in heaps in all parts of the island. The lizards resort to these shell heaps to lay their eggs, and when the shells are rotated like Archimedian screws, the eggs can be rolled out, and in this way we obtained an ample supply of them. At my suggestion Dr. Orr devoted himself to the task of studying and preserving them, and as he was not able to return to Baltimore he has spent the past year in completing this research at Princeton. This is now

announced as in press for the next number of the *American Journal of Morphology*.

While at Nassau I learned that a few traces of the aboriginal inhabitants of the Bahama Islands, the extinct race of Lucayan Indians, still exist, and as these remains are rapidly disappearing, and have never attracted the attention of students, I devoted part of my time to the collection and study of the remains of the skeletons of these people, who were not only the first to welcome the white man to the new world, but also the first to feel his destructive influence, for the whole population, estimated by the Spaniards 400,000, was completely exterminated less than ten years after the discovery.

I obtained notes and drawings of all the skulls which have been preserved, and I also obtained one perfect cranium and fragments of several skeletons which I brought home with me, to be deposited in one of our great collections of American skulls. Since my return I have been occupied in studying this material and an illustrated monograph upon the race characteristics of the Lucayans is now in the hands of the printer.

One of our most interesting discoveries this summer was a bunch of the eggs of some gigantic deep water Cephalopod, which was cast by a storm on to the beach in front of the laboratory. It is very similar to the one which Grenacher found floating at the surface of the ocean at Gibraltar. From it he obtained the material for his well-known monograph on the embryology of Cephalopods, and our specimen, like his, was especially favorable for embryological work on account of the small size of the food yolk. Mr. Fernald therefore made a series of drawings of the successive stages in the development of the eggs and embryos, which we kept alive in aquaria, and he also prepared a series of specimens for further research by means of sections. These have already yielded valuable results, for Mr. Watase, who is studying the germ layers of the common squid, finds that they clear up certain obscure points, regarding which the evidence from the squid's egg is much less intelligible. An abstract of Mr. Watase's work is to appear in the next *University Circular*, and his complete paper is now ready for publication and will soon appear in the *Studies from the Biological Laboratory*.

The success of our work at Nassau was due in great part to the kindly interest of the residents of the town, and our thanks are especially due to His Excellency Governor H. A. Blake, and to Mrs. Blake, both of whom are cultivated naturalists and well-known contributors to the scientific journals. They exerted themselves in every way to render our residence at Nassau pleasant to us; they kindly invited to their own house, one member of our party who was suffering from the effects of the climate; and their aid in the prosecution of our scientific studies was invaluable to us.

Yours Respectfully,

W. K. BROOKS.

BALTIMORE, December, 1887.

B. GIFTS TO THE LIBRARY FROM SEPTEMBER 1,  
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Issued, February 22, 1888.

THIRTEENTH

ANNUAL REPORT

OF THE PRESIDENT OF THE

JOHNS HOPKINS UNIVERSITY

Baltimore, Maryland

1888



## ACADEMIC STAFF, 1887-88.

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J. J. Sylvester, F. R. S., D. C. L., . . . . .	<i>Professor (Emeritus) of Mathematics.</i>
Basil L. Gildersleeve, Ph. D., LL. D., . . . . .	<i>Professor of Greek.</i>
G. Stanley Hall, Ph. D., LL. D., . . . . .	<i>Professor of Psychology and Pedagogics.</i>
Paul Haupt, Ph. D., . . . . .	<i>Professor of the Semitic Languages.</i>
H. Newell Martin, Dr. Sc., A. M., M. D., . . . . .	<i>Professor of Biology.</i>
Simon Newcomb, Ph. D., LL. D., . . . . .	<i>Professor of Mathematics and Astronomy.</i>
Ira Remsen, M. D., Ph. D., . . . . .	<i>Professor of Chemistry.</i>
Henry A. Rowland, Ph. D., . . . . .	<i>Professor of Physics.</i>
William H. Welch, M. D., . . . . .	<i>Professor of Pathology.</i>
John S. Billings, M. D., LL. D., . . . . .	<i>Lecturer on Municipal Hygiene.</i>
Herbert B. Adams, Ph. D., . . . . .	<i>Associate Professor of History.</i>
Maurice Bloomfield, Ph. D., . . . . .	<i>Associate Professor of Sanskrit.</i>
William K. Brooks, Ph. D., . . . . .	<i>Associate Professor of Morphology.</i>
William T. Councilman, M. D., . . . . .	<i>Associate Professor of Anatomy.</i>
Thomas Craig, Ph. D., . . . . .	<i>Associate Professor of Applied Mathematics.</i>
A. Marshall Elliott, Ph. D., . . . . .	<i>Associate Professor of the Romance Languages.</i>
Richard T. Ely, Ph. D., . . . . .	<i>Associate Professor of Political Economy.</i>
George H. Emmott, A. M., . . . . .	<i>Associate Professor of Logic and Ethics, etc.</i>
Harmon N. Morse, Ph. D., . . . . .	<i>Associate Professor of Chemistry.</i>
William E. Story, Ph. D., . . . . .	<i>Associate Professor of Mathematics.</i>
Minton Warren, Ph. D., . . . . .	<i>Associate Professor of Latin.</i>
George H. Williams, Ph. D., . . . . .	<i>Associate Professor of Inorganic Geology.</i>
Henry Wood, Ph. D., . . . . .	<i>Associate Professor of German.</i>
William Hand Browne, M. D., . . . . .	<i>Librarian and Associate in English.</i>
Henry H. Donaldson, Ph. D., . . . . .	<i>Associate in Psychology.</i>
Louis Duncan, Ph. D., . . . . .	<i>Associate in Electricity.</i>
Fabian Franklin, Ph. D., . . . . .	<i>Associate in Mathematics.</i>
Edward M. Hartwell, M. D., Ph. D., . . . . .	<i>Associate in Physical Training.</i>
William H. Howell, Ph. D., . . . . .	<i>Associate in Biology.</i>
J. Franklin Jameson, Ph. D., . . . . .	<i>Associate in History.</i>
Arthur L. Kimball, Ph. D., . . . . .	<i>Associate in Physics.</i>
Edward Renouf, Ph. D., . . . . .	<i>Associate in Chemistry.</i>
Edward H. Spieker, Ph. D., . . . . .	<i>Associate in Latin and Greek.</i>
Henry A. Todd, Ph. D., . . . . .	<i>Associate in Romance Languages.</i>
Philip R. Uhler, . . . . .	<i>Associate in Natural History.</i>
Cyrus Adler, Ph. D., . . . . .	<i>Instructor in the Semitic Languages.</i>
Ethan A. Andrews, Ph. D., . . . . .	<i>Instructor in Osteology.</i>
Bolling W. Barton, M. D., . . . . .	<i>Instructor in Botany.</i>
B. Meade Bolton, M. D., . . . . .	<i>Assistant in Pathology.</i>
James W. Bright, Ph. D., . . . . .	<i>Instructor in English.</i>
William B. Clark, Ph. D., . . . . .	<i>Instructor in Palaeontology.</i>
Henry Crew, Ph. D., . . . . .	<i>Assistant in Physics.</i>
Julius Goebel, Ph. D., . . . . .	<i>Instructor in German.</i>
Marion D. Learned, Ph. D., . . . . .	<i>Instructor in German.</i>
Gustav A. Liebig, Jr., Ph. D., . . . . .	<i>Assistant in Electricity.</i>
Charles L. Reese, Ph. D., . . . . .	<i>Assistant in Chemistry.</i>
Frederick M. Warren, Ph. D., . . . . .	<i>Instructor in French.</i>
Hugh Newell, . . . . .	<i>Instructor in Drawing.</i>
Charles L. Woodworth, Jr., . . . . .	<i>Instructor in Elocution.</i>
Elgin R. L. Gould, Ph. D., . . . . .	<i>Reader in Social Statistics.</i>
Herbert Weir Smyth, Ph. D., . . . . .	<i>Reader in Greek Literature.</i>
Woodrow Wilson, Ph. D., . . . . .	<i>Reader in Administration.</i>
James R. Wheeler, Ph. D., . . . . .	<i>Reader in Archaeology.</i>

THIRTEENTH  
ANNUAL REPORT

OF THE PRESIDENT OF THE

Johns Hopkins University

Baltimore, Maryland

1888



BALTIMORE  
PUBLICATION AGENCY OF THE JOHNS HOPKINS UNIVERSITY

1888

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# REPORT.

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TO THE TRUSTEES OF THE JOHNS HOPKINS UNIVERSITY:—

*Gentlemen:*

I have the honor to present my thirteenth annual report, which covers the academic year between the first of September, 1887, and the first of September, 1888.

To the series of academic celebrations referred to in my last report may now be added one still more noteworthy which took place in the University of Bologna on the eleventh, twelfth, and thirteenth of June, 1888, when the eight hundredth anniversary of its foundation was commemorated. In response to an invitation addressed to the authorities of this university, the Hon. Eugene Schuyler, LL. D., was requested to act as our delegate to the festivities and to present a letter of congratulation sent out in the name of our academic senate. He accepted the appointment, attended the celebration, and has made an official report of his visit, which will be read in one of our assemblies, and placed in our archives.

In reviewing the last year, which is the twelfth year of actual work, I think it will appear that the instruction here given has never been more quickening and successful, and that the progress of literary and scientific undertakings, in charge of the principal teachers, has never been more satisfactory. The *Circulars*, of which eight numbers have been printed during the year, have recorded the principal events of the session, and have given some intimation of the progress of research among us. Statements prepared by the leading instructors and designed to exhibit the methods they have

followed in the various departments of study, will be appended to this report. To these sources of information reference should be made by those who wish to understand the details of our work, or to observe the spirit which prevails in the class-rooms, the libraries, and the laboratories of the university. I shall only call attention to those general considerations which may be of interest to all our associates, and also to the public, especially to such persons as are concerned in the higher education of this country.

We continue to adhere to a definition which is hallowed by age, and confirmed by experience, that a university is a body of teachers and scholars, *universitas magistrorum et discipulorum*,—a corporation maintained for the conservation and advancement of knowledge, in which those who have been thoroughly prepared for higher studies are encouraged to continue, under competent professors, their intellectual advancement in many branches of science and literature. In this society, we recognize two important grades, (a) the collegiate students, who are aspirants for the diploma of Bachelor of Arts, to which they look forward as a certificate that they have completed a liberal course of preliminary study,—and (b) the university students, including the few who may be candidates for a higher diploma, that of Doctor or Master (a certificate that they have made special attainments in certain branches of knowledge), and a larger number who, without any reference to a degree, are simply continuing their studies for varying periods. Corresponding to the wants of these two classes of students, we have two methods of instruction, the rule of the college, which provides discipline, drill, training, in appointed tasks, for definite periods; and the rule of the university, the note of which is opportunity, freedom, encouragement, and guidance in more difficult studies, inquiries, and pursuits. Thus far our organization has maintained but one faculty, the faculty of philoso-

phy or the liberal arts,—although there is an important nucleus of a department of medicine.

The academic staff included during the year fifty-seven teachers, one of whom was a non-resident lecturer. The number of students enrolled during the year was four hundred and twenty, of whom one hundred and ninety-nine were residents of Maryland, and one hundred and ninety-six came here from thirty-six other States of the Union, and twenty-five from foreign countries. Among the students were two hundred and thirty-one already graduated, coming from ninety-three colleges and universities; there were one hundred and twenty-seven matriculates (or candidates for the degree of Bachelor of Arts); and there were sixty-two admitted as special students, to pursue courses of study for which they seemed fitted, without reference to graduation. The attendance upon the public lectures averaged one hundred and ninety-two. The degree of Bachelor of Arts was conferred upon thirty-four candidates; and twenty-seven candidates were promoted to the degree of Doctor of Philosophy.

The following table indicates the enrolment of students in each year since the University was opened in the autumn of 1876:—

	Total Enrolled.	Matriculates.	Non-Matriculates.	Graduates, (incl. Fellows.)	Average Attendance at Public Lectures.
1876-77	89	12	23	54	60
1877-78	104	24	22	58	84
1878-79	123	25	35	63	96
1879-80	159	32	48	79	113
1880-81	176	37	37	102	186
1881-82	175	45	31	99	137
1882-83	204	49	30	125	148
1883-84	249	53	37	159	122
1884-85	290	69	47	174	212
1885-86	314	96	34	184	115
1886-87	378	108	42	228	165
1887-88	420	127	62	231	192

The attendance upon the courses given in some of the principal subjects has been as follows during the last five years :

	1883-84.	1884-85.	1885-86.	1886-87.	1887-88.
Mathematics and Astronomy, . . . . .	37	75	53	76	84
Physics, . . . . .	56	80	57	73	85
Chemistry, . . . . .	51	76	94	118	119
Mineralogy and Geology, . . . . .		41	62	24	25
Biology, . . . . .	47	44	51	65	61
Pathology, . . . . .				25	15
Greek, . . . . .	41	41	43	48	61
Latin, . . . . .	48	64	75	72	74
Sanskrit, etc., . . . . .	10	25	37	37	40
Shemitic Languages, . . . . .	13	13	16	14	18
German, . . . . .	63	107	116	113	130
French, Italian, etc., . . . . .	31	63	64	60	72
English, etc., . . . . .	50	68	56	90	84
History and Political Science, . . . . .	88	109	100	135	137
Psychology, Ethics, etc., . . . . .	28	44	82	65	81

During twelve years, twelve hundred and sixty-nine individuals have been enrolled as students, of whom five hundred and seventy have come from Maryland (including four hundred and forty-eight from Baltimore), and six hundred and ninety-nine from fifty other states and countries. Of this number seven hundred and thirty-three persons pursued courses as graduate students, and five hundred and thirty-six as collegiate students.

Since degrees were first conferred, in 1878, one hundred and seventy-seven persons have attained the Baccalaureate degree, and one hundred and thirty-one have been advanced to the degree of Doctor of Philosophy, as appears from the following table :—

	A. B.	PH. D.		A. B.	PH. D.
1877-78		4	1883-84	23	15
1878-79	3	6	1884-85	9	13
1879-80	16	5	1885-86	31	17
1880-81	12	9	1886-87	24	20
1881-82	15	9	1887-88	34	27
1882-83	10	6			

In the following pages, emphasis will be laid on those parts of our work which are of widest interest, especially on the investigations and publications which have been encouraged, and the opportunities afforded for the education of advanced students in science and literature. The trustees and the faculty of an institution like this, need frequently to recur to general principles, ask themselves what they have undertaken to do, and carefully weigh the results of their labors. Accordingly, a brief restatement of some of the considerations by which we have been influenced, may introduce the record of the year. Far more important than the formal lectures and recitations of a university are the intellectual influences which it affords,—the attractions of its libraries and laboratories; the spirit which animates the professors; the conditions upon which degrees, fellowships, and other academic honors are bestowed; the connection existing between the studies of the place and the studies that are in progress in other seats of learning; and the prospects which are open to young men of character and scholarship at the end of their courses. The university which imparts to a large number of students good impulses, disciplines them with thorough training, encourages them with judicious counsel, and upholds before them lofty ideals, becomes an agency of great power in the advancement

of the general welfare. It annually sends to every part of the land, into all the professions, into professorships, master-ships, and other leaderships, those who are likely to be centres of light and influence in their various states.

The opening of this university occurred in 1876, at a time when many careful writers were engaged in the study of the progress of the United States during the first hundred years of national life. Important articles, then published on the state of the arts and sciences in America, and on the condition of American education, were carefully considered by those who were engaged in planning the new institutions in Baltimore. Among such papers there was one entitled "Abstract Science in America," by Professor Newcomb, which indicated "the points of view from which our claims to be an intellectual nation look very slender indeed." The writer acknowledged the excellent quality of the work which was done by the leaders of American science while he lamented the want of encouragement to engage in such labors. He declared that "we are deficient in the number of men actively devoted to scientific research of the higher types, in public recognition of the labors of those who are so engaged, in the machinery for making the public acquainted with their labors and their wants, and in the preliminary means for publishing their researches." He continued to say—

"Each of these deficiencies is, to a certain extent, both cause and an effect of the others. The want of public recognition and appreciation is due partly to a want of system and organization, partly to the paucity of scientific publications. The paucity of research is largely due to the want of adequate reward in public estimation and recognition; while the paucity of scientific publications is due to the want of an adequate number of supporters. The supply of any one of these deficiencies would, to a certain extent, remedy all the others; and until one or more are so remedied, it is hopeless to expect any great improvement. In other intellectual nations, science has a fostering mother,—in Germany the universities, in France the government, in England the scientific societies; and if science could find one here, it would speedily flourish. The only one it can look to here

is the educated public; and if that public would find some way of expressing in a public and official manner its generous appreciation of the labors of American investigators, we should have the best entering wedge for supplying all the wants of our science.

"The other way in which help could be most effectively given at small expense is by the support of two or three first-class journals of exact science. We say exact science, because this is the department which is worst supplied in this respect; taking mathematics at one extreme and medicine at the other, we can pretty accurately gauge the exactness of each science by the difficulty its cultivators find in supporting journals devoted to it. It may seem like reducing our thesis to the ridiculous to say that our wants in this respect could be well supplied at a cost of five or six thousand dollars per annum, and that the future prospects of the mathematical sciences in this land depend very largely on their cultivators being able to command this annual sum for the purpose indicated."

In two of the particulars just mentioned—the encouragement of advanced studies and the publication of results,—this foundation has aimed to do its part. By precept and example, hundreds of young men have been trained in the methods of exact science and the habits of accurate investigators. Not a few of these students have been called into the scientific service of the government; many are engaged in laboratories, scientific and technical; more are employed as teachers in training up other young men. We can point to no result of our efforts which is so gratifying, and which so thoroughly repays the outlays of this foundation, as the corps of graduates who have gone out from among us to every part of the country, prepared to contribute to the progress of knowledge, and who are now rendering good service to science, literature, and education. By encouraging the publication of journals and monographs, this foundation has endeavored to supply another of the deficiencies referred to above. Five periodicals, devoted to mathematics, chemistry, biology, philology, and history, have been aided by the university chest, and three others devoted to archæology, psychology, and modern languages have been initiated on the personal responsibility of certain members of our academic staff.

I now proceed to consider the higher aspects of the work of the university, especially during the last session.

The subject of Mathematics has received among us a large amount of attention in the years gone by, as every one knows who remembers the seven years leadership of Professor Sylvester, the special courses given by Professor Cayley and Sir William Thomson, and the continued instruction of the mathematicians still associated with us. Every one that has an appreciation of the nature of mathematical thought or of its relation to the advancement of science, must rejoice that this has been so. Dr. Whewell once claimed that mathematics and civilization go forward hand in hand, and quite recently Lord Rayleigh, in reply to some contrary assertions, has said that although some mathematicians are unpractical, yet it is to mathematics one must go to find the results of known causes under new circumstances.

It has always been a surprise to me that so few Americans are interested in the new and advancing developments of this science, and that so large a number of those who are giving their lives to mathematical professorships prefer to walk in well-trodden paths without attempting to follow the higher flights of the leaders. Our number of mathematical students has never been large, but the teachers continue to offer varied advanced courses attractive to a superior class of students, and those who graduate in this subject are not often obliged to wait for a vocation. In addition to the usual number of mathematical lectures, stated in the appendix, there has been a noteworthy advance during the past year in the facilities for the study of Astronomy, theoretical and practical, and it is gratifying to notice that there has been a considerable increase in the number of students.

An observatory for instruction is now provided. Besides the telescope mentioned in the last report, the university has purchased a meridian circle (made by Messrs. Fauth & Co., of Washington) with collimators, mercury basin, and other appliances. Its telescope is of three inches aperture. The circle is divided to five minutes of arc and is read by two micrometer microscopes to single seconds. The collimators are of two inches aperture, and the whole instrument is to be so arranged that the student can make the delicate determinations of flexure, etc., which have to be considered in fundamental work with the largest and finest instruments. To receive this instrument, a special structure has been built adjacent to the physical laboratory. A class in practical and theoretical astronomy has been organized under the guidance of Professor Simon Newcomb, for many years connected with the Naval Observatory in Washington, and now Superintendent of the U. S. Nautical Almanac. During the coming year he will be assisted by Mr. Charles A. Borst, lately one of the astronomical observers of Hamilton College, who has received among us the appointment of a Fellow.

From these statements it is apparent that we are now provided with the most important of the astronomical apparatus suggested many years ago by Professor Newcomb, in one of his public lectures, as desirable for the practical instruction of astronomers. We have also the qualified teachers, and a company of students has begun the prescribed course. The further development of this department of study will be watched with great interest. Its distinctive character is its adaptation to the needs of young men, already proficient in mathematics, who need to be trained in the methods of astronomical inquiry, and who want easy and constant access to

suitable instruments, as they have in the laboratories of chemistry and physics.

One leading idea of the work is to associate with the technical study of the subject a greater breadth of culture than can readily be gained by the student whose attention is wholly occupied by practical work in the observatory or the field. It is therefore intended that all students taking the Doctor's degree in astronomy as their principal subject, shall have an understanding of the historic development of the science since its beginning, of the additions made to it by its leading cultivators, of the mathematical theories of the celestial motions, and of the practical use of the most important astronomical instruments.

The American Journal of Mathematics, of which Professor Newcomb is editor, and Associate Professor Craig, the assistant and managing editor, has completed its tenth volume, and an index of the contents of the entire series has been prepared for publication. In commemoration of the services of Professor Sylvester, to whom the foundation and early renown of this journal is chiefly due, his portrait has been placed in the last volume. The new series begins with a portrait of M. Hermite, the distinguished French mathematician, a valued collaborator for many years past. In the volume just concluded, the thirty-third lecture of Professor Sylvester (delivered in the University of Oxford and reported by Mr. J. Hammond) on the theory of reciprocants is printed, and there are contributions from Dr. Fabian Franklin, associate in mathematics, Dr. Oskar Bolza, reader in mathematics, Dr. David Barcroft, and Messrs. W. C. L. Gorton and C. H. Chapman, Fellows, as well as from distinguished mathematicians resident elsewhere. Eight of the contributors to the tenth volume are Americans; four reside in England; four in France; and one each in Canada, Italy and Germany.

The mathematical staff remains as it has been for several years past; Drs. Story, Craig and Franklin being associated with Professor Newcomb.

The new Physical Laboratory justifies the expectations which led to its construction, not merely in view of the increased facilities it affords for instruction, but also for the greater efficiency with which investigations are carried on.

During the past year, Professor Rowland has continued to devote much attention to the study of the solar spectrum, and the preparation of a new edition of his photographic map. The new ruling engine, which was completed a year ago, has been placed in the vault prepared for it,—where the temperature is equable,—and after months of laborious adjustments and connections, the machine has been so perfected that it rules gratings of the largest size surpassing in definition any that have been obtained before. Several concave gratings six inches in diameter, and with a radius of more than twenty-one feet, have been ruled with from ten to twenty thousand lines to the inch, and they have been mounted in a large room especially adapted to their service. It is chiefly due to the excellence of these gratings that the new photographic maps are so superior to the old. Something is due also to the constant attention Professor Rowland has given to photographic methods and to his skill in making dry plates, simple and orthochromatic. The result of this long and laborious preparation has been the production of a map, soon to be published, of the normal solar spectrum, extending from the extreme ultra violet (down to and including B,) to wave length 6950. The scale of the map is about three times that of Angström, and the scale of wave-lengths attached to the map is placed within one one-hundred-thousandth wave-length of its true position. The map when completed will consist of nine

plates, each three feet by two, and each containing two strips of the spectrum.

The director of the laboratory has been greatly favored in the prosecution of his work by the services of the associate professor in physics, Dr. Kimball, who has given for several years past the general course of instruction and has personally guided the laboratory work of the students.

The special course of instruction in electricity and magnetism has been in charge of Dr. Duncan, and it has been found to meet the wants of students who have an aptitude for both mathematical and experimental work. Four such persons, after a special course of study extending through two years, and after satisfactory final examinations received special certificates at Commencement.

With the unusual facilities now enjoyed by Professor Rowland, it is natural that his principal work during the past year has related to the nature of light. Under his guidance progress has been made in determining the absolute wave-length of light, and the relative wave lengths of lines in the ultra violet portion of the solar spectrum. The spectrum of hydrogen has been studied under various conditions of excitement and pressure, and the spectra of zinc, cadmium and magnesium have been studied photographically and the wave-lengths measured. So also various bands of the carbon spectrum from the electric arc have been investigated, an algebraic expression of the relation between their wave-lengths has been obtained, and the coincidence of the bright lines of the carbon spectrum with the dark lines of the solar spectrum has been verified. Additional measurements have been made on the displacement of lines in the solar spectrum due to the rotation of the sun.

Important work has also been going forward with respect

to electricity and magnetism. A determination has been made of the unit of electrical resistance by the method of Lorenz, and a study has been made of the electrical resistance of pure mercury with reference to the value of the mercury unit. The curves of electro-motive force and current in an alternating dynamo, under varying conditions, have been studied, and also the chemical changes in storage-battery cells and the behavior of different insulating substances under various conditions.

Arrangements have been matured for beginning in the autumn of 1888, the testing of electrical instruments and standards for other laboratories, scientific and industrial. This work, under the supervision of the chief instructors, will be entrusted to Dr. Liebig, a recent graduate in physics, who has shown himself well qualified for the responsibility. Correspondence between Dr. Duncan, associate in electricity, on one part, and the leading electric manufacturers and the professors of physics in different parts of the country, on the other, has indicated the need of such a bureau as is now established. Its actual utility will soon be demonstrated.

I am unwilling to pass on from this subject without endeavoring to arrest the attention of the trustees, and through them the attention of other persons who are observing the development of this university, to the fundamental character of the researches which are here carried on, and to their ultimate relation to the welfare of human society. Costly laboratories, expensive apparatus, numerous assistants, the means of publication, unquestionably call for a great deal of money; and those who are concerned with economical problems have a right to ask what results are to be seen after all this outlay. The answer can readily be given with respect to all departments of science, but just now it is particularly easy to justify

the expenses of a physical laboratory, because of the remarkable progress which is making throughout the world in the study of physical phenomena, and the discovery of principles hitherto vaguely perceived or entirely hidden.

Those who are watching the progress of science are well aware that the year 1888 is memorable for the new evidence which has been brought to the support of Maxwell's electromagnetic theory of light in the experimental discovery of long waves of electromagnetic induction moving through the ether with the velocity of light. The papers of Hertz, presented by Helmholtz to the Academy of Sciences in Berlin, and the discussions to which they have given rise in the recent meeting of the British Association, and in the scientific journals, are proofs of this remark.

This is not the place for more than an allusion to such investigations, but some reference to them seemed called for in order to show that there is constantly even now an advance. The conception of a Faraday, developed by the powerful analysis of a Maxwell, is submitted to the laborious tests of the laboratory; one after another agreements and coincidences are found, facts insignificant in themselves become weighty with importance when seen in their relation to others, and finally some far reaching result, like that of Hertz, compels belief and gives to the world a new truth as a part of its inestimable treasure of knowledge, enriching the intellectual life of all who come after.

Another illustration may be found in the address of Professor Langley at the Cleveland meeting of the American Association. Under the title of the "History of a Doctrine" (radiant energy) he has unfolded, in terms which are easily followed by "the non-mathematical reader" (and even by the "non-scientific"), the steps by which science has reached its

present stage and is still advancing in the discovery and interpretation of a fundamental truth.

In this progress the work of a laboratory is most important. The photographic maps of the sun spectrum and of the spectra of metals, and the measurement of the wave-lengths of light, among the labors that have engaged our own investigators, relate directly to fundamental questions in physics and chemistry.

The diffraction gratings devised by Professor Rowland are of prime importance in the prosecution of these studies of light. In all the principal laboratories of the world they are in demand, and consequently their manufacture is continued, although it requires a large amount of personal supervision from the Director. The measurement of the mechanical equivalent of heat is a fundamental factor in establishing the doctrine of the conservation of energy, and lies at the basis of the modern theory of the steam-engine. So also the solution of problems in electricity and magnetism, besides giving glimpses into a realm of nature still enshrouded with mystery, has a direct bearing on the welfare of the race, by advancing that knowledge which enables mankind to make the forces of nature obedient slaves.

My object in thus dwelling upon the returns which have come and are likely to come from large expenditures of intellectual force and of financial resources, is to invite attention to an opportunity for the endowment of "the ——— Institute of Physical Science" in the Johns Hopkins University. The admirable laboratory that has been built and well equipped, from the mechanic's shops in the basement to the telescope in the tower, is in itself an enormous and complex piece of apparatus for the prosecution of researches. Its staff of teachers and investigators are constantly looking to the

advancement of knowledge and maintaining a helpful attitude toward the practical applications of science. A serviceable way to keep up and extend the efficiency of this laboratory would be to provide it with a fund of its own,—to be perpetually and exclusively devoted to the advancement and diffusion of knowledge in this special domain. More than a hundred years ago an American citizen, well known as Count Rumford, established in this country and in England, large funds for the promotion of investigations in light and heat. The good accomplished by his gifts is incalculable and the lustre of his name increases as the years roll on. Who will follow his example?

If there are any friends of the university who are anxious to know what are the practical results of abstract science or of recondite and to them incomprehensible researches respecting energy, let them read these words of Professor Langley—"the doctrine of radiant energy is reaching out over nature in every direction and proving itself by the fact that through its aid, nature obeys us more and more;—proving itself by such material evidence as is found in the practical applications of the doctrine, in the triumphs of modern photography, in the electric lights in our streets, and in a thousand ways which I will not pause to enumerate;" or these words of Professor Fitzgerald\*—"Let us for a moment contemplate what is betokened by this theory that in electro-magnetic engines we are using as our mechanism the ether, the medium that fills all known space. It was a great step in human progress when man learnt to make material machines, when he used the elasticity of his bow and the rigidity of his arrow to provide food and defeat his enemies. It was a great advance

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\* Address at Bath (Eng.), September, 1888.

when he learnt to use the chemical action of fire ; when he learnt to use water to float his boats and air to drive them ; when he used artificial selection to provide himself with food and domestic animals. For two hundred years he has made heat his slave to drive his machinery. Fire, water, earth and air have long been his slaves, but it is only within the last few years that man has won the battle lost by the giants of old, has snatched the thunderbolt from Jove himself, and enslaved the all-pervading ether."

The work of the Chemical Laboratory having been well organized for a longer period than that in physics, calls for less comment at the present time. Professor Remsen continues to be the director, and Dr. Morse, the sub-director, and Dr. Renouf and several younger men are engaged as assistants and teachers. If increasing numbers are an indication of success, there is every reason to be gratified, for during the past year every available place in the laboratory has been occupied. Looking back four years we find the number of students more than double what it was in 1883-4. Of the total number enrolled in chemistry last year (119), forty-three were graduate students, and thirty-six of these were making chemistry their principal subject. The director is obliged to call attention to the necessity for an increase of accommodations, if this state of things continues. But numerical success is not the best test of any branch of university work. The readiness with which the young men who have here been taught are called to good positions, sometimes as teachers, and sometimes as chemists in technical occupations, is an endorsement more significant than any numerical statement. All the arrangements of the laboratory are adapted to those who desire to devote a long period of time to this study and those

who wish for short and special courses are not encouraged to come here. Three or four years of study is usually required of those who have had already such an undergraduate course as is here given, before they can proceed to the degree of Doctor of Philosophy.

The director of the laboratory continues to edit the American Chemical Journal, which has now nearly reached the conclusion of its tenth volume, and has taken its place among the chemical journals of the world, as the chief repository of what is accomplished in this country for the advancement of the science. In its pages appear the results of investigations which are carried on by American chemists, including the work of our own staff. Three of the dissertations presented last summer for the degree of Doctor of Philosophy have been prepared for publication, namely, by R. O. Graham, "on the conduct of some diazo-compounds towards alcohol," by J. H. Kastle, "on para-nitro-ortho-sulpho-benzoic acid and some of its derivatives," and by F. Lengfeld, "on the relative stability of the alkyl bromides." The following investigations have also been completed: on the atomic weight of zinc; method for the determination of boric acid; method for determining the composition of butter and milk, and those on the following subjects are well advanced: on some double salts of the halogens; on benzoic sulphinide; on sulphor-fluorescein; on chlor-benzoic sulphinide.

An interesting feature in the work of this laboratory is the annual delivery of a course of historical lectures by the teachers and more advanced students. During the past session, in addition to other papers, reviews, based upon original studies of their writings, were given in respect to the work of Dalton, Davy, Liebig, Gerhardt, Dumas, Stas, Graham, Kekulé, Würtz, and Kolbe.

The Geological work in progress at the University is in part petrographical, in part structural, and in part palaeontological in its nature.

The study of interesting chemical and microscopical problems relating to the alterations which certain minerals undergo in the earth's crust, commenced by Dr. Williams five years ago (in the black gabbros occurring west of Baltimore) and published as Bulletin No. 28 of the Geological Survey, has since that time been pursued in widely separated regions. One series of articles on analogous rocks occurring near Peekskill, N. Y. has already appeared, while an extended memoir on similar phenomena observed in the Lake Superior region is now passing through the press in Washington.

At the present time all the varied and complicated crystalline rocks of Maryland, occupying an area of two thousand square miles, are being mapped upon a scale of two inches to the mile. This work has been undertaken in connection with the U. S. Geological Survey and is under the direction of Dr. Williams. Chemical and microscopical studies of the rocks are carried on in connection with the field work.

Dr. W. B. Clark, who has been connected with the university during the past year, is engaged in original research in palaeontology. He has already visited the richly fossiliferous deposits of eastern Maryland and has collected a large fund of material hitherto but little known. He has at present undertaken a comparative study of the fossil forms occurring in all the eocene deposits of the United States.

The most advanced students are encouraged to take an active part in all of these researches so far as practicable.

In response to a request from the university, Major J. W. Powell, Director of the United States Geological Survey, has caused to be made a survey of Baltimore and its environs, in

general conformity with the scheme which is in progress for making a topographical map of the entire country. The survey of the Baltimore region was entrusted to Mr. Sumner H. Bodfish, topographer of the survey, assisted by Mr. J. H. Jennings, assistant topographer of the survey, and Mr. E. G. Kennedy, and the work is now nearly ready for publication.

In reply to a request for detailed information respecting the map Mr. Bodfish prepared the following memorandum, addressed to Professor Williams, March 19, 1888.

"The city of Baltimore appears in the middle of the sheet, the boundaries of which are the parallels  $39^{\circ}-10'$  and  $39^{\circ}-25'$  and the meridians  $76^{\circ}-30'$  and  $76^{\circ}-45'$ .

"The scale of the map as drawn is 1 : 40,000, or about one and a half miles to the inch, and the amount of detail is as much as can be advantageously shown on that scale. The scale of publication will be 1 : 62,500, or about one mile to the inch, a scale which renders the errors of location practically inappreciable.

"The map comprises parts of two of the atlas sheets of the system of maps proposed by the Director of the Survey for that section of the country which includes Maryland as a part, but will be published as now drawn. In the publication the water and drainage systems will be shown in blue, the contours in brown, and the culture, viz., roads, railroads, towns, names, etc., in black.

"The primary triangulation upon which the work is based consists of ten stations, the geographical coördinates of which were furnished by the Coast and Geodetic Survey. From this system a secondary system was expanded by the use of the plane table, 42 stations being occupied with that instrument, from which the location of 70 more points were determined by intersection.

"The vertical element of the topography is shown by means of contour lines, with a vertical interval of 20 feet, and the datum plane is mean sea level.

"About 350 miles of roads were carefully measured and leveled, forming a network of traverse lines adjusted to the triangulation, which served as a base to which the remainder of the roads taken from former surveys were adjusted when found correct, but when not found correct they were resurveyed. This work was greatly aided by elevations of permanent bench marks, which were furnished by the water department, which benches had previously been connected with the bench marks of the U. S. Coast and Geodetic Survey.

"The topography was sketched in actual contours in the field, by the

field parties, as the plane table or traverse work progressed, and the aneroid barometer was used to a limited extent for the interpolation of contours between instrumentally determined stations.

"Of the total area on the sheet, about 178 square miles have been surveyed by my party. The remainder, consisting of the Patapsco river, the entire coast line, and the country immediately bordering the city has been compiled from the original surveys executed by the Coast and Geodetic Survey during the period 1849 to 1863.

"Most of the area within the city limits has been contoured from levels furnished by the chief engineer of the water department and the harbor front was compiled from the records of the Harbor Commission of Baltimore.

"The map thus produced in about eight months covers an area of some 230 square miles, and has cost \$2,730. Field work was begun July 19th, and ended December 15th, since which time the map has been inked and lettered by me. During the months of September, October, and part of November, I had the able assistance of Mr. J. H. Jennings, Assistant Topographer, U. S. G. S., who with Mr. E. G. Kennedy was engaged in measuring and leveling along the roads and in sketching in their immediate vicinity."

The past year has seen improved organization in the department of Psycho-Physics, and likewise the unexpected interruption of its activity. Suitable rooms for experimental work were provided in the physical laboratory, instruments and apparatus were bought, and the services of an Associate well trained in the methods of physiological inquiry were enlisted. Arrangements were perfected for clinical observations and for the examination of pathological conditions of the nervous system. Nor were the wider aspects of psychology neglected; the history of philosophy and the principles of pedagogics were taught. The publication of the *American Journal of Psychology* was begun, with the financial encouragement of a liberal friend. An increasing number of well qualified students were attracted by the learning, the enthusiasm, and the sympathy of Professor Hall. To our great regret, near the close of the academic year, he received an invitation to become the head of Clark University, and the wider sphere of activity there afforded in the organization of a new institution, was so

attractive to him that he has resigned his professorship and entered upon his new station in Worcester. No successor has as yet been nominated.

Since the foundation of this university the biological sciences have received special encouragement partly because of the rapid advances that they have been making and partly because of their relation to the progress of modern medicine. Prolonged courses of training are arranged for those who propose to devote their lives to investigation or to teaching in these branches, as well as for those who intend at a later period to study for the profession of physicians and surgeons. As in physics and chemistry, abundant facilities for laboratory work are called for;—instruments, materials and assistants have been and must be liberally provided.

The science of Biology includes the study of the forms and functions of living beings in their normal conditions,—or in other words physiology and morphology; and in both these departments, animal and vegetable life must be studied. Professor Martin, director of the biological laboratory, gives his chief attention to physiology and Dr. Brooks, director of the marine laboratory, to morphology. Dr. Howell, now associate professor, is the chief assistant in biology and during the past year aid has also been received from Dr. Andrews, Dr. Barton (in Botany) and others.

In considering the work of the session, mention will be first made of the courses that are planned for beginners. The director believes that such students have never been more efficiently taught than during the past year, and the result is indicated by an increase in the number enrolled for the session of 1888-9. When it becomes understood that a medical education should always be based upon an intimate acquaintance

with the laws of life, and the activities of normal and healthy beings, young men will not fail to avail themselves of such preliminary training as is here afforded; but as most of the medical schools of this country prescribe no conditions of scholarship as essential for beginners, it is no wonder that the number of future physicians who are willing to take preparatory instruction in biology is small. It is a great satisfaction however to observe that those who have this thorough foundation rise surely and quickly to professional excellence. A few words will indicate the scope of the undergraduate course. In the first year of biology students examine in the laboratory a number of typical fungi, green plants, and animals, the human skeleton, and some other skeletons, and they study the embryology of the chick. They also learn the elements of structural and systematic botany. In the second year they dissect one of the higher mammals, and spend several hours weekly in practical lessons in normal histology and experimental physiology. All this is of course in connection with their other studies in science, modern languages, and philosophy. The advanced work consists in part of lectures and in part of research. Dr. Martin lectured weekly on the peripheral nervous system, and Dr. Brooks weekly on the laws of heredity. Eleven lectures on special subjects were given, one by Prof. Gaule, of Zurich, two by Dr. J. P. Campbell, and one each by other gentlemen connected with the laboratory. Nine lectures were also given on the embryology of vertebrates by Dr. Brooks, Dr. Andrews, and advanced students. Seminars, physiological and morphological, were conducted respectively by Dr. Martin and Dr. Brooks, and there were frequent meetings of the Journal Club and of a reading club.

Original investigations were made in regard to the following subjects :

- The microscopic structure of the ependyma of the frog's brain.
- The physiological constants of terrapin muscle.
- The temperature limits of the vitality of the mammalian heart.
- The origin and regeneration of red blood corpuscles.
- The influence of light on metabolism in animals deprived of the cerebral hemispheres.
- The influence of liquids containing tannin upon gastric digestion.
- The life history of hæmatococcus.
- Method of multiplication in hydroids.
- Life history of Epinthesis McCradyi.
- The development of Alpheus.
- The solvents of chitin useful for histological purposes.
- The development of Manicina areolata.
- The maturation of ascidian ova.
- The structure and development of the eye of Limulus.

The results of many of the above researches have already been published in abstract in the *University Circulars*, the *Zoologischer Anzeiger* and elsewhere; some of the remainder have been published in full in the *Studies from the Biological Laboratory* and in other journals: and it may in general be said that all of the investigations named above are already so far advanced as to justify the expectation of their early publication *in extenso*.

Three numbers of the fourth volume of *Biological Studies* were printed during the year; and a volume containing Dr. Bruce's observations on the embryology of insects and arachnids was issued with the coöperation of his friends in Princeton.

Dr. Brooks completed in 1887 his tenth year of service as director of our marine laboratory, and he prepared at my request a review of the work of the decade, which was printed in the last Annual Report. During the summer of 1888, he was attached as naturalist to the laboratory of the U. S. Fish Commission at Wood's Holl. The table for which this university subscribed was occupied by Mr. T. H. Morgan; and others of our students were enabled to carry on investigations

at that place. The income of the Bruce fellowship is now available, and Dr. H. V. Wilson has had the honor of being the first to receive the appointment. He has spent his summer with Mr. C. L. Edwards at Green Turtle Cay.

The unusual opportunities which have here been provided for students to become acquainted with the most recent methods of pathological investigation, are but little known, partly because of their novelty and partly because Pathology has been usually regarded as a branch of a distinctly professional education. Looking forward to the time when a medical school will here be organized,—in close relations to the Johns Hopkins Hospital, on the one hand, and to the philosophical faculty of the university on the other,—the trustees in 1883 determined to supplement the physiological work already directed by Dr. Martin, with a new department of pathology, in which the most recent and approved methods of research should be introduced. Dr. William H. Welch of New York was appointed professor of this science, and after a year's residence in Europe, he began the organization of a laboratory, in a building (that had been constructed for autopsies) on the grounds of the Johns Hopkins Hospital. All the apparatus required for such investigations has been provided by the trustees. Cultures of a large number of pathogenic microorganisms have been collected, and likewise a great deal of material illustrative of human and comparative pathology. The laboratory is open and teachers are present during the entire day.

Instruction is given in general pathology and in the special pathological histology of all the organs of the body: in experimental pathology; and in the method of making autopsies. Bacteriology receives a great deal of attention. Students

are taught to study the forms, growth, and functions of bacteria and fungi, particularly those which are related to disease. They have also an opportunity to become acquainted with the methods of biological examinations of air, water, etc. More detailed statements upon all these points are given by Dr. Welch in the appendix, and the attention of medical men is there directed; but to those who are not professionally interested in these subjects a few words may be here addressed. There is hardly any branch of human knowledge which is growing so rapidly and which gives promise of such good fruit as that which includes the laws of life in health and disease. Education for the medical profession of this country must soon be reorganized in accordance with modern developments. In this reorganization laboratory methods are to play a most important part, and young men who have been trained in physics, chemistry and general biology are coming up to the school of medicine ready for further scientific studies especially in the laboratory of pathology. Here among other subjects they must be taught the relations of bacteria to disease and the changes in structure and in function produced by disease in the various organs and tissues of the body. They must be able to understand the discoveries now in progress, to weigh their significance, to see their bearing upon diagnosis and the treatment of disease. Hence it is that at so large a cost, this university has given such vigorous support to its school of pathology, and has aimed to equip the laboratory so completely with the requisite apparatus and with the material needed for study.

Dr. W. T. Councilman, who has long been connected with our laboratories, has been appointed associate professor of anatomy and has been granted leave of absence during the session of 1888-9, in order that he may become familiar with the best methods of anatomical study now pursued in Europe.

Dr. R. Meade Bolton, who was assistant in pathology during the last year has been called to the University of South Carolina as professor of physiology, hygiene and bacteriology. It is expected that the places thus vacated will be filled during the coming year by Dr. F. P. Mall, late fellow in pathology. Fifteen students,—all, or nearly all, physicians,—were engaged in the practical courses or in special investigations during the past year.

Among the subjects investigated upon which papers have been prepared are the following:—

- Hemorrhagic infarction;
- The structure of white thrombi;
- Modes of infection;
- General pathology of fever;
- An experimental study of intestinal suture;
- The healing of intestinal wounds;
- Experimental myelitis;
- The organisms of malaria;
- Bovine tuberculosis;
- Reticulated and elastic tissues;
- Extirpation of the thyroid gland;
- Yellow fever;
- Pleuro-pneumonia;
- Swine plague;
- Corroding ulcer of the cervix uteri;
- Carcinoma originating in the sweat glands;
- Cladotrix.

When we turn from a consideration of studies commonly called scientific, to those called literary, equal activity will be apparent. I remember once saying to the trustees, when the question of "how to begin a university" was upon their minds, "Enlist a great mathematician and a distinguished Grecian; your problem will be solved. Such men can teach in a dwelling house as well as in a palace. Part of the apparatus they will bring, part we will furnish. Other teachers will follow them." So it came to pass, before we had any

buildings for our classes, that overtures were made to Professor Sylvester and Professor Gildersleeve and accepted by them. We still feel the influence of the former although he resides here no longer. Professor Gildersleeve continues to stand at the head of a group of philologists, devoted to a wide range of language-studies, who meet every month, under his leadership, for conference and discussion. If I should name the languages here taught and should specify the language-classes, eighty-two in number, that are in progress, it would be obvious that language and literature hold their time-honored place; but instead of a curriculum based upon Hebrew, Greek and Latin, modern languages have an important place, while a wide range of ancient literature, long overlooked and even buried, is receiving attention.

In the beginning of his report of last year's work, Professor Gildersleeve repeats the principles that have governed his instruction. Without abridging his statement, to which I refer the trustees, I ask attention especially to the facts there brought out, that since the beginning of the classical department, the importance of both sides, the scientific and the literary, has been kept in view; and also that he has followed the plan of varying from year to year his principal theme,—so that a student in a residence of four years might expect to take up successively the Greek historians, the Attic orators, the philosophers and the comic poets.

During the session of 1887-8, the centre of work was formed by the Greek historians, especial importance being given to Thukydides, who forms a connecting link between the studies of the preceding year in comic poetry and the studies of the coming year in Greek oratory. In the seminary proper, which met twice a week during the academic year, select portions of Thukydides were interpreted by the members in turn,

and lectures on Greek historiography (with *Schäfer's Quellenkunde* as a text-book) were delivered by the director, and the treatises of Dionysios of Halikarnassos on the style of Thukydides expounded. The usual practical exercises in translating Greek at dictation and in the extemporaneous rendering of English into Greek were conducted twice a week for the first three months, and a course of some fifty lectures had for its theme Greek syntax in its relation to Greek style.

Among the papers prepared by the members of the seminary under the direction or at the suggestion of the head of the department these may be noted: antithesis in the speeches of Thukydides; the sixth year of the Peloponnesian war in Thukydides; metaphor and simile in the speeches of Herodotos; comparison of the *Leptinea* of Demosthenes and the corresponding oration of Aristeides; the *Μεσσηνιακά* of Pausanias. A study of the participle in the Vulgate as compared with the participle in the Greek N. T., though originating in this department, belongs more strictly to that of Latin. A work begun the year before "on the Pindaric dialect" is nearing its completion, and promises interesting literary results, and the same may be said of a laborious Aristophanic research begun towards the end of the session of 1886-7.

Dr. Herbert Weir Smyth conducted a course on Greek historical inscriptions, twice a week throughout the year. Lectures were first given on the use of inscriptions in the study of the political history of the Greeks. The course then embraced the interpretation by members of the class of certain inscriptions; lectures on the historical documents in Thucydides; the trustworthiness of Thucydides in his citation of official documents, a comparison of the language of the documents with that of the inscriptions, etc.

Of Dr. Bloomfield's course on Greek accent a report is

made under Sanskrit and comparative philology. For the benefit of students of theology, Dr. W. M. Arnolt conducted a course of reading in the New Testament. A variety of undergraduate courses were also given, part of them by Professor Gildersleeve, and others by Dr. E. H. Spieker and Dr. Smyth.

The editorial management of the *American Journal of Philology* absorbs a large amount of intellectual force. A like remark may indeed be made of all the other publications. There is, however, this difference; the journal just named provides not only for the printing of special papers, for which the authors are chiefly responsible, but also for notices of the progress of classical studies as recorded in other journals, for book reviews, and notes on special topics. A high standard of supervision must therefore be maintained and the attainment of such a standard may safely be claimed for the eight volumes now completed which bear, in every number, the marks of accurate scholarship and conscientious vigilance. Among the principal papers in the latest volume are those by the editor, Professor Gildersleeve, and by Messrs. Haupt, Elliott, Goebel, and Elmer, with minor papers by M. Warren, Smyth, Todd, and Bright, all of this university. Among the contributors not connected with us, were Messrs. R. Ellis, K. Brugmann, Collitz, Humphreys, Perrin, Garnett, West, Hewett, Hale, Seaton.

As I write this report, Dr. Warren, associate professor of Latin, is absent from his post by reason of ill health, and no report has been received from him.

In the seminary which he conducted last year, Terence was the theme. Select portions of the *Andria* were made the subject of critical interpretation by the members, analyses of all

the plays of Terence were read, and papers were prepared on the following special subjects: "archaisms and rare words in Donatus;" "The use of music in the plays of Terence;" "A study of the Libri Evangeliorum Quattuor of Juvencus." In connection with the work of the seminary, the director gave, during the first half-year, a course of weekly lectures on the history of Roman comedy, the metres of Plautus and Terence, etc. He also conducted a conference on Latin syntax once a week. In the second half-year he held a course of weekly readings in Aulus Gellius; and once a week conducted an exercise in Latin epigraphy, with interpretation of Latin inscriptions.

Additional courses were given to undergraduates by Dr. M. Warren, Dr. Spieker and Dr. Elmer.

In the place of Dr. Warren, who has been granted leave of absence for a year, Professor Hübner, of the University of Berlin, has consented to act as examiner in Latin for our advanced students, and he has prepared for their guidance a scheme for the study of the Epistles of Cicero, which is printed with an elaborate bibliography.

The instructions of Dr. Bloomfield in Comparative Philology, Comparative Grammar, and Sanskrit have a close relation to classical studies. It is much to be desired that students of other European languages, and especially those of the Teutonic group, should likewise perceive and profit by the opportunities here afforded. His courses are both general and special. To undergraduates and to graduates who have not had such training in their undergraduate career, he gives annually a weekly lesson in the principles of linguistic science, using as a text-book Whitney on the Study of Language, but introducing and supplementing this manual with his own lectures and

comments. To more than twenty advanced students of the Greek seminary, he gave a prolonged course on the principles of Greek accentuation, considered in its physiological, historical and grammatical aspects. The views of Dr. Bloomfield upon this subject are expressed in two articles that have been printed in the fourth and ninth volumes of the American Journal of Philology.

The special work in Sanskrit has been advanced by the recent organization of a seminary in which eleven students came together weekly for the study of the Atharva-Veda. Their interest has been quickened by the fact that the director is engaged in preparing (to be printed by the American Oriental Society) an *editio princeps* of an important ritualistic manual, known as the sūtra of Kāuṣika. By the enlightened liberality of the educational department of the British government in India, several manuscripts of this ritual work on the Atharva-Veda have been lent to Dr. Bloomfield, so that he has been able to introduce his students to the methods which are employed in the collation and publication of ancient manuscripts. Four members of this company were able under his direction to make investigations on points suggested by these manuscripts. Their papers are nearly ready for publication. Further details of the methods pursued by this department, in the study of ancient religion, philosophy and language, are given in the appendix. Those who know that the leader of Sanskrit scholars in this country, Professor Whitney, acquired his early distinction by an edition of the Atharva-Veda, which he published in connection with Professor Roth of Tübingen, cannot fail to observe with interest the continuation of such studies in this place.

Professor Haupt has continued to offer a great variety of courses in the group of Semitic studies, including Hebrew,

Aramean, Arabic and Ethiopic, as well as Assyro-Babylonian and Sumero-Akkadian. Dr. Adler, lately fellow and now instructor in this department, has given constant assistance through the year. A glance at the enumeration of their classes, will suggest how wide a range the instructions cover, how much light studies such as these are likely to shed upon ancient civilization, and how important their bearing is upon the interpretation of the sacred scriptures. The comparative method which Dr. Haupt follows, is adapted only to well taught students,—but it gives breadth and dignity to their work, and carries them beyond the interpretation of single documents, to an acquaintance with the languages, history, and religions of ancient Western Asia. Biblical scholars and other persons who are especially interested in the subject, will find in the appendix a detailed report of the work of the year. I would here call attention to the fact that interest in Semitic studies and especially in cuneiform researches has been rapidly increasing in this country during the last few years. Although the number of specialists who engage in such studies is never likely to be large, scholars in all departments of linguistic, historic, and biblical research are profoundly interested in their discoveries. Moreover the re-introduction of Hebrew as an undergraduate study in many colleges, and among them in our own undergraduate courses, is likely to lead college graduates to a subsequent study of other languages in the Semitic family. Yet the importance of this department should never be estimated by the number of pupils enrolled as members, but rather by the spirit which animates their director and by the contributions to knowledge which he and those who act under his inspiration may make from time to time.

If all efforts in this line were combined we might hope to

have in this country at no distant day a collection of Biblical antiquities similar to those in the great national museums of Europe. At present our scholars have still to visit the European capitals in order to study Assyrian originals.

During the past summer, Dr. Haupt spent several weeks in the British Museum, resuming investigations which he began several years ago.

In connection with Professor Friedrich Delitzsch of Leipsic, he has begun the publication of a journal entitled Contributions to Assyriology and Semitic Comparative Philology. Six articles in the first number are from his own pen, namely :

- On the nominal prefix *na* in Assyrian.
- The twelfth tablet of the Babylonian Nimrod epic.
- A new collation of the Izdubar legends.
- On Assyrian nouns.
- On the Semitic sounds and their transliteration.
- On the semi-vowels *u* and *i*.

He has also in press the second part of his Babylonian Nimrod epic, containing the cuneiform text of the eleventh and twelfth tablets as well as some new fragments of the poem found since 1882. The cuneiform account of the Flood (first brought to light by George Smith in 1872), will be considerably advanced and corrected by this new edition. The fragments were all copied by Dr. Haupt from the originals in the British Museum in 1882 and re-collated during the past summer.

Arrangements have also been made for publishing the now scattered writings of Dr. Edward Hincks, of Dublin, the early and successful interpreter of cuneiform inscriptions.

An announcement still more important has been made to the American Oriental Society by Professor Haupt. With the coöperation of some of his advanced students, he has begun the preparation of an Assyrian glossary. The work

is going on at the present time, but, of course, the period requisite for its completion is not certain. When we remember that at the beginning of this century, the cuneiform inscriptions could not be read by any one, that Grotefend deciphered the first cuneiform text in 1802, we may well wonder at the progress since made in the interpretation of these long buried monuments, in the reconstruction of ancient history, and in the formation of an Assyrian grammar and lexicon. To the advancement of such researches, the labors of Dr. Haupt contribute.

Baltimore affords special advantages for the pursuit of these studies owing to its proximity to Washington. The U. S. National Museum is making an effort to develop its Oriental section and before the end of the year there will be placed on exhibition a study collection of Assyrian and Egyptian monuments which will furnish an excellent opportunity to students desiring to draw directly from the original sources. It may be stated in this connection that Professor Haupt and Dr. Adler were appointed in February last honorary curator and honorary assistant curator of the Oriental antiquities in the U. S. National Museum.

The Modern Languages of Europe are here taught in two groups, the Teutonic and the Romance,—the former group including Anglo-Saxon, English, German, and the related tongues of the North; the other,—French, Italian, Spanish, and the related languages of the South. In both sections there are many classes adapted to the requirements of students in different grades of proficiency. Every one who takes a degree in this university (either that of Bachelor or Doctor) must show that he has at least a reading knowledge of German and French, and practical instruction is arranged accord-

ingly, in recitations and reading classes, to meet the needs of undergraduates, and also of maturer scholars who have not elsewhere had the opportunity to acquire this knowledge. There are also opportunities for advanced students to pursue the study of modern languages in their historical growth, and in their philological aspects. For the prosecution of such study there are in both groups seminaries and a variety of lecture courses, as well as class instruction. Professor Elliott, with the aid of Dr. Todd and Dr. F. M. Warren, directs the Romance studies. Professor Wood is at the head of the Teutonic courses; in the last year Dr. Goebel and Dr. Learned also gave instruction in German; Dr. Browne and Dr. Bright in early and modern English. Their reports are given in the appendix, and I will only recapitulate that which relates to the advanced work.

A Teutonic seminary, meeting twice a week, was conducted by Dr. Wood. As the basis of instruction, Braune's Old High German Reader was made use of. A brief course of lectures on the Alemannic dialect was given by the director, and a number of essays were prepared by members of the class. A course in the history of German literature was also conducted by the same teacher, the period studied being that which followed the beginnings of Humanism in Germany down to the decline of the second Silesian school. Braune's reprints of literary works of the sixteenth and seventeenth centuries were read. Goethe's earlier poems formed the subject of a course of lectures which was supplemented by readings and class work. A class in Old Norse met once or twice a week through the year and after the study of Noreen's grammar began to read the Sagas. Two courses in Middle High German were also given. In the Gothic of Ulfilas, the Gospel of Matthew was critically read. In modern German, selections from Goethe, Schiller, and many other writers were read.

An English seminary, directed by Dr. Wood, met once a fortnight for the study of the literature of the early Elizabethan period, but papers upon earlier and later themes were also introduced. Dr. Bright gave a course of lectures, twice a week through the year, on the grammar of Middle English, paying particular attention to phonology. At the same time, *Piers the Plowman* was read by the class, the three versions being critically compared, and the historical relations of the work receiving attention. Under the same instructor (Dr. Bright), *Boethius* was read, and also the poems *Exodus* and *Daniel*, by a class to which he gave expository lectures on *Sievers's* grammar. This was during the first half-year. In the second half the legend of *Troilus* and *Cressida* was a central theme. After an introductory inquiry with respect to the knowledge of *Homer* in the middle ages, the legend was traced to *Boccaccio*; and subsequently its reproduction in *Chaucer* and *Shakespeare* was studied, and the treatment of the play at the time of the *Restoration* received attention. Less advanced classes studied *Anglo-Saxon* and *Middle English* literature, with the aid of *Ten Brink's* manual, supplemented by lectures from Dr. Bright.

Dr. Browne devoted much attention to a domain hitherto much neglected by English students,—the Scottish poets of the fourteenth, fifteenth, and sixteenth centuries. As a basis of his instructions he prepared and printed, by the papyrograph process, a chrestomathy in which selections of a representative character were reproduced from writings hitherto not readily accessible to an ordinary student. In the first half-year he read with a class some of the principal writers of the Elizabethan period, and afterwards a considerable part of *Chaucer* was read. There was a weekly exercise under his direction in the chief literary works produced in England during the first half of this century.

The Romance seminary under Professor Elliott was engaged in a study of the paraphrase of the *Canticum Canticorum*, and the *Fragment de Valenciennes*, in weekly sessions, continued through the year. Facsimiles of the manuscripts were employed, and linguistic, historical, and phonetic questions were considered. There was also a fortnightly meeting of all the special students of the Romance languages, for the reading of original papers and the discussion of books and journals.

For the study of Old French, Suchier's edition of *Aucassin et Nicolette* was employed, and the relations of the language to Latin and to Modern French were critically considered. There was a corresponding course in Italian philology,—the text being the Decameron of Boccaccio. Lectures were also given by Professor Elliott on the *langue d'oïl* dialects, on the North Italian dialects, on the morphology of the Romance tongues, and on the history of Romance studies.

Dr. Todd conducted classes in Italian, Spanish, Provençal, and Raetian, reading with his classes parts of Ariosto's *Orlando Furioso*, Dante's *Purgatorio*, and *Don Quijote*, with some of the pieces which are included in the chrestomathies of Bartsch and Ulrich.

Dr. F. M. Warren gave a long series of lectures on Old French, Provençal, and Spanish literature.

For the less-advanced students introductory classes were maintained in French, Italian, and Spanish.

The key to the instruction which is given in the department of History and Political Science is an endeavor to show the relations of the past to the present. In looking at current events, their development is considered. The constitutions of States and the institutions of society have naturally received a great deal of attention, and a motto taken from the writings of Pro-

essor E. A. Freeman, which is painted upon the walls of the class room, appears to inspire both the instructors and their pupils—"History is past Politics and Politics present History." Professor Adams continues to be the head of the department, and is chiefly responsible for the historical work, and Professor Ely, whose subject is political economy, is closely associated with him. Professor Emmott, lately lecturer on law in the Victoria University (Eng.), lectures in alternate years, on Roman law, and on the principles of the common law. Dr. Jameson, who has been chief assistant in history for several years, has been called to a professorship in Brown University,—much to the regret of his colleagues and pupils in Baltimore, who will long miss their access to his stores of accurate knowledge, and to his judicial views of the events of American history. Other assistants and lecturers are from time to time engaged. Among those who rendered important services last year were Professor Woodrow Wilson, Ph. D., then of Bryn Mawr College, now of Wesleyan University, and E. R. L. Gould, Ph. D. of the U. S. Department of Labor, in Washington. A public course of lectures by ex-President White of Cornell University is referred to elsewhere.

The rooms devoted to the classes in history are remarkably well adapted to their purposes. To the library of Bluntschli, most important accessions have been made by gifts, purchases and exchanges. The entire collection, including pamphlets, and newspaper cuttings as well as books, is well catalogued and indexed, and has been kept in excellent order, since the departure of Mr. Fifield, by Mr. J. M. Vincent, A. B. (Oberlin). The place is open without interruption, from nine in the morning until six in the evening, and many of the advanced students make constant use of it as their study-room and writing-room. The professors of the department have

private studies adjacent. Besides the books and maps and pamphlets, some interesting relics, portraits and autographs have been brought together, largely the gifts of students and friends, and a noteworthy collection of coins, described on a subsequent page as recently given to the university, is here deposited.

The centre of activity in this department is the seminary, which continues to meet, as in former years, on Friday evenings. The instructors and twenty-six advanced students have thus assembled during the session of 1887-8, and have presented and discussed original papers upon subjects relating to the institutional and economic history of this country. Most of the communications so elicited have been given to the press. Dr. Adams has published the first fruits of a prolonged inquiry respecting the growth of American colleges and universities, in three papers,—one printed in a previous year on William and Mary College, and two, more recent, on an attempt to found a French Academy in Richmond toward the end of the last century, and on Jefferson's relations to the University of Virginia. Dr. Ely has given much attention to the principles of taxation, originally as a member of a city commission and afterwards as a member of the State commission. In addition to his contribution to the official reports, he has published with the aid of Mr. John H. Finley a volume embodying the usages and experience of American States and cities in this matter. Several essays on coöperative industry in the United States have been published in one volume.

The systematic instruction for advanced students during the year included a course of lectures, during the first half, introductory to historical politics, on the early history of institutions; and a course in the second half, on the origin and growth of Prussia; both by Dr. Adams; Professor Emmott

lectured on the history of the English law of real property; Dr. Ely lectured during the year,—on finance with special reference to taxation in the United States; and Dr. Jameson gave weekly lectures through the year on the history of the United States from 1789 to 1793, and a weekly course on historiography, or on the writing of history, with critical comments upon modern works. Dr. Wilson gave twenty-five lectures on administration; Dr. Gould, twelve on social statistics, and several gentlemen, among them Hon. C. D. Wright, gave public lectures on the problems developed by the growth of modern cities. There were also numerous undergraduate courses.

So much space has been given to the more advanced classes that I can say but little of the undergraduate work, but this has been recently described in several places, and the peculiarities of our group system are generally understood,—so that there is less occasion to dwell upon this important part of our work. Professor Emmott's two courses in logic and ethics are attended by all undergraduates; so are Dr. Browne's instructions in English. They are also required to follow Dr. Hartwell's guidance in physical culture, and to pursue for a time one or both the prescribed courses in drawing which are given by Mr. Newell. They must also pay attention to vocal culture as taught by Mr. Woodward. Besides these studies they must follow one of seven schedules of appointed work extending through not less than three years.

The public lectures which attracted most attention during the year were those of Hon. Andrew D. White, lately President of the Cornell University, upon a subject to which he has devoted attention during a very long period, the causes

which led up to the French Revolution. The number of persons wishing to follow this course was so large that we were again obliged to ask permission to make use of one of the halls of the Peabody Institute. The consent of the institute having been given, the lectures were announced as under the joint auspices of the two institutions, and were attended by an audience of six hundred persons. An elaborate schedule of the topics discussed was prepared by the lecturer and printed, and many rare books from his private library were brought to the attention of the audience and were privately shown to the special students of history. The lectures attracted attention at a distance, as well as in Baltimore, and were repeated in Washington and in New Orleans.

An audience of a very different character,—chiefly the students of physical science and persons interested in the progress of electrical discovery,—followed with the greatest pleasure, a course of nine lectures on the history of the science of electricity and magnetism,—and on the state of our knowledge in respect to electrostatics, dynamic electricity and magnetism, and the applications of electricity,—which were given by Professor Rowland, Dr. Kimball, and Dr. Duncan. The excellent facilities of the new laboratory enabled the lecturers to illustrate their lectures in an admirable manner.

A course of six lectures was given in Hopkins Hall on the local study of natural history. Major Powell, the head of the U. S. Geological Survey, gave a general survey of the "physical features of the Atlantic coast," and he was followed by members of our own staff, Dr. Williams, Dr. Clark, Dr. Martin and Dr. Brooks. Taken together, the lectures were so planned as to serve as an introduction to the study of the country which pours its waters into the Chesapeake Bay, while at the same time the attention of the student was

directed to the relation between the local phenomena, and the general problems of physical geography and natural history.

Ten lectures in sociology were given as a public course "on some of the problems of modern cities." Hon. C. D. Wright, director of the U. S. Bureau of Labor, gave a preliminary address and also the closing lecture, while the other lectures were given by three of our own graduates, Dr. E. R. L. Gould, now an expert of the U. S. Department of Labor, Dr. W. Wilson, of Bryn Mawr College, and Dr. A. G. Warner, secretary of the Charity Organization Society of Baltimore.

The subjects of Greek poetry and archæology were brought forward in a course of four lectures on Greek lyric poetry by Dr. H. W. Smyth, now of Bryn Mawr College, and by eight illustrated lectures on the topography of Athens by Mr. J. R. Wheeler, recently a member of the American School at Athens.

Several single lectures were also publicly given.

By the report of the Librarian it appears that the number of bound volumes in the Library is 33,000, and the periodicals at present received exceed 1000 titles.

The number of gifts presented to us during the year has been unusually large and indicates increasing interest in our work. We have received from Mr. John H. Harjes of Paris, a resident of Baltimore in 1849-52, a collection of more than one hundred standard and valuable French works on political economy, finance, and administration, all in the best library-bindings. Among them may be mentioned the works of Colbert, in ten volumes; Dufour, *Droit Administratif*, in eight volumes; D'Audiffret, *Système financier de la France*, in six volumes; Say, *Dictionnaire des finances de la France*, etc. The full list has been printed in the *Circulars*, No. 64.

To the Dowager Lady Vernon we owe our acknowledgments for a copy of the celebrated "Vernon Dante," in three superb folio volumes, containing the text of the *Inferno*, with grammatical and other explanations, a historical and biographical account of the poet, his family, and his time, and a magnificent album of illustrative engravings, drawn and engraved especially for this work. To these was added another folio containing facsimiles of the first four editions of the *Divina Commedia*, edited by Sir Antonio Panizzi from the originals in the British Museum. These works were the results of the scholarly labor and munificent liberality of the late George John Warren, Lord Vernon, long distinguished in Europe as "the Mæccenas of Dante Literature."

Through the generosity of the Government of Switzerland, and the kind mediation of the Hon. Emile Frey, its minister at Washington, the resources of the historical seminary have been enriched by a large collection of books and pamphlets relating to the history, laws, and administration of that country. The list includes documents from all departments of the Federal Government, and numbers over 800 items. A detailed statement in regard to the volumes received is contained in the *Circulars*, No. 62.

At the time of its re-organization, which was successfully brought about last autumn, the Mercantile Library of Baltimore placed at the disposal of the university almost all its public documents and a large number of magazines. About twelve hundred volumes were brought to the university and about fourteen hundred were returned to the Department of the Interior to be used for supplying deficiencies in other libraries. The books retained by the university include a set of the English Annual Register from 1758-1817; a Universal History in sixty-five volumes; the Athenæum (London),

1828-1878; Debates in Houses of Lords and Commons, 1660-1743; American State Papers and other important publications.

The library has acquired by purchase the portfolio of plates illustrative of animal locomotion, by Mr. E. Muybridge, issued under the auspices of the University of Pennsylvania. The portfolio contains 100 plates, produced by the photo-gelatine process, representing men, women, and children, animals and birds, in active motion; the successive stages of each movement being taken by instantaneous photography, by means of a system of forty-eight electro-photographic cameras, operating automatically.

A bronze bust of the late Sidney Lanier, who at the time of his death held here the post of lecturer on English literature, was given to the university in March last by a kinsman of the poet,—Charles Lanier, Esq., of New York. An appropriate marble pedestal was given by a gentleman of Baltimore, not connected with the university. The presentation of this likeness brought together a company of those who knew and loved Lanier, and an account of the proceedings, with the letters and poems drawn out at that time, was subsequently published.

During the past year important accessions have been made to the geological and palaeontological possessions of the university. Dr. William B. Clark, instructor in palaeontology, was encouraged by the trustees to make a number of excursions to the eocene and miocene districts of Southern Maryland (Calvert, St. Mary's, Charles and Prince George's Counties. He was successful in bringing together a large number of valuable specimens, a part of which are here retained, and another part have been exchanged. From the U. S. Geological Survey, Major J. W. Powell, Director, has been re-

ceived, through Dr. W. H. Dall, an extensive collection of cenozoic fossils, including many characteristic species from the eocene, miocene, and post-pliocene of the South Atlantic and Gulf States. Among these, specimens from the renowned eocene deposits of Vicksburg and Jackson, Miss., are to be especially mentioned. From the Geological and Natural History Survey of Canada we have obtained, through Mr. A. C. Lawson, interesting palæozoic and mesozoic fossils, selected from the duplicate material of the Survey collection. Professor Edward Orton, director of the Ohio Geological Survey, has forwarded a valuable series of palæozoic fossils, chiefly silurian. Professor S. Calvin, of the University of Iowa, has sent a representative collection from the Iowa palæozoic formations; and Professor D. W. Dennis, of Earlham College, very perfect specimens from the silurian of Southern Indiana. From the U. S. National Museum, at the instance of Mr. C. D. Walcott, curator of palæozoic fossils, twelve specimens of cambrian fossils have been received. In addition, several private persons have made exchanges with us, and correspondence is now in progress with several other parties.

In the course of the winter, the Maryland Academy of Sciences being compelled to give up the rooms in which its Museum was placed, informed the University (through a committee consisting of Dr. Christopher Johnston, President, and Messrs. P. R. Uhler, and Robert T. Wilson, M. D.) of their willingness to present to us their collections in natural history. This gift was most gratefully received, and the best possible use will be made of the collections, and the exhibition cases which accompanied them. Many of the specimens, beyond their intrinsic value, possess considerable historical interest, as they were collected and labelled by men who were prominent in geological work in the State a generation

or two ago. A very interesting suite of palaeozoic fossils from the region about Cumberland, several cycad stumps, abundant mesozoic leaf impressions, large numbers of tertiary shells from St. Mary's river, and the fossil remains of an elephant from the quaternary of Talbot County, constitute the chief features of the palaeontological part of this collection. In addition to these, there are numerous specimens of characteristic Maryland rocks and minerals. The entire collection affords a valuable addition to our series of distinctively Maryland specimens. A detailed account of the collection is given in the *University Circulars*, No. 64, and in the same place will be found a sketch of the History of the Maryland Academy of Sciences, from its reorganization in 1863, prepared with great care by Mr. P. R. Uhler. It includes much valuable information in regard to the objects presented to the university.

Mr. Charles F. Fitzgerald of Baltimore has given to the herbarium of the biological laboratory, a collection of mosses, including between 3,000 and 4,000 specimens and over 1,200 species. It embraces the mosses of the United States from the high latitudes of the far Northwest and the Pacific coast to the glades and swamps of Florida. With these is also a large collection of European mosses. The specimens have been carefully dried, mounted, and named, and will prove of value for reference in determining the difficult species of our own region. Among the contributors to this collection by exchange and otherwise have been Mr. Lesquereux, Mr. James, and other distinguished specialists in this department of botany.

A collection of ancient Greek and Roman coins, which was gathered by a prominent archæologist during a residence of about twenty-five years in Rome, was purchased through the mediation of Dr. Arthur L. Frothingham, Jr., and presented

to the University by the following gentlemen: Christian Ax, Jr., D. L. Bartlett, Mendez Cohen, G. W. Gail, Robert Garrett, T. Harrison Garrett, Daniel C. Gilman, Hodges Brothers, Reverdy Johnson, Francis T. King, J. W. McCoy, W. W. Spence, and Francis White. This collection includes coins from the Greek colonies in Spain, Gaul, Italy, and Sicily, from the different States of ancient Greece itself, beginning with some of the earliest examples of the seventh century, and continuing to the Diadochi. The collection of Roman coins from the time of the Republic down to the last of the Emperors is especially complete. The list numbers more than 1300, and is highly interesting as illustrative both of the monetary system of ancient times and of various periods of numismatic art. It was formed with the special view of illustrating lectures on ancient history and archæology, and contains the greater part of those ancient coins that have reproductions of famous temples, statues, or paintings on their reverse.

A collection of prehistoric and later relics of savage life, made by Prof. A. M. Mayer, of the Stevens Institute of Technology of Hoboken, N. J., was purchased by the university. It includes a large number of valuable specimens of the implements of the palæolithic period, found in France and England, also many belonging to the neolithic age, found in France, England, Ireland, Denmark, Switzerland, and other places, and a collection of primitive utensils of North and South America illustrating all these periods, as well as Indian art in historic times. Bows and arrows still used in South America, hunting and fishing implements from Alaska, and other Indian work of recent manufacture increase the list of interesting specimens to nearly three hundred. A carefully prepared catalogue came with these relics.

A large number of important instruments have been presented to the physical laboratory, through the agency of Dr. Louis Duncan, associate in electricity, a list of which is here given:—

One electro-motor, one horse-power, given by the Sprague Electric Railway and Motor Company, through Mr. F. J. Sprague.

One electro-motor, half horse-power, by the same company.

One electro-motor, one horse-power, given by the Baxter Electric Motor Company, through Mr. J. F. Morrison.

Twenty storage cells, given by the Electric Storage Company of Baltimore.

Four or five hundred pounds of lead-covered, twenty-five conductor cable, given by the Standard Underground Cable Company, of Pittsburgh.

Incandescent electric lamps, given by the United States Electric Lighting Company, of Baltimore.

One ten-light transformer, given by the United States Electric Lighting Company, of Baltimore.

Various specimens of wire from different makers.

In addition to the gifts named above, the following apparatus was sold to the university at greatly reduced prices:—

Two dynamos by the United States Electric Lighting Company, of Newark, N. J.

A dynamo and lamps by the Brush Electric Company.

A Tatham dynamometer, and an electro-motor, two horse-power, by the Sprague Electric Railway & Motor Company.

The most important changes in the academic staff have already been mentioned. Professor G. Stanley Hall, who has been connected with this institution since 1882 as lecturer and professor resigned his post at the end of the year to become president of Clark University in Worcester, Massachusetts; and Dr. J. F. Jameson, who has been here since 1880 as graduate student, fellow, assistant, and associate, has now become professor of history in Brown University, Providence. There have been the usual changes among the staff of younger men engaged as assistants and instructors, most of whom hold their offices by annual appointment. The Soci-

eties devoted to different lines of scientific and literary work have maintained their activity. The most important of these are the Philological and the Scientific,—but the Field Club has been very active during the year, and the more restricted associations have been kept up as usual.

The names of those who have attained degrees during the year are given in the appendix. A list of publications, encouraged by an appropriation from the university funds or issued by the unaided enterprise of individuals connected with the university, is also printed beyond.

In this review of the activity of the university during the year 1887–88, steady advances may be perceived. The number of students has increased; the standard of scholarship has been maintained; the publications have been as many as ever; the fidelity and enthusiasm of the principal teachers cannot be too strongly commended. Our only cause for anxiety is one of which you are fully aware,—the loss of income from the stocks which were given to the university by its founder. Your wisdom, gentlemen of the Board of Trustees, will no doubt devise some efficient relief. I believe it to be a reasonable expectation that the efforts which you have put forth, and which you have encouraged others to put forth for the establishment of a university, will receive financial support when you are ready to ask for it.

DANIEL C. GILMAN.

BALTIMORE, *October*, 1888.

## REPORTS ON THE INSTRUCTION IN THE CHIEF BRANCHES OF STUDY.

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At the close of the academic year, the following letter was addressed by the President of the University to the chief instructors:

*Sir* :—

It has occurred to me that there will be advantages in publishing the Annual Report of the President of the Johns Hopkins University in October, instead of preparing it after the new year begins and printing it in the middle of the year. I should like also to introduce a change in its form, and to print a special report from the head of each important group of studies, regarding the work of the year, together with such suggestions as may fitly be made public. In view of these considerations, will you be so good as to prepare a report respecting the instruction in \_\_\_\_\_ during the academic year 1887-88, and present the same as soon after June 1 as possible.

If there are suggestions not proper to be made public, which you would like to make to the trustees or to me, they may be presented in a separate communication at the same time, or previously, as you prefer.

The answers received are given in the following pages. An alphabetical schedule will enable the reader to turn readily to any subject.

Astronomy, . . . . .	86	Mathematics, . . . . .	86
Biology, . . . . .	81	Morphology, . . . . .	85
Chemistry, . . . . .	77	Pathology, . . . . .	90
Electricity and Magnetism, . . . . .	74	Physical Training, . . . . .	91
English, . . . . .	62	Physics, . . . . .	74
Geology and Mineralogy, . . . . .	79	Physiology, . . . . .	81
German, etc., . . . . .	61	Political Economy, . . . . .	69
Greek, . . . . .	53	Psychology, . . . . .	89
History and Politics, . . . . .	69	Romance Languages, . . . . .	65
Latin, . . . . .	56	Sanskrit and Comp. Philology, . . . . .	57
Logic and Ethics, . . . . .	89	Semitic Languages, . . . . .	59

### Greek.

The Professor of Greek has the honor to report that during the session of 1887-1888 the work in the Graduate Department has been carried forward in consonance with the principles laid down in the Eleventh Annual Report, the following extract from which may be not inapposite:

“In organizing the classical department the importance of both sides, the scientific and the literary, was carefully considered. Without scientific

study the cultivation of the literary sense is apt to degenerate into finical aestheticism; kept apart from the large and liberal appreciation of antique life in all its aspects, the scientific study of the classic languages divorces itself from sympathy with tradition and relinquishes its surest hold on the world of culture, on which the structure of the university must rest. The smaller the staff the more imperative is it that, as far as possible, each representative of the department should recognize the claims of all the provinces and not trust simply to the balance brought about by opposing forces. Each teacher should have a field for minute, exhaustive work, for, as has been well said, "enthusiasm dwells only in specialization," and should have a broad range of vision for tracing the relations of his special province to the remotest corners of the philological domain. With the increase of teachers and of appliances much may be devolved on others. The head of the department may delegate this branch and that to specialists, but any sound system of higher instruction must be a system of radiation from a scientific centre.

"The difficulty of keeping this combination of special and general steadily in view is much enhanced by the imperfect preparation of many of those who enter upon the university course. Not only have we no satisfactory system of secondary education, we have no uniform system, and college graduates come to us with the most varied outfit, the most diversified deficiencies. To meet the trouble by the multiplication of classes is not a device suited to the university student, much of whose growth and enlightenment is due to the intimate contact with those who are of different capacity and far other attainments. All university students should work in common. The leader should assign no work that is without its lesson to the most experienced student or without its stimulus to the merest novice. Of course a problem like this cannot be reduced to working rules, but to recognize it clearly and to keep it steadily in view is in a measure to solve it.

"To these principles the department of classical philology has been true from the beginning. The advance of preliminary education may make the adjustment of the instruction an easier task in the future. But the principle of scientific specialization not only for the mastery of methods but for the joy and profit of individual achievement, and the other principle of wide and free vision, must abide; and the history of the last ten years shows that the steadfast adherence to these lines of work has won for the university an influence that manifests itself far beyond the domain which it now occupies and which it has been persistently extending."

As heretofore, so during the year 1887-1888, the Greek Seminary has been the focus of the advanced work of the department, and in no year has the attendance been more steady or the interest keener. According to the plan of the seminary the work of the year is concentrated on some leading author or some special province of literature, chiefly with reference to the literary form. During the past year the centre of work was formed by the Greek Historians, especial importance being given to Thukydides, who forms a connecting link between the studies of the preceding year in Comic Poetry and the studies of the coming year in Greek Oratory. In the seminary proper, which met twice a week during the academic year, select portions of Thukydides were interpreted by the members of the Seminary in turn, and lectures on Greek Historiography (with *Schäfer's Quellenkunde* as a text-book) were delivered by the Director, and the treatises of Dionysios of Halikarnassos on the style of Thukydides expounded. The usual

practical exercises in translating Greek at dictation and in the extemporaneous rendering of English into Greek were conducted twice a week for the first three months, and a course of some 50 lectures had for its theme Greek Syntax in its relation to Greek Style.

Among the papers prepared by the members of the Seminary under the direction or at the suggestion of the head of the department may be noted: "Antithesis in the Speeches of Thukydidēs;" "The Sixth Year of the Peloponnesian War in Thukydidēs;" "Metaphor and Simile in the Speeches of Herodotos;" "Comparison of the Leptinea of Demosthenes and the corresponding Oration of Aristeides;" "The Μεσσηνιακὴ of Pausanias." A study of the participle in the Vulgate as compared with the participle in the Greek N. T., though originating in this department, belongs more strictly to that of Latin. A work begun the year before "On the Pindaric Dialect" is nearing its completion, and promises interesting literary results, and the same may be said of a laborious Aristophanic research begun towards the end of the session of 1886-7.

Dr. Herbert Weir Smyth conducted a course on Greek Historical Inscriptions, twice a week throughout the year.

During the first three months, lectures were given on the use of inscriptions in the study of the political history of the Greeks. By way of introduction the following subjects were treated of: the method of engraving, preparation and publication of legal documents; the official formulæ; the various classes of public inscriptions, etc. The course then embraced (1) the interpretation by members of the class of the inscriptions in Hicks' Manual, prior to the Peloponnesian War; (2) lectures on the historical documents in Thukydidēs, with reference to the date of the composition of the Thukydidæan history; the trustworthiness of Thukydidēs in his citation of official documents, a comparison of the language of the documents with that of the inscriptions (ἦν, ἔδν, etc.).

Of Dr. Bloomfield's course on Greek Accent a report is made under Sanskrit and Comparative Grammar.

For the benefit of students of theology, Mr. W. Muss Arnolt, B. D., now Ph. D. of this University, conducted a course of reading in the New Testament.

In the Undergraduate Department:

Professor Gildersleeve conducted a course in

Plato's *Phædo*, twice a week, first half-year.

Aeschylus' *Septem* and Sophocles' *Electra*, twice a week, second half-year.

Lectures on Greek Literature, once a week, throughout the year.

Lectures on Greek Grammar (including metre) once a week, throughout the year.

Additional courses were conducted by:

Dr. Spieker in

Andocides, four times weekly, first half-year.

Homer, *three times weekly, first half-year.*

Homer, Euripides, *four times weekly, second half-year.*

Herodotus, *three times weekly, second half-year.*

Dr. Smyth in

Greek Archaeology, *weekly, through the year.*

Classes in Prose Composition were also conducted by the instructors in connection with each of the courses above named.

Students have read privately for examination the following books:

Plutarch, *Themistocles, Sulla.* (8).

Herodotus, *Merry's Selections.* (9).

Demosthenes, *De Corona.* (3).

Aristophanes, *Knights.* (3).

B. L. GILDERSLEEVE,

*Professor of Greek.*

### Latin.

The following statement is prepared in the absence of Professor Warren.

The Latin Seminary, under the direction of Dr. Minton Warren, held two sessions a week during most of the year, making Terence the centre of work.

Select portions of the *Andria* were made the subject of critical interpretation by the members of the Seminary, analyses of all the plays of Terence were read, and papers were prepared on the following special subjects: "Archaisms and Rare Words in Donatus;" "The Use of Music in the Plays of Terence;" "A Study of the *Libri Evangeliorum Quattuor of Juvenius.*"

In connection with the work of the Seminary, Dr. Warren gave, during the first half-year, a course of weekly lectures on the History of Roman Comedy, the Metres of Plautus and Terence, etc. He also, once a week, conducted a conference on Latin Syntax. In the second half-year he held a course of weekly readings in Aulus Gellius; and once a week conducted an exercise in Latin Epigraphy, with interpretation of Latin Inscriptions.

Additional courses have been conducted during the year by:

Dr. M. Warren in

Catullus, Tibullus, Propertius, *three times weekly, first half-year* (with the assistance of Dr. Elmer).

Pliny, Juvenal, *three times weekly, second half-year.*

Reading at sight, *weekly, through the year.*

Dr. Spieker in

Livy, *four times weekly, first half-year.*

Horace, *four times weekly, second half-year.*

Dr. Elmer in

Tacitus, *four times weekly, second half-year.*

Classes in Prose Composition, meeting weekly, were conducted by the instructors in connection with each of the courses above named.

Students have privately read for examination the following books:

Cæsar, *Bellum Civile*, book i, (14); book ii, (2).

Cicero, *Pro Roscio Amerino*, (12); *Select Letters*, (4); *De Amicitia*, (2).

Horace, *Epodes*, (14).

Livy, books xxiii, xxiv. (1).

Lucan, *Pharsalia*, book i. (5).

Lucretius, books i, iii, v. (1).

Ovid, *Fasti*, books i, ii, (12); *Tristia*, book i, (2).

Terence, *Adelphoe*. (6).

### Sanskrit and Comparative Philology.

The session of 1887-88 marks a period in the study of Sanskrit at this University: in it a "Vedic Seminary" was organized and kept in operation successfully throughout the year. Eleven advanced students met weekly for a systematic and comprehensive study of one of the four Vedas, the Atharvan. Four of the students, Messrs. H. W. Magoun, Fellow in Sanskrit, E. W. Fay, University Scholar in Sanskrit, J. T. Hatfield, and C. J. Goodwin carried on original researches on MS. materials bearing upon this Veda; these MSS. are at present in the hands of the director of the seminary owing to the courtesy and liberality of the British Government in India. Their investigations are in a state sufficiently advanced to warrant the hope, that they will be published at an early date. The work on the MSS. was guided by the instructor in a supplementary hour once a week, informally and somewhat in the manner of a privatissime at a German University. The habits of the MSS., their relations to the printed editions and the elementary principles of text-criticism and emendation were brought rapidly to the notice of these scholars, so as to enable them to operate on their own account a very early period of the year.

The work of the seminary in general was carried on as follows: A short introductory course of lectures described the position of the Atharva-Veda in Vedic literature in general, depicted the contents of the published form of the Veda (Roth and Whitney), and discussed the other schools (*çâkhâs*) of the same Veda, which either are in existence or are reported to have existed by native tradition. Notably the value of the Kashmirian version, the so-called *Pâippalâda-çâkhâ*, the unique MS. of which is at present in the possession of Professor Rudolph von Roth at Tübingen was pointed out. Further the commentary on the Atharvan ascribed to Sâyana, which is at present in the course of publication by a native scholar, Mr. Shankar Pandurang Pandit (recently elected an honorary member of the American Oriental Society) was discussed and presented to the seminary in the advanced sheets obtained through the kindness of the editor. An elaborate

discussion of the interesting introduction to the commentary was entrusted to Mr. Fay, the University Scholar in Sanskrit.

The practical side of the work consisted of the study of selected portions of the hymns of the Veda, and the ritualistic practices which accompany the hymns. The latter were presented to the members from the advanced sheets of the instructor's editio princeps of the sūtra of Kāṅṅika, the very important ritualistic manual of the Atharvavedins. The practices corresponding to the hymns were entrusted severally in turn to each of the members of the seminary, and were presented by him to the rest in as intelligible and accessible a form as was permitted by the difficulties inherent in the subject matter.

During the second half of the year, another course which supplemented the subject matter treated in the seminary was instituted. The law-book of Manu, the best known of the Hindu *śāstras* represents the formalized classical account of Hindu customs and manners. Selections from the first six books of Manu offered a picture of the ordinary life and religious development of the brahmanical Indian, which filled in at many points the picture derived from the Atharva-Veda. The class was made up of thirteen students, the largest number it is believed, which has ever met together for the study of a single Sanskrit text at this university.

During the latter part of the year a course introductory to the study of the Rig-Veda was commenced. The object of this exercise was to make acquainted with the elements of the Vedic language those who had already obtained proficiency in the classical language. After a short course in Vedic grammar the study of selected hymns was commenced. The subject both as far as contents, language and metres are concerned was constantly treated from the point of view of the later language: comparisons between the habits of the Vedic and classical languages are as inevitable and useful as the confrontation of Attic and Homeric dialects in the study of Greek.

The more elementary work in Sanskrit consisted of a somewhat extended course in the Itiopaḍeḍa, two hours a week during the first semester, and a course for beginners embracing two hours a week throughout the year. The latter consisted of exercises in grammar, prose writing, and the reading of the Nala. It was conducted by Mr. H. W. Magoun, Fellow in Sanskrit for the session of 1887-88.

In Comparative Philology the work was two-fold. First, a course in general linguistic science, and the modern methods of comparative grammar. After a short historical sketch describing the origin of the modern science of language, the fundamental principles of grammatical investigation were discussed systematically. The theory of agglutination, the twin subjects of phonetic law and analogy, the questions attaching themselves to the relationships of the Indo-European languages, etc., were presented in formal lectures during the first half-year. During the second half-year, selected chapters of Whitney's "Language and the Study of Language"

were made the basis of the work of the class, which consisted of over twenty students gathered from the various philological departments of the university.

In Comparative Grammar the subject was the Historical and Comparative Study of Greek Accentuation. A course similar to this, but much less extensive was given once before to members of the university in the second semester of 1881-82. The work on this subject during the past session was more comprehensive and involved the coöperation of the entire class of more than twenty scholars. The entire subject of Greek accentuation from the physiological, historical, and grammatical sides was considered, and results differing at many points from the views generally accepted, were arrived at. The views of the instructor on this subject gained expression in his essay entitled "The Origin of the Recessive Accent in Greek," a treatise of 41 pages, printed in the *American Journal of Philology*, Vol. IX, p. 1 fg. This treatise is in a certain way a continuation of the former essay by the same author, which arose in connection with his first course on Greek accent in 1882, and is entitled "Remarks Historical and Critical Introductory to a Comparative Study of Greek Accentuation (*Am. Journ. Phil.*, Vol. IV, pp. 20-62).

MAURICE BLOOMFIELD,

*Associate Professor of Sanskrit and Comparative Philology.*

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## Semitic Languages.

Dr. Cyrus Adler, lately Fellow, having been appointed Instructor in the Semitic courses, it was possible to give the work greater scope. Fourteen different courses were given, eight by Professor Haupt, and the remainder by Dr. Adler.

Six hours weekly were devoted to the study of the language and literature of the Old Testament. Professor Haupt gave a critical interpretation of selected psalms, special stress being laid on a systematic study of the vocabulary of the Psalter. In the second half-year the Book of Proverbs was treated with a critical examination of the different portions of the book, their date and authorship.

In Biblical Aramean the Book of Ezra was studied, instead of which, in the second half-year, Syriac was introduced with readings from the Syriac version of the New Testament.

In the Hebrew Exercises conducted by Dr. Adler various chapters from the books of Genesis, Kings and the Minor Prophets were read at sight, chiefly portions bearing on Assyrian history.

In addition to these advanced courses in Biblical Philology a beginners' course in Hebrew was given two hours weekly through the year. The outlines of the grammar were thoroughly studied in connection with a minute

philological analysis of some chapters in the Book of Genesis. The grammar used was Dr. Mitchell's translation of Gesenius-Kautzsch.

In the Ethiopic course for beginners conducted by Dr. Adler, the grammar was studied after Praetorius' Manual (Carlsruhe and Leipsic, 1886), with especial reference to the noun formations; and then there were read some texts in Dillmann's Chrestomathy.

In Arabic Professor Haupt gave an interpretation of selected Suras of the Coran, Sir William Muir's *Extracts from the Coran* (2d ed., London, 1885) serving as text book. Special attention was paid to a thorough explanation of syntactical phenomena and incidental studies in comparative Hebrew-Arabic lexicography.

To the study of Assyriology seven hours weekly were devoted. Dr. Adler conducted a beginners' course in Assyrian, giving the outlines of the grammar (in lectures) and interpreting the great Syllabary in the first part of Haupt's *Akkadische und Sumerische Keilschrifttexte* (Leipsic, 1881); and in the latter part of the session the reading of some of the easier historical texts was entered upon.

In the Assyriological Exercises for more advanced students Dr. Adler explained the greater portion of the hexagonal *Sennacherib-Prism* (Taylor) and some selected texts in Delitzsch's *Assyrische Lesestücke*. Dr. Adler also gave a course of lectures on the History of Assyria and Babylonia weekly through the year, not intended exclusively for the special students in the Semitic department but especially adapted for historians and theologians. The course was introduced by a survey of the exploration, excavation, and decipherment of the monuments in the valley of the Euphrates and Tigris, and a discussion of their bearing on Scripture, whereupon the principal historical facts of both Assyria and Babylonia were presented according to the monuments, from the earliest period down to the fall of Babylon.

Professor Haupt gave a brief course introductory to the study of the Babylonian texts, interpreting the Borsippa Inscription of Nebuchadnezzar.

A second advanced course in Assyriology was given by Professor Haupt on the Cuneiform Account of the Deluge, with constant reference to the other tablets of the Babylonian Nimrod Epic. Several words, important for the understanding of the text, which had found no satisfactory explanation heretofore were thoroughly studied, special attention being paid to the portion of the story narrating the building of the ark.

In Sumero-Akkadian a course of lectures on the grammar of the Proto-Chaldean idiom were given and then the study of some selected bilingual texts in Haupt's *Keilschrifttexte* was taken up. The Sumero-Akkadian controversy was fully discussed and the syntactical peculiarities of the Assyrian versions of these texts were pointed out.

PAUL HAUPT,  
*Professor of the Semitic Languages.*

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## German.

## ADVANCED COURSES.

The Teutonic Seminary met twice weekly, under the guidance of Professor Wood. The work of the year was on the Alemannic dialect, particularly in the Old High German period. Braune's Old High German Reader (2 auf. 1881) was made the basis of instruction, and the following extracts were read: Nos. I: 1, 2, 3, 4—II, III, V, VI, VII, XIII, XXIII, XXXII: 1, 2, 3. A brief course of lectures on the history of the Alemannic dialect was given, and members of the class presented papers on the following subjects: The relations of Notker's Boethius to the Latin original, Notker's Psalms, Collections of Alemannic (Swiss) Volkslieder, Niklaus Manuel's Fastnachtspiele, the Dialect of Gotthelf's Uli der Knecht, Hebel's Alemannische Gedichte, F. Th. Vischer's Swabian play "Nicht I. a.," with notes on the dialect.

The Seminary met also fortnightly, for the presentation of reports on the contents of recent journals.

The remaining advanced courses were also conducted by Dr. Wood.

In the course on German Literature the period from the beginnings of humanism in Germany to the decline of the second Silesian school was considered. The relations of German literature to English in each advance and decline were particularly emphasized. In the weekly readings connected with this course, each member of the class reported in turn on the contents of representative works, and on their style and language. Thirty-six numbers of Braune's Neudrucke deutscher Litteraturwerke des XVI und XVII Jahrhunderts were so reported on.

Goethe's earlier poems were studied by a class, twice weekly during the second half-year. The editions used were von Loeper's Goethe's Gedichte, 3 Bde., Berlin, 1882-4, and the first volume of Goethe's poems issued by the Goethe Gesellschaft, Weimar, 1887. The work was directed to Goethe's own literary development, as shown in his earlier poems up to the Weimar period. In connection with the poems of the Leipzig period the production of the so-called Anacreontic School were considered. Goethe's poetical style and vocabulary were studied, particularly in connection with his literary relations to Klopstock and Herder.

The class in Old Norse, meeting weekly first half-year, and twice weekly second half-year, studied Noreen's Grammar (Halle, 1884) in detail, after which Norse Prose was studied in the Sagas. One half the texts given in Möbius' *Analecta Norroena* (2 Ausg., Leipzig, 1877) were critically read. Two courses in Middle High German were given. The first, for beginners, included the whole of Paul's Grammar with chapters from Weinhold, and all the poetical extracts in Weinhold's Reader. In the second course, Minnesang's Frühling, ed. Lachmann und Haupt (Leipzig, 1882), supplied the texts, and the following numbers were read critically: I to IX, XI, XVIII,

XX, XXI. The method of instruction employed was that usually pursued in seminaries, each student interpreting in turn, he being also required to make himself familiar with all the important recent literature on the subject.

An advanced course was also given in Gothic, embracing Braune's Grammatik (3 Aufl., 1887) and Douse's Introduction to the Gothic of Ulfilas, London, 1886. In addition to the extracts given in Braune, the Gospel of Matthew was critically read.

#### UNDERGRADUATE COURSES.

(*Major Course*):

Goethe: (Tasso, Hermann and Dorothea, Faust (in part). Dr. Goebel. *Twice weekly.*

Selected Prose Readings: (Masius' Lesebuch, III). Dr. Goebel. *Weekly.*  
History of German Literature. Dr. Goebel. *Weekly.*

Prose Composition: (Buchheim). Dr. Learned. *Weekly.*

(*Minor Course*):

*Class A:*

Goethe: (Egmont). Dr. Learned. *Weekly.*

Prose Readings: (Buchheim's Reader, II). Dr. Goebel. *Twice weekly.*

Oral Practice: (Masius' Lesebuch, II). Dr. Learned. *Weekly.*

Prose Composition. Dr. Learned. *Weekly.*

*Class B:*

Otis, Elementary German; Schiller, Wilhelm Tell; Buchheim's Reader, II; Prose Composition. Dr. Learned. *Five times weekly.*

*Preliminary Class:*

Otis, Elementary German; Buchheim's Reader, I. Dr. Learned. *Three times weekly.*

*Prose Readings for Graduate Students:*

Historical: (Freytag, Aus dem Jahrhundert der Reformation). Dr. Goebel. *Three times fortnightly.*

Scientific: (Haeckel, Indische Reisebriefe). Dr. Learned. *Three times fortnightly.*

German Conversation. Dr. Goebel. *Twice weekly.*

HENRY WOOD,  
*Associate Professor of German.*

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### English Seminary.

The English Seminary has met under my guidance fortnightly through the year. The subject chosen was English Literature in the earlier Elizabethan period. A series of texts, representing the most characteristic productions of the time, was assigned, and each member of the class reported on a text in his turn.

The plan and scope of these reports varied with the original bent of the student, but in all the work the attempt was made to combine the care and accuracy, customary in philological investigations, with literary treatment. The interrelations of English and German literature during the 16th century received special attention. Besides the reports, longer articles on the following subjects were read before the Seminary by members, in the course of the year:

The style of Lord Berners in his Translations; George Gascoigne's Plays; Thomas Lodge; Notes on the Plays of William Rowley; William Dunbar; George Villiers and the English Drama of the 17th Century; On Beowulf, lines 1344, 2685; The Gerund of Necessity in Alfred's Pastoral Care; The Anglo-Saxon Absolute Participle; Lanier as an Artist.

HENRY WOOD,  
Associate Professor of German.

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### English, Advanced and Major Courses.

A course of lectures (twice a week) on Middle English Grammar has been given by me extending through the year. The phonology of the middle period of the language, in its diversity of dialect, was historically investigated, as was also the development of the sounds existing in the language of to-day. Parallel with these lectures an exhaustive study was made of *Piers the Plowman*. The texts of the "three versions" were critically compared for the determination of the philological and literary value of the work, and its social and historic meaning supplied a basis for a study of the times, students from time to time presenting papers on leading topics assigned to them for investigation.

Weekly lectures expository of Sievers' Anglo-Saxon Grammar extended through the first half-year, after which readings were pursued in the text of *Boethius*. For more critical work in Anglo-Saxon the poems *Exodus* and *Daniel* were used.

The legend of Troilus and Cressida in literature was the subject of advanced literary studies in the second half-year. Introductory lectures were given on Homer in the Middle Ages, tracing the legend up to Boccaccio's *Filostrato*. Chaucer's version was then read with reference to his original, and to the principles of his literary workmanship. After an examination of Henryson's *Testament of Cresseid* was next made, the work was centred in the play of Shakespeare as the last significant product in a long line of traditions. The treatment of this play at the time of the "Restoration" closed the list of topics upon which many papers were prepared and read by those in attendance.

In the English Major Course, the literature of the Anglo Saxon and Middle English periods was studied on the basis of Ten Brink's manual.

The text-book was supplemented by lectures, and the students were directed in the private reading of large portions of the literature involved in the subject.

JAMES W. BRIGHT,  
*Associate in English.*

### English, Major and Minor Courses.

The English Major Class met me once a week for the study of the Early Scottish Poets of the 14th, 15th, and 16th centuries. A chrestomathy especially prepared for this class was used, containing sufficient and representative selections from the works of Barbour, Wyntoun, James I, Henryson, Holland, Henry the Minstrel, Dunbar, Gawin Douglas, Lyndsay, etc. The readings were accompanied by lectures illustrating the historical, social, and religious conditions in which this poetry arose.

Two hours a week were given to the study of "Specimens of Early English," Part I. This class was conducted during the first half-year by Dr. F. G. Hubbard, during the second by Mr. R. E. Burton. The same distribution of instruction was made in the case of a class in the Anglo-Saxon of the Minor Course, which met twice a week and completed Sweet's Anglo-Saxon Reader.

In the English Minor Class, in the first half-year, the writers of the Elizabethan period were studied, the class meeting twice a week. The work comprised a study of the period in its social and political relations; the prose-writers, as represented by Lyly, Sidney, Hooker, &c.; the Lyrists and Lyric poetry; the allegorical poetry of Sackville and Spenser; the drama, including a brief glance at the mysteries, moralities and interludes; and the early regular drama of Sackville and Udall. A play of Marlowe was also read as introductory to Shakespeare. Shakespeare's *Twelfth Night* was critically studied by the class under the guidance of the instructor. Jonson's *Silent Woman* was also read; and the later Elizabethans illustrated (as far as the time allowed) from the works of Webster and Fletcher.

In the second half-year the writers of the fourteenth century were studied on a similar plan, with Chaucer as the centre; and his *Nonne Prestes Tale*, *Pardoner's Tale*, and *Chanouns Yemannes Tale*, were read by the class.

The great writers of the first half of the nineteenth century were the subject of study for one hour weekly throughout the year.

The English part of the course required of all undergraduates, consisted of a synoptical view of the whole literature, from its beginnings to the present century. The instructor accompanied the readings with lectures illustrating the historical development of the people co-ordinated with its literature. The class read aloud, under the guidance of the instructor, Shakespeare's *Julius Cæsar*, and selections from Chaucer and Milton. Essays were also written by the undergraduates and submitted to the instructor.

WILLIAM HAND BROWNE,  
*Associate in English.*

## Romance Languages.

The Romance Seminary has been occupied on the Paraphrase of the *Canticum Canticorum* and the *Fragment de Valenciennes*. A critical analysis of these documents was made on MS. facsimiles. The characteristics of the manuscripts, their speech peculiarities, the linguistic problems suggested by them, their relation to the Classic and Low Latin and to the later Old French, as well as to the modern language, their dialect and the extensive critical apparatus (reviews, monographs and special treatises) belonging to the two texts, formed the bulk of material with which the seminary had to do. Special emphasis was laid on an examination of fundamental questions of French phonetics as presented in the linguistic products of these monuments. For the Jonah fragment, moreover, the general principles of the system of Tironian notes were carefully presented as throwing light on the interpretation of the text. Two hours weekly through the year.

In addition to this course, followed by the most advanced students only, a meeting, of two hours, was held once a fortnight in which all special students of this department took part. The exercises here consisted in the reading of original papers bearing upon linguistic and literary subjects, of extracts of important articles in Romance journals, of general reports on the journals themselves, of reports on recent publications received and on any suggestive correspondence, of a professional nature, that might be presented. By this means, students in the early part of their university studies have the benefit of direct and active association with their more experienced co-workers in the field.

Introduction to Old French Philology. This course is intended for first year students and regularly follows the series of lectures on Modern French Phonetics, as given below. A few pages of *Aucassin et Nicolette* (Suchier's edition) were critically examined with special reference to the phonology and morphology of the language. For the former, the constant application of the principles of French phonology was required, while, for the latter, the student was thoroughly drilled in the grammar of the Old French as compared with the Latin on the one hand, and with the Modern French on the other. The leading characteristic forms of the dialect here represented were contrasted with corresponding ones in the Isle-de-France species. Weekly, second half-year.

Introduction to Italian Philology. A few pages of Boccaccio's *Decameron* were critically examined. Attention was here wholly given to the philology of the language, this course corresponding, for Italian, to the work done in Old French Philology as based on the *Aucassin et Nicolette*. The student was made acquainted with the present state of linguistic investigation in this branch of the Romance idioms; his special attention was directed to the scientific application of characteristic phonetic laws in the development of grammar forms and he was thus brought face to face with many of the difficult problems of Italian morphology and phonology. The determination of vowel-quality also formed an important factor in this work.

Lectures: (a) On the Langue d'Oïl Dialects. This course occupies two years: in the first year, the student becomes acquainted with the Norman and Picard; in the second year, with the Wallonian, Lorraine and Burgundian idioms. The system followed here, is to give a series of lectures on the peculiarities and geographical distribution of the dialects, calling attention to the phonetic and morphological characteristics of each idiom and, as soon as a given dialect is thus represented, texts are translated and their peculiarities pointed out by the student himself. During the last year the Norman and Picard have been thus studied and the following texts examined: Norman, *La muse Normande* de Louis Petit (1658 edition), extracts from *Le Coup d'oeil purin* (1773 edition), *Patois Poems of the Channel Islands* (Guille-Allès Library Series); Picard, Translation and phonetic transcription of the Gospel of St. Mathew in the *Amiens Dialect* by Edouard Paris, *Le Franc-Picard* (Extracts for the years 1880, 1882).

(b) On the North Italian Dialects. The object of this course was to give first the leading phonetic and morphological characteristics of the Gallo-Italic dialects (Ligurian, Piedmontese, Lombard and Aemilian) and then to present a detailed statement of some one member of the group. The Milanese, of the Lombard species, was selected for this study and the following work done: (a) A survey of the older and modern literature was given. (b) A series of lectures running through the year was delivered on the phonetics of the dialect, noting also the agreements and differences as compared with the Italian proper and with other members of the general group. (c) Texts were read as follows: Six cantos of *L'Inferno di Dante esposto in Dialetto milanese* da Francesca Candiani; thirty pages of *La Badia Dj Meneghitt* by Balestrieri; extracts from Porta and Grossi.

For the Piedmontese, selections of *Canzoni piemontesi* by Stefano Mina, were examined.

(c) Modern French Phonetics. This course was intended for first year students who wished to become specialists in the Romance Languages. After a survey of the general principles underlying sound and sign change in French, the various phonetic categories were taken up and severally dealt with in their historic development out of the Classic and the Low Latin products. The student was held here to modern forms exclusively and taught to make use of scientific methods. Weekly.

(d) Comparative Romance Morphology. This course, arranged for second year students, is intended to place them abreast of the present movement in Romance Morphological Science. To this end, as convenient and accessible point of departure, Diez' *Grammatik der Romanischen Sprachen* was taken and attention given particularly to the advancement of this science since his time. Special contributions to Romance morphology, the latest theories and suggestions, as found in the editions of individual texts, with reference to the growth of individual grammar categories and notably the influence of dialect, as represented in recent dialect investigations, for the production of morphological variation were laid before the student for the different Romance idioms and the distribution of the work noted in each language.

The *nomen* class and an introduction to the verb system were taken up during the last year. Weekly.

(e) The History of Romance Studies in Europe. The history of the various theories, from the fifteenth century down, with reference to the origin and growth of the Romance Languages, was succinctly given; the writings of individual scholars that have worked in the field were characterized; and the chief treatises, monographs, and articles of those now engaged in Romance studies, their official standing, the universities with which they are connected and their special lines of work were noted, and critical remarks made on the general bearings of their productions for the subjects which they treat. This course was intended to put the student abreast of the present scientific production in this field. Weekly, first half-year.

Special courses in Italian, Spanish, Old Provençal, Raetian and old Spanish were conducted by Dr. H. A. Todd.

Italian and Spanish were each taken up from the beginning, three hours weekly being devoted to Italian and two hours weekly to Spanish throughout the year. Grandgent's *Italian Grammar* was used to give a first rapid survey of the language, further drill in forms and prose composition being continued through the year in Harper's *Italian Principia*, Part I. Reading was early begun in the *Italian Principia*, Part II, and more advanced work done in the study of Goldoni's *Gl' Innamorati*, Ariosto's *Orlando Furioso* (three cantos), and Dante's *Purgatorio* (five cantos). Spanish was begun with a systematic study of Knapp's *Grammar*, and continued with extensive readings from Larra, Andueza, and Selgas. Towards the end of the year *Don Quijote* was taken up, and four chapters were carefully interpreted. At this stage of the work, attention was directed to the critical constitution of the text, and to the apparatus for the advanced study of Cervantes, including the fac-simile of the first edition, and original copies of other early editions of *Don Quijote*.

The work in Provençal included two courses, an elementary and an advanced course. In the former, careful attention was paid to the acquisition of the grammar forms (especially those of the verbs) and of a ready knowledge of the structure and spirit of the simpler productions of the language, and of the Boethius fragment. In the advanced course, the selections were made with a special view to initiating the student into the characteristic subtleties and difficulties of the more artificial forms of the literature. Bartsch's *Chrestomathie* was used as a text-book in both courses.

The course in Raetian comprised a general sketch of the geographical distribution of the principal Raeto-Romanic dialects, a practical study of the language-forms of the Lower Engadine as given in Andeer's *Grammatik*, a presentation of the constituent elements of Raetian speech, based on Gartner's *Grammatik*, and the critical interpretation of the earliest Raetian literary document, *La chanzun della guerra dalg Chiasté d' Misch* (704 verses; Ulrich's *Chrestomathie*).

Old Spanish was studied in the *Poema del Cid*, some 500 verses of which were interpreted with advanced students, particular attention being given, on the linguistic side, to morphology and etymology.

Lectures on literature, by Dr. F. M. Warren, were given to graduates as follows:

1. Old French Literature. The history of comedy, its bearing on the life of the time and its relation to the Renaissance comedy were discussed. The rise, progress and decline of lyric poetry, the influence on it of Provençal lyric, and later its own strophic development were considered. In religious and didactic poetry especial attention was paid to the popular treatises on science, to the sources of popular stories and fables, while in allegorical poetry the significance of the *Roman de la Rose* was made the principal subject and the authority of Ovid in the Middle Ages shown. The *Romans d'Aventure* and the prose works of the early period were treated and an outline of the literature of the xivth and xvth centuries, followed by lectures connecting the mediaeval period with the Renaissance, was given weekly through the year.

2. Spanish Literature:—The general features of Spanish literature were considered, from the first monuments to the accession of Philip V. Particular attention was paid to the national ballad poetry, the influence of Italian lyric, the rise and growth of the drama, its beginnings and development were studied and comparison with the remaining Romance nations and of England were indicated, as well as the material furnished them from Spain. Weekly, through the year.

3. Provençal Literature:—The main purpose in this course, besides an outline of the Old Provençal literature, was to study the forms of the Provençal lyric and their bearing on the poetical structure of other literatures. Weekly, first half-year.

Besides the above courses, lectures were given on the general subject of Portuguese literature and more particularly on the lyric of the xiiiith century and the epic of the xvith.

Also the movement of Italian literature during the last century was sketched with particular reference to the Classical and Romantic epochs.

In the *French Major Course*, the study of Old French was pursued under Dr. Todd twice weekly during the first half-year, including a general survey of Old French Grammar and the reading of numerous extracts from the early monuments of the language. The text-book used was Clédât's *Morceaux choisis des auteurs français du moyen âge*. In the second half-year a similar course was given in the leading authors of the xvith century, with special study of the transitional stages of the language as to form, syntax and style. The text-book was Darmesteter and Hatzfeld's *Morceaux choisis des principaux écrivains du xvie siècle*. In this course weekly lectures on literature previous to the xvith century were given by Dr. F. M. Warren, and classes in composition were carried on with reading of xvith century works. In the Minor course, under the special direction of Dr. F.

M. Warren, the students have read selections from the *Travels* of Gautier and Dumas, and from the *Causeries du Lundi* of Ste.-Beuve. The Romantic drama was studied in *Ruy Blas* and *Ilernani* of Victor Hugo, and an outline of French literature was given on the basis of Saintsbury's *Primer*.

In Historical French, chapters XIII-XXVI of Voltaire's *Sidcle de Louis XIV* have been read, and in Scientific French the greater part of Luquiens' *Course*. By the kindness of the author, lectures delivered in French by Professor Fortier, of Tulane University of Louisiana, on modern French poets were made available to the class and read in part.

In Composition, Whitney's *Grammar*, Part II, was made the text-book and supplemented by common idioms drawn from outside sources.

A. M. ELLIOTT,

*Associate Professor of the Romance Languages.*

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## History and Politics.

Dr. Herbert B. Adams has had the general direction of the department, and has given special attention to

### 1. The Seminary of Historical and Political Science.

This coöperative society of instructors and twenty-six students has continued to meet one evening in the week, as in former years, for the discussion of original papers produced by members of advanced standing. The work of the seminary, from its origin, has been chiefly in fields of American institutional and economic history. The director has recently led inquiries into the history of American colleges and universities. His sketch of William and Mary College was followed (1) by an account of the curious attempt to found a French Academy in Richmond after the American Revolution, and (2) by an elaborate study of "Thomas Jefferson and the University of Virginia," both now published, with other studies, by the Bureau of Education as the first of a series of "Contributions to American Educational History." In this series will appear similar monographs, by members of the seminary, upon the History of Higher Education in North Carolina, South Carolina, and Georgia, which have been completed during the past year. In American Economics, a noteworthy contribution is the "History of Coöperation in the United States," a work undertaken two or three years ago, but completed by supplementary studies presented to the seminary in 1887-8. This work forms volume VI of the University Studies in Historical and Political Science, and is entirely the product of student coöperation by graduates and doctors of this university. The results of Dr. R. T. Ely's original and comparative studies of "Taxation in American States and Cities," prosecuted in vacation journeys in the interest of the Maryland Tax Commission, elaborated by the aid of a graduate student, John H. Finley, and presented in select parts to the seminary, have lately been published in book-form. Henry B. Gardner's historical

study of "Taxation in Rhode Island" has been completed and presented as a doctor's thesis. Both this and P. W. Ayres' thesis on the "Diplomatic Relations between England and the United States, from 1776 to 1792," were critically discussed in the seminary. Various minor contributions, by instructors and students, upon topics pertaining to American history, political economy, education, and social science were first presented here and then published in magazines or other periodicals. The seminary has been addressed, in helpful and suggestive ways, by two or three public men, notably by the Rt. Hon. Joseph Chamberlain, M. P., upon the Irish Land Question and the difficulties in the way of Home Rule.

#### 2. Early History of Institutions, with special reference to Greek Politics.

This course of lectures to thirty graduate students, by Dr. Adams, occupied two hours a week during the first half-year and was designed to introduce the class to a study of Historical Politics. In connection with the lectures, students were encouraged to read such authors as Sir Henry Maine, Fustel De Coulanges, McLennan, Morgan, Herbert Spencer's Sociology, Freeman's Comparative Politics and Federal Government, Aristotle's Politics, Schoemann, Herman, and other authorities upon Greek institutions. A written examination upon the lectures and upon the results of private reading was set at the end of the course. An original study, by Mr. W. P. Trent, on the "Slave Labor of Antiquity" grew out of this course and was given as a popular lecture to three different audiences of workingmen in Baltimore. The subject is to be elaborated into a comparative study of Spartan Helots and Old Virginia Slaves.

#### 3. The Origin and Growth of Prussia.

This course of special lectures was given to the same class of advanced students during the second half-year, and represents our department method of balancing a representative course of ancient history with a representative course of modern history. This method is pursued throughout the three years' curriculum for graduate students (see the pamphlet called "Graduate and Advanced Courses," page 23). After reviewing the early dynastic and territorial history of Prussia, particular attention was given to the period of Frederick the Great, the overthrow of the military state by Napoleon, and its reconstruction by Stein and Hardenberg. The class read, in connection with the course, Professor Tuttle's new work on Prussia, Carlyle's Frederick the Great, and Seelye's *Life and Times of Stein*, and became more or less acquainted with the writings of Droysen, Ranke, and Treitschke. A written examination upon Prussian and German history was required at the end of the course.

#### 4. Undergraduate Courses in History and Political Science.

The usual courses for undergraduates were given by Dr. Adams, in connection with (1) the so-called "P. H. E." class; (2) the History Major; and (3) the Political Science Major. These courses comprised a general introduction to history for newly admitted students; lectures on church and empire, the renaissance and reformation for second year men; and lectures on international law for third year men; altogether, five hours a week, the first half-year, and four hours a week, the second half-year.

Mr. Emmott lectured twice weekly to fourteen graduate and advanced students, upon the history of the English law of Real Property. He considered the effects of the Teutonic settlement in England and of the laws and customs of the Anglo-Saxons relating to property, together with an account of the judicial institutions of the Anglo-Saxons and of Anglo-Saxon vassalage. He then treated of the sources of the feudal system, of the origin of feudal vassalage, and of the effects of the Norman Conquest upon the pre-existing laws and institutions of England, as well as of the origin, sources and leading principles of the common law of England relating to real property. Commencing with Magna Charta, the rise and subsequent development of the statute law of England relating to real property were carefully traced down to the present time, special attention being paid to the effect and operation of the most important statutes, and the rise, progress and final establishment of the Court of Chancery were indicated. In the latter part of the course the following topics were also treated: The development and completion of the common law; Littleton's work on tenures; origin and early history of uses or equitable interests in land; the Statute of Uses (27 Hen. VIII. c. 10), and its principal effects on modern conveyancing; history of the law relating to wills of land; abolition of military tenures; the Statute of Distribution; the various titles or modes of acquisition of rights over things real.

In connection with the lectures frequent oral and written examinations took place upon the various topics treated of by the lecturer.

Dr. R. T. Ely has given the following courses:

1. Lectures on Finance with special reference to taxation in American States and Cities, three hours weekly throughout the year to thirty-three graduate students. This course began with a discussion of the nature and scope of finance and proceeded to a presentation of the proper methods of study and investigation. The various revenues of the State were discussed and their historical development traced. Taxes were treated in their economic and legal aspects and the various kinds of taxes examined. Taxation in American States and Cities occupied a large proportion of time but considerable attention was given to Federal finances. Public debts occupied the attention of the class for some time, and examinations were held on the work by H. C. Adams, bearing that title.

2. A course of class instruction to thirty-three undergraduate students, as in former years.

Dr. J. F. Jameson has conducted class-courses as follows:

1. Lectures to twenty-four graduate students, weekly, on the History of the United States from 1789 to 1793.

The first lectures described the condition of the United States in 1789. Then several lectures were devoted to the history of the individual States during the period chosen, that the history of the United States might be seen to be something more than a mere history of the federal government. The organization of the new government, the legislative and financial

measures of its first four years, the history of slavery, of foreign and Indian affairs, of parties and party politics, of elections and of the judiciary, were then treated with fulness and detail. Much attention was paid to the bibliography of the subject, and efforts were made to have the course contribute to a knowledge of the sources of the history of the United States and of the best methods of using such sources. Members of the class read papers or made oral reports upon the amendments to the Constitution proposed by ratifying conventions, upon the case of *Chisholm vs. Georgia* and the eleventh amendment, upon the constitutional history of the religious bodies of that time, upon the development of the State department, upon the movement for a second general convention, upon the New Madrid Company, and upon the development of the judicial function of declaring unconstitutionality. In some cases, more extended investigations have been undertaken.

2. Lectures to twenty-three graduate students, weekly, on Modern Historians.

After an introduction upon the history of ancient and mediæval historiography, the history of historical literature, since the Renaissance in Italy, Spain, Portugal, France, England, the Netherlands, Germany, and the countries of northern and eastern Europe, was described and discussed with fulness. Attention was given to the development of tendencies and schools, to the characteristics and methods of individual historians, and especially to the influence exerted upon historical literature in each country and age by the prevalent conditions of public and private life, and the course of historical events. The historians of America were then treated in a similar manner.

3. Undergraduate Courses in History and Political Science.

As in former years Dr. Jameson conducted various class courses for undergraduates: (1) Physical and Historical Geography; (2) Greek and Roman History; (3) French and English History; (4) the Constitution of England and the Constitution of the United States, altogether eight hours a week, first half-year, nine hours a week, second half-year.

Dr. Woodrow Wilson has given twenty-five lectures to twenty-five graduate students upon the subject of Administration.

The course opened with two lectures devoted to a brief historical discussion of the functions of government. It was the object of these lectures to bring Administration out of the field of abstract discussion and give it the practical aspect which it is so desirable that it should wear. Following these, two lectures were given to a consideration of the exact field and nature of Administration and the character of administrative questions, so far as these matters could be suggestively treated at the opening of a course. The ground being thus cleared, the great bulk of the work was devoted to comparative expositions of the structure and functions of the Central Government in France, Prussia, England, Switzerland, the German Empire, and the United States. In the cases of Switzerland and the United States the

central governments of the States, as well as the structure and functions of the federal administration, were considered.

These were the first-year lectures of a three-years' course and were meant to afford the student a basis for his own study and for the future portions of the course by familiarizing him with the larger parts, the chief functions and energies, of six typical modern governments.

Col. Carroll D. Wright, Commissioner of the Department of Labor, Dr. Woodrow Wilson, Dr. R. T. Ely, Mr. A. G. Warner and others gave a course of ten public lectures, in Hopkins Hall, upon "Certain Social Problems relating to Modern Cities," with special reference to the condition of the working classes, municipal government, taxation, organized charities and self help. Several of the lecturers afterwards discussed anew their special subjects in the Friends' Meeting House in Washington, by invitation of the Society of Collegiate Alumnae, some of whom had attended the public course in Baltimore.

Dr. E. R. L. Gould gave to twenty-one students a course of twelve lectures on Social Statistics. Four were delivered in the Hopkins Hall course of "Certain Social Problems Relating to Modern Cities," and the remainder to a class of twenty-one students. The sphere of social statistics, and the facilities afforded by different governments for their collection and dissemination were first presented. The subsequent lectures dealt solely with labor questions from the statistical standpoint, including comparative rates of wages, earnings, efficiency, standard and cost of living of European and American working-people; the environment of labor in large cities in respect to housing, out-door breathing-spaces, and facilities for evening instruction and recreation; facts relating to strikes and distribution of products. A scientific basis for tariff legislation was also outlined.

Mr. John M. Vincent, the librarian of the department of History and Politics, gave six lectures upon Library Administration and the Use of Books.

Mr. Frank W. Blackmar successfully conducted a class of twenty-three undergraduate students through the Outlines of European History.

Mr. Henry Clark took efficient charge of a class of ten students for the historical study of Herodotus and Thucydides.

The total number of undergraduate students who have attended classes in this department during the past year is ninety-five. The total number of graduate students who have courses in History or Politics is thirty-eight. Sum total 133.

HERBERT B. ADAMS,  
*Associate Professor of History.*

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### Physics.

The Physical Laboratory, Professor Rowland, director, is a large building seventy-one feet wide by one hundred and seventeen feet long, having four stories not including basement or attic. The basement is commodious and well lighted and contains the work shop, engine and dynamo room, and other rooms of great importance for experiments where steadiness is required. Below the basement are the constant temperature vaults containing the engines for ruling diffraction gratings and comparators for the exact comparison of lengths. During this year these vaults have also proved extremely valuable in the comparison of standard electrical resistances, as the variations in temperature were less than one-fifth of a degree centigrade in a day. The laboratory contains also a large lecture room for experimental lectures and smaller mathematical lecture rooms, three rooms for the storage of apparatus, studies for instructors, a mathematical and physical library well furnished with books and periodicals, and containing an excellent collection of models illustrating mathematical surfaces, rooms in which the more elementary work of undergraduate students is carried on under the immediate direction of the assistant, and a number of rooms fitted for special research in heat, electricity, and light. On account of the importance of photography in the study of physical phenomena, there has also been provided a large room for the conduct of general chemical operations in connection with photography, an emulsion room furnished with refrigerator and drying closet and made with special precautions against dust, and a centrally situated developing room. Some rooms in the building have also been set apart for the study of psycho-physics. At the top of the corner tower of the building is the astronomical observatory with dome and containing the nine and a half inch equatorial. In connection with the laboratory there has been erected during the past year a transit house in which is mounted the Dollond transit and the new meridian circle.

The efficiency of the shop has been increased by the addition of a two horse power gas engine, which is also employed to force water into the tank at the top of the building, and to drive the centrifugal machine belonging to the biological department when the 18 horse power steam engine is not running.

Among the more important apparatus may be mentioned:—

Ten or eleven dynamo machines and motors of different sizes and types, including an alternating dynamo, also direct current dynamos of the Siemens, Edison, Brush and Weston forms, with four motors of from  $\frac{1}{2}$  to 2 horse power. A mechanical transmission dynamometer, also a large collection of galvanometers adapted to different uses, three electro-dynamometers, accurate resistance balances, standard condensers, absolute and quadrant electrometers, and carefully compared resistance standards.

Apparatus for the determination of the mechanical equivalent of heat, and the comparison of thermometers with the air thermometer.

Two concave gratings mounted for the photographic study of spectra, also a large spectrometer with telescopes six inches aperture, and a collection of gratings, both flat and concave of various sizes, and adapted to a great variety of uses.

There is also a spectrometer by Meyerstein, with an accurate circle which admits of great precision in angular measurements.

The instrumental equipment may be classified as follows:—

1. Apparatus adapted to the prosecution of investigation in every department of physics, the collection being particularly rich in instruments of precision for exact measurement in light, heat, and electricity and magnetism.
2. Well determined copies of the various physical standards of length, mass, and of the units employed in electrical measurements as well as thermometric standards, with the necessary apparatus for exact comparison with these and for the construction and testing of other secondary standards.
3. A good collection of instruments adapted to demonstrations and illustrations before the students of general physics.
4. A number of instruments adapted to the training of beginners in physics, in the habits of observation, manipulation and measurement.

The laboratory has been open daily for the prosecution of study and research, under the direction of Professor Rowland, assisted by Dr. Kimball, Dr. Duncan and Dr. Crew. The following courses have been given during the year:

Professor Rowland:

Lectures on Thermodynamics, Heat Conduction and Physical Optics.

*Four and five times weekly through the year.*

Dr. Kimball:

First year's course in General Physics. *Daily, through the year.*

Second year's course, consisting of lectures on Mechanics, Elementary Thermodynamics, Electricity and Magnetism, Sound and the Wave Theory of Light. *Daily, through the year.*

Dr. Duncan:

First year's course in Electricity and Magnetism. *Three times weekly, through the year.*

Second year's course in Electricity and Magnetism, consisting of lectures on the theory of dynamo in motors, the transmission and distribution of energy, the telegraph, the telephone, storage batteries, &c. *Twice weekly, through the year.*

Dr. Crew:

Laboratory Work of the undergraduate students. *Through the year.*

Besides the regular work of instruction the following researches have been carried on:

On the relative wave lengths of lines of the solar spectrum, ultra violet portion.

Determination of absolute wave lengths of light.

On the spectrum of hydrogen under various conditions of excitement and pressure.

The photographic study of the spectra of zinc, cadmium, and magnesium, both separately and alloyed, with measurements of wave lengths.

The photography of various bands of the carbon spectrum from the electric arc, with a study of the arrangement of the lines in these bands and the algebraic expression of the relation between their wave lengths, also a verification of the coincidence of the bright lines of the carbon spectrum with dark lines in the solar spectrum.

The preparation of new negatives for the photographic map of the spectrum, the series being extended below the B group, the earlier negatives being far excelled in definition.

The final adjustment of the new ruling engine. This instrument, though completed more than a year ago, was only brought to its present state of excellence by many months of laborious adjustments and corrections. It now rules gratings of the largest size, which surpass in definition any that have been obtained before, and it is chiefly owing to this excellence of the gratings that the new negatives for the spectrum maps are so much superior to the old.

The determination of the coefficient of expansion of water between 0 and 50° degrees centigrade.

Additional measurements on the displacement of lines in the solar spectrum due to the rotation of the sun.

A determination of the unit of electrical resistance by the method of Lorenz.

A study of the electrical resistance of pure mercury with reference to the value of the mercury unit.

Investigation of the curves of electromotive force and current in an alternating dynamo, with varying conditions of resistance and self-induction in the circuit.

A study of the chemical changes in storage battery cells.

The behavior of different insulating substances under various conditions.

Advanced students have taken part with the instructors in weekly meetings for the discussion of the current physical journals.

A course of nine public lectures were given in the main lecture room of the laboratory during the month of February, and were as follows:—

Three by Professor Rowland, on the history of the development of the study of frictional electricity.

Three by Dr. Kimball, on electric currents, magnetism and the phenomena of induction.

Three by Dr. Duncan, on the dynamo machine and the various practical applications of electricity, and problems connected with them.

The lectures were illustrated by experiments, and the audience filled the lecture room to its utmost capacity, the average attendance being about 150.

During the year there have been seventy-nine students in the department.

Thirteen students have pursued the courses in electricity and magnetism conducted by Dr. Duncan, and four having completed the two years' course and passed the required examinations have received certificates from the university.

During the year arrangements have been made for the testing of electrical instruments and standards in this laboratory, and on September 1, the work will actually begin.

HENRY A. ROWLAND,  
*Professor of Physics.*

### Chemistry.

During the past academic year, 1887-88, the work in Chemistry has been carried on in accordance with the announcements made, with a few slight changes rendered necessary by circumstances.

The laboratory has been constantly open for advanced and for undergraduate students. Lectures and class-room instructions have been given as follows:—

By the Director:

- General Chemistry. *Three times weekly through the year.*
- Chemistry of the Compounds of Carbon. *Twice weekly through the year.*
- Theoretical Chemistry. *Twice weekly through most of the year.*
- Reviews in Organic Chemistry for Graduates. *Once weekly through the year.*

By Dr. Morse:

- Supplementary Inorganic Chemistry. *Twice weekly through the year.*

By Dr. Renouf:

- Reviews in General Chemistry. *Twice weekly through the year.*
- Reviews in Inorganic Chemistry for Graduates. *Once weekly through the year.*
- Reviews in Organic Chemistry. *Once weekly through the year.*

The total number of students who have followed the courses in chemistry during the year is 122. Of these 36 were graduates following chemistry as their principal subject, 7 were graduates following chemistry as a secondary subject, and the rest were undergraduates or special students. The numbers attending the various classes included in the above list were:

<i>Course.</i>	<i>Instructors.</i>	<i>No. students.</i>
General Chemistry, - - - -	Dr. Remsen,	- 46
Chemistry of the Compounds of Carbon, -	Dr. Remsen,	- 65
Theoretical Chemistry, - - - -	Dr. Remsen,	- 24
Reviews in Organic Chemistry, - - - -	Dr. Remsen,	- 10
Supplementary Inorganic Chemistry, -	Dr. Morse, -	- 38
Reviews in General Chemistry, - - - -	Dr. Renouf,	- 35
Reviews in Inorganic Chemistry, - - - -	Dr. Renouf,	- 20
Reviews in Organic Chemistry, - - - -	Dr. Renouf,	- 36

Besides the above, fifteen historical lectures were given by the instructors

and the most advanced students. The lectures and their subjects were as follows:

- Mr. F. Lengfeld on Dalton's work;
- Mr. A. F. Linn on Davy's electro-chemical theory;
- Mr. J. H. Kastle on the composition of hydrochloric acid;
- Mr. M. Barnett on the relation between specific heat and atomic weights;
- Mr. R. O. Graham on Laurent's work;
- Dr. E. Renouf on Liebig's work;
- Mr. A. R. L. Dohme on Gerhardt's work;
- Mr. R. J. J. DeRoode on Dumas' work;
- Mr. W. M. Burton on Stas' work;
- Mr. J. T. Willard on Graham's work;
- Mr. G. M. Richardson on Kekulé's work;
- Mr. J. M. Rich on Würtz's work;
- Mr. W. W. Randall on Kolbe's work;
- Dr. H. N. Morse (two lectures) on the history of the study of the vapor density of chemical compounds.

Three candidates presented themselves for the degree of Doctor of Philosophy. They are Messrs. R. O. Graham, J. H. Kastle and F. Lengfeld. Their dissertations were respectively: "On the Conduct of some Diazo-compounds towards Alcohol," "On Para-nitro-ortho-sulpho-benzoic Acid and some of its Derivatives," and "On the Relative Stability of the Alkyl Bromides." The last two have been printed in separate form, and the main portions of these as well as of the first will be published in the *American Chemical Journal*. Besides these three investigations, the following have been completed: on the atomic weight of zinc; a method for the determination of boric acid; a method for determining the composition of butter and milk. Investigations on the following subjects are well advanced and they will be finished next year: on some double salts of the halogens; further investigations on benzoic sulphinide; on sulphonfluorescein; on chlor-benzoic sulphinide.

The Journal-meetings were held twice weekly until January 1, and once weekly through the rest of the year. Besides the instructors ten advanced students have taken part in this work, and there has been a regular attendance of twenty.

The laboratory has been filled to overflowing, and the lecture-rooms taxed to the fullest extent. If the present rate of increase in attendance should continue, it is difficult to see how the students are to be accommodated. It is especially gratifying to see how many college graduates from various parts of the country have come together. The room originally set apart for the most advanced men is now full, and there are several more applicants for places next year than can be accommodated. The number of those who intend to present themselves for the degree of Doctor of Philosophy next year is considerably larger than it has ever been before, and several of these

will have spent four years in the study of chemistry since receiving the degree of A. B. Experience has shown that for the majority of those who have had simply the usual college course in chemistry a period of four years is necessary to do the work satisfactorily.

IRA REMSEN,  
*Professor of Chemistry.*

### **Geology and Mineralogy.**

The work in Geology and Mineralogy at the university has, during the past year, been mainly carried on in the brick building, No. 610 N. Howard St., which was assigned by the trustees for that purpose one year ago. On account of lack of space in these quarters, however, the larger part of the collections have been left in the upper story of the Chemical Laboratory, where also the lectures in mineralogy have been delivered.

The department has been increased by the important addition of Palaeontology, which line of work is under the direction of Mr. William B. Clark, Ph. D. (Munich, 1887.)

What has been accomplished during the past year may be noted under the three heads: Instruction, Original Work and Collections.

1. INSTRUCTION. The following courses of lectures have been given:—

(a) General Mineralogy, embracing crystallography, physical (especially optical) and descriptive mineralogy, by Dr. Williams, three times weekly throughout the year.

(b) Petrography, by Dr. Williams, three times weekly for the greater part of the year. In this course the two works of Rosenbusch were used as a basis.

(c) Palaeontology and Stratigraphical Geology. A short course of twenty-five lectures given during the months of April and May, by Dr. Clark, as supplementary to the lectures on petrography and inorganic geology.

(d) A short course on Crystallography and Descriptive Mineralogy given five times weekly during the month of January, by Dr. Williams, to undergraduate students as a part of their major course in chemistry.

(e) A course of public lectures delivered by different gentlemen in Hopkins Hall on the Natural History of the Region about Baltimore, dealt largely with geology.

The following laboratory and practical work has also been conducted:—

(a) The petrographical laboratory in the building on Howard St., has been open daily from 9 a. m. to 5 p. m. under the direction of Dr. Williams.

(b) Practical work in mineralogy has been conducted on Friday afternoon of each week in the mineralogical lecture room in the Chemical Laboratory.

(c) During the shorter courses in palaeontology and to the undergraduates in mineralogy, the lectures were supplemented by laboratory work.

(d) Journal-meetings have been held weekly and numerous geological field excursions into the surrounding country have been conducted by Drs. Williams and Clark.

2. ORIGINAL WORK. The following original investigations in Geology have been either commenced or carried to completion:—

(a) A study of the gabbros, diorites and contact phenomena of the "Cortlandt Series," near Peekskill, N. Y., by Dr. Williams. (Published in the *American Journal of Science*.)

(b) A study of the eruptive rocks of the island of Fernando Norhona, Brazil, collected by Prof. J. C. Branner, by Dr. Williams and Mr. Gill.

(c) Completion of the work on the greenstone schist areas on the south shore of Lake Superior for the U. S. Geological Survey, by Dr. Williams. (To be published as a Bulletin of the Survey.)

(d) A field study of the archæan rocks of Harford County, and of the crystalline limestones of Baltimore Co., Md., by Dr. Williams.

(e) An investigation of the tertiary deposits of south-eastern Maryland, by Dr. Clark.

(f) A comparative study of the cretaceous echinoderms of the United States, by Dr. Clark.

(g) A petrographical study of the crystalline rocks (granites, porphyries and diabases) of Missouri, by Dr. E. Howarth. (Published in the *American Geologist*.)

(h) A field and microscopic study of the crystalline rock occurring near Ilchester, Howard Co., Md. (sheet No. 16 of University Field-Club Map), by Dr. W. H. Hobbs.

(i) A study, especially in the field, of the serpentine deposits of Maryland, by Mr. A. C. Gill.

3. COLLECTIONS. No attempt has been made by the university to secure museum materials for exhibition, inasmuch as there are at present no suitable quarters for this purpose. The purchase of the Allen and Root mineral collections, together with various additions made from time to time by gift or purchase, has supplied good material for work in mineralogy. To these collections no important additions have been made within the past year.

The petrographical collections have been increased by several suites of rocks. Mrs. A. C. Marvinne has presented a set of type specimens collected by her husband, the late Prof. Marvinne, on Keweenaw Point, Lake Superior. Mr. A. C. Gill obtained for the laboratory an interesting set of rocks during a recent trip through the Yellowstone National Park. Mr. W. H. Hobbs has presented a set of eruptive rocks from eastern Massachusetts. Large collections have also been made during the past year from the archæan areas of Maryland, especially in Cecil, Harford, Baltimore and Howard Counties. A special collection of the rocks and minerals of the State has also been arranged on the ground floor of the geological building.

The most important additions to the geological collections have been made in the department of palæontology. At the beginning of the last year there was no material of this kind in the possession of the university. During the last eight months, however, Dr. Clark has secured many gifts

of interesting fossils and has instituted a valuable series of exchanges with material collected by himself in the eastern part of Maryland. The presentation to the university of the collections and cases belonging to the Maryland Academy of Sciences made a good nucleus for the palaeontological collections. Through Mr. C. D. Walcott of the United States Geological Survey there has been presented by the Smithsonian Institution a valuable collection of cambrian fossils; and Dr. W. H. Dall has, in the same way, secured for the university a large suite of cenozoic fossils from the southern states, including characteristic representatives of the eocene, miocene, pleiocene and post-pleiocene formations.

Besides adding a very large number of tertiary fossils from southeastern Maryland to the collection, Dr. Clark has made with other of this same material the following exchanges:

(1) With the Geological and Natural History Survey of Canada, for interesting suites of palaeozoic and mesozoic fossils.

(2) With Prof. Edw. Orton, State Geologist of Ohio, for palaeozoic fossils, chiefly from the Cincinnati silurian.

(3) With Prof. H. S. Williams, of Cornell University, for a series of New York devonian fossils.

(4) With Professor S. Calvin, of the University of Iowa, for a collection from the palaeozoic formations in Iowa.

(5) With Prof. D. W. Dennis, of Earlham College, for very perfectly preserved fossils from the silurian beds of southern Indiana.

In addition to these, several private collectors have been very glad to accept of these exchanges. Correspondence is now being held with other institutions, and it is hoped that the collections may soon be further increased by exchange.

GEORGE H. WILLIAMS,  
*Associate Professor of Inorganic Geology.*

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## Biology.

### I. LABORATORY WORK.

The biological laboratory was open to students during eight hours, five days weekly, during the session. The work carried on in it was in part higher study and research by more advanced workers, and in part elementary or collegiate study in connection with the regular class lectures.

Dr. Martin and Dr. Brooks directed the advanced practical work, and Dr. Howell and Dr. Andrews most of the undergraduate practical work. The director of the laboratory believes that the collegiate practical studies were never so efficiently managed as during the past session, and is glad to acknowledge the valuable services in this regard of Dr. Howell and Dr. Andrews, and of those gentlemen who worked under their direction as junior assistants.

During the year original investigations were made in regard to the following subjects:

The microscopic structure of the ependyma of the frog's brain. The physiological constants of terrapin muscle. The temperature limits of the vitality of the mammalian heart. The origin and regeneration of red blood corpuscles. The influence of light on metabolism in animals deprived of the cerebral hemispheres. The influence of liquids containing tannin upon gastric digestion. The life history of *hematococcus*. Method of multiplication in hydroids. Life history of *Epinthisis McCradyi*. The development of alpheus. The solvents of chitin useful for histological purposes. The development of *manicina areolata*. The maturation of ascidian ova. The structure and development of the eye of limulus.

The results of many of the above researches have already been published in abstract in the *University Circulars*, the *Zoölogischer Anzeiger* and elsewhere; some of the remainder have been published in full in the *Studies from the Biological Laboratory* and in other journals: and it may in general be said that all of the investigations named above are already so far advanced as to justify the expectation of their early publication *in extenso*.

As a part of their regular class work, students taking the first year course in biology examined in the laboratory a number of typical fungi, green plants and animals, the human and some other skeletons, and studied the embryology of the chick. During April and May, about sixteen practical lessons in the elements of systematic and structural botany were given by Dr. B. W. Barton.

College students in the second year of their biological course dissected carefully one of the higher mammals (as a preparation for subsequent study in animal physiology); and afterwards spent from five to six hours each week in practical work in normal histology and experimental physiology.

## II. ADVANCED LECTURES.

Professor Martin lectured once a week throughout the session on the physiology and anatomy of the peripheral nervous system. Dr. Brooks lectured once each week on heredity. Other advanced lectures were delivered by guests, instructors, and advanced students of the university, as follows:

- Professor Gaule, of Zurich. One lecture on the nature of the cell.
- Dr. John P. Campbell. Two lectures on tetanus.
- Dr. W. K. Brooks. One lecture on embryonic membranes.
- Dr. E. A. Andrews. One lecture on the development of the uro-genital system.
- Dr. F. H. Herrick. One lecture on the germ layers.
- Dr. H. V. Wilson. One lecture on the development of the vertebrate circulatory organs.
- Dr. Julius Nelson. One lecture on the development of sensory organs.
- Mr. S. Watase. One lecture on the development of the skeleton.
- Mr. C. F. Hodge. One lecture on the development of the nervous system.
- Mr. T. H. Morgan. One lecture on the origin of the mesoderm.
- Mr. H. T. Fernald. One lecture on the fate of the blastopore in vertebrates.

Most of the advanced teaching was, however, carried on individually by daily personal contact and converse with the instructors, who directed the reading and controlled and supervised the work of the students.

## III. COLLEGIATE INSTRUCTION.

Courses for undergraduates, and others not prepared to undertake advanced work, were given as follows:

Laboratory Work, throughout the year. Dr. Howell, Dr. Andrews.

General Biology. Professor Martin. *Thrice weekly until April.*

Embryology of the chick and mammal. Professor Martin. *Thrice weekly, from the beginning of April to the close of the session.*

Osteology. Dr. Andrews. *Twice weekly.*

Elements of Systematic Botany. Dr. Barton. *Twice weekly, from the beginning of April to the close of the session.*

Mammalian Anatomy. Dr. Howell. *Five times weekly, during October.*

Animal Physiology and Histology. Dr. Howell. *Thrice weekly, from November.*

Elements of Zoölogy. Dr. Brooks. *Twice weekly, from November.*

Human Histology. Special practical course for physicians. Dr. Howell. *Three afternoons a week for three months.*

## IV. SEMINARY WORK.

Two seminaries, one physiological, the other morphological, met during the year under the guidance of Dr. Martin and Dr. Brooks respectively.

In the physiological seminary (or reading club), a certain subject was assigned some time beforehand to each of the advanced students in physiology, and he was expected when his turn came to present a critical and historical account of it: and the subject was then discussed by the instructors and others present.

The morphological seminary met once a week throughout the session for the description and discussion of researches in progress in the laboratory, and to hear reports upon the literature of selected morphological topics.

An informal morphological reading club met weekly outside the walls of the university to read and discuss general works bearing on zoölogy. This club was under the guidance of Dr. W. K. Brooks.

## V. JOURNAL CLUB.

The journal club (for reporting and discussing current biological literature), met weekly during the session. Its members were the instructors and advanced students; to each was allotted some special branch of the subject. The topics were so distributed that alternate meetings were chiefly physiological and chiefly morphological.

## VI. THE BIOLOGICAL MUSEUM.

When the present laboratory was built only small provision was made for a museum; the intention being not to attempt to found or maintain a great museum, which is a costly matter, but to keep ready for use such specimens as students would require for their regular studies; and, with the coöperation of the Naturalists' Field Club, to obtain and preserve a collection of the local fauna and flora. During the last few years the labora-

tory has had presented to it, by Prof. A. F. W. Schimper, a very complete collection of the flowering plants of Switzerland, and (during this session) a remarkably perfect series of North American mosses by C. F. Fitzgerald, Esq.: and many valuable specimens by the Maryland Academy of Sciences. It is certain that other similar collections will be offered to us in future, and it would be a shame to let them go from our city or into hands where they would not be properly cared for. Now that the Maryland Academy has given up its museum many valuable specimens or collections in the possession of Maryland naturalists, will be offered to the Johns Hopkins University. But the maintenance and proper care of them will cost much money: so much as in my opinion to be far beyond a due proportion of the expenditure of the university, with its many other departments and interests. I venture to ask whether in these days of generous giving some one may not be willing to endow a Natural History Museum for this city: such a museum (organized and directed by Professor Alpheus Hyatt, a Maryland man) is one of the institutions in which Boston feels a just pride. The Baltimore Museum might either be a department of the Johns Hopkins University or an independent organization, as the donor or donors might prefer. If placed under proper management and a suitable building provided, it would not cost for efficient working more than five thousand dollars a year, and it would surely be a great boon not only to our own pupils but to all teachers and students of Natural History in our city and State.

I transmit herewith the detailed report of Mr. C. F. Hodge, curator of our museum during the past session: it shows that in addition to the gifts from the Maryland Academy of Sciences and from Mr. Fitzgerald, the chief additions to the museum during the last twelve months have been in specimens illustrating comparative physiology.

#### VII. PUBLICATIONS.

During the session there were issued Nos. 2, 3, and 4 of Volume IV of the *Studies from the Biological Laboratory*. They contain the following articles:

- Notes on actiniae obtained at Beaufort, N. C. By J. Playfair McMurrich, Ph. D.
- Notes on mollusca observed at Beaufort, N. C., during the summers of 1882 and 1884. By Henry Leslie Osborn, Ph. D.
- Notes on echinoderms obtained at Beaufort, N. C. By H. F. Nachtrieb, A. B.
- A list of fishes of Beaufort Harbor, N. C. By O. P. Jenkins, A. B.
- The structure of cunocantha octonaria in the adult and larval stages. By H. V. Wilson, A. B.
- Some observations on the laws of muscular stimulation and contraction, made on the muscles of the terrapin. By George T. Kemp, Ph. D. With three plates.
- Experiments on tetanus and the velocity of the contraction wave in striated muscle. By John P. Campbell, Ph. D. With three plates.
- The life history of *Epenethesis McCradyi* (n. sp.). By W. K. Brooks, Ph. D. With three plates.
- Observations on the development of cephalopods: homology of the germ layers. By S. Watase, S. B. With two plates.
- Development of the eustachian tube, middle ear, tympanic membrane and meatus of the chick. By F. P. Mall, M. D. With two plates.
- The branchial clefts of the dog, with special reference to the origin of the thymus gland. By F. P. Mall, M. D. With three plates.
- Experiments with chitin solvents. By T. H. Morgan, A. B.

There was also published by subscription of friends of the late Dr. Adam T. Bruce in Baltimore, Princeton, and elsewhere, a memorial volume: "Observations on the Embryology of Insects and Arachnids." This was edited by Dr. W. K. Brooks.

#### VIII. THE BRUCE FELLOWSHIP.

As announced in my report last year, Mrs. A. T. Bruce, of New York, gave the university ten thousand dollars to endow a fellowship in biology as a memorial of her son, Dr. A. T. Bruce, formerly fellow and instructor in the Johns Hopkins University. The electors to this fellowship have selected Dr. H. V. Wilson, a former graduate scholar, and fellow in the Johns Hopkins University as the first "Bruce fellow." With the approval of the electors he goes to the Bahamas to continue studies commenced there by him two years ago.

H. NEWELL MARTIN,  
*Professor of Biology.*

#### Morphology.

The following advanced courses for special students in Animal Morphology have been given during the year, under the direction of Dr. W. K. Brooks.

1. The morphological section of the journal club has had one meeting every two weeks through the year.
2. One lecture a week through the year on inheritance, by W. K. Brooks.
3. The morphological seminary has met once a week through the year for the discussion of researches which have been in progress in the laboratory, and to listen to reports upon the literature of selected topics in animal morphology.
4. A course of nine lectures in May upon the embryology of vertebrates, by the instructors and advanced students. (*See Report in Biology, p. 82.*)
5. A reading club has met informally once a week from October to May, to read and discuss general works on zoölogy.

During the past year the following papers, which are based either wholly or in part upon morphological research in our laboratory, have been published:

- W. K. Brooks. On a new method of multiplication in hydroids. *University Circulars*, Feb., 1888.
- Notes on the ratio between men and women. *University Circulars*, Feb., 1888.
- On the relative variability of men and women. *Read before the Nat. Acad. of Sciences*, Nov., 1887.
- On the production by medusae of hydroid blastostyles. *Read before the Nat. Acad. of Sciences*, Nov., 1887.
- The life history of *Epenthesia McCradyi*, with three plates. *Studies Biol. Lab.*, Vol. IV, No. 4.
- Galton on the persistence of type. *Amer. Journal of Psychology*, Vol. I, No. 1.
- On the conditions which are necessary for the production, by selection, of a race of congenital deaf mutes. *As part of a report by Professor A. Graham Bell*, entitled "Facts and Opinions relating to the Deaf." London, 1888.
- The origin of the hydro-medusae. An illustrated article. *Popular Science Monthly*, Aug. and Sept., 1888.

- Adam T. Bruce. Observations on the embryology of insects and arachnids. A memorial volume, with six plates. Balto., 1888.
- F. H. Herrick. The habits and color variation of alpheus. *University Circulars*, Feb., 1888.
- The development of alpheus. *University Circulars*, Feb., 1888.
- A. H. Jennings. List of birds observed at New Providence, Bahama Islands, March and June, 1887. *University Circulars*, Feb., 1888.
- F. P. Mall. The first branchial cleft of the chick. *University Circulars*, Feb., 1888.
- The branchial region of the dog. *University Circulars*, Feb., 1888.
- Development of the eustachian tube, middle ear, tympanic membrane, and meatus of the chick. *Studies Biol. Lab.*, Vol. IV., No. 4, two plates.
- The branchial clefts of the dog, with special reference to the origin of the thymus gland. *Studies Biol. Lab.*, Vol. IV, No. 4, two plates.
- T. H. Morgan. Experiments with chitin solvents. *Studies Biol. Lab.*, Vol. IV, No. 4.
- Henry Orr. Notice of researches on the embryology of the lizard (*Anolis*). *University Circulars*, Feb., 1888.
- A contribution to the embryology of the lizard. *American Journal of Morphology*, Vol. I, No. 4, Dec., 1887, with five plates.
- S. Watase. Homology of the germinal layers of cephalopods, with three cuts. *University Circulars*, Feb., 1888.
- Observations on the development of cephalopods. *Studies Biol. Lab.*, Vol. IV, No. 4, two plates.
- H. V. Wilson. Observations on the development of *manicina areolata*, with two cuts. *University Circulars*, Feb., 1888.
- The embryology of *manicina areolata*. *Amer. Journal of Morphology*, Nov., 1888, with six plates.

Many of the subjects treated in these papers are still engaging attention in the laboratory, and further results will be published.

In addition, researches have been carried on in the laboratory during the past year upon several other subjects and are now complete and ready for publication or nearly so. Some of these are named in the Report on Biology, p. 82. Others were as follows:

The embryology of the tunicata. The histology of insects. The histology of the siphonophora. The embryology of crustacea. The metamorphosis of macroura. The maturation and fertilization of teleostian eggs. The luminous organ of insects. The hibernation of pulmonate gasteropods. The ratio between boys and girls among the North American Indians at all the reservations and agencies of the United States. The osteological characteristics of the Lucayan Indians.

W. K. BROOKS,  
Associate Professor of Morphology.

## Mathematics and Astronomy.

### I.—GRADUATE COURSES.

Professor Newcomb lectured twice weekly, through the year, on Spherical and Practical Astronomy. He also lectured twice weekly, in the second half-year, on Dioptries and the Theory of Measuring Instruments. The principal subjects were: The dioptries and mechanism of the eye; the telescope and the spectroscope; the principles of linear and angular

measurements, including the determination of errors of division; the use of the collimator, spirit level, etc.

The class also received instruction in the reduction of observations and other astronomical computations, including the applications of the method of least squares.

Professor Hall gave six lectures (with demonstrations) in the first half-year, on Studies and Experiments in Personal Equation and Errors of Observation. This course, intended primarily for students of psychophysics, was recommended to students of astronomy as an essential branch of their subject.

Professor Newcomb conducted an Astronomical Seminary for the study of the history and literature of astronomy. The work consisted largely in an examination of the leading works of the great masters of the subject, ancient as well as modern, and included a study of the methods by which astronomy has been perfected, and of the present state of the various branches of the science.

Courses were given by Dr. Story as follows:

Introductory Courses for Graduates. (This course is given every year.)

(a) *First Section*: Mechanics, Higher Plane Curves, Quaternions, Finite Differences, Probabilities and Elliptic Functions. *Three times weekly, through the year.*

(b) *Second Section*: Theory of Numbers, Modern Algebra, Surfaces and Twisted Curves. *Twice weekly, through the year.*

*Note*.—Section (a) constitutes a necessary part of every subsidiary course in mathematics for the degree of Doctor of Philosophy, and sections (a) and (b) constitute a necessary part of every principal course in mathematics for this degree. If a candidate gives satisfactory evidence of having already done the work of either section in any subject, he may be excused from attendance on the exercises of the section in that subject. Every graduate student in mathematics (whether candidate for a degree with mathematics as principal or subsidiary subject, or not intending to take a degree) is advised to complete the necessary work of the introductory course before taking more advanced courses.

Advanced Course in Analytic Geometry, including Higher Plane Curves, Surfaces and Twisted Curves. *Three times weekly, through the year.* In this course particular attention was paid to the properties of curves and surfaces of the third and fourth orders.

Linear Associative Algebra, with applications. *Twice weekly, first half-year.*

Algebraical Logic. *Twice weekly, second half-year.*

Seminary. *Weekly, through the year.*

Courses were given by Dr. Craig as follows:

Theory of Functions. *Three times weekly, first half-year.* This course followed Hermité's *Cours professé à la Sorbonne* introducing matter from

Briot and Bouquet's *Théorie des Fonctions Elliptiques* and from memoirs by Poincaré, Appell and others.

Hydrodynamics. *Three times weekly, first half-year.* The text-book employed was Lamb's *Treatise on the Motion of Fluids*, and in addition to this use was made of memoirs by Sir William Thomson and Messrs. Greenhill, Hicks and others. The course also included about a dozen lectures on Spherical Harmonics.

Elliptic Functions. *Twice weekly, through the year.* An account of the theory of transformation and an introduction to Weierstrass's method.

Linear Differential Equations. *Twice weekly, second half-year.* This course was made up from Vol. III of Jordan's *Cours d'Analyse*, and from memoirs by Fuchs, Frobenius, Tannery, Floquet, Poincaré and others.

Differential Equations (Advanced Course). *Three times weekly, first half-year.* The basis of this course was the first chapter in Vol. III of Jordan's *Cours d'Analyse*, and in addition memoirs by Hermite, Picard, and Darboux were consulted.

A course in Problems in Mechanics was given by Dr. Franklin. *Twice weekly, through the year.*

## II.—UNDERGRADUATE COURSES.

These courses are the same from year to year.

Dr. Franklin gave courses in

Advanced Algebra, Preparation for Calculus, Differential and Integral Calculus (Elementary Course), Analytic Geometry and Conic Sections. *Daily, through the year.*

Differential and Integral Calculus (Advanced Course). *Three times weekly, first-half year.*

Solid Analytic Geometry. *Twice weekly, through the year.*

A course was given by Dr. Craig in

Differential Equations. *Three times weekly, second half-year.*

Classes were conducted by Mr. Haight, Mr. Gorton and Mr. Eichelberger in

Trigonometry and Analytic Geometry for Matriculation. *Seven times in two weeks, through the year.*

The Mathematical Society met monthly and papers were read by a large number of actual and former members of the university, and some by gentlemen not connected with the university.

Four numbers, making Vol. X, of the American Journal of Mathematics have appeared during the year. The subjects treated have been various and interesting. It is interesting also to note the extended area from which contributions have been received and the names of the contributors:

United States: Barcroft, Chapman, Franklin, Gorton, Johnson, Moore, Morley, and Page. The first four of these writers are connected with this

university. Canada: Young. England: Cayley, Jenkins, MacMahon, Sylvester. France: Appell, Goursat, Humbert, Liouville. Italy: Faà de Bruno. Germany: Bolza. A portrait of Professor Sylvester forms a frontispiece to the volume.

S. NEWCOMB,  
*Professor of Mathematics and Astronomy.*

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## Psychology, Logic and Ethics.

During the academic year 1887-88, the instruction given in the department of Psychology was as follows. Professor Hall lectured twice weekly during the year on psychology. These lectures constituted the third year of the regular course and covered the topics of instinct, myth-customs and belief among lower races, the psychological problems of language, and of religion.

Lectures were also given once a week by Dr. Hall on contemporary philosophy since Hegel. This course continued through the year.

In connection with these courses a weekly seminary was held throughout the year, in which essays were read and books and topics discussed systematically under Dr. Hall's direction.

Dr. Hall lectured once weekly through the year on pedagogy. This, like the other courses, constituted the third year's course and treated problems of university education, learned societies, and other topics in the field of superior education.

Dr. H. H. Donaldson lectured weekly throughout the year on the histology of the nervous centres, and conducted a weekly seminary on the anatomy and localization of functions of the brain.

Laboratory work was continued through the year, under the direction of Dr. Hall, in experimental psychology, and of Dr. Donaldson, in the histology of the nervous system.

The publication of the *American Journal of Psychology* was begun under the editorial care of Dr. Hall in October and continued quarterly.

Pedagogical excursions to institutions of interest in Baltimore and adjacent cities were given in the Autumn.

The daily work of the undergraduate courses has been conducted as follows:

Associate Professor Emmott taught both Deductive and Inductive Logic during the first term. Special reference was had to Jevons's *Elementary Lessons in Logic*, and Fowler's *Elements of Inductive Logic*. Particular attention was given to the general theories of both deduction and induction, to the various forms of thought, notion, judgment, and reasoning, and to the various methods of scientific investigation and proof.

Numerous exercises were given in the opposition and conversion of propositions, in indication and counter-indication, in the application of the rules of the syllogism, in the detection of fallacies, and in the elimination of contradictions from thought.

Mr. Emmott also taught Ethics from the standpoint of the Christian theory of morals during the third term. The text-book used was Janet's *Elements of Morals*, but with numerous references to the works of other writers, including Martineau's *Types of Ethical Theory*, Martensen's *Christian Ethics*, Maurice's *Social Morality*, Fowler's *Principles of Morals*, and Janet's *Theory of Morals*. The work consisted of frequent recitations, of informal lectures, and of discussions, and two essays on assigned topics were required from each member of the class. The aim throughout was to make the instruction of a directly practical nature and to show the bearing of the fundamental problems of moral philosophy which were discussed upon the field of practical ethics.

During the second term Psychology was taught to undergraduates by Professor Hall on the basis of Ribot's *German Psychology of To-day*, and a series of weekly demonstrations were given by Dr. H. H. Donaldson.

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### Pathology.

The instruction in Pathology, during the year, was under the direction of Dr. W. H. Welch, professor of pathology, assisted by Dr. W. T. Councilman, associate professor of anatomy, Dr. B. Meade Bolton, assistant in bacteriology, and Dr. F. P. Mall, fellow in pathology. Facilities were afforded for study in all departments of pathology, including bacteriology.

The course in Pathological Histology continued throughout the greater part of the year, and embraced the study of subjects in general pathology and of the special pathological histology of all the organs and tissues of the body. For these purposes an ample material was provided.

In this course the student is expected to become familiar both with the technique of pathological histology and with the interpretation of the various morbid changes in the different organs and tissues. He is encouraged to supplement the regular class work by independent and further study of subjects in pathological histology, and thus prepare himself to form correct judgments of the various pathological changes. Demonstrations of fresh pathological specimens are made at least once a week in connection with the course in pathological histology. Sufficient material for these demonstrations is obtained from various sources. Especial importance is attached to the microscopical study of the fresh specimens chiefly by the aid of frozen sections, as the student is thus enabled to compare the gross and the microscopical appearances, and to observe such microscopical alterations as are more evident in fresh than in hardened specimens.

Opportunity was afforded to become familiar with the method of making post-mortem examinations. A number of these examinations were performed weekly by Dr. Councilman.

On account of the increasing importance of the subject special attention was given to the collection and study of material in Comparative Pathology.

The Pathological Institute is now equipped with apparatus for studies in Experimental Pathology. In this, as well as in other departments of pathology and in bacteriology, the resources of the institute are open to those who are prepared to engage in special investigations.

Instruction in Bacteriology was given by Professor Welch, with the co-operation of Dr. Bolton. The bacteriological laboratory is supplied with all the apparatus required by the modern methods of investigation in this important department. There is a large collection of cultures of the most important and interesting micro-organisms belonging to this branch of study. In the bacteriological course, students are instructed in the modern methods of cultivating bacteria, and are taught to study the morphological and biological characters of the bacteria and fungi, particularly of those relating to disease. The method of making biological examinations, of air, water, etc., are taught.

Fifteen students, mostly physicians, were engaged in the practical courses or in special investigations in the pathological institute during the year.

Among the subjects investigated upon which papers have been prepared are the following:—

Hemorrhagic infarction; the structure of white thrombi; modes of infection; general pathology of fever; an experimental study of intestinal suture; the healing of intestinal wounds; experimental myelitis; the organisms of malaria; bovine tuberculosis; reticulated and elastic tissues; extirpation of the thyroid gland; yellow fever; pleuro-pneumonia; swine plague; corroding ulcer of the cervix uteri; carcinoma originating in the sweat glands; cladothrix.

W. H. WELCH,

*Professor of Pathology.*

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### Physical Training.

Since December 10, 1883, when the gymnasium was opened, I have examined 533 individuals connected with the University, of whom 102 were examined in the year 1887-88. Many have been examined several times and their examinations have been duly recorded. I have, as in previous years, given advice to all seeking it in matters pertaining to personal hygiene. From the beginning of the academic year until the Christmas vacation, I lectured once a week to the newly-entered undergraduate students, on selected health topics.

The enlarged play-ground adjoining the gymnasium has been much appreciated by the students, who have put it to constant use during favorable weather, for tennis and ball-play. The adjacent premises of 602 N. Howard Street having been put under my charge and control, it is proper for me to state that good use has been made by the students of such of its rooms as have been set apart as study, conversation and lunch rooms. Good order and propriety of conduct have prevailed to a remarkable degree.

The attendance in the gymnasium has more than doubled in the past year, and all the available space in the main hall has been utilized for additional gymnastic machines. The increased interest and success in physical training, is largely the result of providing regular and systematic instruction in light and heavy gymnastics in connection with scientific oversight and direction. Mr. Hartvig Nissen, a most competent teacher of Swedish and German gymnastics, began a course of class-lessons in November last, which were continued at the rate of three a week till the middle of April. Under his direction and guidance, the students gave their first gymnastic exhibition on the evening of February 22, which was highly creditable to them and to him. Mr. Nissen's success has been most gratifying, and his efforts have been highly appreciated by the students and myself.

EDWARD M. HARTWELL,  
*Director of the Gymnasium.*

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## TABULAR STATEMENT OF COURSES OF INSTRUCTION, 1887-88.

INSTRUCTOR.	COURSES.	No. of hours per week.	No. of students, 1st half-year.	No. of students, 2d half-year.
<b>MATHEMATICS AND ASTRONOMY.</b>				
Newcomb.	Spherical and Practical Astronomy.	2	13	10
Newcomb.	Astronomical Seminary.	2	6	
Newcomb.	Dioptrics.	2		7
Story.	Introductory Course for Graduates. Section A (Mechanics, Higher Plane Curves, Quaternions, Finite Differences, Probabilities, and Elliptic Functions).	3	7	8
Story.	Introductory Course for Graduates. Section B (Theory of Numbers, Modern Algebra, Surfaces, and Twisted Curves).	2	7	5
Story.	Linear Associative Algebra.	2	5	5
Story.	Advanced Analytic Geometry.	2	5	6
Story.	Symbolic Logic.	2		5
Craig.	Hydrodynamics (Lamb, Thomson, and Poincaré).	3	5	
Craig.	Theory of Functions (Hermite, Briot and Bouquet, etc.).	3	7	
Craig.	Elliptic Functions (Cayley and Jordan).	2	2	2
Craig.	Differential Equations (Jordan, Analyse, II, III).	2	4	
Craig.	Differential Equations: Major Course.	3		13
Craig.	Linear Differential Equations.	3		4
Franklin.	Problems in Mathematics.	2	8	4
Franklin.	Solid Analytic Geometry.	2	8	8
Franklin.	Differential and Integral Calculus.	3	11	10
Franklin.	Algebra, Analytic Geometry and Calculus.	5	20	20
Haight.	Analytic Geometry.	1½	20	
Gorton.	Analytic Geometry.	1½		17
Haight.	Trigonometry.	2	20	
Eichelberger.	Trigonometry.	2		20
<b>PHYSICS.</b>				
Rowland.	Thermodynamics.	4	6	
Rowland.	Physical Optics.	4		5
Duncan.	Electricity and Magnetism. (First Year's Course.)	4	13	12
Duncan.	Electricity and Magnetism. (Second Year's Course.)	2	6	7
Kimball.	Major Course.	5	21	20
Kimball.	Minor Course.	5	41	45
Rowland, Kimball, Duncan, Crew.	Laboratory Work.		70	73
<b>CHEMISTRY.</b>				
Remsen.	Compounds of Carbon. (Major Course.)	2	65	62
Remsen.	Theoretical Chemistry. (Graduate Students.)	2		24
Remsen.	Reviews in the Compounds of Carbon. (Graduate Students.)	1		10
	Historical Lectures.	1		20
	Journal Meetings.	2	15	15

INSTRUCTOR.	COURSES.	No. of hours per week.	No. of students, 1st half-year.	No. of students, 2d half-year.
Morse.	Advanced Inorganic Chemistry. (Major Course.)	3	38	37
Morse.	Reviews in General Chemistry. (Minor Course.)	2	34	
Renouf.	Reviews in General Chemistry. Graduate Students.)	2	20	17
Renouf.	Reviews in General Chemistry. (Minor Course.)	2		35
Renouf.	Reviews in the Compounds of Carbon. (Major Course.)	1		36
Rensen.	General Inorganic Chemistry. (Minor Course.)	3	44	46
Rensen, Morse, Renouf, Reese.	Laboratory Work.		107	105
<b>MINERALOGY AND GEOLOGY.</b>				
Williams.	Mineralogy (also practical work weekly.)	3	22	22
Williams.	Petrography.	3	9	
Clark.	Palaeontology.	3		10
Williams, Clark.	Laboratory Work.		10	11
<b>BIOLOGY.</b>				
Martin.	Physiology of the Peripheral Nervous System.	1	10	11
Martin.	General Biology.	3	30	30
Martin.	Physiological Readings.	1	7	10
Brooks.	Advanced Morphology.	1½	14	14
Brooks.	General Zoölogy.	2		25
Brooks.	Morphological Problems.	Alt. w'ks.		10
Howell.	Vertebrate Histology.	3	15	
Howell.	Mammalian Anatomy.	5	23	
Howell.	Animal Physiology.	3		13
Andrews.	Human Osteology.	2	30	
Andrews.	Comparative Osteology.	2		30
Andrews.	Laboratory Work in General Biology.			24
Martin, Brooks, Howell, Andrews.	Laboratory Work.		58	56
<b>PATHOLOGY.</b>				
Welch, Bolton.	Bacteriology.—Laboratory Work.	18	2	3
Welch, Councilman	Pathological Histology.—Laboratory Work.	18	6	6
Welch, Councilman Bolton.	Special Researches.— “ “		7	6
<b>GREEK.</b>				
Gildersleeve.	Greek Seminary. (Thucydides.)	2	23	24
Gildersleeve.	Greek Syntax.	1	23	24
Gildersleeve.	Practical Exercises.	2	20	
Gildersleeve.	Plato.	4	8	
Gildersleeve.	Aeschylus; History of Literature and Grammar.	4		11
Spieker.	Andocides.	4	12	
Spieker.	Homer.	3	9	
Spieker.	Homer; Euripides.	4		12
Spieker.	Herodotus.	3		9
Smyth.	Greek Historical Inscriptions.	2	14	13
Smyth.	Greek Archaeology.	1	6	6
Smyth, Spieker.	Prose Composition.	2	27	32
Arnolt.	Critical Interpretation of the Gospels.	1	6	6

INSTRUCTOR.	COURSES.	No. of hours per week.	No. of students, 1st half-year.	No. of students, 2d half-year.
<b>LATIN.</b>				
M. Warren.	Latin Seminary.	2	16	17
M. Warren.	Lectures on Latin Comedy.	1	19	
M. Warren.	Conferences on Latin Syntax.	1	14	
M. Warren.	Latin Epigraphy.	1		15
M. Warren.	Readings in Aulus Gellius.	1		17
M. Warren.	Pliny; Juvenal.	3		10
M. Warren.	Reading at Sight.	1	8	9
M. Warren, } Elmer, }	Catullus, Tibullus, Propertius.	3	8	
Spleker.	Livy.	4	27	
Spleker.	Horace.	4		21
Spleker. } Elmer, }	Prose Composition.	2	23	24
Elmer.	Cicero; Vergil; Ovid.	4	15	14
Elmer.	Tacitus.	4		4
<b>SANSKRIT.</b>				
Bloomfield.	Introduction to the Study of Comparative Philology.	1	24	24
Bloomfield.	Comparative Study of the Greek Accent.	1	20	20
Bloomfield.	Vedic Seminary. (Literature of Atharva-Veda).	1	11	11
Bloomfield.	Readings from Sanskrit MSS.	1	3	4
Bloomfield.	Advanced Sanskrit. (Hitopadeça and Manu.)	2	10	
Bloomfield.	Introduction to the Rig-Veda.	1		10
Bloomfield.	The Law-book of Manu.	1		13
Magoun.	Elementary Sanskrit.	2	5	4
<b>SEMITIC LANGUAGES.</b>				
Haupt.	Selected Psalms.	1	12	
Haupt.	Biblical Aramean.	1	10	
Haupt.	Sumero-Akkadian. (Haupt's Keilschrifttexte.)	1		7
Haupt.	Coran.	1	6	6
Haupt.	Cuneiform Account of the Deluge.	1	8	7
Haupt.	Babylonian Inscriptions.	1	8	
Haupt.	Hebrew. (Advanced Course: Book of Proverbs.)	1		11
Haupt.	Syriac. (New Testament.)	1		10
Adler.	Ethiopic. (Dillmann's Chrestomathy.)	1		2
Adler.	Assyrian. (Elementary)	2	6	4
Adler.	Elementary Hebrew.	2	7	4
Adler.	Hebrew Exercises.	1	1	
Adler.	Ethiopic for Beginners.	2	2	2
Adler.	History of Assyria and Babylonia.	1	9	11
Adler.	Assyrian Exercises. (Annals of Sennacherib.)	2		1
<b>GERMAN.</b>				
<i>Advanced Work.</i>				
Wood.	Teutonic Seminary.	2	10	
Wood.	(a) Old High German.	2		8
Wood.	(b) For reading of original papers, etc.	Alt. Wed.		12
Wood.	Gothic. (Braune's Grammar; Ulfilas, ed. Heyne.)	2	9	8
Wood.	Middle High German. (Paul's Grammatik, Weinhöld's Lesebuch.)	1	5	4
Wood.	Old Norse. (Noreen's Grammatik; Moebius, Analecta Norroena.)	1	4	3
Wood.	Middle High German. (Minnesang's Frühling.)	2		10
Wood.	German Literature in the 16th and 17th Centuries.	3	19	
Wood.	Journal Meetings.	Alt. Wed.	13	
Wood.	Goethe. (Gedichte, ed. G. von Loeper.)	2		16

## Tabular Statement of Classes.

INSTRUCTOR.	COURSES.	No. of hours per week.	No. of students, 1st half-year.	No. of students, 2d half year.
<i>Major Course.</i>				
Goebel.	Selected Prose Readings. (Masius' Reader, III.)	1	11	10
Goebel.	History of German Literature.	1	12	11
Goebel.	Goethe. (Hermann und Dorothea, Tasso.)	2	12	13
Learned.	Prose Composition. (Buchheim.)	1	11	11
<i>Minor Course: Class A.</i>				
Goebel.	Selected Prose Readings. (Buchheim's Reader, II; Masius' Reader, II.)	2	31	30
Learned.	Goethe (Egmont) Oral Practice (Masius' Reader, II), Prose Composition.	3	38	36
<i>Minor Course: Class B.</i>				
Learned.	Otis, Elementary German. Selected Readings.	5	33	
Learned.	Buchheim, II; Prose Composition (Meissner's Grammar).	3		21
Goebel.	Schiller. (Wilhelm Tell.)	2		23
Learned.	Scientific Readings. (Haeckel, Indische Reisebriefe.)	1½	9	6
Goebel.	Historical Readings. (Freitag, Jahrhundert d. Reformation.)	1½	8	7
Learned.	Preliminary Class. (Buchheim, I; Whitney.)	3	10	9
Goebel.	German Conversation.	2	11	9
<b>ROMANCE LANGUAGES.</b>				
Elliott.	Advanced Courses: (Romance Morphology, Italian Philology, Milanese Dialect, Picard Dialect, Romance Seminary).	4	9	9
Elliott.	Advanced Courses: (French Phonetics, History of Romance Studies, Aucassin et Nicolette).	2	5	5
Todd.	Italian and Spanish.	5	10	8
Todd.	Ætæian.	1	6	
Todd.	Provençal (Elementary and Advanced).	2	7	7
F. M. Warren.	French, Provençal, and Spanish Literature.	3	10	8
Todd.	French: Major Course.	5	6	7
F. M. Warren.	French: Minor Course.	5	33	31
F. M. Warren.	French: Elementary.	3	16	12
Bowen.				
<b>ENGLISH.</b>				
Wood.	English Seminary.	Alt. Wed.	17	15
Bright.	Middle English Grammar.	2	12	11
Bright.	Piers the Ploughman.	2	11	10
Bright.	Anglo-Saxon Poetry (Caedmon).	2	10	
Bright.	Chaucer and Shakespeare.	2		9
Bright.	Anglo-Saxon Grammar.	1	11	
Bright.	Anglo-Saxon Grammar and Boethius.	1		9
Bright.	Middle English Literature.	2		3
Browne.	Early Scottish Poets.	1	7	7
Bright.	Early English Literature.	2	3	
Browne.	Elizabethan Literature; Nineteenth Century Literature.	3	9	
Browne.	Fourteenth and Nineteenth Century Literature.	3		3
Browne.	English Literature. (P. H. E. Course.)	2	52	51
Hubbard.	Early English (12th and 13th Centuries).	2	4	
Hubbard.	Elementary Anglo-Saxon (Sweet's Reader).	2	10	2
Burton.	Early English (Morris and Skeat's Specimens).	2		4
Burton.	Elementary Anglo-Saxon (Sweet's Reader).	2		6

Tabular Statement of Classes.

INSTRUCTOR.	COURSES.	No. of hours per week.	No. of students, 1st half-year.	No. of students, 2d half-year.
<b>HISTORICAL AND POLITICAL SCIENCE.</b>				
Adams.	Seminary of History and Politics.	1	26	26
Adams.	Ancient Politics.	2	30	
Adams.	Church History.	2	22	
Adams.	Renaissance and Reformation.	2		24
Adams.	History of Prussia.	2		27
Adams.	International Law.	2	15	17
Adams.	Oriental History. (P. H. E. Course.)	1	53	
Ely.	Finance.	3	31	31
Ely.	Political Economy.	5	31	32
Emmott.	Historical Jurisprudence.	2	13	12
Jameson.	English and French History.	3	19	20
Jameson.	English and American Constitutions.	3	19	19
Jameson.	Modern Historians.	1	23	19
Jameson.	United States History, 1789-1793.	1	24	22
Jameson.	Greek and Roman History. (P. H. E. Course.)	2	31	29
Jameson.	Physical and Historical Geography. (P. H. E. Course.)	1		51
Blackmar.	European History. (P. H. E. Course.)	2	22	23
Clarke.	Herodotus and Thucydides.	1	9	10
Wilson.	Administration.	2		25
Gould.	Social Statistics.	1		21
<b>PSYCHOLOGY AND PEDAGOGICS.</b>				
Hall.	History of Philosophy.	1	23	22
Hall.	Physiological Psychology.	2	27	28
Hall.	Education.	1	15	13
Hall.	Psychology. (L. E. P. Course.)	5		36
Donaldson.	Anatomy of the Central Nervous System.			
	(a) Seminary.	1	7	4
	(b) Lectures and Demonstrations.	2	16	15
Donaldson.	Histology of the Central Nervous System, and Psycho-Physica.	2	6	5
<b>LOGIC AND ETHICS.</b>				
Emmott.	Logic and Ethics. (L. E. P. Course.)	5	35	35
<b>DRAWING.</b>				
Newell.	Free-hand Drawing.	5	69	65
Newell.	Mechanical, Perspective, and Topographical Drawing.	1	45	48
<b>ELOCUTION.</b>				
Woodworth.	Elocution.	5	106	116

## DEGREES CONFERRED, 1888.

### Doctors of Philosophy.

Twenty-seven candidates who had presented the requisite theses and had passed the examinations successfully, were made Doctors of Philosophy, namely:—

William Muss Arnolt, of Baltimore, B. D., New Brunswick (N. J.) Theological Seminary, 1882. *Subjects*: Greek and the Shemitic Languages. *Thesis*: The Oracles in Herodotus.

Philip Wheelock Ayres, of Villa Ridge, Ill., Ph. B., Cornell University, 1884. *Subjects*: History, Political Economy, and International Law. *Thesis*: Diplomatic Relations of the United States with Great Britain during the Revolution, the Confederation, and Washington's First Administration.

Louis Bell, of Baltimore, A. B., Dartmouth College, 1884. *Subjects*: Physics, Astronomy, and Chemistry. *Thesis*: The Absolute Wave Length of Light.

Benjamin Lester Bowen, of Chili Station, N. Y., A. B., Rochester University, 1881. *Subjects*: Romance Languages and Latin. *Thesis*: Contributions to Periphrasis in the Romance Languages.

William Henry Burnham, of Dunbarton, N. H., A. B., Harvard University, 1882. *Subjects*: History of Philosophy and Ethics, Psychology, and Political Economy. *Thesis*: An Historical Sketch of the Conceptions of Memory among the Ancients.

Richard Eugene Burton, of Hartford, Conn., A. B., Trinity College, 1883. *Subjects*: English, German, and Old Norse. *Thesis*: Sir John Van Olden Barnavel: a Study.

John Pendleton Campbell, of Baltimore, A. B., Johns Hopkins University, 1885. *Subjects*: Animal Physiology and Histology, Animal Morphology, and Chemistry. *Thesis*: Experiments on Tetanus and the Velocity of the Contraction Wave in Striated Muscle.

Herbert Charles Elmer, of Rushford, N. Y., A. B., Cornell University, 1883. *Subjects*: Latin, Greek, and Sanskrit. *Thesis*: *Que, Et, Atque* in the Inscriptions of the Republic, in Terence, and in Cato.

Robert Orlando Graham, of New Wilmington, Pa., A. B., Amherst College, 1877. *Subjects*: Chemistry, Geology, and Mineralogy. *Thesis*: On the Decomposition of some Diazo-compounds by Alcohol.

Erasmus Haworth, of Oskaloosa, Ia., S. B., Kansas State University, 1881. *Subjects*: Inorganic Geology and Petrography, Mineralogy, and Chemistry. *Thesis*: The Archæan Rocks of Missouri.

- ✓ Francis Hobart Herrick, of Tilton, N. H., A. B., Dartmouth College, 1881. *Subjects:* Animal Morphology, Animal Physiology, and Vegetable Morphology. *Thesis:* The Development of Alpheus.
- ✓ William Herbert Hobbs, of Worcester, Mass., S. B., Worcester Polytechnic Institute, 1883. *Subjects:* Geology and Mineralogy, Chemistry, and Physics. *Thesis:* On the Rocks occurring in the Neighborhood of Ilchester, Howard County, Maryland.
- ✓ Joseph Hoeing Kastle, of Lexington, Ky., S. B., Kentucky State College, 1884. *Subjects:* Chemistry, Mineralogy, and Physiology. *Thesis:* On Para-nitro-ortho-sulpho-benzoic Acid and some of its Derivatives.
- ✓ Andrew Cowper Lawson, of Ottawa, Canada, A. B., University of Toronto, 1883. *Subjects:* Inorganic Geology, Mineralogy, and Chemistry. *Thesis:* The Rocks of the Rainy Lake Region.
- ✓ Felix Lengfeld, of San Francisco, Cal., California College of Pharmacy. *Subjects:* Chemistry, Mineralogy, and Geology. *Thesis:* Researches on the Stability of the Alkyl Bromides.
- ✓ Thomas McCabe, of New York City, A. B., Johns Hopkins University, 1886. *Subjects:* Romance Languages, Italian with Spanish, and History. *Thesis:* The Morphology in Francesco Petrarca's Canzoniere.
- ✓ Archibald Byron Macallum, of Toronto, Ont., A. B., University of Toronto, 1880. *Subjects:* Animal Physiology and Histology, and Chemistry. *Thesis:* Observations on the Origin of Hæmoglobin.
- ✓ John Ernst Matzke, of Baltimore, A. B., Hope College, 1882. *Subjects:* Romance Languages, Italian with Spanish, and German. *Thesis:* Dialektische Eigenthümlichkeiten in der Entwicklung des mouillierten l im Altfranzösischen.
- ✓ Yuzero Motora, of Tokio, Japan, Doshisha Kioto, Japan, 1879. *Subjects:* History of Philosophy, Psychology, and Political Economy. *Thesis:* Exchange, considered as the Principle of Social Life.
- ✓ Julius Nelson, of Waupaca, Wis., S. B., University of Wisconsin, 1881. *Subjects:* Animal Morphology, Animal Physiology and Psychology. *Thesis:* The Significance of Sex.
- ✓ George Thomas White Patrick, of Lyons, Ia., A. B., Iowa State University, 1878. *Subjects:* History of Philosophy and Ethics, Psychology, and Political Economy. *Thesis:* Heraclitus: a translation of the genuine fragments of his work, with an introduction critical and reconstructive.
- ✓ Edmund Clark Sanford, of Oakland, Cal., A. B., University of California, 1883. *Subjects:* Psychology, History of Philosophy, and Political Economy. *Thesis:* The Relative Legibility of the Small Letters.
- ✓ Henry Taber, of New York City, Ph. B., Yale College, 1882. *Subjects:* Mathematics and Logic. *Thesis:* On Clifford's n-fold Algebra.
- ✓ Amos Griswold Warner, of Roca, Neb., B. L., University of Nebraska, 1885. *Subjects:* Political Economy, History, and International Law. *Thesis:* Three Phases of Coöperation in the West.
- ✓ John Roaf Wightman, of Toronto, Ont., A. B., University of Toronto, 1871. *Subjects:* Romance Languages, German, and English. *Thesis:* The French Language in Canada.

Henry Van Peters Wilson, of Baltimore, A. B., Johns Hopkins University, 1883. *Subjects*: Animal Morphology, Animal Physiology, and Histology. *Thesis*: Development of Manicina Areolata.

Thomas Kimber Worthington, of Baltimore, A. B., Haverford College, 1883. *Subjects*: Political Science and History. *Thesis*: Historical Sketch of the Finances of Pennsylvania.

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### Bachelors of Arts.

Thirty-four undergraduates have come forward to the Baccalaureate degree during the year, namely:—

George Henry Harold Ballard, Baltimore.

Edward Ambrose Bechtel, Colora.

James William Black, Baltimore.

Charles Pliny Brigham, Baltimore.

William Bromwell, Port Deposit.

Hamilton McFarland Brown, Baltimore.

Arthur Lee Browne, Baltimore.

Charles Hamilton Carey, Baltimore.

Charles Hiram Chapman, Wisconsin  
(*extra ordinem*).

John Broughton Daish, Washington,  
D. C.

William Levering Devries, Baltimore.

Gustav Edward Gieske, Catonsville.  
Raleigh Colston Gildersleeve, Baltimore.

Harris Hancock, Virginia.

Charles Collier Holden, Ellicott City  
(*extra ordinem*).

Walter Jones, Baltimore.

William Augustine Jones, Alabama.

Arthur Lincoln Lamb, Baltimore.

Charles Day Lanier, McDonogh.

John Bright Macauley, Washington,  
D. C.

William Howard Miller, Baltimore.

George Neville Moore, Washington,  
D. C.

Harry O'Donovan, Baltimore.

Frank Eugene Reader, Pennsylvania.

Louis Rettger, Indiana.

David Ellsworth Roberts, Baltimore.

Lessing Rosenthal, Illinois.

Charles Edmund Simon, Baltimore.

Charles Kephart Swartz, Pennsylvania.

Robert Melvin Tarleton, Baltimore.

Edward Lucas White, Baltimore.

John White, Jr., Poolesville.

Westel Woodbury Willoughby, Virginia.

William Franklin Willoughby, Virginia.

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## LIBRARY.

The number of bound volumes now in the Library is 33,000. In addition to the main Library of general reading and reference, special collections have been placed in the Biological, Chemical, and Physical Laboratories, and in the Classical, Germanic, Historical, Oriental, and Romance Seminaries. Though not without some drawbacks, this system of segregation is found at present best to meet the various needs of instructors and students.

The periodicals at present received number over 1,000 titles.

### GIFTS TO THE LIBRARY FROM SEPTEMBER, 1, 1887, TO SEPTEMBER 1, 1888.

*(Exclusive of works received in exchange, and reports of public bodies gratuitously distributed.)*

- ABERDEEN, UNIVERSITY OF. Catalogue of University Library. 4 vols. Aberdeen, 1873. O.  
 ADAMS, H. B. (Author). The Study of History in American colleges. 1887. O.  
 Price, L. L. Industrial Peace. London, 1887. O.  
 AMEGHINO, F. (Author). Mammifères fossiles de l'Amérique du Sud. Buenos Aires, 1880. O.  
 AMN. SWEDENBORG PUBL. CO. Swedenborg, E. Works. 9 vols. New York, 1885. O.  
 BALL, Rev. W. D. The Battle of Waterloo. 1815. O.  
 BARBEY, W. La Bible. Trad. par L. Segond. Oxford, 1886. O.  
 BARTON, B. W., M. D. Bell, C. Anatomy of Human Expression. London, 1806. Q.  
 BILLINGS, J. S., M. D. Index-Catalogue of Library of Surg.-Gen's Office, VIII. Washington, 1888. Q.  
 BINION, S. A., M. D. Brerewood, E. Scrutinium linguarum. Frankfort, 1659. S.  
 Horton, T. Exposition of the Psalms. London, 1675. F.  
 BLOOMFIELD, M. (Author). Monographs on Sanskrit Philology. Baltimore, v. d. O.  
 (Editor). Grhyasamgrahaparisishla. Leipzig. O.  
 BORGEAUD, C. (Author). Histoire du Piébisците. Geneva, 1887. O.  
 BOURINOT, J. G. (Author). The Constitution of Canada. Montreal, 1888. O.  
 BROOKS, W. K. (Author). Rept. on Stomatopoda of the "Challenger" Expedition. London, 1886. T.  
 CANFIELD, W. B., M. D. Selfert and Müller. Chemical Diagnosis. New York, 1887. D.  
 CHICAGO LAW INSTITUTE. Illinois Laws. Springfield, 1887. O.  
 CONKLING, C. L. Sets of Official reports of Illinois.  
 COURTENAY, W. A. (Mayor). Year-book of the City of Charleston. Charleston, 1886. O.  
 DODGE, D. S. Post, G. E. Botanical Geography of Syria and Palestine. London, n. d. O.  
 ELMORE, J. F. Raimundi, A. El Perú. 3 vols. Lima, 1874-80. Q.  
 Raimundi, A. Ancaches y sus riquezas minerales. Lima, 1873. Q.  
 Raimundi, A. Minerales del Perú. Lima, 1878. O.  
 ELY, R. T. Smith, B. Liberty and Liberalism. London, 1887. D.  
 Hitchcock, H. American State Constitutions. New York, 1887. D.  
 GILDERSLEEVE, B. L. Early History of the University of Virginia. Richmond, 1856. O.  
 GILMAN, Prest. D. C. Book of Common Prayer, from Dublin MS. London, 1849. O.  
 Fairchild, H. L. History of the N. Y. Acad. of Sciences. New York, 1887. O.  
 Memorial of E. R. Sill. O.  
 Morton, S. G. Types of mankind. Philadelphia, 1854. Q.  
 Schlosser, F. C. Weltgeschichte. 10 vols. Frankfort, 1844. O.  
 Whitney, W. D. On the Avesta. O.  
 (Also a large number of pamphlets).  
 HAINES, E. M. (Author). Parliamentary Law. Chicago, 1887. S.  
 HAMILTON, Mrs. E. Vesalius, A. Opera omnia. Leiden, 1725. F.  
 Bidloo, G. Anatomia. Amsterdam, 1685. F.  
 Cowper, W. Myotomia reformata. London, 1724. F.  
 Surgical History of the War of the Rebellion. Washington, 1876. Q.

- HASKINS, G. W. Institutes of Justinian. Philadelphia, 1812. O.
- HARJES, J. H. Amé. Etude sur les tarifs de douanes. Paris, 1876. 2 vols. O.
- André, A. Traité du régime hypothécaire. Paris, 1886. O.
- Beillac, de. Instruction générale sur le service et la comptabilité des ordonnateurs et des receveurs de . . . . . douanes. Paris, 1867. O.
- Béres, E. Manuel de l'emprunteur et du prêteur aux caisses du crédit foncier. Paris, 1855. S.
- Bessen. Traité . . . de la taxe de 3 pr. et. sur le revenu. Paris, 1887. O.
- Blanche, A. et Ymbert, T. Dictionnaire général de l'administration. Paris, 1884. O.
- Block, M. Statistique de la France. Paris, 1875. O.
- Boiteau, P. Fortune publique et finances de la France. Paris, 1866. O.
- Bonnal, E. Traité des octrois. Paris, 1873. O.
- Bonnet, V. Crédit et les banques. Paris, 1875.
- Boulangier, E. Traité des radiations hypothécaires. Paris, 1886. 2 vols. O.
- Chailley, J. Impôt sur le revenu. Paris, 1884. O.
- Clément, P. Histoire de Colbert. Paris, 1874. 2 vols. D.
- Gouvernement de Louis XIV. Paris, 1843. O.
- Code des lois sur l'enregistrement, le timbre, etc. Paris, n. d. O.
- Coffinières, A. S. G. Études sur le budget. Paris, 1848. O.
- Colbert, J. B. Lettres, instructions, et mémoires. Publiés par P. Clément. Paris, 1861. 10 vols. Q. Tom. 1, 2, 22, 31, 32, 4, 5, 6, 7, and Table.
- Coquelin, C. Crédit et les banques. Paris, 1859. D.
- Courcelle-Seneuil, J. G. Traité des opérations de banque. Paris, 1876. O.
- Courtois, A. Histoire des banques en France. Paris, 1881. O.
- D'Audiffret. Système financier de la France. Paris, 1863. 6 vols. Q.
- Dictionnaire des percepteurs, des receveurs municipaux, etc. Paris, 1887. O.
- Dufour, G. Traité général de droit administratif. Paris, 1868. 8 vols. O.
- Dufresne, E. J. Manuel de la perception des droits de timbre. Paris, 1864. O.
- Dumaine, C. Du contrat d'assurance sur la vie. Paris, 1883. D.
- Faura, F. Budgets de la France . . . . . et des principaux états de l'Europe. Paris, 1887. Q.
- Flaix, E. F. de. Études économiques et financières. Paris, 1883. 2 vols. D.
- Reforme de l'impôt en France. Paris, 1883. I. O.
- Fougerousse, A. Patrons et ouvriers de Paris. Paris, 1880. Q.
- Fournier, C. Traité des contributions directes. Paris, 1885. D.
- Gandillot, R. Principes de la science des finances. Paris, n. d. 3 vols. O.
- Garnier, J. Traité des finances. Paris, 1883. O.
- Gauthier, A. A. Code des placements fonciers. Paris, 1865. O.
- Géraud, C. Dictionnaire de comptabilité, domaines, hypothèques, etc. Paris, 1882. 3 vols. Q.
- Table général des instructions et circulaires . . . . . de l'enregistrement, etc. Paris, 1887. 2 vols. O.
- Géraud, C. et Prisse, F. Commentaire de l'instruction générale sur le service des amendes. Paris, 1878. O.
- Germain, F. Dictionnaire du budget. Paris, 1884. O.
- Gorges, J. M. Dette publique. Paris, 1884. D.
- Guillard, E. Opérations de la Bourse. Paris, 1875. Q.
- Jauvelle, B. L. de. Répertoire général des contributions directes. 4 ed. Paris, 1885. Q.
- Josseau, J. B. Traité du crédit foncier. Paris, 1884. 2 vols. O.
- Jourdaa, J. B. Manuel de la transcription hypothécaire. Paris, 1886. O.
- Kaufmann, R. de. Finances de la France. Trad. par Ducaurier et De Riedmatten. Paris, 1884. O.
- Küss, T. Manuel de l'aspirant au surnumériat. Paris, 1885. O.
- Manuel complet des surnuméraires. Paris, 1885. 2 vols. O.
- Labeysrie, H. Théorie et histoire des conversions de rentes. Paris, 1878. O.
- Lavollée, R. Classes ouvrières en Europe. Paris, 1884. 2 vols. Q.
- Le Couppey, G. De l'impôt foncier. Paris, 1867. O.
- Le Touzé, C. Traité du change des monnaies. Paris, 1883. O.
- Naquet, E. Traité des droits d'enregistrement. Paris, 1882. 3 vols. O.

- HARJES, J. H. Nicolas, C. Budgets de la France. Paris, 1882. Q.  
 Parleu, E. de. Traité des Impôts. Paris, 1866. 4 vols. O.  
 Pioget, J. Influence des lois de procédure civile sur le crédit foncier. Paris, 1854. O.  
 Pont, P. Explication du code civil. Paris, 1878. 2 vols. O.  
 Say, L. Dictionnaire des finances. Paris, 1833-7. Q. Fasc. 1-8.  
 Smith, A. Richesse de nations. Traduction de G. Garnier. Paris, 1881. 2 vols. O.  
 Stourm, R. Finances de l'ancien régime et de la révolution. Paris, 1885. 2 vols. O.  
 Tixier, E. De l'assiette de l'impôt foncier. Paris, 1875. O.  
 Trescaze, A. Dictionnaire des contributions indirectes. Poitiers, 1834. Q.  
 Vigarío, F. Banques populaires. Paris, 1865. 2 vols. Q.  
 Vignes, E. Traité des impôts en France. Paris, 1880. 2 vols. O.  
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WILLIAM HAND BROWNE,  
 Librarian.

## STATEMENT OF THE PUBLICATION AGENCY OF THE UNIVERSITY FOR THE YEAR, 1887-8.

The periodicals issued under the auspices of the University have appeared, at regular intervals, through the year.

Of the American Journal of Mathematics, under the editorial direction of Professors Newcomb and Craig, four numbers, completing the tenth volume, and containing 384 pages quarto, have been issued. An index to the first ten volumes is now nearly ready. The publication of a series of portraits of distinguished mathematicians was begun in Vol. X, with the portrait of Professor Sylvester. A portrait of Professor Hermite appears with Vol. XI.

The tenth volume of the American Chemical Journal, under the editorial direction of Professor Remsen, is now nearly completed. Six numbers, making 488 pages octavo, have appeared during the year. Beginning with Vol. XI, this Journal will appear eight times yearly.

The eighth volume of the American Journal of Philology, of which Professor Gildersleeve is editor, has been completed, and the ninth volume begun. Four numbers, making 530 pages octavo, have appeared this year.

Of the Studies from the Biological Laboratory, issued under the editorial direction of Professors Martin and Brooks, three numbers of the fourth volume have appeared. These contain 166 pages octavo and 21 plates.

Series V of the Studies in Historical and Political Science, Professor H. B. Adams, editor, has been completed. Series VI has also been issued as one bound volume, containing the Studies on the "History of Coöperation" by graduate students of the University. Series VII will soon be begun, and additional extra volumes are under way. The earlier numbers have been reprinted, to meet the demand for full sets.

Eight numbers of the University Circulars (Nos. 60-67), containing 106 pages quarto, have been issued at monthly intervals during the year.

The Twelfth Annual Report of the President was issued in February. It contains 68 pages octavo. The Annual Register, with 128 pages octavo, was issued in June.

The Photographs of the MS. of the Didache were received from Jerusalem in the mid-summer of 1887. They were edited by Professor J. Rendel Harris, and printed at the Cambridge (England) University Press in the autumn. They were received here, and placed on the American market in January last. The volume contains 110 quarto pages of text and 10 plates.

The Thesis of the late Dr. Adam T. Bruce on the Embryology of Insects and Arachnids was edited by Professor W. K. Brooks during the autumn, and issued from the press in February. The volume contains 46 pages and 7 plates. It was published with the coöperation of the friends of Dr. Bruce in Princeton, who bore a portion of the cost of issue.

The Poems, Letters, and Papers read at the Commemoration of Sidney Lanier, February 8, 1888, were published in a pamphlet of 56 pages, 16c.

A translation by Dr. Edward Renouf, of Volhard and Zimmermann's Notes on Experimental Chemistry, edited by Professor Remsen, was issued in October. It contains 143 pages octavo.

A volume of Selections from the Scottish Poets of the Fifteenth and Sixteenth Centuries was compiled by Dr. Browne for the use of his classes here, as the texts themselves were virtually inaccessible to students. The texts were reproduced by the papyrograph process. The volume contains 175 pages quarto.

A new edition of Rowland's Photographs of the Solar Spectrum has been in preparation during the year, and will soon be issued.

A second edition of the Excursion Map of Baltimore, prepared by Dr. Williams, was issued in October last.

Several small pamphlets have been published by the Agency during the year. Among these may be mentioned Haupt, P., *The Assyrian E-Vowel*; Elmer, H. C., *The Copulative Conjunctions Que, Et, Atque, in the Inscriptions of the Republic, etc.*; Williams, G. H., *Notes on the Minerals in the Neighborhood of Baltimore.*

The publication of the *American Journal of Psychology* was begun in November, 1887, under the editorial direction of Professor G. Stanley Hall. The first volume of 760 pages octavo is completed. It appears quarterly and is published for its Editor.

The *Modern Language Notes* is published by its Managing Editor, Professor A. M. Elliott. He is assisted in its issue by Drs. Bright, Goebel, and Todd, Associate Editors. It appears eight times yearly. It is now in its third volume.

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FOURTEENTH  
ANNUAL REPORT

OF THE PRESIDENT OF THE

JOHNS HOPKINS UNIVERSITY

Baltimore, Maryland

1889



## ACADEMIC STAFF, 1888-89.

Daniel C. Gilman, LL. D.,	<i>President of the University.</i>
J. J. Sylvester, F. R. S., D. C. L.,	<i>Professor (Emeritus) of Mathematics.</i>
Basil L. Gildersleeve, Ph. D., LL. D.,	<i>Professor of Greek.</i>
Edward H. Griffin, D. D., LL. D.,	<i>Professor (elect) of History of Philosophy &amp; Dean.</i>
Paul Haupt, Ph. D.,	<i>Professor of the Semitic Languages.</i>
H. Newell Martin, Dr. Sc., A. M., M. D.,	<i>Professor of Biology.</i>
Simon Newcomb, Ph. D., LL. D.,	<i>Professor of Mathematics and Astronomy.</i>
William Osler, M. D.,	<i>Professor of the Principles and Practice of Medicine.</i>
Ira Remsen, M. D., Ph. D.,	<i>Professor of Chemistry.</i>
Henry A. Rowland, Ph. D.,	<i>Professor of Physics.</i>
William H. Welch, M. D.,	<i>Professor of Pathology.</i>
John S. Billings, M. D., LL. D.,	<i>Lecturer on Municipal Hygiene.</i>
Herbert B. Adams, Ph. D.,	<i>Associate Professor of History.</i>
Maurice Bloomfield, Ph. D.,	<i>Associate Professor of Sanskrit.</i>
William K. Brooks, Ph. D.,	<i>Associate Professor of Animal Morphology.</i>
William T. Councilman, M. D.,	<i>Associate Professor of Anatomy.</i>
Thomas Craig, Ph. D.,	<i>Associate Professor of Applied Mathematics.</i>
A. Marshall Elliott, Ph. D.,	<i>Associate Professor of the Romance Languages.</i>
Richard T. Ely, Ph. D.,	<i>Associate Professor of Political Economy.</i>
George H. Emmott, A. M.,	<i>Associate Professor of Logic and Ethics, etc.</i>
William H. Howell, Ph. D.,	<i>Associate Professor of Animal Physiology.</i>
Harmon N. Morse, Ph. D.,	<i>Associate Professor of Chemistry.</i>
Arthur L. Kimball, Ph. D.,	<i>Associate Professor of Physics.</i>
Edward H. Spieker, Ph. D.,	<i>Associate Professor of Greek and Latin.</i>
William E. Story, Ph. D.,	<i>Associate Professor of Mathematics.</i>
Minton Warren, Ph. D.,	<i>Associate Professor of Latin.</i>
George H. Williams, Ph. D.,	<i>Associate Professor of Inorganic Geology.</i>
Henry Wood, Ph. D.,	<i>Associate Professor of German.</i>
James W. Bright, Ph. D.,	<i>Associate in English.</i>
William Hand Browne, M. D.,	<i>Librarian and Associate in English.</i>
Henry H. Donaldson, Ph. D.,	<i>Associate in Biology.</i>
Louis Duncan, Ph. D.,	<i>Associate in Electricity.</i>
Fabian Franklin, Ph. D.,	<i>Associate in Mathematics.</i>
Edward M. Hartwell, M. D., Ph. D.,	<i>Associate in Physical Training.</i>
Marion D. Learned, Ph. D.,	<i>Associate in German.</i>
Edward Renouf, Ph. D.,	<i>Associate in Chemistry.</i>
Henry A. Todd, Ph. D.,	<i>Associate in Romance Languages.</i>
Philip R. Uhler,	<i>Associate in Natural History.</i>
Cyrus Adler, Ph. D.,	<i>Instructor in the Semitic Languages.</i>
Joseph S. Ames, A. B.,	<i>Assistant in Physics.</i>
Ethan A. Andrews, Ph. D.,	<i>Instructor in Osteology.</i>
William H. Burnham, Ph. D.,	<i>Instructor in Psychology.</i>
William B. Clark, Ph. D.,	<i>Instructor in Palæontology.</i>
Gustav A. Liebig, Jr., Ph. D.,	<i>Assistant in Electricity.</i>
Franklin P. Mall, M. D.,	<i>Assistant in Pathology.</i>
J. Leverett Moore, A. M.,	<i>Instructor in Latin.</i>
Edmund C. Sanford, Ph. D.,	<i>Instructor in Psychology.</i>
Henry Taber, Ph. D.,	<i>Assistant in Mathematics.</i>
Frederick M. Warren, Ph. D.,	<i>Instructor in French.</i>
Hugh Newell,	<i>Instructor in Drawing.</i>
Charles L. Woodworth, Jr.,	<i>Instructor in Elocution.</i>
Professor E. Hübner, Ph. D.,	<i>Examiner in Latin.</i>
Oskar Bolza, Ph. D.,	<i>Reader in Mathematics.</i>
Elgin R. L. Gould, Ph. D.,	<i>Reader in Social Statistics.</i>
Albion W. Small, A. M.,	<i>Reader in Constitutional History.</i>
Amos G. Warner, Ph. D.,	<i>Reader in Sociology.</i>
Woodrow Wilson, Ph. D., LL. D.,	<i>Reader in Administration.</i>

FOURTEENTH  
ANNUAL REPORT

OF THE PRESIDENT OF THE

Johns Hopkins University

Baltimore, Maryland

1889

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BALTIMORE  
PUBLICATION AGENCY OF THE JOHNS HOPKINS UNIVERSITY  
1889

# TRUSTEES.

1888-9.

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*President:*

GEORGE W. DOBBIN.

*Treasurer:*

FRANCIS WHITE.

*Secretary:*

LEWIS N. HOPKINS.

*Members of the Board:*

GEORGE WILLIAM BROWN,	FRANCIS T. KING,
GEORGE W. DOBBIN,	J. HALL PLEASANTS,
JOSEPH P. ELLIOTT,	ALAN P. SMITH,
ROBERT GARRETT,	C. MORTON STEWART,
CHARLES J. M. GWINN,	JAMES CAREY THOMAS,
LEWIS N. HOPKINS,	FRANCIS WHITE.

## COMMITTEES.

*Executive Committee:*

GEORGE WILLIAM BROWN,	C. MORTON STEWART,
JAMES CAREY THOMAS,	FRANCIS WHITE,
CHARLES J. M. GWINN,	GEORGE W. DOBBIN, <i>ex officio</i> .

*Finance Committee:*

FRANCIS WHITE,	J. HALL PLEASANTS,
GEORGE W. DOBBIN, <i>ex officio</i> .	

*Building Committee:*

J. HALL PLEASANTS,	ALAN P. SMITH,
FRANCIS T. KING,	JAMES CAREY THOMAS,
GEORGE W. DOBBIN, <i>ex officio</i> .	

*Committee in Charge of the Clifton Grounds:*

LEWIS N. HOPKINS,	FRANCIS WHITE,
GEORGE W. DOBBIN, <i>ex officio</i> .	

# REPORT.

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TO THE TRUSTEES OF THE JOHNS HOPKINS UNIVERSITY:—

*Gentlemen :*

I have the honor to present the fourteenth annual report of the progress of the University, covering the academic year between the first of September, 1888, and the first of September, 1889.

The year that is now closed has been one of the most interesting in the history of the University. At the end of the previous session in the summer of 1888, the continued suspension of the dividends of the Baltimore and Ohio Railroad Company gave us much solicitude. The public shared our apprehensions, and it was not strange that exaggerated reports were circulated both in public and in private, with respect to the situation. A series of appropriate remedies have averted the threatened danger, and have given us renewed confidence in the future of the University.

Those who are familiar with the history of this endowment are aware that Johns Hopkins gave the institution which he founded fifteen thousand shares of the common stock of the Baltimore and Ohio Railroad Company, which paid until recently an annual dividend of ten per cent., and was free from taxation. The loss of this dividend was a very serious matter to the University, and the Trustees at once proceeded to inquire what could be done. They soon decided to increase the charges

for tuition to a sum more nearly commensurate with that which is paid in other kindred institutions and with the advantages here offered, and they determined that all students, including the holders of fellowships, should be subject to this charge. They also refrained from making certain appropriations, which were not absolutely essential, but which had been regarded as important. By their prudence in former years a considerable amount of income had been laid aside for future contingencies; there were no debts; the credit of the University was unimpaired; the buildings requisite for immediate use had been constructed or purchased, and paid for; a liberal amount had been expended in collecting the library of 34,000 volumes, and the laboratories and astronomical observatory were well equipped with scientific apparatus which had been acquired at a cost of \$96,500.

“The past at least was secure.” As to the future, the Trustees looked forward to the day when revenue would again come from the capital now invested in the Baltimore and Ohio Railroad, and, also, to the time when an income might be derived from the great estate of Clifton, belonging to the University, a tract of nearly three hundred acres, now within the city limits and free from all incumbrance.

But, though the past was secure, and the future looked promising, much anxiety was felt with respect to the immediate requirements of the next few years. While the Trustees were considering what course it was best to pursue, and were preparing a statement to be laid before the public, a merchant of Baltimore, William W. Spence, Esq., who in other ways had already shown his interest in the University, suggested that twenty persons might be found who would contribute the sum of five thousand dollars each to meet the present emergency. He, therefore, proceeded to lay this suggestion before some of

the citizens of Baltimore who were thought to be willing and able to respond. Eighteen subscriptions of five thousand dollars each were consequently made. Several subscriptions were also made in sums between one thousand and three thousand dollars, so that the Emergency Fund, thus promptly and generously subscribed, amounted to \$108,700. The names of the donors will long be honorably remembered. A gentleman in Connecticut sent a gift of two thousand dollars; a friend of the University, resident in Liverpool, gave one thousand dollars; and a gentleman in New York contributed five thousand dollars. All the other subscriptions came from Baltimore. These contributions added to the income which may reasonably be expected from the charge for tuition, and from the other available resources of the University, enable it to go forward on its present plane with wonted efficiency, for the next three years.

The spontaneous liberality of these friends of the University has been most encouraging to the President, and to his colleagues who are engaged in the daily work of instruction, as well as to the Trustees who are responsible for its financial administration. One good result has certainly come from the emergency. The character, the work, and the influence of the Johns Hopkins University have been widely discussed and carefully investigated. The public have been led to look into its plans, its record, and its hopes; its limitations and its merits, as well as its needs and possibilities, have been made obvious; friends have rallied to its support; its future is again assured.

The completion of the emergency fund was informally announced when the Hospital was opened on the seventh of May, and at the annual commencement on the thirteenth of June, the following minute adopted by the Trustees, as an

acknowledgment of the generous support extended to the University, was publicly read :

“At a meeting of the Board of Trustees of the Johns Hopkins University, held on Monday, June 10, 1889, the President laid before the Board two papers, subscribed by friends of the University, offering to place at the disposal of the Board an amount somewhat exceeding one hundred thousand dollars, as an ‘Emergency Fund,’ to make up in part, the loss to the University from the suspension of the dividends of the Baltimore and Ohio Railroad Company.

“It was thereupon unanimously

“RESOLVED that the Board of Trustees of the Johns Hopkins University gratefully accepts the aid generously offered to it by the subscribers to the ‘Emergency Fund’ and, in the name of the University, gives hearty thanks to each one of them. The record of their liberality will be kept among the archives of the University as a lasting memorial of the good work they have done, in enabling us, by means of the aid thus afforded, to maintain and develop its usefulness.

“RESOLVED that this Board while expressing its earnest thanks to all those who have subscribed to the ‘Emergency Fund,’ makes a particular acknowledgment to William W. Spence, Esq., for the part taken by him in forming the plan for this Fund, and in conducting this plan to a successful issue. It begs leave to assure him of the abiding gratitude of the University.

“RESOLVED that the Board expresses to Robertson Taylor, Esq., its hearty thanks for services rendered by him in promoting subscriptions to the ‘Emergency Fund.’

“RESOLVED that the President of the Board of Trustees be requested to enclose a copy of the first of these ‘Resolutions’ to each subscriber to the ‘Emergency Fund,’ to enclose a copy

of the second Resolution to W. W. Spence, Esq., and to enclose a copy of the third Resolution to Robertson Taylor, Esq."

In addition to the emergency fund, the University has received two other important and welcome gifts. Mr. and Mrs. Lawrence Turnbull, of Baltimore, have established a Lecture-ship of Poetry, which is to bear the name of their deceased son, Percy Graeme Turnbull, a youth of great promise who died February 12, 1887, in the ninth year of his age. The income from this gift is one thousand dollars per annum. It is the wish of the donors, in which the Trustees concur, that the annual courses of lectures on this foundation be given by writers of distinction in the world of letters, who will aim to inspire the students of the University with a love of literature, especially of poetry, and to teach the principles of literary criticism. The introductory course may be expected during the coming session. As a token of the confidence of those who have watched the progress of the institution from its beginning, this gift is most gratifying.

Another large gift has been offered to the University by Mr. Eugene Levering, of Baltimore. He has offered us the sum of twenty thousand dollars to promote the work of the Young Men's Christian Association. With this sum he proposes to build on land provided by the Trustees a building which will contain an attractive library and a reading room; a chapel or room for devotional meetings and conferences; and a room for large assemblies where lectures may from time to time be given on subjects not inappropriate to the work of the society. This association has never been so efficient or so wide-spread throughout the world as it is now. Its branches are found in Harvard, Yale, Princeton, Cornell, Michigan, and Virginia,—in fact, in most of the important colleges of this country. Amongst us its work has already been favorable to the promo-

tion of Christian fellowship and worship, without sectarian bias, and I have no doubt that, in the future, its influence in promoting righteousness of life and Christian unity, among those who are here devoted to study, will be more and more apparent.

The University has received several other gifts during the past year, which it is a pleasure to record. A gentleman in Philadelphia who appreciates our work, and whose name I am not at liberty to mention, has given the sum of \$500 for the purpose of increasing the apparatus in electricity and magnetism. Mr. J. A. Shriver of Baltimore, at the suggestion of a friend, gave the sum of \$150 for the purchase of a collection of models, maps and charts, much needed for the illustration of the courses in Physical Geography. The library has received some acceptable presents,—among them a collection of rare and valuable volumes of Spanish literature and history from S. T. Wallis, Esq., of Baltimore. The two volumes upon Spain, which were written by Mr. Wallis, many years ago, have identified his name with the study of the customs and institutions of that country, and the lovers of Spanish literature among us are much gratified to have access to some of the editions of important works which he collected while abroad, and which can now be only obtained with difficulty.

The year just closed is also memorable because of the opening of the Johns Hopkins Hospital. A group of seventeen buildings, well arranged to promote the care and comfort of the sick and suffering, has been completed, and the wards have been opened for the reception of patients. The public ceremonies connected with this event were held in the Hospital, May 7th, 1889, and were attended by a large number of medical men, philanthropists and others, many of whom came from distant parts of the country.

Dr. William Osler, Physician-in-chief of the Hospital, has been made Professor of Medicine in the Johns Hopkins University, and Dr. Welch, Professor of Pathology in the University, has been made Pathologist to the Hospital. The close alliance thus indicated between the two foundations which bear the name of Johns Hopkins, is in strict accordance with the request of the founder, who enjoined upon his Trustees to bear in mind that it was his "constant wish and purpose that the Hospital should ultimately form a part of the Medical School of the University, for which he made ample provision in his will."

It seems proper for me to add that the President of the University was requested by the Trustees of the Hospital, in January last, to aid them in completing the organization of the Hospital, and, with the consent of the Trustees of the University, he was partially engaged in this service until July. The selection of Dr. Henry M. Hurd, of the State Asylum for the Insane at Pontiac, Michigan, to be the Superintendent, and his acceptance of this office on the first of August, 1889, rendered it needless to continue the temporary arrangement. But it is greatly to be desired that the intimate and harmonious relations thus established between the two foundations of Johns Hopkins, may endure throughout all time, so that whatever charity and science can devise for the relief of suffering may be enlisted in the service of the afflicted and unfortunate, and in the promotion of the healing arts.

The University from its beginning has given especial attention to the preparation of young men for a course in medicine to be afterwards pursued. Its laboratories of Physics, Chemistry, Biology, and Pathology have been established and maintained at great cost, with the constant desire to encourage the study of those sciences which underlie the Science and Art of

Medicine. A special group of studies has been arranged to meet the wants of those who intend at a later date to enter a professional school, and the success which has followed this preliminary course has been encouraging. It is now possible to offer during the next session of the University special courses adapted to those who have already taken a medical degree. Lectures to physicians will doubtless be given during the coming winter by the medical and scientific gentlemen connected with the Hospital and the University.

The University requires a large and special endowment before it can organize its Medical School. A gift of half a million of dollars would enable the Trustees to establish such an institution as they have in mind, and this endowment would be supplemented by the resources of the University and of the Hospital. It is doubtful whether there is anywhere an opportunity so full of promise as this, and when the attention of those who are able to give is brought to its consideration, let us hope that some one will be found willing to associate his name with those of George Peabody and Johns Hopkins, by establishing "The — School (or Institute or College) of Medicine and Surgery."

The academic staff included during the year fifty-five teachers. The number of students enrolled was three hundred and ninety-four, of whom one hundred and eighty-three were residents of Maryland, and one hundred and ninety came here from thirty-four other States of the Union, and twenty-one from foreign countries. Among the students were two hundred and sixteen already graduated, coming from ninety-six colleges and universities; there were one hundred and twenty-nine matriculates (or candidates for the degree of Bachelor of Arts); and there were forty-nine admitted as special students, to pursue courses of study for which they seemed fitted,

without reference to graduation. The degree of Bachelor of Arts was conferred upon thirty-six candidates; and twenty candidates were promoted to the degree of Doctor of Philosophy.

The following table indicates the enrolment of students in each year since the University was opened in the autumn of 1876:—

	Total Enrolled.	Matriculates.	Non-Matriculates.	Graduates, (incl. Fellows.)	Average Attendance at Public Lectures.
1876-77	89	12	23	54	60
1877-78	104	24	22	58	84
1878-79	123	25	35	63	96
1879-80	159	32	48	79	113
1880-81	176	37	37	102	186
1881-82	175	45	31	99	137
1882-83	204	49	30	125	148
1883-84	249	53	37	159	122
1884-85	290	69	47	174	212
1885-86	314	96	34	184	115
1886-87	378	108	42	228	165
1887-88	420	127	62	231	192
1888-89	394	129	49	216	

During thirteen years, fourteen hundred and twenty individuals have been enrolled as students, of whom six hundred and twenty-six have come from Maryland (including four hundred and ninety-four from Baltimore), and seven hundred and ninety-four from fifty other states and countries. Of this number eight hundred and nineteen persons pursued courses as graduate students, and six hundred and one as collegiate students.

The attendance upon the courses given in some of the principal subjects has been as follows during the last five years:

	1884-85.	1885-86.	1886-87.	1887-88.	1888-89.
Mathematics and Astronomy, . . . . .	75	53	76	84	82
Physics, . . . . .	80	57	73	85	74
Chemistry, . . . . .	76	94	118	119	124
Mineralogy and Geology,	41	62	24	25	38
Biology, . . . . .	44	51	65	61	81
Pathology, . . . . .			25	15	24
Greek, . . . . .	41	43	48	61	58
Latin, . . . . .	64	75	72	74	69
Sanskrit, etc., . . . . .	25	37	37	40	39
Semitic Languages, . . .	13	16	14	18	43
German, . . . . .	107	116	113	130	119
French, Italian, etc., . .	63	64	60	72	69
English, etc., . . . . .	68	56	90	84	94
History and Political Science, . . . . .	109	100	135	137	162
Psychology, Ethics, etc.,	44	82	65	81	48

Since degrees were first conferred, in 1878, two hundred and thirteen persons have attained the Baccalaureate degree, and one hundred and fifty-one have been advanced to the degree of Doctor of Philosophy, as appears from the following table :—

	A. B.	PH. D.		A. B.	PH. D.
1877-78		4	1883-84	23	15
1878-79	3	6	1884-85	9	13
1879-80	16	5	1885-86	31	17
1880-81	12	9	1886-87	24	20
1881-82	15	9	1887-88	34	27
1882-83	10	6	1888-89	36	20

The increasing number of undergraduate students has made it apparent for a long time past that an officer should be appointed to act as friend and counsellor of those who are

thus enrolled,—the chief of the Advisers. After much enquiry, the choice has fallen with unanimity upon Professor Griffin, one of the most respected professors in one of the most excellent colleges of New England. Having visited Baltimore and acquainted himself with our affairs, he decided to accept the position offered to him, and will enter upon his duties at the beginning of the academic year.

Professor Edward H. Griffin, D. D., LL. D., who now assumes the office of Dean, and of Professor of the History of Philosophy, graduated at Williams College, Mass., in 1862, and subsequently pursued the study of theology in Princeton and New York. In 1872, he was called by his alma mater to a professorship, and he has remained there until now, occupying of late the chair of Intellectual and Moral Philosophy, which bears the name and was instituted in honor of the late Mark Hopkins. Dr. Griffin is a man of varied culture and attainments, whose accession to our faculty will increase its strength and usefulness, while his knowledge of college life, and his interest in young men, will render him as we believe a most acceptable leader in our collegiate work.

Professor William Osler, M. D., lately one of the medical faculty in that distinguished seat of medical science, the University of Pennsylvania, having accepted the position of Physician in Chief to the Johns Hopkins Hospital, has been appointed Professor of Medicine in the Johns Hopkins University, and has accepted the office. He entered upon his services at the hospital in May last, and a corps of young physicians of marked ability are already gathered around him, to whom and to others who have taken a medical degree he will give certain courses of lectures during the ensuing winter. Dr. Osler is a native of Canada, who graduated in medicine in the University of McGill College, Montreal, in 1872, and

soon afterwards became a Fellow of the Royal College of Physicians in London. For ten years prior to 1884 he was a Professor in McGill University, and since that time he has filled the chair of clinical medicine in the University of Pennsylvania.

Dr. Howard A. Kelley, also of Philadelphia, has likewise accepted a call to the Johns Hopkins Hospital, where he holds the position of Gynecologist. He will be nominated, at the first opportunity, to a professorship of Gynecology in this University. Dr. Kelley is a graduate in arts and in medicine of the University of Pennsylvania, and has won a distinguished reputation in the special branches of medicine and surgery to which he is devoted.

Assistant Engineer W. F. C. Hasson, of the United States Navy, a graduate in 1880 of the Naval Academy at Annapolis, has been detailed by the Secretary of the Navy, in compliance with a request from the Trustees of this University, to give instruction here during the next three years in Mechanics and Engineering, and he has already entered upon the duties of his post. His appointment is made with reference especially to the enlargement of the course in Electrical Engineering.

Dr. Fabian Franklin, who has been devoted to the University, since its opening, as graduate student, fellow, assistant instructor, assistant editor of the American Journal of Mathematics, and Associate, has been promoted to the position of Associate Professor; and Dr. W. B. Clark and Dr. F. M. Warren, who have rendered excellent services as instructors in their respective departments, Geology, and Modern Languages, have been promoted to be Associates.

Among those who rendered us special services for the first time during the last year, should be named three gentlemen who were designated as Readers. Dr. Oskar Bolza, a graduate

of the University of Göttingen in 1886, recently invited to a mathematical chair in Clark University, Worcester, gave a course of twenty lectures, at the request of our mathematicians, on the *Theory of Substitutions*. Professor Small, lately chosen President of Colby University, in Waterville, Me., while proceeding to the degree of Doctor of Philosophy, gave instruction in English and American Constitutional History. One of our own graduates, Dr. A. G. Warner, now Professor of Political Economy in the University of Nebraska, gave us, while holding the office of General Agent of the Charity Organization Society of Baltimore, a course of lectures on Municipal and State Charities.

The usual celebration was held upon Commemoration Day, February 22, 1889. The trustees, faculty, and students assembled in the rooms of the University and went in procession to the Mt. Vernon Place Methodist Episcopal Church, where the principal address was given by Professor H. B. Adams on the Relations of the Civil Government to Higher Education. This discourse made a marked impression upon those who heard it, and much of it was printed in the newspapers of the day. It was subsequently published in the Johns Hopkins University Circulars and in pamphlet form. After the public exercises were concluded, the Alumni had their annual collation, at which the President of the Association, Professor Royce of Harvard University, (Doctor of Philosophy in 1878), presided and introduced the speakers. The Physical Laboratory was opened in the evening for the reception of ladies and gentlemen, and many of the most interesting pieces of apparatus, including those devoted to the photographic and spectrographic work of Professor Rowland, and the dynamos and other electrical instruments, were exhibited.

The ceremonies connected with the bestowal of degrees at the end of the year were held in the same church. Twenty young men were promoted to the degree of Doctor of Philosophy and thirty-six to that of Bachelor of Arts. Their names will be found upon another page. Professor Remsen spoke to the candidates for degrees, and one of their number, about to become a Doctor of Philosophy, Professor A. W. Small, now President of Colby University, Me., also made an address.

Among the incidents of the year most pleasant to remember may be named a celebration in honor of the promulgation of the written constitution of Japan. The Japanese Minister at Washington having sent the University a copy of this remarkable State paper, and having intimated that an expression of opinion in regard to it would be acceptable, it occurred to us that a public utterance of the thoughts which are awakened by this advancing movement of civilization would be of interest. Accordingly, on the seventeenth of April, an assembly of the faculty and students was held in Hopkins Hall. Judge Cooley, of Michigan, distinguished as an authority on Constitutional Law, and once a lecturer in this University, consented to take the chair. He was supported by the Japanese Minister and the Secretary of the Japanese Legation, and also by the President and Professors of the University. The remarks of Judge Cooley, and the still more extended address by Mr. Iyenaga, a Japanese student in our department of Historical and Political Science, were printed soon afterward in pamphlet form. The English versions of the Japanese Constitution and of the Emperor's proclamation were also published.

Our obligations to the Library of the Peabody Institute, under Dr. N. H. Morison, and to the Enoch Pratt Free Library, under Dr. L. H. Steiner, are more and more

important. The Peabody Library has within the year made special additions to its collection in Romance Literature, now very large and valuable. The fourth volume of its monumental catalogue is nearly ready for publication.

With the consent of the Trustees, arrangements have been made by which the graduates of the Baltimore City College will be received by us hereafter as matriculates without further examination.

Near the close of our last session, the Trustees by a formal vote gave me a leave of absence, in order that I may visit, during the coming winter, Egypt, Syria and Greece, and other countries near the Mediterranean. After fourteen years of service, I am planning for the first time a prolonged absence from Baltimore during the academic sessions. I shall leave my duties for a while with confidence that the University, which is so dear to us, will ere long be strengthened and enlarged; and I hope to be better fitted, after this proposed rest, to take a part in the new developments to which I confidently look forward.

DANIEL C. GILMAN.

BALTIMORE, *September 1*, 1889.

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As these pages are passing through the press, the death has occurred of one of the most devoted friends of the University, Mr. John W. McCoy, of Baltimore. By his will he gives to the University his choice collection of books and makes it his residuary legatee. A more ample acknowledgment of these generous gifts will be subsequently made.

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## LIST OF FELLOWS AND GRADUATES, 1876-1889.

### HOLDERS OF THE ADAM T. BRUCE FELLOWSHIP.

1888.

Henry Van Peters Wilson, Ph. D., Resident Naturalist of the U. S. Fish Commission, Woods Holl, Mass.

1889.

Shozaburo Watase, S. B. (Now in residence at the university.)

### FELLOWS.

(Arranged under the date of first appointment. \*—Deceased.)

1876.

Henry Carter Adams, Ph. D., Professor of Political Economy and Finance, University of Michigan.

Herbert Baxter Adams, Ph. D., Associate Professor of History (J. H. U.).

William Keith Brooks, Ph. D., Associate Professor of Morphology (J. H. U.); Director of the Chesapeake Zoölogical Laboratory.

Samuel Fessenden Clarke, Ph. D., Professor of Natural History, Williams College.

Thomas Craig, Ph. D., Associate Professor of Mathematics (J. H. U.).

Joshua Walker Gore, C. E., Professor of Natural Philosophy and Engineering, University of North Carolina.

George Bruce Halsted, Ph. D., Professor of Mathematics, University of Texas.

Edward Hart, Ph. D., Professor of Analytical Chemistry, Lafayette College.

Daniel Webster Hering, C. E., Professor of Physics, University of the City of New York.

Malvern Wells Iles, Ph. D., Chemist, Denver, Colorado.

William White Jacques, Ph. D., Instructor in Telegraph Engineering, Massachusetts Institute of Technology.

Charles Rockwell Lanman, Ph. D., Professor of Sanskrit, Harvard University.

David McGregor Means, A. B., Professor of Political and Mental Science, Middlebury College, 1877-80; Attorney-at-Law, New York City.

Harmon Northrop Morse, Ph. D., Associate Professor of Chemistry (J. H. U.).

Walter Hines Page, Professor in Louisville (Ky.) Male High School, 1878-79; Editor, New York City.

\*Peter Porter Poinier, M. E. *Did not enter on the fellowship.*

Erasmus Darwin Preston, C. E., U. S. Coast and Geodetic Survey, Washington.

\*Henry Joseph Rice, Sc. D., Professor of Natural Sciences, Brooklyn (N. Y.) High School, 1882-85.

Josiah Royce, Ph. D., Assistant Professor of Philosophy, Harvard University.

Alexander Duncan Savage, B. Litt., New York City.

Ernest Gottlieb Sihler, Ph. D., Classical Instructor, New York City.

Frederick Boyd Van Vorst, A. B., Attorney-at-Law, New York City.

\*John Henry Wheeler, Ph. D., Professor of Greek, University of Virginia, 1882-87.

1877.

Francis Greenleaf Allinson, Ph. D., Classical Instructor, Baltimore.

Fabian Frahklin, Ph. D., Associate Professor of Mathematics (J. H. U.).

Lyman Beecher Hall, Ph. D., Professor of Chemistry and Physics, Haverford College.  
Allan Marquand, Ph. D., Professor of the History of Art, Princeton College.

1878.

Maurice Bloomfield, Ph. D., Associate Professor of Sanskrit and Comparative Philology (J. H. U.).  
Constantine Fahlberg, Ph. D., Chemist, Salbke-Westerhüsen, Germany.  
Edwin Herbert Hall, Ph. D., Assistant Professor of Physics, Harvard University.  
Edward Coles Harding, A. M., Professor of Greek, University of Louisiana, 1879-80; Baltimore.  
Rev. Charles Robert Hemphill, D. D., Associate Professor of Biblical Literature, Southern Theological Seminary, 1882-85; Clergyman, Louisville, Ky.  
Isaac Ott, M. D., late Lecturer on Physiology, University of Pennsylvania; Physician, Easton, Pa.  
Henry Sewall, Ph. D., M. D., Professor of Physiology, College of Physicians and Surgeons, Baltimore.  
Christian Sihler, Ph. D., M. D., Assistant in Biology (J. H. U.), 1879-80; Physician, Cleveland, Ohio.  
Washington Irving Stringham, Ph. D., Professor of Mathematics, University of California.  
Charles Ambrose Van Velzer, S. B., Professor of Mathematics, University of Wisconsin.  
Abram Van Epps Young, Ph. B., Professor of Chemistry, Northwestern University, Illinois.

1879.

Brown Ayres, S. B., Professor of Physics, Tulane University, New Orleans.  
Louis Bevier, Ph. D., Adjunct Professor of Modern Languages, Rutgers College, N. J.  
William Burney, Ph. D., Professor of Chemistry, South Carolina Agricultural College.  
Edward Mussey Hartwell, Ph. D., Associate in Physical Training and Director of the Gymnasium (J. H. U.).  
\*John Robin McDaniel Irby, Ph. D.  
Mitsuru Kuhara, Ph. D., Professor of Chemistry, First Middle School of Tokio, Japan.  
\*Oscar Howard Mitchell, Ph. D., Professor of Mathematics, Marietta College, 1882-89.  
Edward Learnington Nichols, Ph. D., Professor of Physics, Cornell University.  
George Frederick Nicllassen, Ph. D., Professor of Greek and Latin, Southwestern Presbyterian University, Tenn.  
Waldo Selden Pratt, A. B., Associate Professor of Ecclesiastical Music and Hymnology, Hartford (Conn.) Theological Seminary.  
Robert Woodworth Prentiss, S. B., U. S. Nautical Almanac Office, Washington.  
William Thompson Sedgwick, Ph. D., Associate Professor of Biology, Massachusetts Institute of Technology.  
\*Herman Voorhees, C. E. *Did not enter on the fellowship.*  
Edmund Beecher Wilson, Ph. D., Professor of Biology, Bryn Mawr College.

1880.

James Wilson Bright, Ph. D., Associate in English (J. H. U.).  
Benjamin Chapman Burt, A. B., Assistant Professor of English and Rhetoric, University of Michigan, 1881-87.  
Robert Dorsey Coale, Ph. D., Professor of Chemistry and Toxicology, University of Maryland.  
Lawrence Bunting Fletcher, Ph. D., Instructor in Physics, Wesleyan University, 1882-83; Marlboro, N. Y.  
\*Spencer Heiden Freeman, A. B., Professor of Physics and Astronomy, Adelbert College, 1882-86.  
Kakichi Mitsukuri, Ph. D., Professor of Zoölogy, University of Tokio, Japan.  
Bernard Francis O'Connor, Ph. D., Instructor in French, Columbia College.  
Chase Palmer, Ph. D., Professor of Chemistry, Wabash College, Ind.  
Herbert Mills Perry, A. B., Instructor, Cascadilla School, Ithaca, N. Y.  
Andreas Franz Wilhelm Schimper, Ph. D., Professor of Botany, University of Bonn.  
Edward Henry Spieker, Ph. D., Associate Professor of Greek and Latin (J. H. U.).

Morrison Isaac Swift, Ph. D., Instructor in Philosophy, Hobart College, 1882-84; New York City.

\*Arthur Wilson Wheeler, A. B.

## 1881.

William John Alexander, Ph. D., Professor of English, University of Toronto.

Edward Sanford Burgess, A. B., Instructor in Natural Sciences, Washington (D. C.) High School.

William James Comstock, Ph. B., Instructor in Organic Chemistry, Yale University.

William Cathcart Day, Ph. D., Professor of Chemistry and Physics, Swarthmore College.

Henry Herbert Donaldson, Ph. D., Associate Professor of Neurology, Clark University.

William Pitt Durfee, Ph. D., Professor of Mathematics, Hobart College, N. Y.

George Stetson Ely, Ph. D., Assistant Examiner, U. S. Patent Office.

Benjamin Ives Gilman, A. B., Colorado Springs, Colo.

John Franklin Jameson, Ph. D., Professor of History, Brown University.

Charles Herschel Koyl, A. B., Instructor in Physics, Swarthmore College.

Henry Leslie Osborn, Ph. D., Professor of Biology and Geology, Hamline University, Minn.

Henry Newlin Stokes, Ph. D., U. S. Geological Survey.

Benjamin Willis Wells, Ph. D., Instructor in English, Friends' School, Providence, R. I., 1881-87; Student in Germany.

## 1882.

James McKeen Cattell, Ph. D., Professor of Psycho-physics, University of Pennsylvania.

Ellery William Davis, Ph. D., Professor of Mathematics and Astronomy, University of South Carolina.

David Talbot Day, Ph. D., U. S. Geological Survey, and Expert on Mining and Minerals for U. S. Census.

Alfred Emerson, Ph. D., Professor of Greek, Lake Forest University, Ill.

William Scott Fleming, A. B., Professor of Greek and German, Davidson College, 1883-85; Wetumpka, Ala.

Arthur Lincoln Frothingham, Jr., Ph. D., Professor of Archaeology, Princeton College.

Henry Root Goodnow, A. B., Brooklyn, N. Y.

Elgin Ralston Lovell Gould, Ph. D., Statistician, U. S. Bureau of Labor; Reader in Social Statistics (J. H. U.).

Arthur Stafford Hathaway, B. S., Instructor in Mathematics, Cornell University.

William Henry Howell, Ph. D., Lecturer in Physiology, University of Michigan.

Edward Harrison Keiser, Ph. D., Associate Professor of Chemistry, Bryn Mawr College.

Arthur Lalanne Kimball, Ph. D., Associate Professor of Physics (J. H. U.).

Harry Fielding Reid, Ph. D., Professor of Physics, Case School of Applied Science, Cleveland, O.

## 1883.

William Muss Arnolt, Ph. D., (J. H. U.).

Gustav Bissing, Ph. D., Assistant Examiner, U. S. Patent Office.

\*Adam Todd Bruce, Ph. D., Instructor in Osteology and Mammalian Anatomy (J. H. U.), 1886-87.

Archibald Lamont Daniels, D. Sc., Professor of Mathematics, University of Vermont.

John Dewey, Ph. D., Professor of Philosophy, University of Michigan.

\*James Reynolds Duggan, Ph. D., Professor of Chemistry, Wake Forest College, N. C., 1886-88.

Hans Carl Günther von Jagemann, Ph. D., Assistant Professor of German, Harvard University.

Gustav Adolph Liebig, Jr., Ph. D., Assistant in Electricity (J. H. U.).

Charles William Emil Miller, Ph. D., Professor of Greek and Latin, Peoria (Ill.) High School.

Charles Albert Perkins, Ph. D., Associate in Physics, Bryn Mawr College.

Lewis Tebbets Stevens, M. D., Demonstrator of Physiological Chemistry, St. Louis Medical College; Physician, St. Louis, Mo.

Lewis Webb Wilhelm, Ph. D., Mathematical Instructor, Baltimore.

1884.

- Ethan Allen Andrews, Ph. D., Associate in Biology (J. H. U.).  
 Henry Crew, Ph. D., Instructor in Physics, Haverford College.  
 Homer Winthrop Hillyer, Ph. D., Instructor in Chemistry, University of Wisconsin.  
 Rev. Abel Henry Huzinga, A. B., Clergyman, New Paltz, N. Y.  
 Frederick Schiller Lee, Ph. D., Associate in Physiology and Histology, Bryn Mawr College.  
 Charles Herbert Levermore, Ph. D., Assistant Professor of History, Massachusetts Institute of Technology.  
 Henry Francis Nachtrieb, S. B., Assistant Professor of Biology, University of Minnesota.  
 Henry Barber Nixon, Ph. D., Professor of Mathematics, Pennsylvania College, Gettysburg.  
 William Noyes, Jr., M. D., Assistant Physician and Pathologist, McLean Asylum, Somerville, Mass.  
 Albert Gallatin Palmer, Ph. D., Assistant Professor of Chemistry, Swarthmore College, 1886-87; Chemist, Baltimore.  
 Ernest Mondell Pease, A. B., Professor of Latin, Bowdoin College.  
 Albert Harris Tolman, A. B., Professor of English Literature and Rhetoric, Ripon College, Wisconsin.  
 Woodrow Wilson, Ph. D., LL. D., Professor of History, Wesleyan University, Conn.; Reader in the Science of Administration (J. H. U.).

1885.

- Cyrus Adler, Ph. D., Instructor in the Semitic Languages (J. H. U.).  
 David Barcroft, Ph. D., Berkeley, Cal.  
 William Shirley Bayley, Ph. D., U. S. Geological Survey; Professor of Geology and Mineralogy, Colby University, Me.  
 Louis Bell, Ph. D., Instructor in Physics, Purdue University, Ind.  
 William Henry Burnham, Ph. D.  
 Frank Albert Christie, A. B., Latin and Greek Master, Lawrenceville School, N. J.  
 Louis Rich Dewey, Ph. D., Assistant Professor of Economics and Statistics, Massachusetts Institute of Technology.  
 Albert E. Egge, Ph. D., Instructor in Modern Languages, Northfield, Minn.  
 William Henry Emerson, Ph. D., Professor of Chemistry, Georgia School of Technology.  
 John Charles Fields, Ph. D., Professor of Mathematics, Allegheny College, Pa.  
 Joseph Jastrow, Ph. D., Professor of Experimental and Comparative Psychology, University of Wisconsin.  
 George Theophilus Kemp, Ph. D., Associate in Bacteriology and Physiology, Hoagland Laboratory, Brooklyn, N. Y.  
 Marion Dexter Learned, Ph. D., Associate in German (J. H. U.).  
 Gonzalez Lodge, Ph. D., Associate in Latin, Bryn Mawr College.  
 Charles Skeels Palmer, Ph. D., Professor of Chemistry, University of Colorado.  
 George Thomas White Patrick, Ph. D., Professor of Philosophy and Didactics, Iowa State University.  
 Moses Slaughter, A. B., Professor of Latin, Iowa College.  
 Charles Whetham, A. B., Modern Language Master, Upper Canada College, Toronto.  
 Charles Baker Wright, A. B., Professor of English Literature and Rhetoric, Middlebury College, Vt.

1886.

- Edgar Pierce Allen, A. B. (J. H. U.).  
 John Pendleton Campbell, Ph. D., Professor of Biology, University of Georgia.  
 Henry Clarke, A. B., Classical Instructor, London, England.  
 Herbert Charles Elmer, Ph. D., Acting Assistant Professor of Latin, Cornell University.  
 Henry Brayton Gardner, A. B., Instructor in Political Economy, Brown University.  
 Milton Haight, A. B., Professor of English and Mathematics, Sapporo Agricultural College, Japan.  
 John Leslie Hall, Professor of English and History, William and Mary College, Va.  
 Charles Willard Hayes, Ph. D., U. S. Geological Survey, Washington.

George Benjamin Hussey, Ph. D., Fellow in Archaeology, Princeton College.  
 James Hervey Hyslop, Ph. D., Instructor in Philosophy, Columbia College.  
 Andrew Cowper Lawson, Ph. D., Geological Survey of Canada, Ottawa.  
 Franklin Paine Mall, M. D., Adjunct Professor of Anatomy, Clark University.  
 Yuzero Motora, Ph. D., Professor in the Aoyama Yeiwa Gakuko, Tokio, Japan.  
 Julius Nelson, Ph. D., Professor of Biology, Rutgers College.  
 William Ridgely Orndorff, Ph. D., Instructor in General and Organic Chemistry, Cornell University.  
 Daniel Richard Randall, Ph. D., Attorney at Law, Annapolis, Md.  
 Henry Dallas Thompson, A. B., Tutor in Mathematics, Princeton College.  
 Edward Burr Van Vleck, A. B., Tutor in Mathematics, Wesleyan University, Conn.  
 Amos Griswold Warner, Ph. D., Professor of Political Economy, University of Nebraska.  
 John Roaf Wightman, Ph. D., Professor of French, Iowa College.

## 1887.

Joseph Sweetman Ames, A. B., Assistant in Physics (J. H. U.).  
 Philip Wheelock Ayres, Ph. D., Assistant Secretary, Bureau of Charities, Brooklyn, N. Y.  
 William Snyder Eichelberger, A. B., Fellow by Courtesy (J. H. U.).  
 Henry Rushton Fairclough, A. B., Lecturer in Greek, University College, Toronto.  
 William Curmus Lawrence Gorton, Ph. D., Associate Professor of Mathematics, Woman's College of Baltimore.  
 William Herbert Hobbs, Ph. D., U. S. Geological Survey.  
 Joseph Hoeing Kastle, Ph. D., Professor of Chemistry, Kentucky State College.  
 Felix Lengfeld, Ph. D., Student of Chemistry in Germany.  
 Archibald MacMechan, Ph. D., Professor of the English Language and Literature, Dalhousie College, Nova Scotia.  
 Herbert William Magoun, A. B., Fellow by Courtesy (J. H. U.).  
 Thomas McCabe, Ph. D., Professor of Modern Literatures and Director of the German Department, University of Indiana.  
 John Leverett Moore, A. B. (J. H. U.).  
 Augustus Taber Murray, A. B., Professor of the Greek Language and Literature, Earlham College.  
 Edmund Clark Sanford, Ph. D., Instructor in Psychology, Clark University.  
 Charles Lee Smith, Ph. D., General Agent, Charity Organization Society of Baltimore; Instructor in History (J. H. U.).  
 Arthur Clarence Wightman, Ph. D., Demonstrator in Physiology (J. H. U.).  
 Henry Van Peters Wilson, Ph. D., Resident Naturalist, U. S. Fish Commission, Woods Holl, Mass.

## 1888.

Charles McLean Andrews, Ph. D., Associate Professor of History, Bryn Mawr College.  
 Frank Wilson Blackmar, Ph. D., Professor of History and Sociology, University of Kansas.  
 Charles Austin Borst, A. B., Assistant in Astronomy (J. H. U.).  
 William Merriam Burton, Ph. D., Chemist, Standard Oil Company, Cleveland, O.  
 Morgan Callaway, Jr., Ph. D., Professor of English, Southwestern University, Texas.  
 Charles Hiram Chapman, A. B., Instructor in Mathematics (J. H. U.).  
 Edwin Whitfield Fay, A. M. (J. H. U.).  
 Adam Capen Gill, A. B., Fellow by Courtesy (J. H. U.).  
 Joseph Edward Harry, Ph. D., Professor of Greek and German, Georgetown College, Ky.  
 James Taft Hatfield, A. B., Fellow by Courtesy (J. H. U.).  
 George Allison Hench, Ph. D., Student in Germany.  
 Clifton Fremont Hodge, Ph. D., Fellow in Psychology, Clark University.  
 Cary Talcott Hutchinson, Ph. D., Electrician, New York City.  
 Alvin Frank Linn, A. B., Professor of Chemistry, Wittenberg College, O. *Resigned without entering on the fellowship.*  
 Thomas Logie, A. B., Fellow by Courtesy (J. H. U.).  
 Alfred Edward Thayer, M. D., Physician, Warsaw, N. Y.  
 James Starr Trueman, A. B., Professor of Greek and Latin, Allegheny College, Pa.  
 Shozaburo Watase, S. B., Adam T. Bruce Fellow (J. H. U.).

1889.

Edward Carey Applegarth, A. B.	}	
Rudolph J. J. de Roode, Jr., S. B.		
George Peter Dreyer, A. B.		
Hermann Louis Ebeling, A. B.		
Charles Jacques Goodwin, A. B.		
Christopher Johnston, Jr., A. M.		Now in
Hiram Benjamin Loomis, A. B.		
John Hanson Thomas McPherson, A. B.		residence
Thomas Hunt Morgan, S. B.		
Daniel Alexander Murray, A. B.		
Charles Lane Poor, S. B.		at the
George Mann Richardson, A. C.		
John Cunningham Robertson, A. M.		university.
Charles Hunter Ross, S. B.		
Joseph Samuel Shefoc, A. B.		
Robert Benson Steele, A. B.		
Bert John Vos, A. B.		
James Albert Woodburn, A. B.		

DOCTORS OF PHILOSOPHY.

(When the institution is not named, the Johns Hopkins University is to be understood. (F) indicates that the person named has held a Fellowship here. \*—Died.)

1878.

- Henry Carter Adams, (F), A. B., Iowa, 1874, Instructor in Political Economy, 1879-81, Lecturer and Associate Professor of Political Economy, Cornell University, 1879-87.—Professor of Political Economy and Finance, University of Michigan.
- Thomas Craig, (F), C. E., Lafayette, 1875, U. S. Coast Survey, 1879-81.—Associate Professor of Mathematics.
- Josiah Royce, (F), A. B., University of California, 1875, Assistant Professor of English Literature, University of California, 1878-82.—Assistant Professor of Philosophy, Harvard University.
- Ernest Gottlieb Sihler, (F), Concordia, 1869.—Classical Instructor, New York City.

(4)

1879.

- Maurice Bloomfield, (F), A. M., Furman, 1877.—Associate Professor of Sanskrit and Comparative Philology.
- Samuel Fessenden Clarke, (F), Ph. B., Yale, 1878, Assistant in Biology, 1879-81.—Professor of Natural History, Williams College.
- George Bruce Halsted, (F), A. B., Princeton, 1875, Tutor and Instructor, Princeton, 1878-84.—Professor of Mathematics, University of Texas.

- Edward Hart, (F), S. B., Lafayette, 1874.—Professor of Analytical Chemistry, Lafayette College.
- William White Jacques, (F), S. B., Mass. Inst. of Technology, 1876.—Instructor in Telegraph Engineering, Massachusetts Institute of Technology.
- Henry Sewall, (F), S. B., Wesleyan, 1876, Hon. M. D., University of Michigan, 1888, M. D., University of Colorado, 1889, Associate in Biology, 1880-82, Professor in the University of Michigan, 1882-89.—Professor of Physiology, College of Physicians and Surgeons, Baltimore.

(6)

1880.

- Francis Greenleaf Allinson, (F), A. B., Haverford, 1876, A. B., Harvard, 1877, Assistant Professor of Latin and Greek, Haverford College, 1880-82.—Classical Instructor, Baltimore.
- Fabian Franklin, (F), Ph. B., Columbian, 1869, Assistant and Associate, 1879-82.—Associate Professor of Mathematics.
- Edwin Herbert Hall, (F), A. B., Bowdoin, 1875, Assistant in Physics, 1880-1, Instructor in Harvard, 1881-88.—Assistant Professor of Physics, Harvard University.

Allan Marquand, (F), A. B., Princeton, 1874.—Professor of the History of Art, Princeton College.

Washington Irving Stringham, (F), A. B., Harvard, 1877.—Professor of Mathematics, University of California.

(5)

## 1881.

Louis Bevier, (F), A. B., Rutgers, 1878, Instructor in French, Rutgers College, 1881-8.—Adjunct Professor of Modern Languages, Rutgers College.

Robert Dorsey Coale, (F), Assistant in Chemistry, 1881-83.—Professor of Chemistry and Toxicology, University of Maryland.

Edward Allen Fay, A. B., University of Michigan, 1862.—Vice-President and Professor of Languages, National Deaf-Mute College, Washington.

Lawrence Bunting Fletcher, (F), A. B., Columbia, 1877, Instructor in Physics, Wesleyan University, 1882-83.—Marlboro, N. Y.

Samuel Garner, A. B., St. John's, 1871, Professor of Modern Languages, University of Indiana, 1881-87.—Assistant Professor of Modern Languages, U. S. Naval Academy.

Edward Mussey Hartwell, (F), A. B., Amherst, 1873, M. D., Miami Medical College, 1882, Instructor in Physical Training, 1883-84.—Associate in Physical Training.

William Thompson Sedgwick, (F), Ph. B., Yale, 1877, Assistant in Biology, 1880-81, Associate, 1881-83.—Associate Professor of Biology, Massachusetts Institute of Technology.

Christian Sihler, (F), Concordia, 1866, M. D., University of Michigan, 1871, Assistant in Biology, 1879-80.—Physician, Cleveland, O.

Edmund Beecher Wilson, (F), Ph. B., Yale, 1878, Assistant in Biology, 1881-82, Lecturer in Williams College, 1883-84, Associate Professor, Bryn Mawr College, 1885-88.—Professor of Biology, Bryn Mawr College, Pa.

(9)

## 1883.

James Wilson Bright, (F), A. B., Lafayette, 1877, Assistant in German, 1882-83, Instructor in English, 1885-88, Instructor in Cornell University, 1885.—Associate in English.

John Franklin Jameson, (F), A. B., Amherst, 1879, Assistant and Associate in History, 1882-88.—Professor of History, Brown University.

Mitsuru Kuhara, (F), S. B., University of Tokio, 1877, Lecturer on Organic Chemistry, University of Tokio, 1882-87.—Professor of Chemistry, First Middle School of Tokio, Japan.

Robert Wright Mahon, C. E., Lehigh, 1876, Tutor in Chemistry, Lafayette College, 1882-83, Acting Professor of Chemistry, Rose Polytechnic Institute, 1888-89.

\*Oscar Howard Mitchell, (F), A. B., Marietta, 1875, Professor of Mathematics, Marietta College, 1882-89. \*March 29, 1889.

George Frederick Nicolassen, (F), A. B., University of Virginia, 1879, Assistant in Greek and Latin, 1881-82.—Professor of Ancient Languages, Southwestern Presbyterian University, Tenn.

William Albert Noyes, A. B., Iowa, 1879, Instructor in the University of Minnesota, 1882-83, Professor of Chemistry, University of Tennessee, 1883-86.—Professor of Chemistry, Rose Polytechnic Institute, Ind.

Chase Palmer, (F), A. B., 1879, Assistant, Mass. Institute of Technology, 1882-83, Professor of Chemistry, Mass. State Normal School, Salem, 1883-87, Assistant in Organic Chemistry, Tufts College, 1887-88.—Professor of Chemistry, Wabash College, Ind.

Edward Henry Spleker, (F), A. B., 1879, Instructor and Associate, 1882-88.—Associate Professor of Greek and Latin.

(9)

## 1883.

William John Alexander, (F), A. B., University of London, 1876, Professor in Dalhousie College, 1883-89.—Professor of English, University of Toronto.

William Cathcart Day, (F), A. B., 1880, Professor of Chemistry and Physics, St. John's College, Md., 1883-84, and University of Nashville, 1884-87.—Professor of Chemistry, Swarthmore College, Pa.

William Pitt Durfee, (F), A. B., University of Michigan, 1876.—Professor of Mathematics, Hobart College, N. Y.

George Stetson Ely, (F), A. B., Amherst, 1878, Professor of Mathematics, Buchtel College, 1883-84.—Assistant Examiner, U. S. Patent Office.

Kakichi Mitsukuri, (F), Ph. B., Yale, 1879.—Professor of Zoology, University of Tokio, Japan.

Bernard Francis O'Connor, (F), Bach. ès Lettres, Université de France, 1874.—Instructor in French, Columbia College.

(6)

1884.

- Herbert William Conn, A. B., Boston University, 1881, Assistant in Biology, 1883-84, Associate Professor, Wesleyan University, 1884-88.—Professor of Biology, Wesleyan University, Conn.
- Ellery William Davis, (F), S. B., University of Wisconsin, 1879, Professor in the Florida Agricultural College, 1884-88.—Professor of Mathematics and Astronomy, University of South Carolina.
- David Talbot Day, (F), A. B., 1881, Teacher, Baltimore, 1885-86.—U. S. Geological Survey, Washington; Special Agent and Expert in the department of Mining, etc., U. S. Census.
- John Dewey, (F), A. B., University of Vermont, 1879, Instructor, University of Michigan, 1884-87.—Professor of Philosophy, University of Michigan.
- \*James Reynolds Duggan, (F), A. B., Mercer University, 1877, M.D., Jefferson Medical College, 1879, Professor of Chemistry, Wake Forest College, 1886-88. \*January 10, 1888.
- William Henry Howell, (F), A. B., 1881, Assistant, Associate, Associate Professor of Biology, 1884-89.—Lecturer in Physiology, University of Michigan.
- Hans Carl Günther von Jagemann, (F), Naumburg Gymnasium, 1876, Professor of Modern Languages, Earlham College, 1884-85, Professor of German, Indiana University, 1884-89.—Assistant Professor of German, Harvard University.
- Edward Harrison Kelsor, (F), S. B., Swarthmore, 1880, Assistant in Chemistry, 1884-86.—Associate Professor of Chemistry, Bryn Mawr College, Pa.
- Arthur Lalanne Kimball, (F), A. B., Princeton, 1881, Associate, 1884-88.—Associate Professor of Physics.
- Henry Leslie Osborn, (F), A. B., Wesleyan, 1878, Professor of Zoology, Purdue University, Indiana, 1884-87.—Professor of Biology and Geology, Hamline University, Minn.
- Charles Albert Perkins, (F), A. B., Williams, 1879, Assistant in Physics, 1884-87.—Associate in Physics, Bryn Mawr College, Pa.
- Albert Shaw, A. B., Iowa, 1879.—Journalist, Minneapolis, Minn.; Lecturer on Municipal Government, Cornell University.
- Henry Newlin Stokes, (F), S. B., Haverford, 1879.—U. S. Geological Survey, Washington.
- Lewis Webb Wilhelm, (F), A. B., 1880.—Mathematical Instructor, Baltimore.

Arthur Yager, A. B., Georgetown College, Ky., 1879.—Professor of History, Georgetown College, Ky.

(15)

1885.

- Edward Webster Bemis, A. B., Amherst, 1880, Instructor in Political Economy, Amherst, 1885-86.—Adjunct Professor of History and Economics, Vanderbilt University.
- Gustav Bissing, (F), A. B., 1882.—First Assistant Examiner, U. S. Patent Office.
- Henry Herbert Donaldson, (F), A. B., Yale, 1879, Assistant in Biology, 1883-84, Instructor and Associate in Psychology, 1885-89.—Assistant Professor of Neurology, Clark University.
- Louis Duncan, (F), U. S. Naval Academy, 1880.—Associate Professor of Electricity.
- Homer Winthrop Hillyer, (F), S. B., University of Wisconsin, 1882.—Instructor in Chemistry, University of Wisconsin.
- Frederic Schiller Lee, (F), A. B., St. Lawrence University, 1878, Instructor in Biology, St. Lawrence University, 1886-87.—Associate in Physiology and Histology, Bryn Mawr College, Pa.
- Gustav Adolph Liebig, Jr., (F), A. B., 1882.—Assistant in Electricity.
- James Playfair McMurrich, A. B., Toronto, 1879, Instructor in Osteology, etc., 1884-86, Professor of Biology, Haverford College.—Instructor in Biology, Clark University.
- Albert Gallatin Palmer, (F), A. B., 1882, Assistant, and Assistant Professor of Chemistry, Swarthmore College, 1885-87.—Chemist, Baltimore.
- Harry Fielding Reid, (F), A. B., 1880, Assistant in Physics, 1882-84.—Professor of Mathematics and (now) of Physics, Case School, Cleveland, O.
- Henry Alford Short, A. B., Columbia, 1880, Tutor in Latin, Columbia College, 1885-88.—New York City.
- Morrison Isaac Swift, (F), A. B., Williams, 1879, Instructor in Philosophy, Hobart College, 1882-84.—New York City.
- Henry Alfred Todd, A. B., Princeton, 1876, Instructor, 1883-85.—Associate in Romance Languages.

(13)

1886.

William Shirley Bayley, (F), A. B., 1883.—U. S. Geological Survey; Professor of Geology and Mineralogy, Colby University, Me.

- \*Adam Todd Bruce, (F), A. B., Princeton, 1881, Instructor in Osteology, etc., 1886-87.  
\*February 9, 1887.
- Davis Rich Dewey, (F), A. B., University of Vermont, 1879, Instructor Mass. Institute of Technology, 1886-88.—Assistant Professor of Economics and Statistics, Mass. Institute of Technology.
- William Henry Emerson, (F), U. S. Naval Academy, 1880, Professor, S. C. Military Academy, 1886-88.—Professor of Chemistry, Georgia School of Technology, Atlanta.
- Joseph Auguste Fontaine, College of St. Nancy, France, 1879, Instructor in the University of Nebraska, 1887-89.—Professor of Modern Languages, University of Mississippi.
- Elgin Ralston Lovell Gould, (F), A. B., Victoria (Ont.), 1881, Instructor in History, Washington (D. C.) High School, 1884-87.—Statistician, Bureau of Labor, Washington; Reader in Social Statistics.
- William Penn Holcomb, B. L., Swarthmore, 1878.—Professor of History and Political Science and Lecturer on Pedagogics, Swarthmore College, Pa.
- Joseph Jastrow, (F), A. B., University of Pennsylvania, 1882.—Professor of Experimental and Comparative Psychology, University of Wisconsin.
- George Theophilus Kemp, (F), A. B., 1883, Demonstrator of Physiology, University of Pennsylvania, 1886-87.—Associate in Bacteriology and Physiology, Hoagland Laboratory, Brooklyn, N. Y.
- Charles Herbert Levermore, (F), A. B., Yale, 1879, Instructor in Political Economy, University of California, 1886-88.—Assistant Professor of History, Mass. Institute of Technology.
- Gonzalez Lodge, (F), A. B., 1883, Professor of Greek and German, Davidson College, 1886-88.—Associate in Latin, Bryn Mawr College.
- Charles William Emil Miller, (F), A. B., 1882.—Professor of Greek and Latin, Peoria (Ill.) High School.
- Henry Barber Nixon, (F), University of North Carolina, 1878.—Professor of Mathematics, Pennsylvania College, Gettysburg.
- Charles Skeele Palmer, (F), A. B., Amherst, 1879.—Professor of Chemistry, University of Colorado.
- Burr James Ramage, A. B., Newberry, 1880.—Attorney at Law, New York City.
- Shosuke Sato, S. B., Sapporo Agricultural College, 1880.—Professor of History and Political Economy, Imperial College of Agriculture, Sapporo, Japan.
- Woodrow Wilson, (F), A. B., Princeton, 1879, Associate and Associate Professor, Bryn Mawr College, 1885-88.—Professor of History, Wesleyan University, Conn.; Reader in the Science of Administration. (17)
- 1887.
- Cyrus Adler, (F), A. B., University of Pennsylvania, 1883.—Instructor in the Semitic Languages.
- Ethan Allen Andrews, (F), Ph. B., Yale, 1881.—Associate in Biology.
- Albert Clayton Applegarth, A. B., 1884.—Assistant Librarian, Md. Historical Society.
- David Barcroft, (F), Ph. B., University of California, 1882.—Berkeley, Cal.
- Henry Gustav Beyer, M. D., Bellevue Hospital Medical College, 1876, M. R. C. S. (London).—Passed Assistant Surgeon, U. S. N.
- Richard Newman Brackett, A. B., Davidson, 1883.—Arkansas Geological Survey, Little Rock.
- Henry Crew, (F), A. B., Princeton, 1882, Assistant in Physics, 1887-88.—Instructor in Physics, Haverford College.
- Albert E. Egge, (F), A. B., Norwegian Luther College, 1879.—Instructor in Modern Languages, Northfield, Minn.
- John Charles Fields, (F), A. B., Toronto, 1884.—Professor of Mathematics, Allegheny College, Pa.
- Andrew Fossum, A. B., Norwegian Luther College, 1882.—Classical Instructor, Pottstown, Pa.
- Richmond Harding, A. B., Davidson, 1880.—Professor of Greek, Davidson College.
- Charles Willard Hayes, (F), A. B., Oberlin, 1883.—U. S. Geological Survey, Washington.
- William Adam Hedrick, A. M., Columbian, 1884.—Instructor in the High School, Washington, D. C.
- Frank Gaylord Hubbard, A. B., Williams, 1880, Instructor in Smith College, 1887-88.—Instructor in English, University of California.
- George Benjamin Hussey, (F), A. B., Columbia, 1884.—Fellow in Archæology, Princeton College.
- James Hervey Hyslop, (F), A. B., Wooster University, 1877.—Instructor in Philosophy, Columbia College.

Marion Dexter Learned, (F), A. B., Dickinson, 1880.—Associate in German.  
 William Ridgely Orndorff, (F), A. B., 1884.—Instructor in General and Organic Chemistry, Cornell University.  
 Daniel Richard Randall, (F), A. B., St. John's College, 1883.—Attorney at Law, Annapolis, Md.  
 Frederick Morris Warren, A. B., Amherst, 1880.—Associate in French and German.

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## 1888.

- William Muss Arnolt, (F), B. D., New Brunswick (N. J.) Theological Seminary, 1882.—Fellow by Courtesy.  
 Philip Wheelock Ayres, (F), Ph. B., Cornell, 1884.—Assistant Secretary, Bureau of Organized Charities, Brooklyn, N. Y.  
 Louis Bell, (F), A. B., Dartmouth, 1884.—Instructor in Physics and Applied Electricity, Purdue University, Lafayette, Ind.  
 Benjamin Lester Bowen, A. B., Rochester University, 1881, Professor in Bowdoin College, 1888-89.—Associate Professor of French, Ohio State University.  
 William Henry Burnham, (F), A. B., Harvard, 1882, Instructor in Psychology, 1888-89.  
 Richard Eugene Burton, A. B., Trinity College, 1883.—New York City.  
 John Pendleton Campbell, (F), A. B., 1885.—Professor of Biology, University of Georgia, Athens.  
 Herbert Charles Elmer, (F), A. B., Cornell University, 1883.—Acting Professor of Latin, Cornell University.  
 Robert Orlando Graham, A. B., Amherst, 1877.—Professor of Chemistry, Illinois Wesleyan University, Bloomington.  
 Erasmus Haworth, S. B., Kansas State University, 1881.—Professor of Chemistry, Penn College, Oskaloosa, Iowa.  
 Francis Hobart Herrick, A. B., Dartmouth College, 1881.—Instructor in Biology, Adelbert College, Cleveland.  
 William Herbert Hobbs, (F), S. B., Worcester Polytechnic Institute, 1883.—U. S. Geological Survey.  
 Joseph Hoeing Kastle, (F), S. B., Kentucky State College, 1884.—Professor of Chemistry, Kentucky State College, Lexington.  
 Andrew Cowper Lawson, (F), A. B., University of Toronto, 1883.—Geological Survey of Canada, Ottawa.  
 Felix Lengfeld, (F), California College of Pharmacy.—Student of Chemistry, Germany.

Thomas McCabe, (F), A. B., 1886, Instructor in the University of Michigan, 1888-89.—Professor of Modern Literatures and Director of the German Department, University of Indiana.

Archibald Byron Macallum, A. B., University of Toronto, 1880.—Lecturer on Physiology and Demonstrator of Histology, University of Toronto.

John Ernst Matzke, A. B., Hope College, 1882.—College Professor of French, Bowdoin College, Maine.

Yuzero Motora, (F), Doshisha Kioto, Japan, 1879.—Professor in the Aoyama Yeiuwa Gakuko, Tokio.

Julius Nelson, (F), S. B., University of Wisconsin, 1881.—Professor of Biology, Rutgers College, New Brunswick, N. J.

George Thomas White Patrick, (F), A. B., Iowa State University, 1878, B. D., Yale, 1885.—Professor of Philosophy and Didactics, Iowa State University, Iowa City.

Edmund Clark Sanford, (F), A. B., University of California, 1883, Instructor in Psychology, 1888-89.—Instructor in Psychology, Clark University.

Henry Taber, Ph. B., Yale College, 1882, Assistant, 1888-89.—Docent in Mathematics, Clark University.

Amos Griswold Warner, (F), B. L., University of Nebraska, 1885, General Agent, Charity Organization Society, Baltimore, 1887-89.—Professor of Political Economy, University of Nebraska, Lincoln

John Roaf Wightman, (F), A. B., University of Toronto, 1871.—Professor of French, Iowa College.

Henry Van Peters Wilson, (F), A. B., 1883, Adam T. Bruce Fellow, 1888-89.—Resident Naturalist of the U. S. Fish Commission at Woods Holl, Mass.

Thomas Kimber Worthington, A. B., Haverford College, 1883.—Student of Law, Baltimore.

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## 1889.

Charles McLean Andrews, (F), A. B., Trinity College, 1884.—Associate Professor of History, Bryn Mawr College.

Frank Wilson Blackmar, (F), Ph. B., University of the Pacific, 1881.—Professor of History and Sociology, University of Kansas.

Jeffrey Richardson Brackett, A. B., Harvard University, 1883.

William Merriam Burton, (F), A. B., Adelbert College, 1886.—Chemist, Standard Oil Company, Cleveland, O.

- Morgan Callaway, Jr., (F), A. B., Emory College (Ga.), 1881.—Professor of English, Southwestern University, Texas.
- Alfred Robert Louis Dohme, (F), A. B., Johns Hopkins University, 1886.—Student in Germany.
- William Curns Lawrence Gorton, (F), A. B., Johns Hopkins University, 1886.—Associate Professor of Mathematics, Woman's College of Baltimore.
- Joseph Edward Harry, (F), A. B., Johns Hopkins University, 1886.—Professor of Greek and German, Georgetown College, Ky.
- George Allison Hench, (F), A. B., Lafayette College, 1885.—Student in Germany.
- Clifton Fremont Hodge, (F), A. B., Ripon College, 1882.—Fellow in Psychology, Clark University.
- Cary Talcott Hutchinson, (F), A. B., Washington University, 1886.—Electrician, New York City.
- James Thomas Loes, A. B., Adelbert College, 1886.—Principal of the Latin School, and Instructor in Greek and Latin, University of Nebraska.
- Archibald MacMechan, (F), A. B., University of Toronto, 1884.—Professor of the English Language and Literature, Dalhousie College, Nova Scotia.
- Charles William Moulton, A. B., University of Minnesota, 1888.—Instructor in Chemistry, Shattuck School, Faribault, Minn.
- Albion Woodbury Small, A. B., Colby University, 1876.—President of Colby University.
- Charles Lee Smith, (F), S. B., Wake Forest College, 1884.—General Agent of the Charity Organization Society of Baltimore; Instructor in History.
- Kirby Williams Smith, A. B., University of Vermont, 1884.—Instructor in Latin.
- Lemon Leander Uhl, A. B., Wittenberg College (Ohio), 1871.
- Arthur Clarence Wightman, (F), A. B., Wofford College (S. C.), 1879.—Demonstrator in Physiology.
- William Klapp Williams, A. B., Johns Hopkins University, 1886. (20)  
(151)

## BACHELORS OF ARTS.

When the institution is not named, the Johns Hopkins University is to be understood. (F) indicates that the person named has held a Fellowship here. \*—Died.

## 1879.

- George Washington McCreary.—Baltimore.
- Chase Palmer, (F), Ph. D., 1882, Assistant, Mass. Institute of Technology, 1882-83, Professor of Chemistry, Mass. State Normal School, Salem, 1883-7, Assistant in Organic Chemistry, Tufts College, 1887-8.—Professor of Chemistry, Wabash College, Ind.
- Edward Henry Spieker, (F), Ph. D., 1882, Instructor and Associate, 1882-8.—Associate Professor of Greek and Latin. (3)

## 1880.

- Rev. Thomas Milton Beadenkopf, B. D., Yale, 1885.—Clergyman, North Waterford, Me.
- Allen Kerr Bond, M. D., University of Maryland, 1882.—Physician, Baltimore.
- William Cathcart Day, (F), Ph. D., 1883, Professor in St. John's College, Md., 1883-84, and in the University of Nashville, 1884-87.—Professor of Chemistry, Swarthmore College, Pa.

- Henry Laurence Gantt, M. E., Stevens Institute of Technology, 1884, Instructor, McDonogh School, 1886-7.—Mechanical Engineer, Nicetown, Pa.
- Edgar Goodman, LL. B., University of Maryland, 1881.—Attorney at Law, Baltimore.
- Rev. Carl Eckhardt Grammer, Virginia Theological Seminary, 1884, Clergyman, Hancock, Md., and Cincinnati, O., 1884-7.—Professor of Greek and Hebrew, Virginia Theological Seminary.
- Alexander Fridge Jamieson.—Instructor, Lawrenceville School, N. J.
- \*Edmund Allen Jarvis. \*October 15, 1880.
- Stewart Brian Linthicum, LL. B., University of Maryland, 1882.—Attorney at Law, Portland, Oregon.
- John Hanson Lowe, LL. B., University of Maryland, 1882.—Attorney at Law, Baltimore.
- Rev. Leigh Clinton Morgan.—Clergyman, Cleveland, O.
- \*Nelson Palmer. \*June 12, 1886.

Thomas Pettigrew.—Civil Engineer, Parkersburg, W. Va.  
 Harry Fielding Reid, (F), Ph. D., 1885, Assistant in Physics, 1882-4.—Professor of Physics, Case School, Cleveland, O.  
 Rev. Wiltz Raymond Stricklen.—Clergyman, Baltimore.  
 Lewis Webb Wilhelm, (F), Ph. D., 1884.—Mathematical Instructor, Baltimore.

1881.

William Wilson Baden, LL. B., University of Maryland, 1883.—Graduate Student.  
 Henry Johns Bowdoin, LL. B., University of Maryland, 1883.—Attorney at Law, Baltimore.  
 John Wilson Brown.—Philadelphia, Pa.  
 David Talbot Day, (F), Ph. D., 1884, Teacher, Baltimore, 1885-6.—U. S. Geological Survey, Washington.  
 William Henry Howell, (F), Ph. D., 1884, Assistant and Associate, 1884-8, Associate Professor of Animal Physiology, 1888-9.—Lecturer in Physiology, University of Michigan.  
 John Johnson, LL. B., University of Maryland, 1887, Instructor, McDonogh School, 1881-6.—Attorney at Law, Baltimore.  
 James Edward Keeler, Allegheny (Pa.) Observatory, 1882-6.—Assistant Astronomer, Lick University, San José, Cal.  
 Rev. Edwin George Richardson.—Clergyman, Milwaukee, Wis.  
 Adoniram Judson Robinson, LL. B., University of Maryland, 1885, Instructor in Baltimore City College, 1881-7.—Attorney at Law, Baltimore.  
 \*Henry Rolando, M. D., University of Maryland, 1883, Resident Physician, Presbyterian Hospital, N. Y., 1883-5. \*October 4, 1888.  
 Lee Sale, LL. B., Washington University, 1885.—Attorney at Law, St. Louis, Mo.  
 Mactier Warfield, M. D., University of Maryland, 1884.—Physician, Baltimore.

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1882.

William Hughlett Adkins, LL. B., University of Maryland, 1883.—Attorney at Law, Baltimore.  
 Thomas Alexis Berry.—Baltimore.  
 Gustav Bissing, (F), Ph. D., 1885.—First Assistant Examiner, U. S. Patent Office.  
 Walter Bernard Clarkson, Teacher, Jacksonville, 1880-3.—Superintendent of County Schools, Jacksonville, Fla.  
 Hermann Louis Ebeling, Teacher, Bloomfield, N. J., 1882-6.—Fellow.

Louis Garthe.—Baltimore.  
 Edward Ingle.—Baltimore.  
 Richard Fuller Kimball, LL. B., University of Maryland, 1884.—Attorney at Law, Baltimore.  
 Gustav Adolph Liebig, Jr., (F), Ph. D., 1885.—Assistant in Electricity.  
 Charles William Emil Miller, (F), Ph. D., 1886.—Professor of Greek and Latin, Peoria (Ill.) High School.  
 James Page, Assistant, Astronomical Observatory, Allegheny, Pa., 1886-7.—Baltimore.  
 Albert Gallatin Palmer, (F), Ph. D., 1885, Assistant, and Assistant Professor of Chemistry, Swarthmore College, 1885-7.—Chemist, Baltimore.  
 Robert Miller Reese.—Baltimore.  
 Lewis Tebbetts Stevens, (F), M. D., Harvard, 1886.—Demonstrator of Physiological Chemistry, St. Louis Medical College; Physician, St. Louis, Mo.  
 Herbert Thorndyke Tiffany, LL. B., University of Maryland, 1885.—Attorney at Law, Sioux City, Iowa.

(15)

1883.

William Shirley Bayley, (F), Ph. D., 1886.—U. S. Geological Survey; Professor of Geology and Mineralogy, Colby University, Me.  
 Maurice Fels, LL. B., University of Pennsylvania, 1886.—Attorney at Law, Philadelphia.  
 David Sterrett Gittings.—Baltimore.  
 William Beatty Harlan, LL. B., University of Maryland, 1885.—Attorney at Law, Belair, Md.  
 George Theophilus Kemp, (F), Ph. D., 1886, Demonstrator of Physiology, University of Pennsylvania, 1886-7.—Associate in Bacteriology and Physiology, Hoagland Laboratory, Brooklyn, N. Y.  
 Gonzalez Lodge, (F), Ph. D., 1886, Professor of Greek and German, Davidson College, 1886-8.—Associate in Latin, Bryn Mawr College.  
 William Edgar Stratton, M. D., Harvard, 1886, Assistant Physician, Hartford (Conn.) Hospital, 1886-7.—Physician, Brooklyn, N. Y.  
 Henry Winslow Williams, LL. B., University of Maryland, 1885.—Attorney at Law, St. Paul, Minn.  
 Henry Van Peters Wilson, (F), Ph. D., 1888, Adam T. Bruce Fellow, 1888-9.—Resident Naturalist of the U. S. Fish Commission, at Woods Holl, Mass.

William John Wizenbacher, Instructor in McDonogh School, 1883-6.—Attorney at Law, Hagerstown, Md.

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## 1884.

Albert Clayton Applegarth, Ph. D., 1887.—Assistant Librarian, Md. Historical Society.

Charles Walter Artz, LL. B., Columbia, 1886. Attorney at Law, New York City.

Walter Bliss Canfield.—Chemist, Walston, Pa.

George Gibson Carey, Jr., LL. B., University of Maryland, 1886.—Attorney at Law, Baltimore.

William Kennedy Cromwell.—Baltimore.

Charles William Remsberg Crum, M. D., University of Maryland, 1888.—Instructor in Mathematics, Mercersburg College, Pa.

Harry Friedenwald, M. D., College of Physicians and Surgeons, Baltimore, 1886, Resident Physician, City Hospital, Baltimore, 1886-7.—Student in Germany.

William Lindsay Glenn, LL. B., University of Maryland, 1888.—Attorney at Law, Baltimore.

John Hinkley, LL. B., University of Maryland, 1886.—Attorney at Law, Baltimore.

Charles Morris Howard, LL. B., University of Maryland, 1888.—Attorney at Law, Baltimore.

John Deering Lord, Jr., LL. B., Columbia, 1886.—Attorney at Law, Baltimore.

Jere Williams Lord, M. D., University of Pennsylvania, 1887, Resident Physician, Presbyterian Hospital, Philadelphia, 1887-8.—Physician, Baltimore.

William Patrick Lyons, LL. B., University of Maryland, 1886.—Attorney at Law, Baltimore.

Edgar George Miller, Jr., LL. B., University of Maryland, 1886.—Attorney at Law, Baltimore.

William Ridgely Orndorff, (F), Ph. D., 1887.—Instructor in General and Organic Chemistry, Cornell University.

George Dobbie Penniman, LL. B., University of Maryland, 1886.—Attorney at Law, Baltimore.

William Henry Perkins, Jr., LL. B., University of Maryland, 1888.—Attorney at Law, Baltimore.

George Clement Stokes, Jr., LL. B., University of Maryland, 1888.—Attorney at Law, Baltimore.

\*William Jones Thomas. \*March 9, 1885.

\*William Ferdinand Walz. \*March 21, 1887.

Frederick Henry Wilkens.—Student in Leipzig, Germany.

George Wishart Edmond, (*extra ordinem*).—Assistant in Chemistry.

Charles Howard Shinn, (*extra ordinem*).—San Francisco, California.

(23)

## 1885.

John Pendleton Campbell, (F), Ph. D., 1888.—Professor of Biology, University of Georgia.

John Glenn, Jr., LL. B., University of Maryland, 1887.—Attorney at Law, Baltimore.

Junius Moore Horner, General Theological Seminary, New York, 1889.—Clergyman, Oxford, N. C.

James Albert Loane.—Baltimore.

Harry Wilbur Price, LL. B., Columbian University, 1887.—Attorney at Law, Chicago, Ill.

Benjamin Titus Roberts, Jr.—North Chili, N. Y.

Moses Roth Ryttenberg, LL. B., University of Maryland, 1888.—Attorney at Law, Baltimore.

Hugo Steiner, LL. B., University of Maryland, 1887.—Attorney at Law, Baltimore.

Henry Hazlehurst Wiegand.—Graduate Student.

(9)

## 1886.

Joseph Sweetman Ames, (F).—Assistant in Physics.

Wilson Lloyd Bevan, General Theological Seminary, New York, 1889.

Thomas Hepburn Buckler, M. D., University of Maryland, 1888.—Physician, Baltimore.

Alfred Robert Louis Dohme, (F).—Student in Germany.

Albert Alvin Doub.—Teacher, Frostburg, Md.

William Snyder Eichelberger, (F).—Fellow by Courtesy.

Harry English.—Instructor in the High School, Washington, D. C.

Abraham Flexner.—Professor of Greek, Louisville (Ky.) High School.

William Edward Gates.—Cleveland, O.

William Curns Lawrence Gorton, (F), Ph. D., 1889.—Associate Professor of Mathematics, Woman's College of Baltimore.

Joseph Edward Harry, (F), Ph. D., 1889.—Professor of Greek and German, Georgetown College, Ky.

Benjamin Henry Hartogensis.—Baltimore.

James Shaler Hodges, Instructor in St. Paul's School, Concord, N. H., 1886-88.—Graduate Student.

Theodore Hough, Instructor in McDonogh School, 1886-9.—Graduate Student.

Percy Meredith Hughes.—Instructor in the High School, Washington, D. C.

John Henry Laessig, Jr.—Student of Chemistry in Germany.

Allan McLane, Jr., LL. B., University of Maryland, 1888.—Attorney at Law, Baltimore.

John Hanson Thomas McPherson.—Fellow.

Colyer Meriwether.—Instructor in English, Second Middle School, Sendai, Japan.

John Pleasants.—Baltimore.

Richard Hall Pleasants, Jr., LL. B., University of Maryland, 1889.—Attorney at Law, Baltimore.

William Flood Smith, M. D., College of Physicians and Surgeons, Baltimore, 1889, Instructor in McDonogh School, 1886-7.—Resident Physician, City Hospital, Baltimore.

Michael Daniel Stein.—Oakland, Cal.

Bernard Wiesenfeld, LL. B., University of Maryland, 1889.—Attorney at Law, Baltimore.

John Whitridge Williams, M. D., University of Maryland, 1888.—Student in Germany.

Langdon Williams.—Teacher, Baltimore.

William Klapp Williams, Ph. D., 1889.—Athenaeum, Boston.

John Randolph Winslow, M. D., University of Maryland, 1888.—Physician, Baltimore.

\*Allan Chase Woods. \*September 9, 1886.

Frederick George Young.—Vice-President, State Normal School, Madison, South Dakota.

Thomas McCabe, (*extra ordinem*), (F), Ph. D., 1888.—Instructor in French, University of Michigan.

1887.

(31)

Edward Carey Applegarth.—Fellow.

Richard Howard Bayard.

Herbert Maxwell Brune, LL. B., University of Maryland, 1889.—Attorney at Law, Baltimore.

Charles Edward Coates, Jr.—Graduate Student.

William Roswell Cole.—Student of Divinity, Harvard University.

Paul Joseph Dashiell.—Instructor in Organic Chemistry, Lehigh University.

George Peter Dreyer.—Fellow.

Edward Duffy, Jr., LL. B., University of Maryland, 1889.—Attorney at Law, Baltimore.

James Clark Fifield.—Student of Law, Minneapolis, Minn.

Julius Friedenwald.—Student of Medicine, College of Physicians and Surgeons, Baltimore.

Douglas Huntly Gordon, LL. B., University of Maryland, 1889.—Graduate Student.

Jay Caesar Guggenheimer.—Student of Law, University of Maryland.

Charles Homer Haskins.—Assistant in History.

George Lincoln Hendrickson.—Professor of Latin, Colorado College.

Franz Otto Karl Hoffmann.—Graduate Student.

Robert Milligan McLane, Jr.—Student of Law, University of Maryland.

Robert William Rogers.—Tutor in Greek, Haverford College.

Henry Oliver Thompson.—Student of Law, University of Maryland.

Benjamin Simon William Tuska, LL. B., Columbia College, 1889.—Attorney at Law, New York City.

Rev. Robert William Henry Weech.—Clergyman, Hagerstown, Md.

Edward William Willis, M. D., University of Maryland, 1889.—Physician, Baltimore.

Henry Firey Wingert.—Teacher, Hagerstown, Md.

Walter Bell Scaife, (*extra ordinem*), Ph. D., University of Vienna, 1887.—Student in Paris, France.

Albert Henry Smyth, (*extra ordinem*).—Professor of English, Central High School, Philadelphia.

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1888.

George Henry Harold Ballard.

Edward Ambrose Bechtel.—Professor of Greek, Mt. Morris College, Ill.

James William Black.—Graduate Student.

Charles Pliny Brigham.—Graduate Student.

William Bromwell.—Graduate Student.

Hamilton McFarland Brown.—Baltimore.

Arthur Lee Browne.—Graduate Student.

Charles Hamilton Carey.—Baltimore.

John Broughton Daish.—Instructor in the High School, Washington, D. C.

William Levering Devries.—Graduate Student.

Gustav Edward Gleske.—Student of Medicine, Baltimore.

Raleigh Colston Gildersleeve.—Student in Berlin, Germany.

Harris Hancock.—Graduate Student.  
 Walter Jones.—Graduate Student.  
 William Augustine Jones.—Student of Law,  
 University of Alabama, Tuscaloosa.  
 Arthur Lincoln Lamb.—Teacher, Baltimore.  
 Charles Day Lanier.—Teacher, Baltimore.  
 John Bright Macauley.—Washington, D. C.  
 William Howard Miller.—Teacher, Centre-  
 ville, Md.  
 George Neville Moore.—Graduate Student.  
 Harry O'Donovan.—Student of Medicine,  
 University of Maryland.  
 Frank Eugene Reader.—New Brighton, Pa.  
 Louis Rettger.  
 David Ellsworth Roberts.  
 Lessing Rosenthal.—Student of Law, Chi-  
 cago, Ill.  
 Charles Edmund Simon.—Assistant in the  
 Johns Hopkins Dispensary.  
 Charles Kephart Swartz.—Gettysburg, Pa.  
 Robert Melvin Tarleton.—Birmingham,  
 Ala.  
 Edward Lucas White.—Graduate Student.  
 John White, Jr.—Graduate Student.  
 Westel Woodbury Willoughby.—Graduate  
 Student.  
 William Franklin Willoughby.—Student of  
 Law, Washington, D. C.  
 Charles Hiram Chapman, (*extra ordinem*),  
 (F).—Instructor in Mathematics.  
 Charles Collier Holden, (*extra ordinem*).—  
 Teacher, Raleigh, N. C.

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## 1889.

Adolph Bernhard.—Teacher, Milwaukee,  
 Wis.  
 Hiram Horsburgh Bice.—Utica, N. Y.  
 John Sedgewick Billings.  
 Walton Bolgiano.—Student of Medicine,  
 University of Pennsylvania.  
 Theodore Cooke, Jr.  
 Frank Barnum Culver.—Graduate Scholar.

Richard Edward Edes.—Graduate Scholar.  
 Daniel Nathan Eisendrath.—Student of  
 Medicine, Chicago.  
 Albert Bernhardt Faust.—Graduate Scholar.  
 Charles Lee Fulton.  
 Joseph Elliott Gilpin.—Graduate Student.  
 Ross Granville Harrison.—Graduate Stu-  
 dent.  
 George Newton Cressy Henschen.—Teach-  
 er, Reading, Pa.  
 William Sadler Hilles.  
 William Isaac Hull.—Graduate Scholar.  
 Harry Clary Jones.—Graduate Scholar.  
 George Charles Keidel.—Graduate Scholar.  
 Jesse William Lazear.  
 Alfred Mann.—Student of Medicine, New  
 York City.  
 Charles Carroll Marden.—Teacher, Norfolk,  
 Va.  
 William Watson McCulloh.  
 Philip Randle Moale.—Graduate Student.  
 Waldo Newcomer.  
 Leonard Magruder Passano.—Graduate  
 Scholar.  
 Arthur Jackson Patek.—Student of Medi-  
 cine, New York City.  
 William Peters Reeves.—Graduate Student.  
 Legh Wilber Reid.—Alexandria, Va.  
 Ralph Robinson.  
 Brantz Mayer Roszel.—Graduate Scholar.  
 John George Sadtler.  
 Benjamin Bittinger Shreeves.—Baltimore.  
 Robert Tunstall Taylor.—Student of Medi-  
 cine, University of Virginia.  
 Walter Herron Taylor.—Student of Law,  
 University of Virginia.  
 Winfield Scott Thomas.—Professor of Greek  
 and Latin, Chaffee College, Cal.  
 Harry Ullmann.—Graduate Student.  
 Horatio Alanson Warren.

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# REPORTS ON THE INSTRUCTION IN THE CHIEF BRANCHES OF STUDY.

Prepared by the Principal Instructors in the several departments.

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## Mathematics and Astronomy.

### I.—ASTRONOMY.

Professor Newcomb lectured twice weekly, through the year, in Astronomy. During the second half-year the subject specially considered was Celestial Mechanics.

In the practical work with instruments the students taking astronomy as their principal subject have been chiefly engaged with the meridian circle. The operations of adjusting the instrument and collimators, determining time, right ascensions and declinations, and investigating the results of the observations, have all been practised until a high degree of proficiency has been reached.

Practice has also been had in the adjustment and general management of the equatorial, but time has not been found for much regular observation with this instrument.

In celestial mechanics and theoretical astronomy the work has been mostly in the field of special and general perturbations and correction of orbits. An application of the method of special perturbations was made to the planet Anahita, discovered by Dr. Peters in October, 1887. An orbit was found from all the observations made during the opposition of discovery (October, 1887, to January, 1888), and the perturbations were then computed forward to March, 1889, when the planet again came into opposition, and an ephemeris was published in the *Astronomical Journal*. With the aid of this ephemeris the planet was found by Dr. Peters only 2' from the predicted place. In general perturbations an application has also been made to the perturbations of Eurynome by Jupiter, but this work was not completed.

### II.—MATHEMATICS.

Dr. Story has conducted the following courses :

1. Introductory Course for Graduates (Analytic Mechanics, Theory of Numbers, Modern Algebra, Higher Plane Curves, Twisted Curves and Surfaces, Quaternions, Finite Differences, and Probabilities). *Daily, through the year.*

2. Quaternions (Advanced Course). *Three times weekly, through the year.*

3. Twisted Curves (Advanced Course). *Twice weekly, first half-year.*
4. Theory of Numbers (Advanced Course). *Twice weekly, second half-year.*
5. Mathematical Seminary. *Weekly, through the year.*

Courses were given by Dr. Craig as follows:

Theory of Functions. *Three times weekly, first half-year.* This course followed mainly Hermite's *Cours professé à la Sorbonne* introducing matter from Briot and Bouquet's *Théorie des Fonctions Elliptiques* and from memoirs by Weierstrass, Poincaré, Picard and others.

Mechanics and Hydrodynamics. *Three times weekly, through the year.* The course in Hydrodynamics was based chiefly upon Lamb's *Treatise on the Motion of Fluids* and Basset's *Treatise on Hydrodynamics*, and the course in Mechanics was made up from Jacobi's *Vorlesungen über Dynamik*, Appell's *Cours de Mécanique Rationnelle*, and memoirs by Darboux and Halphen.

Advanced Differential Equations. *Twice weekly, first half-year.* This course was made up from Vol. III of Jordan's *Cours d'Analyse* and from memoirs by Hermite, Picard and Darboux.

Abelian Functions. *Twice weekly, through the year.* This course was taken in part from Clebsch and Gordan's *Abel'sche Functionen* but principally from memoirs by Kronecker, Mme. Kowalevski, Poincaré, Picard and others.

Linear Differential Equations. *Twice weekly, second half-year.* The basis of this course was Vol. I of Craig's *Treatise on Linear Differential Equations*, and in addition memoirs by Forsyth and Halphen were consulted.

Courses were given by Dr. Franklin as follows:

Problems in Mechanics. *Twice weekly, through the year.*

Analytic Geometry. *Daily, til December 15.*

Differential and Integral Calculus. *Daily, from December 15 to end of year.*

Differential and Integral Calculus (Advanced Course). *Three times weekly, first half-year.*

Solid Analytic Geometry. *Twice weekly, through the year.*

A course of twenty lectures on the Theory of Substitutions and their applications to Algebraic Equations was given by Dr. Oskar Bolza in January and February.

Four numbers, making Vol. XI, of the American Journal of Mathematics have appeared during the year. The subjects treated have been various and important. It is interesting to note the extended area from which contributions have been received and the names of the contributors.

From the United States: Bolza, Fields, Fine, Franklin, Johnson, Morley, Rowland. From England: Basset, Cayley, Love, MacMahon. From France: Goursat, D'Ocagne, Perott, Picard. From Germany: Heun, Koenigsberger, Lie.

A portrait of M. Hermite forms a frontispiece to the volume.

S. NEWCOMB,  
Professor of Mathematics and Astronomy.

## Physics.

During the year 1888-9, regular courses have been given as follows:—

By Professor Rowland:

Lectures on Electricity and Magnetism, with especial reference to the development of the mathematical theory; a course given to advanced students of Physics. *Four times weekly, through the year.*

By Dr. Kimball:

A course of experimental lectures in General Physics, with recitations. *Daily, through the year.*

Lectures on Mechanics, Elementary Thermodynamics, Electricity and Magnetism, Sound, and the Wave Theory of Light. *Daily, through the year.*

By Dr. Duncan:

The first year's course in Electricity and Magnetism consisting of lectures on the mathematical theory of the subject. *Three times weekly, through the year.*

Second year's course in Electricity and Magnetism, consisting of lectures on the theory of the dynamo and of motors, the transmission and distribution of energy, the telegraph, storage batteries, etc. *Twice weekly, through the year.*

Mr. Ames has had the immediate charge of the laboratory work of the undergraduate students during the year, under the general supervision of Dr. Kimball.

Advanced students have taken part with the instructors in weekly meetings for the discussion of the current physical journals.

The Physical Seminary has met weekly under the guidance of Dr. Kimball. The following topics have been reported on and discussed:

The history of thermodynamics. Experiments on the liquefaction of gases and on the properties of gases in the critical state. Kinetic theory of gases. Capillarity. Diffusion, effusion and viscosity of gases. Langley's investigations of distribution of energy in the spectrum, and atmospheric absorption. Measurement of high temperatures. Radiation and theory of exchanges. Investigations on the range of molecular action. Diffraction in the microscope, with the theory of the limit of visibility in that instrument. Theory of dissociation and thermodynamic potential. On sky colors. Theory of the spectroscope and resolving power of prisms. Velocity of light determinations. On color sensation. On the theory and use of concave gratings. Experiments on electric convection currents. Stokes's work on aberration. Chemical action of light. Lockyer's work in spectrum analysis.

Beside the regular work of instruction the following researches have been carried on:

The photographic map of the spectrum has been extended so as to include the whole ultra violet to w. l. 3000, the limit of the solar spectrum.

A table of standard wave lengths of lines in the solar spectrum has been completed and published, from w. l. 3094 to 7714.

The new machine for ruling gratings has been adjusted and put into working order.

The experiments of Hertz have been repeated and the various phenomena studied.

The ratio of the electromagnetic to the electrostatic units has been determined with greater accuracy than has before been attained.

The magnetic effect of a rotating disc having an electrostatic charge has been very carefully measured.

Experiments have been continued on the chemical changes which take place in the storage battery cell.

The iron spectrum has been photographed, and the wave lengths are being determined through its entire length, some 15,000 lines having been recorded.

Papers have been prepared and published on the following subjects:

The theory of the concave grating and a detailed account of the mode of mounting, adjusting and using it.

An account of experiments to determine the ratio of the Mercury unit to the B. A. unit of resistance.

On the inherent defects of lead secondary batteries.

A lecture was given by Professor Rowland, addressed particularly to physicists, on electromagnetic waves and the ether.

A course of three public lectures was given in the main lecture room of the physical laboratory:—

One by Dr. Kimball, on the diffraction of light and the spectrum. One by Dr. Duncan, on some electrical experiments. One by Mr. Ames, on color and color mixtures.

The lectures were illustrated by experiments, and were well attended.

The electrical testing department has standardised a large number of electrical measuring instruments and resistances, and has tested cables, dynamos, motors, primary and secondary batteries, etc.

During the year there have been seventy students in the department, twenty-one of whom were graduates. Eight have followed the advanced courses in physics. Thirteen have taken the special course in electricity and magnetism.

One student, Mr. C. T. Hutchinson, has received the degree of Doctor of Philosophy, having presented as his thesis an important investigation on the magnetic effect of a rapidly rotating body charged with electricity.

During the year arrangements have been made for the establishment of a course in applied mechanics, to supplement the course in the training of electrical engineers, and Asst. Engineer W. F. C. Hasson, U. S. N.,

has been stationed here by the Navy Department to act as instructor in applied mechanics and the mechanics of machinery during the next three years.

HENRY A. ROWLAND,  
*Professor of Physics.*

### Chemistry.

During the past academic year, 1888-89, the work in Chemistry has been carried on essentially in accordance with the announcements.

The laboratory has been constantly open for advanced and for undergraduate students. Lectures and class-room instructions have been given as follows:—

By the Director:

1. General Chemistry. *Three times weekly, through the year.*
2. Chemistry of the Compounds of Carbon. *Twice weekly, through the year.*
3. Chemistry of the Compounds of Carbon (Advanced Course). *Twice weekly, through the year.*
4. Meetings for reading and discussing the Current Journals of Chemistry. *Twice weekly, first half-year; and once weekly, second half-year.*

By Associate Professor Morse:

1. Supplementary Course in Inorganic Chemistry. *Twice weekly, through the year.*
2. Stoichiometry. *Twelve lectures.*

By Dr. Renouf:

1. Supplementary Course in Inorganic Chemistry for Graduate Students. *Twice weekly, through the year.*
2. Reviews in General Chemistry. *Twice weekly, through the year.*
3. Reviews in Organic Chemistry. *Once weekly, through the year.*

The total number of students who have followed the courses in chemistry during the year is one hundred and twenty-three. Of these forty were graduates following chemistry as their principal subject; nine were graduates following chemistry as a subordinate subject, and the rest were undergraduates or special students. The numbers attending the various classes included in the above list were:

Course.	Instructors.	No. Students.
General Chemistry, - - - -	Dr. Remsen,	- 61
Chemistry of the Compounds of Carbon, -	Dr. Remsen,	- 65
Chemistry of the Compounds of Carbon, (Advanced Course), - - - -	Dr. Remsen,	- 20
Supplementary Course in Inorganic Chem- istry, - - - - -	Dr. Morse, -	- 26
Stoichiometry, - - - - -	Dr. Morse, -	- 23
Supplementary Course in Inorganic Chem- istry for Graduate Students, - -	Dr. Renouf,	- 19
Reviews in General Chemistry, - -	Dr. Renouf,	- 35
Reviews in Organic Chemistry, - -	Dr. Renouf,	- 25

The average attendance at the Journal Meetings was twenty.

Besides the above, fifteen historical lectures were given by the most advanced students on topics selected and assigned by the Director. The lecturers and their subjects were as follows:

- Mr. A. R. L. Dohme on the Constitution of Sulphuric Acid;
- Mr. W. W. Randall on Ozone;
- Mr. C. W. Moulton on Affinity;
- Mr. L. E. Williams on the History of Chlorine;
- Mr. W. M. Burton on Magnetic Rotary Power of Chemical Compounds;
- Mr. G. W. Edmond on Mass-action (two lectures);
- Mr. P. S. Baker on Perkin's Synthesis;
- Mr. J. M. Rich on Nitroso-compounds;
- Mr. P. J. Dashiell on Rosaniline;
- Mr. R. J. J. DeRoode on the Laws of Addition and Substitution in the Paraffin Series;
- Mr. J. H. Holmes on Molecular Refracting Power;
- Mr. C. E. Saunders on Williamson's Work;
- Mr. C. H. Herty in Quinones;
- Mr. C. C. Blackshear on the History of Fluorine.

Three candidates presented themselves for the degree of Doctor of Philosophy. They are Messrs. W. M. Burton, A. R. L. Dohme, and C. W. Moulton. Their dissertations were respectively: "On The Atomic Weight of Zinc as determined by the Composition of the Oxide," "On Ortho-sulpho-benzoic Acid," and "On Phthalic Sulphinide." These have been printed in separate form as dissertations, and the essential parts either have been or will soon be published in the American Chemical Journal. Besides these three investigations the following are either completed or well advanced: (1) On the nature and constitution of the double halides; (2) On the atomic weight of zinc as determined by its action on hydrochloric acid; (3) On the rate of reduction of isomeric nitro-compounds; (4) On the rate of oxidation of isomeric benzene derivatives; (5) On the dissociation of oxides and sulphides; (6) On a method for the analysis of commercial saccharin. Papers on the subjects numbered 1 and 5 have been published in the American Chemical Journal.

Attention was called last year to the crowded condition of the laboratory and lecture-rooms. The number of students this year has been practically the same as then with a slight increase in those most advanced. In fact it is impossible at present to accommodate a larger number. It is desirable that there should be an additional working-room provided, so that the beginners may be separated from those who are in their second year. This could be done at a comparatively small expense by using the present mineralogical lecture-room for the museum, and fitting up the museum with working desks. Sooner or later this change will become absolutely necessary. Additional room will also be needed for the most advanced students. It has been necessary this year to use for students the Director's private

laboratory, and the room set aside for preparing the experiments for the lectures. The indications are that the number asking for accommodations in the research laboratory will be fully as large next year.

IRA REMSEN,  
*Professor of Chemistry.*

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## Geology and Mineralogy.

During the past year the work in Geology has been carried on in the three-story brick building, No. 610 N. Howard Street, while the instruction in Mineralogy has been conducted in the third story of the Chemical Laboratory, where, on account of lack of space, the mineralogical and a large part of the petrographical collections still remain.

The petrographical laboratory on the second floor of the Geological Building, has been open daily from 9 a. m. till 5 p. m., under the direction of Dr. Williams; the palaeontological laboratory on the third floor of the same building has been similarly opened under the direction of Dr. W. B. Clark.

Regular courses of instruction have been given as follows:

(a) General Mineralogy, embracing crystallography, physical and descriptive mineralogy, by Dr. Williams. *Three lectures and three hours of practical work each week, throughout the year.*

(b) Dynamical Geology, by Dr. Williams. *Three times weekly till Christmas.*

(c) Palaeontology and Stratigraphical Geology, by Dr. Clark. *Three times weekly from Christmas till Easter.*

(d) Geology of Maryland, by Dr. Williams. *Three times weekly from Easter to end of the session.*

(e) Examinations in optical mineralogy and petrography. *Weekly, throughout the year.*

(f) Readings for advanced students in Geology have also been held on one evening of each week throughout the year.

1. *Field Work.* While the weather permitted, field work in the geology of Maryland has been actively carried on by both Drs. Williams and Clark. Students have been encouraged to participate in these investigations when they did not conflict with their other duties. Dr. Williams has conducted long excursions through the Frederick valley and Carroll county during the Christmas and Easter holidays; and Dr. Clark, accompanied by several students, took a sailing trip as far south as the York river to examine the richly fossiliferous tertiary strata along the Chesapeake.

2. *Original Work.* The most important work in progress in the geological department is being carried on under the auspices of the U. S.

Geological Survey. This consists of the mapping, on a large scale, of all the areas of crystalline rocks in Maryland (about 2000 square miles) by Dr. Williams, and a comparative study of the eocene strata of the U. S. by Dr. Clark. Within the past year the following papers have been published:

G. H. Williams: Contact-metamorphism produced in the adjoining mica-schists and limestones by the massive rocks of the Cortlandt Series.—*Am. Journal of Science*, Oct. 1888.

— Petrography of Fernando de Noronha.—*Am. Journal of Science*, March, 1889.

— and W. M. Burton: On the crystal form of metallic zinc.—*Am. Chemical Journal*, April, 1889.

W. B. Clark: Discovery of Fossil-bearing cretaceous strata in Anne Arundel and Prince George counties, Md.—*University Circulars*, No. 69.

— The origin, structure and sequence of the Sedimentary rocks, 45 pp. (*Synopsis of lectures*).

The following work is now in progress:

Study of the eruptive pyroxenites of Maryland, by Dr. Williams.

Study of a collection of rocks from Southern Norway, by Dr. Williams.

Geological study of sheets 1 (Reisterstown) and 6 (Randallstown) of the University Field Club map, by Mr. A. C. Gill.

Study of the cretaceous echinoderms of the U. S., by Dr. Clark.

3. *Collections.* Both the petrographical and palaeontological collections have steadily increased throughout the year, making the very inadequate accommodations for such material more and more keenly felt. Many important additions have been made to the collection of Maryland minerals, and several discoveries have materially increased the number of species known to occur within the State.

The collection of crystalline rocks of the State has grown by the addition of interesting specimens from every county in which they occur.

Dr. Clark has made large collections of the cretaceous and tertiary fossils occurring in Maryland and elsewhere.

The available petrographical material has been further increased by a large collection of instructive specimens made by Dr. Williams during a recent trip through Southern Norway in company with Professors Rosenbusch, Brögger and Reusch.

GEORGE H. WILLIAMS,  
*Associate Professor of Inorganic Geology.*

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## Biology.

Since the foundation of this University the biological sciences have received special encouragement, partly because of the rapid advances that they have been making and partly because of their relation to the progress

of modern medicine. Prolonged courses of training are arranged for those who propose to devote their lives to investigation or to teaching in these branches, as well as shorter courses for those who intend at a later period to study for the medical profession. As in physics and chemistry, abundant facilities for laboratory work are called for; instruments, material and assistants have been and must be liberally provided.

The science of Biology includes the study of the forms and functions of living beings in their normal and abnormal conditions; but it is convenient to separate the study of diseased living things from that of healthy. Under the heading *Pathology* there is given a distinct report; by the title *Biology*, as here used, only normal biology is meant,—the physiology and morphology of healthy organisms; and in both these departments, animal and vegetable life must be studied. Professor Martin, director of the biological laboratory, gives his chief attention to physiology, and Dr. Brooks, director of the marine laboratory, to morphology. Dr. Howell, now associate professor, is the chief assistant in biology, and during the past year aid has also been received from Dr. Andrews, and others.

In considering the work of the session, mention will be first made of the courses planned for beginners. Students of this grade have been unusually numerous this session, necessitating the appointment of an additional laboratory assistant, and testing to its utmost the accommodations provided for undergraduates, mainly because many graduates coming here find it necessary to follow the college courses for one or more years before commencing advanced study.

A few words will indicate the scope of the undergraduate course. In the first year students examine in the laboratory a number of typical fungi, green plants, and animals, the human skeleton, and some other skeletons, and they study the embryology of the chick. They also are taught the elements of structural and systematic botany. In the second year, they dissect one of the higher mammals, and spend several hours weekly in practical lessons in normal histology and experimental physiology. All this is of course in connection with other studies in science, modern languages, and philosophy, and subsequent to a year's study in physics and chemistry.

The advanced work consisted in part of lectures, and in part of research. Dr. Martin lectured weekly on selected topics in Physiology, mainly on vegetable physiology, on the temperature regulating mechanisms of warm blooded animals, and on physiological optics. Dr. Brooks lectured once a week on the Coelenterata. Eleven special lectures on physiological topics were given by the instructors and more advanced students; and there was a similar course in Animal Morphology. Seminars, physiological and morphological, were conducted respectively by Dr. Martin and Dr. Brooks. The Biological Journal Club met weekly or oftener; and two informal reading clubs met regularly outside the university walls. The physiological club finished the translation from Latin of Haller's ninth book, *Motus*

*Animalis Phenomena*; the other club read and discussed works bearing on general zoölogy. Of the eighty-three students who entered the laboratory during the year, sixteen were permitted to undertake advanced work; the remaining sixty-seven took undergraduate courses, although the majority of them had already a college degree.

During the session researches by the staff and advanced students have been made on the following subjects:

The lethal temperatures of the isolated dog's heart. Chemical composition of blood plasma as affected by severe hæmorrhage. The origin and regeneration of red blood corpuscles. The respiratory mechanism of the frog. Reflex and reaction time. The rate of transmission of nerve impulses in a mammal. Changes produced in ganglion cells by stimulation. The relation of the size of the fibres of motor nerves to the distribution of the fibres. The structure of the ependyma of the frog's brain. The physiological action of antipyrin. The embryology and histology of insects. The structure and development of the mouth parts of Myriapods. The segmentation of the Cephalopod egg. The structure and development of the compound eyes of Arthropods. The anatomy and embryology of Sphérinum. The structure of hydroids and siphonophores. The ontogeny and phylogeny of the Pelagidae. The histology and evolution of the sense organs of the Discomedusæ. The anatomy and histology of Pteropods. The sexual and asexual multiplication of marine sponges. The egg-embryology of Salpa. The embryology and anatomy of Holothurians. The embryology of Cyanea and Aurelia. The embryology of Amphibia. The anatomy of sea-anemones. The anatomy and histology of a new family of Medusæ. The influence of sex in the transmission of deafness.

The results of many of the above researches have already been published in abstract in the *University Circulars*, the *Zoologischer Anzeiger*, and elsewhere; some of the remainder have been published in full in the *Studies from the Biological Laboratory* and in other journals: and it may in general be said that a majority of the investigations named above are already so far advanced as to justify the expectation of their early publication *in extenso*.

The pteropods, cephalopods, tunicates, stomatopods, siphonophoræ, and jelly fishes which were collected in the Pacific during the cruise of the U. S. Fish Com. Ss. Albatross, have been assigned by the Commission to instructors and advanced students of the University for investigation and the preparation of reports. Researches upon these groups are now in progress, although a year or more will be needed to complete them.

The fifth number of the fourth volume of the *Studies from the Biological Laboratory* was published during the session: and the sixth number is in press.

During the summer of 1888 Dr. Brooks was attached as naturalist to the laboratory of the U. S. Fish Commission at Wood's Holl, and he has been reappointed for the summer of 1889. The table for which this university subscribed was occupied by Mr. T. H. Morgan, who is succeeded this year by Mr. Bigelow, a Harvard graduate, who has been studying here during the past session.

During last summer, through the courtesy of Professor Marshall McDonald, U. S. Fish Commission, five other members of the University were permitted to avail themselves of opportunities for research at Wood's Holl,

and some of them were also permitted to go on the Fish Commission schooner *Grampus*, for a trip of some weeks, to study the Fauna of the Gulf Stream. Professor McDonald has very kindly offered similar facilities to qualified students during the summer of 1889.

Dr. H. V. Wilson who held the Bruce Fellowship last year, did excellent work at Green Turtle Cay in the Bahamas: he has now been appointed by the National Fish Commission to study the embryology of fishes at Wood's Holl. He is succeeded in the fellowship by Mr. S. Watase, of Japan, who has been a graduate student here for several years, and has held an ordinary fellowship.

H. NEWELL MARTIN,  
*Professor of Biology.*

### Greek.

Under the direction of Professor Gildersleeve the advanced students of Greek have been organized into a Greek Seminary. According to the plan of the Seminary, the work of each year is concentrated on some leading author or some special department of literature. During the past year the work has been in the Attic Orators.

In the seminary proper, which met twice a week during the academic year, the orators chiefly studied were Antiphon, Andokides, Lysias, Isokrates, Isaios, and Demosthenes. Especial attention was paid to the development of language and style, and to the antique canons of aesthetic criticism. The members were required to present in turn exegetical and critical commentaries on select portions of the orators, and to make analyses of speeches and abstracts of rhetorical treatises.

Of the investigations carried on in this field and in others may be noted—

Vindication of the first speech of Antiphon, comparison of the first and third speeches of Antiphon, Dionysios of Halikarnassos and his *Iudicium Lysiae*, comparison of Lysias iii, Dem. liv and Isok., xx, comparison of Isok. xvii and Dem. xxxvi, Isokrates' views of culture, phraseology of Isaios, the *Λόγος ἐπιτάφιος*, the Menexenos of Plato, dramatic features of the Gorgias of Plato, metaphor in the speeches of Thukydidēs, position of the genitive in Pausanias, dialect mixture in Pindar.

The work of the Seminary was supplemented by the study, under the Director's guidance, of the rhetorical writings of Dionysios of Halikarnassos, and by courses of lectures on Greek Rhetoric and on the History of Attic Oratory.

Besides the seminary course proper, Professor Gildersleeve delivered fourteen lectures on select chapters of Greek Syntax and a short course on Elegiac and Iambic Poetry. In addition, he conducted twenty-one exercises in translating at dictation from Greek into English and from English into Greek.

Dr. W. M. Arnolt conducted courses in New Testament Greek through the year.

In the Undergraduate Department:

Dr. Spieker conducted courses in

Plato's *Protagoras*. *Three times weekly, first half-year.*

Aischylos, *Prometheus Vincetus*, and Sophokles, *Antigone*. *Three times weekly, second half-year.*

Lysias, *Select Orations*. *Four times weekly, first half-year.*

Homer, *Iliad*, books xviii and xix, and Euripides, *Alkestis*. *Four times weekly, second half-year.*

Greek Literature. *Weekly, through the year.*

Classes in Prose Composition were also conducted in connection with each of the courses above named.

Students have read privately for examination the following books:

Xenophon's *Oikonomikos*. (7).

Herodotos, *Merry's Selections*. (12).

Aristophanes, *Clouds*. (6).

Isokrates, *Panegyrikos*. (11).

B. L. GILDERSLEEVE,  
*Professor of Greek.*

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## Semitic Languages.

The work of the year centred in Assyriology, especially in the preparation of an Assyrian Glossary.

The Assyrian Seminary, consisting of four advanced Assyriologists and three hearers, met under the direction of Professor Haupt six hours weekly through the year, reading almost completely vols. I, II and V of Sir Henry Rawlinson's *Cuneiform Inscriptions*; and this work was supplemented by the course in *Sumero-Akkadian*, in which most of the bilingual texts in Haupt's *Keilschrifttexte* and vol. IV of Rawlinson's *Inscriptions* were studied. Dr. Adler conducted a second year's course in Assyriology, giving some lectures on Assyrian Grammar, and interpreting a number of texts in Delitzsch's *Lesestücke*. During the first half-year Dr. Adler gave a course in Assyrian Archaeology, commenting on some specimens furnished by the U. S. National Museum.

To the study of the Old Testament there were devoted five hours weekly through the year. Professor Haupt gave a critical interpretation of the book of Ecclesiastes, and Dr. Adler conducted weekly exercises in reading Hebrew at sight, at the same time instructing a beginners' class in the elements of Hebrew Grammar, combined with readings from the Pentateuch. In addition to these special courses, a series of more general lectures on the History of Israel were given during the first half year, for which, during the second half year, Introduction to the Old Testament was substituted.

In the History of Israel, after four introductory lectures, the causes which led to the division of Israel into the Northern and Southern king-

doms were traced, and a detailed account given of the events in the Northern Kingdom to the fall of Samaria. Stress was laid on a discussion of the contemporary monuments, confirming the historical statements in the Old Testament.

In the Introduction to the Old Testament, the Seminary method was followed. The topics discussed were: The English Bible; history of its translations. The Bible in other modern languages. The text of the Hebrew Bible. Ancient Greek and Latin versions. Aramean and Syriac versions. The Canon in the Synagogue and in the Church. Review of the history of Old Testament criticism. Contents of the Hexateuch. Views as to its date and origin.

Post-Biblical Hebrew was studied by some advanced students, under the guidance of Dr. Adler, the Talmudic tract *Yoma*, or the Day of Atonement, being read in Prof. Strack's recent edition.

In Syriac Professor Haupt explained some extracts from the Syriac Chronicle of Gregory Bar Ebhraya, laying special stress on the analysis of the forms from the comparative point of view.

PAUL HAUPT,

*Professor of the Semitic Languages.*

### Sanskrit and Comparative Philology.

During the session of 1888-89 a group of eleven advanced students in Indian Philology was organized as a Vedic Seminary under my direction. The subject of the year's work was the literature of the *brāhmaṇas*. This embraces the second period of Vedic literature,—the texts, which go by that name, holding the same position in relation to the Vedic hymns, as is occupied by the Talmud in reference to the Old Testament. The exegesis of the hymns, and the exposition of the sacerdotal practices, which grew up around them—cf. the Talmudic *hallacha*—are interwoven with mythical accounts of the origin of the sacrifice, which develop incidentally some of the most prominent and interesting legends of the Vedic period—cf. the Talmudic *haggada*. After an introductory description of the style and language of these writings, and an account of their chief representatives in the several Vedas, a course of reading and critical exegesis was entered upon. Some of the most interesting passages from the legendary, as well as the doctrinal parts of the *brāhmaṇas*, were subjected to careful scrutiny. Towards the end of the second half-year selections from the *upaniṣads*, the early theosophic speculations of the Brahmanical schools, supplemented the course described above.

The work of last year, which had centred about the Atharva-Veda, was continued privately by various members of the Seminary, and has resulted in several publications. The director has in readiness, and hopes to present to the eighth Oriental Congress, which meets at Stockholm and Chris-

tania next September, his elaborate edition of the sūtra of Kāuṣika, the ritual of the Atharva-Veda. This work will be published by the American Oriental Society, making Volume XIV of its Transactions. Mr. H. W. Magoun, fellow by courtesy, has in the press his edition of the Āsuri-kalpa, a manual of witchcraft practices; this will appear in the tenth volume of the American Journal of Philology. Minor publications of Messrs. J. T. Hatfield and E. W. Fay have appeared recently, or are about to appear, while other members of the seminary are engaged in investigations, which are likely to result in contributions to Vedic knowledge.

The Vedic Seminary during the coming session (1889-90) will again take up new sides of Vedic study. The centre of the work will be the Rig-Veda, the most valuable and ancient literary document of India. The subject will be treated under various heads:

1. The arrangement of the Rig-Veda collection.
2. The metres of the hymns.
3. The relation of the text to the later Vedic hymn-collections.
4. The orthoepic redaction.
5. The relation of the text to the sūtras.
6. Principles and practice of interpretation and text-criticism.

An important parallel line of study will be conducted at the same time in connection with the ancient literature of the Persians, the Zend-Avesta. For the first time an introduction to Zend, or Old Baktrian, the language of the most ancient Zoroastrian writings, will be offered at this university. The close relationship of the Veda and the Avesta renders this study a peculiarly fit companion to the study of the most prominent Vedic book.

The advanced work in classical Sanskrit in 1888-9 centred about the drama *Çakuntala*. Indian dramas are written partly in Sanskrit and partly in Prākṛit. The acquaintance with the last-named dialect was prepared by a preliminary course of lectures on the phonetics and morphology of the Prākṛit of the dramas: during the entire year especial attention was bestowed upon the analysis of the Prākṛit passages, occurring in the drama. About fifty pages of the edition of Monier Williams were read.

The advanced work was supplemented by a course of reading in the *Hitopadeça*, an introduction to the elements of Vedic study, and by practical exercises in grammar and prose-writing. Messrs. H. W. Magoun, fellow by courtesy in Sanskrit, and E. W. Fay, fellow in Sanskrit, assisted most efficiently in the guidance of these studies.

In comparative philology the work was two-fold. First, a course in general linguistic science, and the modern methods of comparative grammar. After a short historical sketch describing the origin of the modern science of language, the fundamental principles of grammatical investigation were discussed systematically. The theory of agglutination, the twin subjects of phonetic law and analogy, the questions attaching themselves to the interrelation of the Indo-European languages, etc., were presented in formal

lectures during the first half-year. During the second half-year selected chapters of Whitney's "Language and the Study of Language," were made the basis of the work of the class, which consisted of about twenty students, gathered from the various philological departments of the university.

In comparative grammar a course intended especially for beginners was given. The treatment of the sounds and inflections of the classical languages has within the last dozen years gradually passed over into the hands of the comparative grammarians. It is now generally conceded that a fruitful treatment of these topics is impossible without bringing to bear upon the language under discussion all the light which can be gathered from genetically related tongues. The immortal Jacob Grimm, the founder of the historical study of German grammar, recognized the principle that every dialect of a language must contribute to the understanding of the group, to which it belongs, and that the entire group must in turn elucidate the single dialect. This is the method which has gradually established itself in the treatment of a single Indo-European language. There is no longer occasion for a polemic utterance such as was made by the great Latinist Corsen, who once said, that one might as well refuse to recognize the light of the sun as the light obtained from Comparative Philology. The modern grammar of these languages testifies to this abundantly. The object of the course given during the past year was two-fold. To enable younger scholars to read books written from the comparative point of view, by teaching them the technicalities and the points of view of the writers, and to introduce them to a first practical acquaintance with classical grammar, treated from this point of view. To this end the vowels of Greek and Latin were presented in a series of theses, in which each vowel was discussed first by itself, and afterwards again in its correlation with the rest. The work was carried on constantly with the coöperation of the members of the class, which consisted of more than twenty scholars.

MAURICE BLOOMFIELD,

*Associate Professor of Sanskrit and Comparative Philology.*

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### German.

Dr. Wood conducted Advanced Courses as follows:

In the Teutonic Seminary, First Section, meeting twice weekly, the work was in Wolfram von Eschenbach's *Parzival*. After four introductory lectures by the Director, the members of the class reported in turn upon recent literature on this monument. The following parts were then critically read: Books I, II, VII, IX, and XV, in part, and the whole of Books III, IV, V, VI. This was followed by a series of lectures on the Grail Cycle and Wolfram's relation to the French and Welsh forms of the story. The songs of Wolfram were read, and his relation to the "*Tagelied*" and the "*Volskied*"

was discussed. An introduction to the Titirel was then given, and selections from it were read.

The Second Section of the Seminary was devoted to the study of the Alemannic dialect. Thomas Platter's *Selbstbiographie*, Leipzig, 1878, was read, and the relation of the phonology of Basel-speech to that of Middle and Old High German was particularly considered. In this connection, and on the basis of Swiss and Alsatian dialects, the arguments of Behaghel, Kaufmann and others, for and against the existence of a Middle High German literary language, were discussed. Two lectures on the dialect of Wallis were given, and the attempt was made to estimate the influence of this native dialect of Platter upon his literary work. Recent monographs on the field of Alemannic were reported on and discussed in the meetings.

The study of Gothic was carried on twice weekly through the year on the basis of Braune's *Grammatik*, Douse's *Introduction to the Gothic of Ulfilas*, and Heyne's *Ulfilas*. The chapters on phonology and morphology in Douse's work were expanded and illustrated in a series of lectures, and the rudiments of Historical Germanic Grammar were taught. Kluge's *Etymologisches Wörterbuch der Deutschen Sprache*, 4<sup>te</sup> Aufl. 1889, was carefully studied, and an Index to the Gothic forms in that work was prepared under Dr. Wood's direction by Mr. J. T. Hatfield, with some assistance from the other members of the class. The Index has now been printed (pp. 8. Publication Agency of the Johns Hopkins University, 1889).

Comparative German Grammar. *Lectures, twice weekly, through the year.*

In this course the attempt was made to embody the latest researches in the field of Germanic Phonology and Morphology, in so far as they represent assured results. Selected chapters from Brugmann's *Grundriss*, Bd. I, and Bd. II, 1<sup>te</sup> Hälfte, were studied by the class, in connection with the lectures. A third weekly meeting, devoted to a review of the contents of the lectures of each week, was conducted by Mr. G. A. Hench, fellow in German.

The Elder Edda was studied in class, twice weekly, through the year, and the following poems were critically read: Grípisspá, Guðrúnarkvida I and II, Hávamál and Voluspá. In connection with the poem last mentioned, Bugge's theories as to the origin of the Edda myths were carefully considered, and Müllenhoff's *Deutsche Alterthumskunde* V, 1<sup>te</sup> Abth., was studied in detail. The edition of Bugge was made the basis of the work, but those of Hildebrand, Jónsson, and Sijmons were also constantly used.

German Literature in the 18th century. *Lectures, twice weekly, through the year.*

This course was a continuation of that given during the session of 1887-8, on German Literature in the sixteenth and seventeenth centuries, and a similar manner of treatment was followed. The Influence of English Literature on German in the first half of the eighteenth century was examined and illustrated in detail, and the classical period of German Literature was considered up to Goethe's return from Italy.

The following advanced courses were conducted by Dr. Learned:

Rhine-Frankish. *Lectures, twice weekly, first half-year.*

The following subjects received special treatment: The origin of the Frankish nation, the earliest forms of Frankish speech as preserved in proper names, the glosses of the *Lex Salica*, the relation of the language of the Salic Franks to Upper-Frankish, the criteria of dialect division in the Old High German period, and the comparative phonology of the Rhine-Frankish monuments up to 900 A. D.

Old High German Literature. *Lectures, twice weekly, second half-year.*

The direct and indirect influences of Latin and Christian Culture, and the direct influence of Celtic and Anglo-Saxon Christianity upon German Literature in the earliest period, were considered. The latter part of the course was devoted to Carolingian literature.

Middle High German: Elementary Course. *Weekly, through the year.*

During the first half-year Paul's *Grammatik* was studied and selections from Weinhold's *Mittelhochdeutsches Lesebuch* were read. In the second half-year the class read part of Hartmann von Aue's *Iwein*.

#### UNDERGRADUATE COURSES.

*Major Course.* Dr. Learned.

Classics: Goethe, *Tasso, Hermann und Dorothea, Faust.* *Twice weekly.*

Essays on subjects connected with these readings were presented by each member of the class.

Prose Readings: Masius, *Lesebuch III.* *Weekly.*

History of German Literature: Kluge, *Geschichte der Deutschen National-litteratur.* *Weekly.*

In connection with this, Kluge's *Auswahl deutscher Gedichte* (50 pp.) was read and examined on, as private reading.

Prose Composition: Buchheim (50 pp.), and Wilmann's *Deutsche Schulgrammatik.* *Weekly.*

*Minor Course A.* Dr. Learned and Dr. F. M. Warren.

Classics: Goethe, *Egmont*; Heine, *Harzreise*; Schiller, *Das Lied von der Glocke.* *Twice weekly.*

Prose Readings: Buchheim's *Reader, II*; Hauff, *Das kalte Herz.* *Twice weekly.*

Prose Composition: Whitney's *Grammar, Exercises, Second series.* *Weekly.*

Essays on subjects connected with the classical readings were presented by each member of the class.

*Minor Course B.* Dr. F. M. Warren. *Daily, through the year.*

Otis, *Elementary German.*

Buchheim, *German Reader, II.*

Schiller, *Wilhelm Tell, Maria Stuart.*

Hauff, *Das kalte Herz.*

Prose Composition: Whitney's *Grammar, Exercises, First series.*

*Supplementary Courses.*

Historical German. *Three times fortnightly.* Dr. Learned.

Riehl, *Burg Neideck.*

Virchow, *Die Urbewölkung Europas.*

Fichte, *Reden an die Deutsche Nation.*

Scientific German. *Three times fortnightly.* Dr. Learned.

Humboldt, *Ansichten der Natur.*

Goethe, *Die Metamorphose der Pflanze.*

German Conversation. *Twice weekly.* Dr. Plate.

HENRY WOOD,

*Associate Professor of German.*

## English.

### ADVANCED COURSES.

The Graduate Courses in English are adapted to the requirements of men who may wish to become either special scholars, or practical teachers of our own language and literature. The methods employed in this department have been so far developed as to secure within the compass of each successive year's programme a just proportion between philological and literary work, and an organic succession of annual courses that serves the two-fold purpose of advancement on the basis of preceding sessions, and of making possible and advantageous the entrance of new students at the beginning of any year.

During the past year the poems of Chaucer, exclusive of the "Canterbury Tales," have constituted the theme for the work of the English Seminary. Texts were interpreted, the language and metrical forms of the poems minutely studied, and special investigations made of the poet's life, of his relation to his literary sources and of his influence on poets of subsequent periods. In connection with reports on the current journals, papers, representing more or less of original research on the part of the writers, were presented and discussed on the following topics: Shakespeare's Versification (Bright); the Sources of Robert of Gloucester's Chronicle (Callaway); Life and Works of Thomas Otway (Weeks); Historical notes on "Romeo and Juliet" (Callaway); Jonathan Swift's relation to Francis Godwin and Cyrano de Bergerac (Freeman); Hoccleve's Poems (Ross); The Origin of Standard English (Bright); The Study of English at Cambridge, England (Callaway); English in the University of Virginia (Ross); English literature and English philology: the province of each (Bright); Forms of verse recently revived in English (Freeman); The Mystery Plays (Harrison); Chaucer's "Dream" (Epics); Elizabethan and Victorian Poetry (MacMechan); "The Tale of Gamelyn" and Chaucer (Ross); English Prose Style (Reeves); John Skelton's "Garland of

Laurel" (Epes); Gawain Douglas' "Palice of Honour" (Freeman); Pope's "Temple of Fame" (Harrison); Tennyson's "Dream of Fair Women" (Ross).

A course of weekly lectures on English Philology, in which the Anglo-Saxon period of the language was particularly treated, extended through the year. During the first half-year a class was conducted in the reading of the Anglo-Saxon poem "Judith"; the same class, in the second half-year, studied the Anglo-Saxon Scriptural texts, giving special attention to the Gospels.

A course of ten lectures introductory to the science of Phonetics was given in the second half-year. These lectures were also attended by graduate students from the other language departments of the university.

JAMES W. BRIGHT,  
*Associate in English.*

## English.

### UNDERGRADUATE COURSES.

The English Major Class met Dr. Bright twice weekly for the study of Middle English (Morris and Skeat's Specimens), and twice weekly for the first half-year for instruction in Rhetoric (Genung). In the second half-year, the class studied English Literature (Milton and other poets) with Mr. Callaway, twice weekly. The Early Scottish Poets of the fourteenth to the sixteenth century were studied weekly with Dr. Browne.

The Minor Class studied, under the guidance of Dr. Browne, the Literature of the Elizabethan period, twice weekly for the first half-year, and that of the fourteenth century twice weekly for the second half-year; also the writers of the eighteenth century, weekly, throughout the year. With Dr. Bright this class studied Anglo-Saxon (Sweet's Reader), twice weekly.

The students of the P. H. E. course (required of all undergraduates) met Dr. Browne twice weekly for a synoptical study of English Literature from the earliest period to the beginning of the present century.

WM. HAND BROWNE,  
*Associate in English.*

## Romance Languages.

The Romance Seminary met under the direction of Mr. Elliott. *Two hours a week, through the year.*

The work centered here on the *Cantillène de Sainte Eulalie*, for which the MS. fac-simile was used. The characteristics of this manuscript, its speech peculiarities (phonetic and morphological) in their relation to the Classic and Low Latin and to the later Old French as well as to the modern language, its dialect and the extensive critical apparatus belonging to the text,

formed the bulk of material with which the seminary was occupied. Special emphasis was laid on an examination of fundamental questions of French phonetics and morphology as presented in the linguistic products of this monument.

In addition to this course, followed by the most advanced students only, a meeting of two hours was held once a fortnight, in which all special students of this department took part. The exercises here consisted in the reading of original papers bearing upon linguistic and literary subjects, of extracts of important articles in Romance journals, of general reports on the journals themselves, of reports on recent publications received, and on any suggestive correspondence, of a professional nature, that might be presented. By this means, students in the early part of their university studies have the benefit of direct and active association with their more experienced co-workers in the field.

Introduction to Old French Philology. *Weekly.*

This course is intended for first year students and regularly follows the series of lectures on Modern French Phonetics as given below. A few pages of *Aucassin et Nicolette* (Suchier's edition) were critically examined with special reference to the phonology and morphology of the language. For the former, the constant application of the principles of French phonology was required, while, for the latter, the student was thoroughly drilled in the grammar of the Old French as compared with the Latin on the one hand, and with the Modern French on the other. The leading characteristic forms of the dialect here represented were contrasted with corresponding ones in the Isle-de-France species. During the past year this course was continued, one hour a week, for second year students. The exercises here were of a pro-seminary character, particular attention being given to points of grammar and language for which time was wanting in the regular seminary work.

Introduction to Italian Philology. *Weekly.*

As a continuation of last year's course a few pages of Boccaccio's *Decameron* were critically examined. For reference, the part for Italian in Gröber's *Grundriss der romanischen philologie* was constantly used. Attention being given here wholly to the philology of the language, this course corresponds, for Italian, to the work done in Old French Philology as based on *Aucassin et Nicolette*. The student was made acquainted with the present state of linguistic investigation in this branch of the Romance idioms; his special attention was directed to the scientific application of characteristic phonetic laws in the development of grammar forms and he was thus brought face to face with many of the difficult problems of Italian morphology and phonology. The determination of vowel quality also formed an important factor in this work.

Portuguese. *Weekly, first half-year.*

After a short introduction to Portuguese grammar, the chief episodes of *Os Lusíadas* were read: the Maria Mission III, 101-6; Dream of D. Manuel IV, 94 to end; Adamastor V, 37-59; Palace of Neptune VI, 16-37;

Twelve of England VI, 40-68; Calming of Storm by Erycina VI, 85-93; Ilha dos Amores IX, 51-84.

*Lectures:* (a) French and Italian morphology. This course was a specialization of that given last year on general Romance morphology; the verb class was treated, with Gröber's *Grundriss der romanischen Philologie* as a basis for work, and this was supplemented by lectures.

(b) Modern French Phonetics. This course was intended for first year students who wished to become specialists in Romance languages. It was divided into two parts: 1. Physiological, 2. Historical phonetics. For the former, Beyer's *Französische Phonetik* was made the basis of work and supplemented by lectures; for the latter, Schwan's *Grammatik des Altfranzösischen* was used and likewise supplemented by lectures.

(c) On the Langue d'Oïl dialects. The system followed here, is to give a few lectures on the general characteristics and geographical distribution of the dialects, calling attention to the phonetic and morphological characteristics of each idiom to be examined and as soon as a given dialect is thus represented, texts are translated and their peculiarities pointed out by the student. The work was confined during the last year to the Wallonian, Lorraine and Champagne dialects. For Wallonian, the following works were examined: the *Noëls Wallons* (Doutrepoint), published in Vol. I of the *Revue des Patois Gallo-Romans*, *Li Pwèzon dè l'Jonèsse, Commèdeie è in' acke* (Simon Radoux); for the Lorraine: the selections published in *Patois lorrains* (Lucien Adam); for the Champagne: the selections published in *Recherches sur l'histoire du langage et des patois de Champagne* (P. Tarbé.)

(d) On the North Italian dialects. The object of this course was to give the student a fair knowledge of one of the Gallo-Italic group of dialects together with an introduction to the other three (Piedmontese, Ligurian and Aemilian), to note especially points of their phonetic and morphological resemblances and differences, their relation as a whole to French and Provençal on the one hand and to Italian on the other. For the Lombard, the Milanese was made the centre of work. A few lectures were given on Milanese literature; these were followed by the reading of texts in the dialect: seven cantos of *L'Inferno di Dante esposto in dialetto milanese* (Francisco Candiani); extracts from *Storia de Milan cuntada su en lengua meneghina* (Giusepp Sommariva); *La Badia dj meneghitt* (1740), and *Guida Ballografo-Umoristica*. For Piedmontese: extracts from *Canzoni Piemontesi* (Stefano Mina) together with selections from the Prince Donaparte collection of dialect translations of the Gospel of St. Matthew. These were also used for Ligurian (Genoese), *Vangelo di San Matteo in dialetto Genovese* (G. Olivieri); for Aemilian (Bolognese), *Vangelo di S. Matteo in dialetto Bolognese* (Pepoli). In addition to the reading of these texts and the pointing out by the student of their dialect characteristics, that part of Gröber's *Grundriss der romanischen Philologie*, Vol. I, which treats of Italian dialects, was carefully worked over.

Courses in Italian, Spanish, Old French, and Old Provençal were conducted by Dr. H. A. Todd.

Italian and Spanish were taken up from the beginning, three hours weekly being devoted to Italian and two hours weekly to Spanish throughout the year. Harper's *Italian Principia*, Part I, was used to give a first rapid survey of the language and for later drill in forms and in prose composition. Reading was early begun in the *Italian Principia*, Part II, and more advanced work done in the study of Tasso's *Gerusalemme Liberata* (one canto), and Dante's *Divina Commedia* (fifteen cantos of the *Inferno*, eight cantos of the *Purgatorio*, two cantos of the *Paradiso*). Spanish was begun with a systematic study of Knapp's *Grammar* (which extended through the entire year) and was continued with selections from his modern readings. Toward the end of the year, *Don Quijote* was taken up, and five chapters were carefully interpreted. Attention was directed to the apparatus for the advanced study of Cervantes, including the fac-simile of the first edition, with its interesting peculiarities, and copies of other early or elaborately annotated editions of *Don Quijote*.

The work in Old French for graduate students consisted in the critical interpretation of limited portions of *Huon de Bordeaux* and *Aliscans*, with especial reference to points of morphology and syntax; and in an introduction to text criticism, based on Koschwitz's diplomatic and constituted text of the *Pèlerinage de Charlemagne*, two hundred lines of which were critically examined.

The course in Old Provençal was second year's work for graduate students, whose attention was chiefly directed to the characteristic subtleties and difficulties of the more artificial forms of the literature. Bartsch's *Chrestomathie* was used as a text-book.

Lectures on Literature, by Dr. F. M. Warren, were given to graduates as follows:

(1) During the year weekly lectures on French Epic poetry and the early drama have been given; their origins and growth were particularly considered, and the connection of the Epic poetry with the Italian romances of the Renaissance studied at length.

(2) In a weekly course of lectures on Italian literature especial attention was paid to the development of the early lyric, the progress of romantic poetry and the movement of the drama in the sixteenth century. The course ended with the work of Tasso.

In the French Major Course, the study of Old French was pursued under Dr. Todd twice weekly during the first half-year, including a brief general survey of Old French grammar and the reading of numerous extracts from the early monuments of the language. The text-books used were G. Paris' *Extraits* and Clédat's *Morceaux Choisis*. In the second half-year, a similar course was given in the leading authors of the XVI century, with special study of the transitional stages of the language as to form, syntax and style. The text-book was Darmesteter and Hatzfeld's *Morceaux choisis des principaux écrivains du xvie siècle*. The reading of XVII century authors was carried on weekly through the year, and weekly exercises in composition (including

original essays) were commented in class and later returned with written correction. Lectures on the beginnings of Epic poetry and down to the decline of Renaissance literature, were given weekly by Dr. F. M. Warren.

In the Minor Course the class read in Scientific French, from Luquiens' text-book, one hundred and fifty-five pages; in Historical French, from Thierry's *Recits des Temps Mérovingiens* and Montesquieu's *Grandeur et Décadence des Romains* one hundred and seventy pages; in Literary French, one hundred and ten pages of Balzac's *Eugénie Grandet*, *La Mare au Diable* of George Sand, Augier's *Le Gendre de M. Poirier*; four of Daudet's *Contes* and Hugo's *Hernani*. Talks on literature were given with Saintsbury's *Primer* as a basis. For Composition, Whitney's *Grammar* and *Exercises*, Part II, supplemented by various connected passages, represent the work.

A Course in French Grammar and Reading for students of the Classical Group has been given by Dr. Todd three hours weekly through the year.

A. M. ELLIOTT,

*Associate Professor of the Romance Languages.*

## History and Politics.

The work in this department for the year 1888-1889 has been in general accordance with the programme announced in the University Circulars for July, 1888. The staff of instructors included Messrs. Adams, Emmott, Ely, Small, Smith, and Haskins. Among the readers and special lecturers were Dr. Woodrow Wilson, Dr. E. R. L. Gould, and Dr. A. G. Warner, all graduates of this University. Other lecturers have from time to time contributed to the course on Social Science, and will be mentioned in connection with that subject. Mr. J. M. Vincent has remained in charge of the library and various collections of the department.

Forty-five graduate students have pursued historical or political courses during the past year. Of these, thirty have taken historical or political science for their principal subject. Six of them have completed their course and received the degree of Doctor of Philosophy. The total number of students enrolled in the department, including undergraduates, was one hundred and sixty-two.

Courses of instruction have been given by the following individuals:

Dr. Herbert B. Adams has continued to direct

### 1. The Seminary of History and Politics.

This voluntary association of five instructors and thirty-six advanced students has met one evening in the week for a session of two hours. The exercises consisted chiefly of the reading and discussion of original papers upon educational, institutional, and economic history. Among the subjects presented and discussed were: The Relation of the State to Higher Educa-

tion in the United States; the History of Higher Education in North and South Carolina, Louisiana and Indiana; Early Educational Institutions in Baltimore. These and other papers of similar character will appear in enlarged or modified form, among the "Contributions to American Educational History," published by the U. S. Bureau of Education. Other papers read in abstract in the seminary have appeared in full in the University Studies, or have been accepted as Doctors' dissertations. Among them may be mentioned: The River Towns of Connecticut, a Study of Wethersfield, Windsor, and Hartford; English Culture in Virginia; Influence of the Fur Trade upon the History of the North-west; the Relation of the Continental Congress to the Colonies; Crimes and Punishments of Slaves in Maryland. One or two contributions have been made to European institutional history, notably an Introduction to the History of the Lombard Communes, and chapters in the History of Federal Government in Switzerland.

Dr. Adams has given the following courses of lectures:

2. Roman Constitutional History.

This is one part of a systematic course on the History of Politics, which embraces three years of graduate instruction. The lectures were given two hours a week for six months to a class of thirty-eight men. While the lecturer specially treated institutions of Roman government from the royal to the imperial period, including the land question and the organization of colonies and provinces, the class pursued private courses of historical reading in Ihne, Mommsen, and other authorities, and was required to pass two written examinations upon Roman history in general.

3. History of the Nineteenth Century.

This course was one hour a week throughout the year with the same class of students as in course 2. The lectures related to the downfall of the Napoleonic empire and the reconstruction of Europe, with special consideration of the revolutions in Spain, Portugal, South America, Greece, and Italy. In connection with this course, two exhibitions of prints illustrating French and German history were given by Hon. G. G. Hubbard, of Washington, D. C.

4. French Absolutism.

After the conclusion of the course in Roman Constitutional History, lectures were given for two months, two hours a week, upon the literature of French Politics under the Old Regime, and upon the characteristics of French absolute monarchy.

5. Undergraduate Courses in History.

Dr. Adams gave fifteen introductory lectures in History to fifty-nine undergraduates in the so called "P. H. E." course, which embraces Physical Geography, History and English; he conducted sixty exercises for thirty students in the History of Church and Empire, and sixty in the History of International Law for seventeen students.

6. Mr. Emmott lectured twice weekly to fifteen graduate and advanced students upon the History and Principles of the Roman Law.

The course opened with a description of the origin and nature of the primitive Roman State, and of the early legal institutions of the Roman people, and traced fully the history and gradual development of the Roman Law through all its stages from the earliest times down to and including the Codification of the Law by Justinian, special attention being paid to the original sources of the Roman Law. The subsequent history of the Roman Law in the East and in the West after the time of Justinian will be fully treated of in the course on Comparative Jurisprudence to be given in 1890-91. In the second part of the course the subject matter of the Institutes of Gaius and of the Institutes of Justinian was carefully analyzed, compared and classified, and the fundamental principles of the Roman Law fully explained and illustrated. The results of the investigations of Moyle, Hunter, Ortolan, Muirhead, Austin, Clark, Markby, Holland, Maine, and Roby, as well as of the most recent French and German scholarship in reference to the subjects treated of, were placed before the class. In connection with the lectures frequent oral and two written examinations took place upon the various topics treated of by the lecturer, and the students often took part in the translation and explanation of the text.

Dr. Ely has given the following courses of instruction:

7. History of Political Economy.

This course, weekly during the first half-year with twenty-seven students, and three times a week with twenty-four students during the second half-year, traced the development of economic theories from Plato and Aristotle through the Middle Age to the present time. Particular attention was given to those writers whose works may be regarded as epoch-making. Discussions were held, and oral and written examinations were frequently given. Selections from various writers were assigned to the class for criticism.

8. The Methods of Economics and Special Economic Questions.

This course was twice weekly during the first half-year. The greater part of the time was given to a critical examination of economic methods. The relation of economics to ethics and religion was discussed at some length. The topic of rent occupied considerable time. The members of the class were examined on assigned collateral reading, and also on the lectures.

9. Undergraduate Course in Political Economy.

The usual undergraduate course on elements of economics and the topics of the day was conducted. Essays, some of them of considerable merit, were written, and the opinions of leading writers on many of the subjects were carefully compared. From time to time economic problems and exercises taken from various authors were assigned to the members of the class to test their knowledge and to stimulate their thought. Examinations were frequently held, and the work of the class is regarded by the instructor as the most successful year's work in undergraduate political economy during his connection with the University. The class numbered thirty-seven, including ten graduates.

10. Dr. Woodrow Wilson gave twenty-five lectures upon Administration to twenty-four graduate students.

The lectures comprised a systematic and somewhat detailed account of the methods and machinery of local government in Prussia, France, England, and the United States, together with a brief notice of the organization of local administration in Switzerland, Austria-Hungary, and Sweden-Norway.

11. Professor Albion W. Small, a resident graduate, upon leave of absence from Colby University, taught a class of seventeen undergraduates three hours a week throughout the year, in English and American Constitutional History.

12. Mr. Charles L. Smith, formerly Fellow in History, taught a class of thirty-two undergraduates two hours a week, through the year, in the Outlines of European History, and a class of sixteen, three hours a week, in Continental History.

13. Mr. Charles H. Haskins conducted a class of fourteen undergraduates in the Greek Historians—Herodotus and Thucydides (in translation)—one hour a week throughout the year, and in Tacitus (Latin text) four hours a week, second half-year. He also taught a class of twenty-nine in Greek and Roman History, two hours a week through the year, by means of textbooks. Mr. Haskins was in charge of a class of fifty-five in Physical Geography, which met one hour a week the second half-year, alternately for lectures by specialists and for text-book exercises with Mr. Haskins.

14. Mr. J. M. Vincent, librarian of the department, and curator of the historical museum, has lectured upon Greek and Roman Numismatics.

15. Co-operative Course in Social Science.

The most novel, and, perhaps, the most suggestive course of lectures in this department during the past year was that upon certain select topics in Social Science by a group of lecturers, four of them connected with the university, and seven of them invited from without. Professor Emmott gave an historical account of the English Poor Law. Six lectures on "Charities" were given by Dr. A. G. Warner, formerly Fellow of the Johns Hopkins University, then General Secretary of the Charity Organization Society of Baltimore. Some account of these lectures has been given by Dr. Warner in the Notes published in connection with the University Studies. Dr. E. R. L. Gould, a graduate of this University, and now connected with the Department of Labor in Washington, gave four lectures upon the past and present relations of the Family to social life, with some consideration of the causes and statistics of Divorce in Europe and America. The President of the University gave an introductory lecture upon the scope of Social Science and analyzed the relations of the State to Crime, Philanthropy, and Education, with special consideration of college and university problems.

These lectures marked the transition to a more distinctively educational course to which the following gentlemen, by invitation, contributed lectures: Principal Scott, of Phillips Exeter Academy, upon the elements of a Liberal Education which should be represented in the Preparatory School; James MacAlister, Superintendent of Public Instruction in Philadelphia, on Popular Education in Europe and America; Mr. Philip R. Uhler and Dr. L. H. Steiner, on the Educational Value of the Peabody and Pratt Libraries of Baltimore; and Dr. G. Brown Goode, Assistant Secretary of the Smithsonian Institution, on the Educational and Historical Value of the National Museum. Besides these suggestive lectures, practical talks were given by Hon. Seth Low, ex-Mayor of Brooklyn, upon Municipal Government, and by William Grey, Esq., of London, upon Social Work in Australia and London, and upon the Rugby Colony in Tennessee. The first two of these talks were afterward written out and published in the Notes supplementary to the University Studies, as was also Mr. Uhler's lecture, now revised, and entitled "A Sketch of the Libraries of Baltimore."

#### 16. Publications.

During the past year the History of Coöperation in the United States, written entirely by graduate students of this University, has been issued as the Sixth Series of the Studies. The Seventh Series, of which about one-half is the work of Johns Hopkins men, is now well advanced. Two extra volumes of the Studies have also been published. The first is by Professor George E. Howard, of the University of Nebraska, on the Local Constitutional History of the United States, with special reference to the development of the Township, the Hundred, and the Shire. This work is at once a generalization and a farther advance upon lines of special work already pursued in Baltimore. The second extra volume is a Doctor's Dissertation by Jeffrey R. Brackett upon "The Negro in Maryland: A Study of the Institution of Slavery," based upon Maryland laws and archives.

A new feature of the Studies, or, rather, a return to an original feature, is the plan of publishing brief, supplementary Notes in connection with more elaborate monographs. Seven leaflets have thus far appeared:

1. Municipal Government in England. By Dr. Albert Shaw, of Minneapolis.
2. Social Work in Australia and London. By Mr. William Grey, of London.
3. Encouragement of Higher Education. By H. B. Adams.
4. Address on Municipal Government. By Hon. Seth Low, of Brooklyn.
5. A Sketch of the Libraries of Baltimore. By Mr. Philip R. Uhler.
6. Work among Workingwomen in Baltimore. By H. B. Adams, with Comparative Statistics by Hon. Carroll D. Wright.
7. Charities. By Dr. A. G. Warner.

HERBERT B. ADAMS,  
*Associate Professor of History.*

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### Logic, Ethics and Psychology.

The advanced instruction in Ethics has been given through the organization of a seminary which met fortnightly under my guidance. The course was mainly devoted to the History of Modern Ethical Philosophy and Ethical Psychology in England from Hobbes to Paley, but attention was also paid to the consideration of many of the problems suggested by the present state of ethical speculation, both in this country and in Europe. During the year each regular member of the seminary took his turn in the presentation of original papers containing the results of his own investigations upon the various subjects assigned for consideration, and a discussion took place after the reading of each paper. On many topics, *e. g.* Pessimism, Mythology, and Materialism, the chief opinions in the History of Philosophy were carefully worked up and made the basis of discussion.

The daily work of the undergraduate courses has been conducted as follows:

I taught both Deductive and Inductive Logic during the first term. Special reference was had to Jevons's *Elementary Lessons in Logic* and Fowler's *Elements of Inductive Logic*. Particular attention was given to the general theories of both deduction and induction, to the various forms of thought: notion, judgment, and reasoning; and also to the various methods of scientific investigation and proof.

Numerous exercises were given in the opposition and conversion of propositions, in indication and counter-indication, in the application of the rules of the syllogism, in the detection of fallacies, and in the elimination of contradictions from thought.

I also taught Ethics mainly from the standpoint of the Christian Theory of Morals during the third term. The text-book used was Fowler's *Principles of Morals*, but with numerous references to the works of other writers, including Martineau's *Types of Ethical Theory*, Martensen's *Christian Ethics*, Maurice's *Social Morality*, Sidgwick's *Outlines of the History of Ethics*, and Janet's *Theory of Morals*. The work consisted of frequent recitations, of informal lectures, and of discussions, and two essays on assigned topics were required from each member of the class. The aim throughout, whilst keeping to a strictly scientific basis, was to make the instruction of a directly practical nature and to show the bearing of the fundamental problems of moral philosophy which were discussed upon the field of practical ethics.

During the second term Psychology was taught by Drs. E. C. Sanford and W. H. Burnham on the basis of Hill's *Psychology*. The work consisted of frequent recitations with practical lectures on such subjects as mental hygiene, memory, attention, association of ideas, feelings, and will,

together with the most surely demonstrable facts in experimental Psychology.

During the year there have been forty-eight students in the department.

GEORGE H. EMMOTT,  
*Associate Professor of Logic and Ethics.*

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### Pathology.

The instruction in Pathology, during the past year, has been under the direction of Dr. W. H. Welch, Professor of Pathology, and Dr. F. P. Mall, Assistant in Pathology. Dr. W. T. Councilman, Associate Professor of Anatomy and Associate in Pathology, has spent the year in Europe, with leave of absence. The fellowship in pathology for the past year has been held by Dr. A. E. Thayer.

Thirty-four students have been engaged in work in the Pathological Laboratory during the year. Of these, twenty-four are physicians, and the others advanced students either in biology or in medicine.

The courses in Pathological Histology were attended by fifteen students, those in Bacteriology by ten students, and nine physicians have devoted themselves to special work in pathology or bacteriology.

Instruction has been given in Pathological Histology, in Demonstrations in Pathological Anatomy, in Bacteriology, and in Experimental Pathology.

Ample material is provided for the study of pathological histology, and arrangements are made so that each student can devote all of the time at his disposal during every day of the week to this subject. He is encouraged to do independent work both in familiarizing himself with the technique and in the interpretation of a large number of specimens.

Facilities are afforded for bacteriological study in accordance with the most approved methods. There is a full supply of pathogenic microorganisms in culture. The student is taught the methods of morphological and biological study of these organisms, and the most important application of these methods to the study of disease, and to the analysis of air, water, etc.

As heretofore, much attention has been given to the collection and study of material in Comparative Pathology.

Several interesting researches in Experimental Pathology have been made and will afford material for original papers.

Many valuable specimens in both human and comparative pathology have been added to the museum.

During the year, the Johns Hopkins Hospital has been opened, and thereby the opportunities afforded for pathological demonstrations and for instruction in the methods of conducting post-mortem examinations have been increased. Special facilities are now afforded for combining clinical and pathological studies.

The courses in pathological histology, which in previous years have been attended only by physicians, were made available during the past year also to advanced students in biology who intend to study medicine. The results of this plan have proved satisfactory.

WILLIAM H. WELCH,  
*Professor of Pathology.*

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### Latin.

Professor Minton Warren, Associate Professor of Latin, was absent during the year.

Professor Emil Hübner, Ph. D., of the University of Berlin, acted as Examiner in Latin. In this capacity, he provided a scheme of study for the special subject, previously announced—the Epistles of Cicero. He also criticised papers prepared by the advanced students of Latin, conducted the written examinations required for the Ph. D. degree, when Latin was taken as a subject, and passed upon the theses submitted to him.

The Latin Society (composed of the graduate students) met twice weekly in the room of the Latin Seminary, for the reading and interpretation of Cicero's Letters. Mr. J. L. Moore acted as President, and Mr. Hatfield as Secretary.

The following undergraduate courses were conducted during the year by:  
Mr. J. L. Moore in

Juvenal and Catullus, *three times weekly, first half-year.*

Plautus and Terence, *three times weekly, second half-year.*

Livy, *four times weekly, first half-year.*

Horace, *four times weekly, second half-year.*

Reading at sight, *weekly, throughout the year.*

Mr. C. H. Haskins in

Tacitus, *four times weekly, second half-year.*

Classes in Prose Composition, meeting weekly, were conducted in connection with each of the courses above named.

Students have privately read for examination the following books:

Cæsar, *Bellum Civile, book i.* (18).

Cicero, *De Senectute, De Amicitia.* (18).

Horace, *Epodes.* (18).

Ovid, *Fasti, books i and ii.* (18).

Pliny's *Letters.* (9).

Terence, *Phormio.* (9).

Plautus, *Trinummus.* (9).

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**Physical Training.**

During the temporary absence of the Director, Dr. E. M. Hartwell, who has spent the past year in study abroad, I have attended to the duties of the gymnasium. For the year 1888-9, I have examined seventy-six individuals, recorded the results in the proper books, and given such advice as each seemed to require.

Early in January, at the request of some of the young men, I started a class in Swedish movements to take part in an exhibition which was to be given by the Athletic Association. The training of this class was kept up every day for about a month and all who cared to do so were invited to join it. The interest manifested led me to leave a paper on my desk for the signatures of such persons as desired to continue the exercises. The list soon contained fifty names, and the class was continued three times a week during March and April.

On the evening of February 21, an exhibition under the auspices of the Athletic Association was given in the gymnasium. A class of eighteen gave the ordinary movements of the Swedish system, after which the young men did themselves great credit in heavy gymnastics, tumbling, etc.

The interest in athletics has been unusually great during the past year, the gymnasium having been more generally used than ever before. The addition of four shower-baths, with hot and cold water, has added greatly to the comfort of the young men, and a cage for base-ball playing placed over the narrow part of the playground has been found a great convenience by the ball players. The lunch and study rooms have been in constant use and good order has prevailed, though the young men have been mostly left to govern themselves, being merely under my general supervision.

H. W. MAGOUN,  
*Acting Director of the Gymnasium.*

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## TABULAR STATEMENT OF COURSES OF INSTRUCTION, 1888-89.

INSTRUCTOR.	COURSES.	No. of hours per week.	No. of students, 1st half-year.	No. of students, 2d half-year.
<b>MATHEMATICS AND ASTRONOMY.</b>				
Newcomb.	Theoretical Astronomy. (First half-year.)	2	8	
Newcomb.	Celestial Mechanics. (Second half-year.)	2		7
Story.	Introductory Course for Graduates: Section A (Mechanics, Higher Plane Curves, Quaternions, Finite Differences, Probabilities, and Elliptic Functions).	3	4	5
Story.	Introductory Course for Graduates: Section B (Theory of Numbers, Modern Algebra, Surfaces, and Twisted Curves).	2	2	8
Story.	Quaternions.	3	5	4
Story.	Advanced Analytic Geometry. (First half-year.)	2	4	
Story.	Theory of Numbers. (Second half-year.)	2		4
Story.	Mathematical Seminary.	1	5	5
Craig.	Hydrodynamics. (First half-year.)	3	5	
Craig.	Theory of Functions. (First half-year.)	3	3	
Craig.	Abelian Functions.	2	2	3
Craig.	Differential Equations: Advanced. (First half-year.)	2	3	
	Differential Equations: Major Course. (Second half-year.)	3		16
Craig.	Linear Differential Equations. (Second half-year.)	2		4
Craig.	Mechanics. (Second half-year.)	3		4
Franklin.	Problems in Mechanics.	2	8	3
Franklin.	Solid Analytic Geometry.	2	13	11
Franklin.	Differential and Integral Calculus: Advanced. (First half-year.)	3	18	
Franklin.	Algebra, Analytic Geometry, and Calculus.	5	27	29
Bolza.	Theory of Substitutions. (Second half-year.)	5		10
Taber.	Analytic Geometry.	2	11	12
Taber.	Trigonometry.	1½	10	11
<b>PHYSICS.</b>				
Rowland.	Electricity and Magnetism.	4	9	8
Kimball.	Physical Seminary.	1	9	8
Kimball.	General Physics: Major Course.	5	23	23
Kimball.	General Physics: Minor Course.	5	33	32
Duncan.	Electricity and Magnetism. (First Year's Course.)	3	10	11
Duncan.	Electricity and Magnetism. (Second Year's Course.)	2	7	7
Rowland, Kimball, Duncan, Ames. }	Laboratory Work.		64	63
<b>CHEMISTRY.</b>				
Remsen.	Compounds of Carbon: Advanced.	2	19	20
Remsen.	Compounds of Carbon: Major Course.	2	65	65
Remsen.	General Inorganic Chemistry: Minor Course.	3	61	59
Morse.	Advanced Inorganic Chemistry: Major Course.	2	26	23
Morse.	Stoichiometry. (Twelve Lectures.)			
Renouf.	Reviews in General Chemistry. (Graduate Students.)	2	14	19
Renouf.	Reviews in General Chemistry: Minor Course.	2	35	33
Renouf.	Reviews in the Compounds of Carbon: Major Course.	1	25	25

INSTRUCTOR.	COURSES.	No. of hours per week.	No. of students, 1st half-year.	No. of students, 2d half-year.
Remsen, Morse, Renouf. }	Laboratory Work.		108	107
	Historical Lectures. (Fifteen lectures, by instructors and advanced students, second half-year.)	1		20
	Journal Meetings.	2	15	15
<b>MINERALOGY AND GEOLOGY.</b>				
Williams. Williams, Clark. } Williams. Clark. }	General Mineralogy.	3	23	22
	Dynamical Geology. (First half-year.)	3	17	
	Geology of Maryland. (Second half-year.)	3		18
	Paleontology. (Second half-year.)	3		18
<b>BIOLOGY.</b>				
Martin.	Physiology: Advanced Course.	1	12	15
Martin.	General Biology.	3	41	39
Martin.	Physiological Seminary.	1	12	12
Martin.	Embryology of the Chick. (Second half-year.)	3		39
Brooks.	Advanced Morphology.	1	12	13
Brooks.	General Zoölogy.	2	29	29
Brooks.	Morphological Seminary.	1	11	12
Brooks.	Morphological Readings.	1	14	16
Howell.	Vertebrate Histology. (First half-year.)	3	84	
Howell.	Mammalian Anatomy. (During October.)	5	35	
Howell.	Animal Physiology. (Second half-year.)	3		34
Donaldson.	Histology of the Central Nervous System.	2	2	2
Andrews.	Human and Comparative Osteology.	2	31	30
Andrews.	Systematic Botany. (Second half-year.)	2		39
Martin, Brooks, Howell, Andrews. }	Laboratory Work.		72	72
	Biological Journal Club.	1	15	17
<b>PATHOLOGY.</b>				
Welch, Mall, Welch, Mall, Welch, Mall. }	Bacteriology. (Second half-year.)			10
	Pathological Histology.		2	15
	Special Research.		7	9
<b>GREEK.</b>				
Gildersleeve.	Greek Seminary: the Attic Orators.	3½	22	26
Gildersleeve.	Greek Syntax and Lyric Poets. (Second half-year.)	1		26
Gildersleeve.	Practical Exercises. (First half-year.)	2	22	
Spieker.	Plato. (First half-year.)	3	11	
Spieker.	Lysias. (First half-year.)	4	16	
Spieker.	Homer; Euripides. (Second half-year.)	4		19
Spieker.	Aeschylus; Sophocles. (Second half-year.)	3		11
Spieker.	Greek Literature.	1	10	11
Spieker.	Prose Composition.	2	27	31
Arnolt.	New Testament Greek. (Second half-year.)	2		11
<b>LATIN.</b>				
Moore.	Latin Society. (Graduate Students).	2	16	14
Moore.	Terence; Plautus. (Second half-year.)	3		13
Moore.	Reading at Sight.	1	13	13
	Catullus; Juvenal. (First half-year.)	3	13	

INSTRUCTOR.	COURSES.	No. of hours per week.	No. of students, 1st half-year.	No. of students, 2d half-year.
Moore.	Livy. (First half-year.)	4	36	19
Moore.	Horace. (Second half-year.)	4		
Moore.	Prose Composition.	2	36	31
Haskins.	Tacitus. (Second half-year.)	4		14
<b>SANSKRIT, ETC.</b>				
Bloomfield.	Introduction to the Study of Comparative Philology.	1	19	21
Bloomfield.	Comparative Grammar of Latin and Greek.	1	23	25
Bloomfield.	Vedic Seminary. (Literature of the Brāhmanas.)	1	10	11
Bloomfield.	Advanced Sanskrit. (Ākuntala and Prakrit.)	1	9	10
Magoun.	Advanced Sanskrit. (Hitopadeśa and Nala). (First half-year.)	1	2	
Magoun.	Introduction to the Rig-Veda. (Second half-year.)	1		2
Bloomfield, } Fay. }	Elementary Sanskrit.	2	10	9
<b>SEMITIC LANGUAGES.</b>				
Haupt.	Assyrian Seminary.	6	5	7
Haupt.	Sumero-Akkadian. (Haupt's Keilschrifttexte.)	1	6	7
Haupt.	Hebrew. (Advanced Course: Ecclesiastes.)	1	10	13
Haupt.	Syriac. (Roediger's Chrestomathy.)	1	6	8
Adler.	Ethiopic. (Dillmann's Chrestomathy.) (First half-year.)	1	3	
Adler.	Assyrian. (Elementary.)	2	2	5
Adler.	Elementary Hebrew.	2	8	9
Adler.	Hebrew Exercises. (Second half-year.)	2		4
Adler.	Arabic. (First half-year.)	1	3	
Adler.	History of Israel. (First half-year.)	1	20	
Adler.	Assyrian Archaeology. (First half-year.)	1	3	
Adler.	Mishnic Hebrew. (Second half-year.)	1		6
Adler.	Introduction to the Old Testament. (Second half-year.)	1		27
<b>GERMAN.</b>				
<i>Advanced Work.</i>				
Wood.	Teutonic Seminary. (a) Parzival.	2	7	7
	(b) Alemannic Dialect.	Alt.	9	10
Wood.	Gothic.	W'ks.	2	11
Wood.	Old Norse. (The Elder Edda).	2	2	2
Wood.	German Literature in the 18th Century. (Lectures.)	2	11	9
Wood.	Comparative German Grammar. (Lectures.)	2	7	6
Learned.	Rhine Frankish. (Lectures.) (First half-year.)	2	2	
Learned.	Old High German Literature. (Lectures.) (Second half-year.)	2		4
Learned.	Middle High German.	1	5	4
<i>Major Course.</i>				
Learned.	Selected Prose Readings. (Masius' Reader, III).	1	19	18
Learned.	History of German Literature. (Lectures).	1	19	18
Learned.	Goethe (Hermann and Dorothea, Tasso, Faust).	2	19	18
Learned.	Prose Composition. (Buchheim).	1	19	18
<i>Minor Course: Class A.</i>				
F. M. Warren.	Selected Prose Readings. (Buchheim's Reader, II; Hauff, Das kalte Herz.)	2	30	19
Learned.	Goethe (Egmont), Heine (Harzreise), Schiller (Das Lied von der Glocke).	2	31	27
Learned.	Prose Composition (Whitney).	1	31	27

INSTRUCTOR.	COURSES.	No. of hours per week.	No. of students, 1st half-year.	No. of students, 2d half-year.
<i>Minor Course: Class B.</i>				
F. M. Warren.	Otis, Elementary German; Hauff, Das kalte Herz. (First half-year.)	5	26	
F. M. Warren.	Buchheim, II; Prose Composition; Schiller (Wilhelm Tell, Maria Stuart). (Second half-year.)	5		22
<i>Supplementary Courses.</i>				
Learned.	Scientific Readings. (Humboldt and Goethe.)	1½	7	6
Learned.	Historical Readings. (Riehl, Fichte, and Virchow.)	1½	18	13
Plate.	German Conversation.	2	14	8
<b>ROMANCE LANGUAGES.</b>				
Elliott.	Advanced Courses. (Romance Morphology, Italian Philology, Wallonian Dialect, Gallo-Italic Dialects, Romance Seminary, Lorraine Dialect.)	6	3	3
Elliott.	Advanced Courses. (French Phonetics, Aucassin et Nicolette.)	3	4	3
Elliott.	Portuguese. (First half-year.)	1	4	
Todd.	Italian and Spanish.	5	8	6
Todd.	Old French. (Second half-year.)	1		5
Todd.	Provençal.	1	3	
Todd.	French: Major Course.	5	10	10
F. M. Warren.	French and Italian Literature.	1	4	5
F. M. Warren.	French: Minor Course.	5	42	40
Todd.	French: Elementary.	3	15	13
<b>ENGLISH.</b>				
Bright.	English Seminary. (Chaucer).	2	11	12
Bright.	English Philology. (Lectures).	1	13	13
Bright.	Anglo-Saxon Poetry. (First half-year.)	1	7	
Bright.	English Phonetics. (Second half-year.)	1		21
Bright.	Anglo-Saxon Gospels. (Second half-year.)	1		5
Bright.	Anglo-Saxon. (Sweet's Reader).	2	21	13
Bright.	Middle English.	2	9	9
Bright.	Rhetoric. (First half-year.)	2	8	
Browne.	Early Scottish Poets.	1	11	11
Browne.	Elizabethan Literature; Fourteenth Century Literature.	2	15	15
Browne.	Eighteenth Century Literature.	1	15	16
Browne.	General English Literature. (P. H. E. Course).	2	62	48
Callaway.	Milton, Wordsworth. (Second half-year.)	2		8
<b>HISTORICAL AND POLITICAL SCIENCE.</b>				
Adams.	Seminary of History and Politics.	2	36	82
Adams.	History of Politics.	3	33	33
Adams.	History of Church and Empire.	2	30	27
Adams.	International Law.	2	17	15
Adams.	Oriental History. (P. H. E. Course.) (First half-year.)	1	59	
Ely.	History of Political Economy. (First-half-year.)	1	27	
Ely.	History of Political Economy. (Second half-year.)	3		24
Ely.	Special Economic Questions. (First half-year.)	2	27	
Ely.	Elements of Political Economy.	5	36	37
Emmott.	Historical Jurisprudence. (Roman Law).	2	15	13
Small.	English and American Constitutions.	3	15	17

*Tabular Statement of Classes.*

INSTRUCTOR.	COURSES.	No. of hours per week.	No. of students, 1st half-year.	No. of students, 2d half-year.
Smith.	Continental History.	3	15	16
Smith.	European History. (P. H. E. Course).	2	31	32
Haskins.	Greek and Roman History. (P. H. E. Course).	2	29	26
Haskins and others. }	Physical and Historical Geography. (P. H. E. Course.) (Second half-year.)	1		55
Haskins.	Herodotus and Thucydides.	1	15	14
Wilson.	Administration. (Second half-year.)	4		24
Various Lecturers. }	Social Science.	1	35	31
<b>LOGIC, ETHICS, AND PSYCHOLOGY.</b>				
Emmott.	Ethico-Historical Seminary. (Second half-year.)	Alt. W'ks.		6
Emmott.	Logic. (L. E. P. Course.)	5	41	
Emmott.	Ethics. (L. E. P. Course.)	5		40
Sanford, Burnham. }	Psychology. (L. E. P. Course.) (Second half-year.)	5		40
<b>DRAWING.</b>				
Newell.	Free-hand Drawing.	2	64	62
Newell.	Mechanical Drawing.	1	35	30
<b>ELOCUTION.</b>				
Woodworth.	Elocution. (Till Christmas.)	5	53	

## DEGREES CONFERRED, 1889.

### Doctors of Philosophy.

Charles McLean Andrews, of Wethersfield, Conn., A. B., Trinity College (Conn.), 1884. *Subjects:* History, Political Economy, and English. *Thesis:* The River Towns of Connecticut: a Study of Wethersfield, Hartford, and Windsor.

Frank Wilson Blackmar, of San José, Cal., Ph. B., University of the Pacific, 1881. *Subjects:* History, Political Economy, and English. *Thesis:* Spanish Colonization in the Southwest.

Jeffrey Richardson Brackett, of Quincy, Mass., A. B., Harvard University, 1883. *Subjects:* History, Roman Law, and English Literature. *Thesis:* The Negro in Maryland: a Study of the Institution of Slavery.

William Merriam Burton, of East Cleveland, Ohio, A. B., Adelbert College, 1886. *Subjects:* Chemistry, Mineralogy, and Geology. *Thesis:* The Atomic Weight of Zinc as determined by the Composition of the Oxide.

Morgan Callaway, Jr., of Oxford, Ga., A. B., Emory College (Ga.), 1881. *Subjects*: English, German, and History. *Thesis*: The Absolute Participle in Anglo-Saxon.

Alfred Robert Louis Dohme, of Baltimore, A. B., Johns Hopkins University, 1886. *Subjects*: Chemistry, Mineralogy, and Geology. *Thesis*: On Orthosulphobenzoic Acid and some of its Derivatives.

William Curns Lawrence Gorton, of Baltimore, A. B., Johns Hopkins University, 1886. *Subjects*: Mathematics, Astronomy, and Chemistry. *Thesis*: Line Congruences.

Joseph Edward Harry, of Pylesville, Md., A. B., Johns Hopkins University, 1886. *Subjects*: Greek, Latin, and Sanskrit. *Thesis*: A Rhetorical Study of the Leptinean Orations.

George Allison Hench, of Carlisle, Pa., A. B., Lafayette College, 1885. *Subjects*: German, English, and Sanskrit. *Thesis*: The Monsee Fragments: newly collated text, variant readings, and a phonology.

Clifton Fremont Hodge, of Ripon, Wis., A. B., Ripon College, 1882. *Subjects*: Physiology, Morphology, and Geology. *Thesis*: Some Effects of Electrically Stimulating Ganglion Cells.

Cary Talcott Hutchinson, of St. Louis, Mo., Ph. B., Washington University, 1886. *Subjects*: Physics, Mathematics, and Chemistry. *Thesis*: On the Electromagnetic Effect of Convection Currents.

James Thomas Lees, of Peoria, Ill., A. B., Adelbert College, 1886. *Subjects*: Greek, Latin, and Sanskrit. *Thesis*: The Rhetorical Element in Euripides.

Archibald MacMechan, of Port Perry, Ont., A. B., University of Toronto, 1884. *Subjects*: German, English, and Old Norse. *Thesis*: The Relation of Hans Sachs to the Decameron.

Charles William Moulton, of Minneapolis, Minn., A. B., University of Minnesota, 1885. *Subjects*: Chemistry, Mineralogy, and Physics. *Thesis*: On Phthalic Sulphinide and some of its Derivatives.

Albion Woodbury Small, of Waterville, Me., A. B., Colby University, 1876. *Subjects*: History, Political Economy, and Social Science. *Thesis*: The Beginnings of American Nationality: the Constitutional Relations between the Continental Congress and the Colonies and States.

Charles Lee Smith, of Raleigh, N. C., S. B., Wake Forest College, 1884. *Subjects*: History, Political Economy, and International Law. *Thesis*: The History of Education in North Carolina.

Kirby Williams Smith, of Rutland, Vt., A. B., University of Vermont, 1884. *Subjects*: Latin, Greek, and Sanskrit. *Thesis*: Archaisms and Rare Words in the Commentary of Donatus to Terence.

Lemon Leander Uhl, of Millersburg, O., A. B., Wittenberg College, (Ohio), 1871. *Subjects*: History of Philosophy, Psychology, and Sanskrit. *Thesis*: Attention.

Arthur Clarence Wightman, of Baltimore, A. B., Wofford College, 1879. *Subjects*: Physiology, Animal Morphology, and Vegetable Morphology. *Thesis*: On the Ventricular Epithelium of the Frog's Brain.

William Klapp Williams, of Boston, Mass., A. B., Johns Hopkins University, 1886. *Subjects:* History, Political Economy, and Roman Law. *Thesis:* An Investigation of the Causes which led to the Development of Municipal Unity in the Lombard Communes. (20)

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### Bachelors of Arts.

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|---|--|
| Adolph Bernhard, of Ohio.                     | Jesse William Lazear, of Baltimore County. |
| Hiram Horsburgh Bice, of New York.            | Alfred Mann, of Wisconsin.                 |
| John Sedgewick Billings, of Washington, D. C. | Charles Carroll Marden, of Baltimore.      |
| Walton Bolgiano, of Waverly.                  | William Watson McCulloh, of Baltimore.     |
| Theodore Cooke, Jr., of Baltimore.            | Philip Randle Moale, of Baltimore.         |
| Frank Barnum Culver, of Baltimore.            | Waldo Newcomer, of Baltimore.              |
| Richard Edward Edes, of Washington, D. C.     | Leonard Magruder Passano, of Baltimore.    |
| Daniel Nathan Eisendrath, of Illinois.        | Arthur Jackson Patek, of Wisconsin.        |
| Albert Bernhardt Faust, of Baltimore.         | William Peters Reeves, of Indiana.         |
| Charles Lee Fulton, of Ellicott City.         | Legh Wilber Reid, of Virginia.             |
| Joseph Elliott Gilpin, of Baltimore.          | Ralph Robinson, of Centreville.            |
| Ross Granville Harrison, of Baltimore.        | Brantz Mayer Roszel, of Baltimore.         |
| George Newton Cressy Henschen, of Baltimore.  | John George Sadtler, of Baltimore.         |
| William Sadler Hilles, of Baltimore.          | Benjamin Bittinger Shreeves, of Baltimore. |
| William Isaac Hull, of Baltimore.             | Robert Tunstall Taylor, of Baltimore.      |
| Harry Clary Jones, of New London.             | Walter Herron Taylor, of Virginia.         |
| George Charles Keidel, of Catonsville.        | Winfield Scott Thomas, of Delaware.        |
|   | Harry Ullmann, of Missouri.                |
|   | Horatio Alanson Warren, of Connecticut.    |

## LIBRARY.

The number of bound volumes now in the Library is 34,000. The periodicals received number over 1,000 titles.

### GIFTS TO THE LIBRARY FROM SEPTEMBER 1, 1888, TO SEPTEMBER 1, 1889.

*(Exclusive of works received in exchange, and reports of public bodies gratuitously distributed.)*

- ADAMS, Rev. C. F. Christian Thought. 5 vols. New York; 1836. O.  
BALFOUR FAMILY. Works of F. M. Balfour. 4 vols. London, 1885. Q.  
BARTON, B. W., M. D. Hunter, John. Works. 4 vols. and atlas. London, 1835. O and Q.  
Bell, J. Principles of Surgery. 3 vols. Edinburgh, 1801. Q.  
BILLINGS, J. S., M. D. Index-Catalogue of Library of Surgeon-General's Office. Vols. 8, 9. Washington, 1887-8. Q.  
BOARDMAN, G. D. (Author). The Ten Commandments. Phila. D.  
BRANNER, J. C. (Author). Report, Geological Survey of Arkansas. Little Rock, 1888. O.  
BRITISH GOVERNMENT. Reports of the Voyage of the Challenger. 7 vols. London, 1887-8. F.  
CAYLEY, A. (Author). Mathematical Papers. I. Cambridge, 1859. Q.  
CHRISTIE, J., M. D. (Author). Medical Institutions of Glasgow. Glasgow, 1888. O.  
COOK, G. H. (Author). Report of State Geologist of New Jersey. Trenton, 1888. O.  
CRESPO, A. F. Censo general de Buenos Aires. Vol. I. Buenos Aires, 1889. Q.  
DAY, D. T. (Author). Report of United States Geological Survey, 1887. Washington, 1887. O.  
FOSTER, R. F. Pick, E. Memory and its Doctors. London, 1875. D.  
Pick, E. Method of Studying French. London, 1876. D.  
Pick, E. Method of Studying German. London, 1879. D.  
FRANKLIN, Mrs. F. Carroll, L. The Game of Logic. London, 1886. D.  
Jacobi, M. P. Notes on Primary Education. New York, 1889. D.  
GALLATLY, W. (Author). Elements of Logarithms. London, 1888. D.  
GARNETT, J. M. (Translator). Cynewulf's Elene. Boston, 1889. O.  
GILMAN, Prest. D. C. Naville, E. Goshen. London, 1887. Q.  
Petrie, W. M. F. Naukratis. London, 1886. Q.  
Petrie, W. M. F. Tanis. London, 1888. Q.  
Hawthorne, S. Notes in England and Italy. New York, 1869. D.  
GINN & Co. (Publishers). Alexander, W. J. Introduction to the Poetry of Browning. Boston, 1889. D.  
GOODE, J. B. (Author). Fisheries of the United States. 5 vols. Washington, 1887-3. Q.  
HOLT, H. & Co. (Publishers). Maine, H. S. International Law. New York, 1889. O.  
Durand, J. Materials for History of American Revolution. New York, 1889. O.  
(And 8 volumes of other publications).  
INGHAM, W. A. Reports, 2nd Geological Survey of Pennsylvania. 3 vols. and 4 atlases. Harrisburg, 1888, 1889. O.  
LANMAN, C. R. Sanskrit Reader. Boston, 1889. Q.  
LONGMANS, GREEN & Co. (Publishers). Gibson, R. H. Elementary Biology. London, 1889. D.  
MACCOUN, T. (Author). Historical Geography of the United States. New York, 1889. D.  
MANN, A. Forbes, E. British Starfishes. London, 1841. O.  
Siebold, T. v. Anatomy of Invertebrata. Boston, 1854. O.  
Mill, J. S. System of Logic. New York, 1846. O.  
MAYOR, J. E. B. (Editor). The Latin Pentateuch. London, 1889. O.  
PERRY, Mrs. B. F. Perry, B. F. Sketches of American Statesmen. Phila., 1887. O.  
Memorial of Ex-Governor Perry. Greenville, 1887. O.  
POGSON, N. R. (Author). Observations of Stars at Madras Observatory. Madras, 1888. Q.  
SCHÖNRICH, K. O. (Author). Baltimore: seine Vergangenheit, &c. Baltimore, 1887. O.  
SMITH, J. C. (Author). Culmination of the Science of Logic. Brooklyn, 1888. D.  
STRONG, A. H. (Author). Philosophy and Religion. New York, 1888. O.  
TRAIL, FLORENCE (Author). Studies in Criticism. New York. O.  
VAN RENSSELAER, Rev. M. (Author). Annals of the Van Rensselaers. Albany, 1888. O.

WALLIS, S. T.

- Calderon de la Barca, P. Comedias. 5 vols. v. p. v. d. O.  
 Comedias Españolas. 6 vols. v. p. v. d. O.  
 Hurtado de Mendoza, D. Guerra de Granada. Valencia, 1833. D.  
 Leon, L. de. Poesías. Madrid, 1816. D.  
 Zorrilla, J. Poesías. 3 vols. Madrid, 1837. D.  
 Zorrilla, J. Dos Leyendas. Madrid, 1845. D.  
 Zorrilla, J. Cantos del Trovador. Madrid, 1841. D.  
 Quintana, M. J. Poesías. 2 vols. Madrid, 1821. D.  
 Quintana, M. J. Parnaso Español. Paris, 1838. O.  
 Romancero de Romances Moriscos. Madrid, 1823. D.  
 Garcilaso de la Vega. Obras. Madrid, 1788. D.  
 Tirso de Molina. Cuentos. Madrid, 1848. D.  
 Mena, J. de. Obras. Madrid, 1804. D.  
 Hita, G. P. de. Guerras civiles de Granada. Barcelona, 1757. D.  
 Manrique, J. Coplas. Madrid, 1779. D.  
 Tragedias Españolas. Valencia, 1815. D.  
 Lope de Vega. El Peregrino. Madrid. O.  
 Ercilla y Zuniga, A. de. La Araucana. 4 vols. Madrid, 1821. D.  
 Iglesias de la Casa, J. Poesías. 2 vols. Paris, 1821. D.  
 Melendez, J. Poesías. 3 vols. Madrid, 1821. D.  
 Moratin, L. F. de. Obras. 3 vols. Paris, 1826. D.  
 Gorostiza, M. E. de. Teatro. Paris, 1822. D.  
 Quevedo, F. de. Obras. 11 vols. Madrid, 1791. O.  
 Lozano, C. Reyes nuevos de Toledo. Madrid, 1764. O.  
 Villegas, E. M. de. Eróticas. 2 vols. Madrid, 1774. D.  
 Ochoa, E. de. Romanceros y Cancioneros. Paris, 1838. O.  
 Ochoa, E. de. Teatro Español. 5 vols. Paris, 1838. O.  
 Perez, A. Relaciones. Paris, 1624. Q.  
 Zarate, A. G. de. Manual de Literatura. 3 vols. Madrid, 1844. D.  
 Rodriguez de Castro, J. Biblioteca Española. 2 vols. Madrid, 1781. F.  
 Martinez de la Rosa, F. Obras. 11 vols. Paris, v. d. D.  
 Sanchez, T. A. Coleccion de Poesías. Paris, 1842. O.  
 Ferrer del Rio, A. Literatura Española. Madrid, 1846. O.  
 Toledo, D. R. Codice . . . . de Cristobal Colon. Habana, 1867. Q.  
 Conde, J. A. Dominacion de los Arabes. 3 vols. Madrid, 1820. O.  
 Taboada, N. de. Diccion. Fr.-Esp. y Esp.-Fr. 2 vols. Paris, 1827. O.  
 Connelly and Higgins. Dict. Eng.-Sp. and Sp.-Eng. 4 vols. Madrid, 1798. Q.  
 Chambaud, L. Dict. Fr.-Ang. et Ang.-Fr. 2 vols. London, 1778. Q.  
 Cervantes, M. de. Don Quijote. 6 vols. Madrid, 1839. O.  
 Cervantes, M. de. Novelas. 4 vols. Perpiñan, 1816. D.  
 Bayle, P. Dict. hist. et crit. 4 vols. Rotterdam, 1720. F.  
 Gonzalez, E. Vida y hechos. Madrid, 1844. D.  
 Aleman, M. Guzman de Alfarache. Barcelona, 1843. D.  
 Navarrete, M. F. de. Coleccion de Viages. 3 vols. Madrid, 1825. O.  
 Navarrete, M. F. de. Opúsculos. Madrid, 1848. O.  
 Toreno, Conde de. La Revolucion de España. Madrid, 1835. O.  
 San Miguel, E. Historia de Felipe II. Madrid, 1844. O.  
 Ticknor, George. History of Spanish Literature. 3 vols. New York, 1849. O.  
 Tapia, E. de. Historia de la Civilizacion Española. 4 vols. Madrid, 1840. D.  
 Navarrete, P. F. Conservacion de Monarquías. Madrid, 1792. O.  
 Discusion sobre . . . . la Inquisicion. Cadiz, 1813. O.  
 Dupuis, C. F. Origine de tous les cultes. 3 vols. and atlas. Paris, 1795. Q.  
 Refranes de la lengua castellana. Barcelona, 1815. D.  
 Argüelles, J. C. Observaciones sobre . . . la guerra en España. 2 vols. Londres, 1829. D.  
 WHIPPLE, F. H. (Author). The Electric Railway. Detroit, 1889. O.  
 WIENER, M., M. D. Medhurst, W. H. Chinese-English Dictionary. Batavia, 1842. O.  
 Chinese Bible. O.

WILLIAM HAND BROWNE, *Librarian.*

## STATEMENT OF THE PUBLICATION AGENCY OF THE UNIVERSITY FOR THE YEAR 1888-89.

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The several periodicals, issued under the auspices of the University, have appeared at regular intervals through the year.

Of the American Journal of Mathematics, under the editorial direction of Professors Newcomb and Craig, four numbers, completing the eleventh volume, and containing 400 pages quarto, have been issued. A complete index to the first ten volumes is now ready, and will appear in the autumn. It contains 36 pages, and has an index by authors and an analytical index by subjects. The series of portraits of distinguished mathematicians, begun with the portrait of Professor Sylvester in Volume X, has been continued in Volume XI with the portrait of M. Hermite; with Volume XII will be given that of M. Poincaré.

Volume XI of the American Chemical Journal, under the editorial direction of Professor Remsen, began with January, 1889. Commencing with this volume, the number of issues was increased to eight yearly, and the price was raised to four dollars. One number of about seventy-two pages will be issued each month of the year, excepting June, July, August, and September. It is proposed to resume the issue of the reviews, reports, and abstracts, which formed a prominent feature of the earlier volumes, and it is designed that these shall give a fair idea of the progress of Chemistry in its various branches.

The ninth volume of the American Journal of Philology, of which Professor Gildersleeve is editor, has been completed, and the tenth volume begun. Four numbers, making 538 pages octavo, have appeared during the year.

Two numbers of the Studies from the Biological Laboratory are now nearly ready for issue. One of these, edited by Professor Martin, contains physiological papers; the other, edited by Professor Brooks, is devoted to morphological papers.

Nine numbers of Series VII of the Studies in Historical and Political Science, Professor H. B. Adams, editor, have been issued. These contain 455 pages octavo. Beginning with January, the publication of a series of Notes supplementary to the Studies was initiated. Seven of these Notes have appeared. The Notes are sent free to the subscribers to the Studies, and are sold to others at five cents each. Extra Volume IV (Local Constitutional History of the United States, Vol. I, by Professor G. E. Howard) was issued in May. This volume contains 526 pages octavo, and is bound in cloth. Extra Volume V will be the second volume of Professor Howard's

work. Extra Volume VI (The Negro in Maryland, by Dr. J. R. Brackett) is nearly ready for issue. The reprinting of the earlier numbers of the Studies, to meet the demand for full sets, is now nearly completed.

Eight numbers of the University Circulars (Nos. 68-75), containing 114 pages in all, have been issued at monthly intervals. This is now a widely recognized scientific journal, and is received by the leading institutions of this country and abroad.

During the year arrangements were made for the co-operation of the University in the issue of the Beiträge zur Assyriologie, of which Professor Haupt is one of the editors. The first volume is nearly ready for issue. When received, it will be offered for sale by us, as the American publishers.

The Thirteenth Annual Report of the President was issued in December. It contains 106 pages octavo. The Annual Register, containing 128 pages octavo, was issued at the close of May.

The most important separate publication of the year is the second series of the Photographic Map of the Solar Spectrum, by Professor H. A. Rowland. The map is now complete. The regular series consists of ten plates each three by two feet, containing two strips of the spectrum. It runs from wave length 3000 to 6950. Four extra plates, two of the B and D lines, and two of the Carbon Bands, have also been issued. This series has aroused a widespread scientific interest, and sets of the maps have been ordered from all parts of the world. The prices charged are just about the cost of printing. University Circular 74 contains a number of scientific notes relating to these photographs, and to the concave gratings made in the Physical Laboratory.

The Constitution of Japan, with the addresses at the meeting, April 7, commemorating its promulgation, were brought together in pamphlet form and issued in May.

Professor Patrick's thesis on Heraclitus, 131 pages, octavo, was issued in November, and several smaller pamphlets and monographs have been placed on sale.

A detailed price list, 26 pages octavo, of our publications, has been printed and distributed.

The Publication Agency has continued in charge of the publication of the American Journal of Psychology, during the absence of its editor, Dr. G. Stanley Hall, in Europe. This Journal will hereafter be issued from Worcester, Mass.

The Agency has been placed in charge of the printed theses, accepted for the degree of Doctor of Philosophy here, and the distribution of the same has been undertaken.

One hundred and fifty printed copies of the following-named theses have been received, as required by the regulations:

- Andrews, C. M.—The River Towns of Connecticut: A Study of Wethersfield, Hartford, and Windsor.
- Brackett, J. R.—The Negro in Maryland: a Study of the Institution of Slavery.

- Burton, W. M.—The Atomic Weight of Zinc, as determined by the Composition of the Oxide.
- Dohme, A. R. L.—Orthosulphobenzoic Acid and some of its Derivatives.
- Gorton, W. C. L.—Line Congruences.
- Hodge, C. F.—Some Effects of Electrically Stimulating Ganglion Cells.
- Hutchinson, C. T.—On the Electromagnetic Effect of Convection Currents.
- Haworth, E.—A Contribution to the Archæan Geology of Missouri.
- Kastle, J. H.—Paranitro-Sulpho-Benzoic Acid, etc.
- Lengfeld, F.—Researches on the Stability of the Alkyl Bromides.
- Moulton, C. W.—On Phthalic Sulphinide and some of its Derivatives.

An exhibition of our publications was asked for by the Commissioners to the Paris Exposition, and a box was made up and sent in February. Space was allotted in the section of Publications, American Education, Political and Economic Science, Instruments of Precision, etc. We are indebted to Dr. W. R. Orndorff, a graduate of the University and a member of the American Commission at Paris, for important services in this matter. Information has recently been received that a grand prize and two gold medals have been awarded for the exhibit of the University.

The system of exchanges has been conducted as in former years, and has been reported on in detail to the Librarian.

The report of the New Book Department has also been submitted to the Librarian. During the year 5,268 volumes of new books, of the value of about \$8,250, were received. Since the opening of the department in 1877 47,683 volumes of new books, of the value of about \$80,000, have been received.

N. MURRAY,

*In charge of the publications of the  
Johns Hopkins University.*

September 1, 1889.

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FIFTEENTH

ANNUAL REPORT

OF THE PRESIDENT OF THE

JOHNS HOPKINS UNIVERSITY

Baltimore, Maryland

1870



## ACADEMIC STAFF, 1889-90.

Daniel C. Gilman, LL. D.,	<i>President of the University.</i>
J. J. Sylvester, F. R. S., D. C. L.,	<i>Professor (Emeritus) of Mathematics.</i>
Basil L. Gildersleeve, Ph. D., LL. D.,	<i>Professor of Greek.</i>
Edward H. Griffin, D. D., LL. D.,	<i>Dean and Professor of History of Philosophy.</i>
Paul Haupt, Ph. D.,	<i>Professor of the Semitic Languages.</i>
Henry M. Hurd, A. M., M. D.,	<i>Professor of Psychiatry.</i>
H. Newell Martin, Dr. Sc., M. D., F. R. S.,	<i>Professor of Biology.</i>
Simon Newcomb, Ph. D., LL. D.,	<i>Professor of Mathematics and Astronomy.</i>
William Osler, M. D., F. R. C. P.,	<i>Professor of Medicine.</i>
Ira Remsen, M. D., Ph. D.,	<i>Professor of Chemistry.</i>
Henry A. Rowland, Ph. D.,	<i>Professor of Physics.</i>
William H. Welch, M. D.,	<i>Professor of Pathology.</i>
John S. Billings, M. D., LL. D.,	<i>Lecturer on Municipal Hygiene.</i>
Herbert B. Adams, Ph. D.,	<i>Associate Professor of History.</i>
Maurice Bloomfield, Ph. D.,	<i>Associate Professor of Sanskrit, etc.</i>
William K. Brooks, Ph. D.,	<i>Associate Professor of Animal Morphology.</i>
William T. Councilman, M. D.,	<i>Associate Professor of Anatomy.</i>
Thomas Craig, Ph. D.,	<i>Associate Professor of Mathematics.</i>
Louis Duncan, Ph. D.,	<i>Associate Professor of Electricity.</i>
A. Marshall Elliott, Ph. D.,	<i>Associate Professor of the Romance Languages.</i>
Richard T. Ely, Ph. D.,	<i>Associate Professor of Political Economy.</i>
George H. Emmott, A. M.,	<i>Associate Professor of Logic, etc.</i>
Fabian Franklin, Ph. D.,	<i>Associate Professor of Mathematics.</i>
William S. Halsted, M. D.,	<i>Associate Professor of Surgery.</i>
Howard A. Kelly, A. M., M. D.,	<i>Associate Professor of Gynecology, etc.</i>
Arthur L. Kimball, Ph. D.,	<i>Associate Professor of Physics.</i>
Harmon N. Morse, Ph. D.,	<i>Associate Professor of Chemistry.</i>
Edward H. Spieker, Ph. D.,	<i>Associate Professor of Greek and Latin.</i>
Minton Warren, Ph. D.,	<i>Associate Professor of Latin.</i>
George H. Williams, Ph. D.,	<i>Associate Professor of Inorganic Geology.</i>
Henry Wood, Ph. D.,	<i>Associate Professor of German.</i>
Ethan A. Andrews, Ph. D.,	<i>Associate in Biology.</i>
James W. Bright, Ph. D.,	<i>Associate in English.</i>
William Hand Browne, M. D.,	<i>Librarian and Associate in English.</i>
William B. Clark, Ph. D.,	<i>Associate in Paleontology.</i>
Edward M. Hartwell, M. D., Ph. D.,	<i>Associate in Physical Training.</i>
William F. C. Hasson, U. S. N.,	<i>Associate in Applied Mechanics.</i>
Marion D. Learned, Ph. D.,	<i>Associate in German.</i>
Edward Renouf, Ph. D.,	<i>Associate in Chemistry.</i>
Henry A. Todd, Ph. D.,	<i>Associate in Romance Languages.</i>
Philip R. Uhler,	<i>Associate in Natural History.</i>
Frederick M. Warren, Ph. D.,	<i>Associate in French and German.</i>
Alexander C. Abbott, M. D.,	<i>Assistant in Bacteriology, etc.</i>
Cyrus Adler, Ph. D.,	<i>Instructor in the Semitic Languages.</i>
William S. Aldrich, M. E.,	<i>Instructor in Drawing.</i>
Joseph S. Ames, A. B.,	<i>Assistant in Physics.</i>
Charles A. Borst, A. M.,	<i>Assistant in Astronomy.</i>
Charles H. Chapman, A. B.,	<i>Instructor in Mathematics.</i>
George W. Edmond, A. B.,	<i>Assistant in Chemistry.</i>
Charles H. Haskins, A. B.,	<i>Instructor in History.</i>
Gustav A. Liebig, Jr., Ph. D.,	<i>Assistant in Electricity.</i>
Charles L. Smith, Ph. D.,	<i>Instructor in History.</i>
Kirby W. Smith, Ph. D.,	<i>Instructor in Latin.</i>
Arthur C. Wightman, Ph. D.,	<i>Demonstrator of Physiology.</i>
Walter B. Scaife, Ph. D.,	<i>Reader in Historical Geography.</i>
Albert Shaw, Ph. D.,	<i>Reader in Municipal Government.</i>
John M. Vincent, A. M.,	<i>Reader in Library Methods.</i>
Woodrow Wilson, Ph. D., LL. D.,	<i>Reader in Administration.</i>

FIFTEENTH  
ANNUAL REPORT

OF THE PRESIDENT OF THE

Johns Hopkins University

Baltimore, Maryland

1890

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BALTIMORE  
THE JOHNS HOPKINS PRESS  
1890

# TRUSTEES.

1889-90.

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*Treasurer:*

FRANCIS WHITE.

*Secretary:*

LEWIS N. HOPKINS.

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GEORGE W. DOBBIN,	J. HALL PLEASANTS,
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CHARLES J. M. GWINN,	JAMES CAREY THOMAS,
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JAMES CAREY THOMAS,	FRANCIS WHITE,
CHARLES J. M. GWINN,	GEORGE W. DOBBIN, <i>ex officio.</i>

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FRANCIS T. KING,	JAMES CAREY THOMAS,
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*Committee in Charge of the Clifton Grounds.*

LEWIS N. HOPKINS,	FRANCIS WHITE,
GEORGE W. DOBBIN, <i>ex officio.</i>	

# REPORT.

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TO THE TRUSTEES OF THE JOHNS HOPKINS UNIVERSITY:—

*Gentlemen:*

I have the honor to present my fifteenth annual report, for the academic year beginning September 1, 1889. During most of the session, I was not in this country—having received a leave of absence, in order to visit, during the winter season, the historic lands that lie upon the borders of the Mediterranean Sea. I left Baltimore, after the opening of the term, on the fifteenth of October, and returned to the University on the seventh of July. In my absence the duties of the office were discharged by Professor Remsen, at my request and with your concurrence, and they were discharged to the complete satisfaction of the entire University. Personally and officially I am very grateful to him, and to the Board of Trustees and to the members of the academic staff, for relieving me of all anxieties during this long separation. In these acknowledgments I would also gratefully mention the Publication Agent, the Registrar, and the Treasurer's assistants, upon whom were devolved many of the minor cares and responsibilities.

## STATISTICS.

The year was in all respects a year of prosperity. The financial anxieties which had been felt in the two years previous, because of the continued suspension of the dividends of

the Baltimore and Ohio Railroad, were relieved by the generous subscription of an emergency fund.

The academic staff included during the year fifty-eight teachers. The number of students enrolled was four hundred and four, of whom two hundred and fifteen were residents of Maryland, and one hundred and seventy-five came here from thirty-one other States of the Union, and fourteen from foreign countries. Among the students were two hundred and twenty-nine already graduated, coming from one hundred and four colleges and universities; there were one hundred and thirty matriculates (or candidates for the degree of Bachelor of Arts); and there were forty-five admitted as special students, to pursue courses of study for which they seemed fitted, without reference to graduation. The degree of Bachelor of Arts was conferred upon thirty-seven candidates; and thirty-three candidates were promoted to the degree of Doctor of Philosophy.

The following table indicates the enrolment of students in each year since the University was opened in the autumn of 1876:—

	Total Enrolled.	Graduates, (incl. Fellows.)	Matriculates.	Non-Matriculates.
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	127	62
1888-89	394	216	129	49
1889-90	404	229	130	45

During fourteen years, fifteen hundred and seventy-one individuals have been enrolled as students, of whom six hundred and ninety-six have come from Maryland (including five hundred and fifty-five from Baltimore), and eight hundred and seventy-five from fifty-one other states and countries. Of this number nine hundred and two persons pursued courses as graduate students, and six hundred and sixty-nine as collegiate students.

The attendance upon the courses given in some of the principal subjects has been as follows during the last five years :—

	1885-86.	1886-87.	1887-88.	1888-89.	1889-90.
Mathematics and Astronomy, . . . . .	53	76	84	82	83
Physics, . . . . .	57	73	85	74	85
Chemistry, . . . . .	94	118	119	124	137
Mineralogy and Geology,	62	24	25	33	33
Biology, . . . . .	51	65	61	81	64
Pathology, . . . . .		25	15	24	34
Greek, . . . . .	43	48	61	58	55
Latin, . . . . .	75	72	74	69	69
Sanskrit, etc., . . . . .	37	37	40	39	38
Semitic Languages, . . .	16	14	18	43	35
German, . . . . .	116	113	130	119	116
French, Italian, etc., . .	64	60	72	69	88
English, etc., . . . . .	56	90	84	94	90
History and Political Science, . . . . .	100	135	137	162	142
Psychology, Ethics, etc.,	82	65	81	48	60

Since degrees were first conferred, in 1878, two hundred and fifty persons have attained the Baccalaureate degree, and one hundred and eighty-four have been advanced to the degree of Doctor of Philosophy, as appears from the following table:

Mrs. Caroline Donovan, of Baltimore, presented to the Trustees, through Hon. Ferdinand C. Latrobe, recently Mayor of the City, the sum of one hundred thousand dollars for the establishment of a professorship. While the donor did not restrict the action of the Trustees, it was understood that she would be gratified if the professorship thus founded should be a chair of literature. The Trustees and the Faculty unanimously concurred in this wish. The gift is most acceptable and will enable the Trustees to enlarge the work of the University in one of the most important subjects. Mrs. Donovan died soon after she made this gift, but her name will be perpetuated for many generations as that of a generous promoter of education, and a timely benefactor of this University.

One of the most important events of the year was the construction of a convenient hall for the uses of the Young Men's Christian Association. This building, the gift of Mr. Eugene Levering of Baltimore, was completed in January 1890, and was formally opened on the 16th of that month. The Hon. John W. Foster, of Washington, who has recently represented the United States as minister plenipotentiary in Spain, Mexico and Russia, was requested to preside on that occasion, and addresses were made by William E. Dodge, Esq., of New York, and Russell Sturgis, Esq., of Boston, distinguished friends of the Association, and by President Gates, then of Rutgers, and now of Amherst College. This new building includes a large reading-room, a room for devotional services, a committee-room, an office for the Dean, and a large assembly room where four hundred and twenty-nine persons may be seated. The Trustees have placed near the entrance a tablet which reads as follows :

	A. B.	PH. D.		A. B.	PH. D.
1877-78		4	1884-85	9	13
1878-79	3	6	1885-86	31	17
1879-80	16	5	1886-87	24	20
1880-81	12	9	1887-88.	34	27
1881-82	15	9	1888-89	36	20
1882-83	10	6	1889-90	37	33
1883-84	23	15			

#### DONATIONS.

As the report of last year was passing through the press, the death occurred of Mr. John W. McCoy, of Baltimore. He gave to the University his costly library, including some 8,000 volumes, and after providing for many legacies to other institutions and to personal friends, he bequeathed to us the residue of his estate. It will be many years before the exact amount of this legacy is known, as annuities are established, which are not likely to be soon terminated. The trustees have already received as a part of the legacy the books above referred to, and the dwelling-house of Mr. McCoy, which they have allotted to the President of the University for his residence; and within the current year they expect to receive a further instalment. A suitable book plate has been provided for the library, and the titles of the catalogue, originally prepared by Mr. J. W. M. Lee, will soon be transferred to our general catalogue, and arrangements will be made by which those who desire to consult the collection can readily do so while it continues in the rooms where the donor placed it, adjacent to his dwelling-house.

Another generous gift soon followed that of Mr. McCoy.

This building,  
Constructed as a home for  
The Young Men's Christian Association  
By Eugene Levering of Baltimore,  
has been called  
By the Trustees of the University  
Levering Hall,  
That the name of the Donor  
may be gratefully borne in mind.  
MDCCLXXXIX.

They have also placed here several other memorial tablets, including one that commemorates Percy Graeme Turnbull, in whose memory the Turnbull lectureship has been founded.

#### PUBLIC LECTURES AND ASSEMBLIES.

The first course of public lectures \* before the Young Men's Christian Association on the Levering foundation was delivered in the spring of 1890 by Rev. J. A. Broadus, D. D., of Louisville, Ky. The hall was crowded by an audience consisting chiefly of students and their personal friends.

The National Conference of Charities and Correction held their meetings in this hall in the month of May. A large number of distinguished delegates were present from every part of the United States. It was a pleasure to have them here. To our students of the historical and social sciences a most favorable opportunity was afforded for becoming acquainted with those who are engaged in the actual solution of social problems, and for hearing discussions and papers pertinent to some of the most serious difficulties of modern society.

\* Published by A. C. Armstrong & Son, New York.

Commemoration Day was celebrated as usual on the twenty-second of February by an assembly of the officers, students, and friends of the University, in the Mt. Vernon Place Methodist Episcopal Church. The Acting President presided and made an address which was followed by an Inaugural Discourse delivered by the Dean, Professor Griffin, and subsequently published.\*

The close of the academic year was celebrated on the twelfth of June in the same place, when thirty-six young men were admitted to the degree of Bachelor of Arts, and thirty were promoted to the degree of Doctor of Philosophy. Addresses were delivered by Acting President Remsen and Professor Adams.

#### CHANGES IN HOPKINS HALL.

The large number of students who devote themselves to Chemistry has again required an enlargement of the space devoted to this study. Not without regret, the conclusion was reached that Hopkins Hall, which for fourteen years has been our principal general lecture-room, should be re-seated and adapted to the requirements of a chemical lecture room. To some extent, Levering Hall takes the place of Hopkins Hall,—but another lecture room, which will hold two hundred persons, is now very much needed.

#### MEDICAL INSTRUCTION.

The opening of the Johns Hopkins Hospital, in the spring of 1889, and the appointment of a staff of physicians and surgeons to carry on the work of the Hospital and the Dispen-

\* *Johns Hopkins University Circulars*, March, 1890.

sary gave prominence at once to the question of systematic instruction in medicine and surgery. After much consideration among the members of both Boards of Trustees the conclusion was reached that until a special fund was provided for the purpose, it would be unwise for the University to undertake to organize its medical school—particularly as the authorities of the Hospital were willing to guide the studies and investigations of a few persons who had already taken a degree in medicine and were ready to profit by the supplementary instruction that could immediately be given. The particulars in respect to these courses belong to the reports of the Hospital and not to the University.

In the course of last winter, a number of ladies who are interested in securing for such women as desire it and are fitted for it an opportunity to profit by the very best advantages for medical education, undertook, of their own accord, to raise a sum of money for the endowment fund of the Johns Hopkins Medical School—to be offered to the Trustees of the University on condition that women should be admitted to the School, when it is opened, on the same terms as men. They associated in their undertaking many ladies of the highest intellectual and social standing in other cities, and at length, in October, 1890, they offered to the University the sum of one hundred thousand dollars, for the purposes above stated, and their gift was accepted on the conditions expressed in the letter of the givers and in the subsequent resolution of the Trustees. The official minutes are given in the appendix. It is unnecessary, at this time, to recapitulate the arguments which have been urged for the admission of women to the medical school of this University, or to enumerate the difficulties which naturally suggest themselves when the proposition is discussed. It is fortunate that the action of the

Trustees in accepting the gift was unanimous and that their conclusion was based, to some extent at least, on the expressed opinion of the Superintendent, the Physician in Chief, and the Gynecologist of the Hospital, that the gift which was offered should be accepted. The committee of ladies who have undertaken, with unselfish enthusiasm and devotion, the task of raising the sum that is requisite, are still actively at work, and they are hopeful of being able to raise a very much larger sum, perhaps indeed the entire amount required, and thus to hasten the day when a medical school may be systematically organized in connection with the University and the Hospital, the authorities of which are ready to coöperate, with all the resources that they can command, in the work of medical instruction.

#### DETAILS IN RESPECT TO THE COURSES OF INSTRUCTION.

The papers, appended to this report, which were prepared by the chief instructors, exhibit the educational work which has been in progress during the last twelve months. Every department has gone forward with satisfactory efficiency. A statement of the donations to the library and of the publications that are issued under the auspices of the University is also printed.

#### OBITUARY.

Judge George William Brown, who had been a Trustee of the University since its foundation, and of late years the Chairman of the Executive Committee, died at Lake Mohonk, N. Y., September 5, 1890, in the seventy-eighth year of his age. May I be allowed to repeat in this place the first words which were spoken in a public assembly at the opening of the current year.

Fourteen years ago, a company of perhaps one hundred persons assembled in the room since known as Hopkins Hall to begin the educational work of the Johns Hopkins University. Among those then present, there was one who has rarely, if ever, failed to be with us upon similar occasions from that time until now. Not infrequently, we have heard his voice on public occasions—always with an inspiring note. His presence, his sympathy and his counsels were a perpetual benediction. But his influence was even greater in the councilroom than it was upon the platform. Invariably present at the meetings of the Trustees and of the Executive Committee—unless unavoidably detained—he was one of the most faithful, attentive, patient, experienced, and enlightened members of the Board. In the conduct of our affairs he showed, at times, those chivalric qualities, in-born and in-bred, which made him in early life the brave advocate of private rights and the fearless defender of public order; while he also showed the calm, considerate and judicial qualities, which, in later years, adorned his station on the bench. Few lives are so complete as his. Few of our contemporaries can be named who discharge so faithfully the duties of a citizen.

It is probable that before long we shall be called together to consider the example he has left us, and to rehearse his virtues\*—but I am quite sure of your concurrence, as I anticipate the more extended eulogies which we may hope to hear, by making the first words of this academic term a tribute of affectionate respect and gratitude for the life, character, and services of Judge George William Brown.

\*The proposed meeting was held on the twentieth day of October, and the proceedings are fully reported in the *Johns Hopkins University Circulars*, No. 83.

His mute dust  
I honor and his living worth ;  
A man more pure and bold and just  
Was never born into the earth.

We have recently lost other friends. General George S. Brown, a distant kinsman of Judge Brown, was one of the most respected citizens of Baltimore, who contributed liberally to the advancement of all good works. He was one of the first persons not connected with the University to see, two years ago, the need of a special fund to sustain our finances in a time of depression, and he was one of the generous company who made up the Emergency Fund. He was also one of the first who responded to a proposal for reorganizing the Mercantile Library and saving a valuable collection of books from the threatened dispersion. Another of our recent benefactors was Mr. John S. Gilman, who showed his interest in our work in many ways, and especially by contributing to the Emergency Fund. Such aid deserves perpetual remembrance.

Still more recently death has removed another friend of the University, not indeed officially connected with it, but always interested in its proceedings. I refer to Nathaniel H. Morison, LL. D., Provost of the Peabody Institute, to whom all the scholars now assembled in Baltimore and all who have been here for many years past are deeply indebted. To him is chiefly due the honor of building up a library of costly, scholarly books, which ranks among the noblest libraries of the country. It is a collection wisely chosen, carefully catalogued, well arranged, and constantly accessible. Dr. Morison has many other claims to grateful and honorable remembrance, but to us, the members of a University, his greatest service has been the collection of that great library on a plan so definite and so thoroughly carried out that it is supplemented by and is supplementary to all the other libraries of Baltimore. There

are but few cities, if any, in this country, and not many in Europe, where books of the highest character, as well as books of popular interest, are so readily accessible to all classes in the community, as they are in this place. The variety and excellence of our library system is largely due to the distinctive character that the Peabody Library has always maintained.

#### THE FINANCES OF THE UNIVERSITY.

During the last few months, in this and in foreign lands, I have often been asked for a full statement of the financial condition of the Johns Hopkins University. It has surprised me to discover how widely certain incorrect and exaggerated reports have been circulated, how limited is the knowledge of our resources, and how sincerely the friends of learning, at a distance from Baltimore, as well as in our immediate neighborhood, would regret any misfortune which should seriously impair our activity. Some of those whom I have met would doubtless be as willing as they are able to come to our support if all the facts could be clearly and openly laid before them. To such inquiring friends, and to others with whom we have had relations, the following statements are accordingly submitted.

The founder of the University bequeathed to it in 1874, property that was then estimated at three and a half million dollars—consisting of an estate near Baltimore of 330 acres, fifteen thousand shares of the common stock of the Baltimore and Ohio Railroad, and other securities amounting to about three quarters of a million dollars. About sixty acres of the landed estate were subsequently taken by the city for a reservoir, the construction of which has delayed the improvement or the sale of the remaining portion. We may reasonably expect

that, ultimately, the funds of the University will be largely augmented by the sale or rental of this property, but at present it yields a very slight income. The miscellaneous securities retain their value. The only embarrassment in our financial administration has been due to the failure of the Baltimore and Ohio Railroad to pay any dividend on its common stock since May, 1887.

The reasons for keeping this investment are not generally known. It is, therefore, important to say that for some time after the foundation of the University the common stock of the Baltimore and Ohio Railroad paid an annual dividend of ten per cent. The stock was free from taxation. Moreover, many of those who were in a position to know the facts, believed that a large stock-dividend would soon be declared to represent the accumulated surplus acquired during many previous years. But there was even a stronger reason for retaining this investment. The founder, in his will, used these words: "I recommend the said Johns Hopkins University not to dispose of the said capital stock, or of the stock accruing thereon by way of increment or dividend, but to keep the said stock and said increment or dividend stock, if any, as an investment." He also enjoined upon the University "the duty of voting and representing the said stock with diligence, zeal, and perfect fidelity," and he expressed the desire that "each and every Trustee should use his or their influence and power with the purpose of promoting its [the Company's] influence and the value of the stock." These were recommendations and wishes, it is true, and not positive restrictions. The Trustees were still free to exercise their best judgment in respect to the property entrusted to them—and yet few persons, if any, when these facts are borne in mind, will question whether the University did right to retain the endowment in

its original investment. If "too many eggs were kept in one basket," the basket with its contents was the gift of the founder.

All the expenses of the University, including the purchase of land, the construction of buildings, the acquisition of a library and of costly apparatus, the bestowal of fellowships and scholarships, the publication of serials and monographs, and the engagement of a large staff of teachers, were met without the slightest encroachment on the capital. Everything was paid from income. Not only so, but yearly, until the loss of income already mentioned, a portion of the income was put by and invested for such contingencies as the future might reveal. Accordingly, when the dividends of the Baltimore and Ohio stock were suspended, the University was able to fall back upon its reserved funds. This reserve, however, could not hold out many years and great anxiety was felt by the authorities as to the future of the University. All expenses were carefully scrutinised and many economies were introduced. The charges for tuition were advanced. Important supplies were withheld. There was danger that still greater retrenchments would be imperative, and many anxious hours were spent in considering what departments of the University work could be abandoned with the least amount of injury.

Then came most welcome and timely relief. Some friends of the University, most of them resident in Baltimore, but a few of them non-resident, subscribed the sum of one hundred and eight thousand dollars as an emergency fund, to enable the University to go forward for a period of three years without further contraction. It would not be easy to over-estimate the importance of this gift. It assured the authorities of the University that its work was understood and valued, and that

watchful friends would take care that it receive financial support. Other important gifts and a generous legacy soon followed. With the aid of this Emergency Fund and of the reserved income, the University could go forward until 1892, on its present scale of expenditure, even without any dividend from the railroad stock.

But fortunately, within a short time past, an opportunity has occurred to exchange the common stock of the Baltimore and Ohio Railroad for the preferred stock of the same corporation. Ten thousand shares of the preferred stock have thus been secured, which are free from taxation and which annually yield six per centum. The preferred stock has the first claim upon the earnings of the road, after its current expenses are paid. Three thousand shares of the common stock are still owned by the University.

In addition, there will be the income of a new professorship founded by Mrs. Donovan; the income of the McCoy bequest, the value of which is not yet known; and the Turnbull lectureship, devoted to a specific object.

With this income the University can proceed without any apprehensions. It has no debts. Its investments are safe and, for the most part, income-yielding. Its future is assured.

Nevertheless, it is important that one fact should not be concealed. The income from the Baltimore and Ohio Railroad, originally one hundred and fifty thousand dollars, was first reduced, then suspended, and is now (after the reinvestment just mentioned) but sixty thousand dollars, with whatever may come from three thousand shares of the common stock, yielding nothing at present.

It must also be borne in mind that some unwelcome economies were introduced in the days of apprehension. Chiefly to be regretted were the lessened allowances for books, appa-

ratus, lectureships and scholarships—the necessities of a vigorous academic life. Even with the continuance of these economies, the necessary outlay of the University during the coming year may be a little more than the income above mentioned. The Emergency Fund, distributed over a term of years, enables the Trustees to make up this deficit and to resume the desired appropriations for the libraries and laboratories.

The friends of the Johns Hopkins University may therefore have the satisfaction of knowing that its activity is not likely to be diminished. It has passed the crisis in its affairs. Its present income is assured. Its friends have rallied to its support. Its future suggests no anxiety. The era of great gifts has begun.

On the other hand, it cannot enlarge its usefulness without enlarging its resources. It needs more buildings, more professorships, more funds for the encouragement of meritorious scholars. It needs to organize new departments of study, especially a school of medicine and surgery.

Indeed, it is clear that the work of the University with its increasing attractions, its rapidly growing libraries, its large number of students, and its relations to the public, as a centre of literary, scientific, and educational activities, cannot any longer be carried on with the requisite efficiency, unless larger and better buildings are provided. The three laboratories devoted to Chemistry, Biology and Physics, having been carefully planned and built for their purposes, are excellent structures. But the rooms devoted to the study of language, literature, history, philosophy, and the literary in distinction from the scientific branches, are most inadequate. They are not large enough for our present classes; they are not conveniently arranged nor properly ventilated. The students,

much more than the professors, suffer from the inconveniences to which they are exposed. We have no proper place for those lectures which are attended by audiences of one or two hundred hearers; no suitable rooms for study and refreshment; not near room enough for our library of forty thousand volumes. I urge upon the Trustees the early consideration of this necessity. Doubtless one large building, adapted to our surroundings, can be so contrived as to provide for all our wants under one roof,—or perhaps two or three isolated buildings, like the laboratories, may be found more convenient. It is not at all unlikely, if we may judge by the many buildings given within the last ten years to Harvard, Yale, Princeton, and Cornell, that some friend of the University who wishes to show his interest in the education of youth and to leave a name identified with the promotion of knowledge, will aid us in the construction of such a building if his attention is directed to our needs and our opportunities. Perhaps several persons will unite in supplying the want.

D. C. GILMAN,  
*President.*

*Presented to the Board of Trustees, December 1, 1890.*

## APPENDIX.

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### MINUTE IN HONOR OF THE MEMORY OF JUDGE BROWN.

OCTOBER 20, 1890.

The Trustees, President, and Academic Staff of the Johns Hopkins University, with the Trustees, President, and Officers of the Johns Hopkins Hospital, assembled to do honor to the memory of their associate, counselor, governor, friend, the late George William Brown, desire to put on record their appreciation of a character marked by rare courage and rarer kindness, of an intellect which owed the reach of its vision to the serenity of a pure and fearless soul, which owed the justice of its insight to quick sympathy with the springs of humanity.

Few men have lived in any community that have been so closely identified with so many movements for the public good, and of these few he was always among the first, often the very first to go forward—a man wise in counsel, diligent in performance, and whether in deliberation or in action living and moving under a sense of duty to his own ideal of citizenship, that was at once an example and an inspiration. Breadth of view, fearlessness and purity of soul, wisdom in counsel, ready sympathy, the priceless experience of a life consecrated to high ideals—all this being his, was ours, and was counted among the sources of the power of these foundations which he served so faithfully from the beginning, was counted and will count to the end of time.

Impossible though it be to suppress the natural sorrow for our personal loss, for the loss to the University and to the Hospital, no more beautiful close could have been wished for a course that had stretched through so many years of arduous labor and high achievement; and we know that the memory of a life so rounded and complete will abide in strength, and even beyond that memory the good which he has wrought and which we here reverently recognize.

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## THE DONOVAN PROFESSORSHIP.

The following letter was received from Mrs. Caroline Donovan, by the hand of Hon. F. C. Latrobe, Mayor of Baltimore, on the eighth day of November, 1889:

*To the President and Board of Trustees of the Johns Hopkins University:—*

*Gentlemen*—I have requested my friend and counsel, the Hon. Ferdinand C. Latrobe, Mayor of Baltimore, to hand to you my certified check for one hundred thousand dollars, provided you will accept it on the following conditions:

First—The money to be invested by the president and board of trustees of the Johns Hopkins University, and the annual income thereof to be expended in maintaining a chair or professorship in the said university for instruction in English literature, to be known as the "Caroline Donovan Chair."

Second—A report to be made by the president and board of trustees to the Mayor of Baltimore, setting forth the security or securities in which the said sum of one hundred thousand dollars is invested, and whenever hereafter any change is made in the said investment, it shall be reported to the Mayor of Baltimore.

If my check is accepted with the conditions herein named, you will please give a receipt therefor to my friend, Mayor Latrobe, who will hand it to me.

Very Respectfully,

October 21, 1889.

CAROLINE DONOVAN.

The following is the letter of the Trustees acknowledging the gift:

*Mrs. Caroline Donovan:—*

*Madam*—I am instructed by the Board of Trustees of this University, to whom your munificent gift of a hundred thousand dollars was made known this morning, to convey to you, on their behalf, a grateful acknowledgment of your generosity, and a deep sense of the good you have done by it. It is especially gratifying to them to know that their labors have become known to you, though living in comparative retirement, and that your appreciation of them has been testified in a form of such lasting value.

The conditions with which you have accompanied the gift, dictated, doubtless, by your views as to how the money will best benefit the interests of your fellow-citizens among whom it will be used, will be carefully observed.

I am, Madam, with great respect,

Your obedient servant,

GEORGE W. DOBBIN,

*President of the Board of Trustees.*

November 8, 1889.

Mrs. Donovan died March 5, 1890.

## THE BEQUEST OF JOHN W. MCCOY.

Mr. John W. McCoy was a devoted friend of this University from its beginning until his death, and he showed his interest by many public and private acts. He will always be remembered as one of the earliest and most liberal of our benefactors. He was not only generous but large-minded. When his library is opened, it will be seen at once that this part of his bequest is of great value, and as the years roll on, the University will for other reasons be more and more grateful to him.

The principal facts of his life are stated in the following sketch, and those passages of his will are quoted which relate to this institution.

John W. McCoy was born in Baltimore, April 2, 1821. After completing his education at Baltimore College, the literary department of the University of Maryland, he entered active life as a member of the staff of a weekly newspaper, and for many years he retained a connection with the press.

In 1859 Mr. McCoy was made president of two mining companies in North Carolina, having their business offices in Baltimore. On the breaking out of the war, he had to make the choice between abandoning the property at heavy loss to himself and his associates, or removing to North Carolina. He chose the latter, and during four years devoted his time, personal labor, and mental energies, to carrying on and developing the mining operations. Notwithstanding the extreme disadvantages under which he labored, the paralysis of nearly all industries, the lack of funds, of materials, and of skilled workmen, and his own inexperience, his energy and fertility of resource were such that he triumphed over all difficulties and kept his mines working throughout the war.

At the restoration of peace, Mr. McCoy returned to Baltimore and became a partner in the commercial house of W. T. Walters & Co., in which he remained until he retired from active business.

Throughout his life Mr. McCoy was distinguished for his love of literature and art, and most of his leisure hours were spent in his library, which he was constantly enriching with the best current literature. Of art, he was not only an admirer, but a discriminating judge and liberal patron; and in a number of instances he befriended and brought to public notice native genius that but for his generous help might have long remained unknown. His collection of works treating of and illustrating art in its various epochs and schools, is one of the finest in the country.

Mr. McCoy's devotion to the best interests of his native city, his independence of character, and his sound and practical judgment, made him an invaluable member of various public administrative bodies, such as the Mercantile Library, the board of trustees of the Pratt Library, and the Association for Improving the Condition of the Poor.

Mr. McCoy never married. He died August 20, 1889, bequeathing his art collections to the Peabody Institute, and his library of about eight thousand volumes to the Johns Hopkins University. He gave a number of legacies to his personal friends and to charitable institutions in which he was interested, and the rest of his property, subject to the payment of certain annuities, will ultimately come to the Johns Hopkins University as residuary legatee.

The following are the paragraphs of his will (dated April 7, 1888) which refer to the Johns Hopkins University.

\* \* \* \* To the Institution now conducted in the City of Baltimore, and known as the "Johns Hopkins University," my library in bulk, including books, pamphlets, prints, engravings, autotypes, and all matters and things pertaining to said library, the same to be delivered over to the said Johns Hopkins University by my executors, and to be thenceforth the absolute property of the said Johns Hopkins University.

To the Peabody Institute of the City of Baltimore, all my pictures, statuary, and works of art (not included in my library and disposed of in the last preceding clause of my will), whether the same are in my dwelling, in the club-house of the Athenæum Club, or elsewhere, the same to be delivered over to the said Peabody Institute, and to be thenceforward the absolute property of the said Peabody Institute.

\* \* \* \* It shall be the duty of my Trustee under this will to ascertain (at least approximately), between the first day of January and the first day of April in each and every calendar year, during the continuance of the said trust, the total market value of the said estate then in the hands of the said Trustee, and therefrom the said Trustee shall reserve: First: An amount equal, at the market value at that time, to the aggregate of all the specific sums—not annuities—thereafter to be paid out of said trust up to the termination thereof. Second: An amount which, at the market value of the assets constituting the estate, shall be equal at that time to thirty times the aggregate amount of all the annuities under this my will, which are payable during the said current calendar year, whether the said annuities are for life or for a term of years. Third: An amount equal to the cost, as near as it can be estimated, of the administration of said trust during said calendar year, including the taxes which may be levied, or assessed, or required to be paid on the said estate.

And it is my will and I order and direct that after the making of the reservations aforesaid, the said Trustee shall pay over, on or before the first day of May in each and every calendar year, to the Johns Hopkins University hereinbefore mentioned, all the residue of my estate then in the hands of said Trustee; and after the payment of all the specific legacies hereinbefore made and appointed to be paid out of my said estate, and upon the termination of all the annuities hereinbefore created and directed to be paid out of my estate, I give and devise all the residue and remainder of said estate to the Johns Hopkins University aforementioned, which I hereby designate and constitute my sole residuary legatee.

## THE WOMEN'S MEDICAL SCHOOL FUND.

At a meeting of the Board of Trustees of the University, October 29, 1890, the following letter was presented :

"The committees formed for the purpose of raising a fund to procure the most advanced medical education for women, can now place at your disposal the sum of one hundred thousand dollars for the use of your medical school, if you will, by resolution, agree that women whose previous training has been equivalent to your preliminary medical course, shall be admitted to the school, when it shall open, upon the same terms which may be prescribed for men. There can be no doubt that women ought to be trained to act as nurses for sick women. There is as little doubt that a sufficient number of women ought to be educated and trained in such manner as to be fully able to care for sick women who may wish or ought to be treated by women. We have devoted ourselves to the furtherance of this object. We have reason to hope that a university which proposes to found a medical school intended to teach advanced methods in the treatment of those diseases which afflict mankind, will not refuse to women the opportunity of learning such methods. There is now a general interest in our movement. In order that this interest may be sustained we ask you to consider our offer at the earliest possible period.

NANCY MORRIS DAVIS,  
*Chairman of the Baltimore Committee."*

The following minute was adopted by the Board :—

"The President and Board of Trustees of the Johns Hopkins University have received from Mrs. Nancy Morris Davis, chairman of one of the committees formed for the purpose of raising a fund to procure the most advanced medical education for women, the gratifying intelligence that one hundred thousand dollars has been raised for the use of their intended medical school, and is at their disposal if they will, by resolution, agree to the terms upon which the money was contributed by its donors. These terms are that this board, if it accepts the fund thus raised, shall agree, by resolution, that when its medical school shall be opened, women whose previous training has been equivalent to the preliminary medical course prescribed for men, shall be admitted to such school upon the same terms as may be prescribed for men: The offer to this university of the particular fund is the free, voluntary act of women residing in this State and in other States, made without the suggestion or solicitation of this board, and we accept it under and subject to the terms which are made a part of the gift, with the

understanding and declaration, however, that such preliminary training in all its parts shall be obtained in some other institution of learning devoted in whole or in part to the education of women, or by private tuition.

"The fund so contributed shall be invested, and known as the 'Women's Medical School Fund'; and that fund and all interest to accrue thereon, and all additions made thereto for the same purpose, shall remain invested for the purposes of increase only, until, with its aid as a foundation, a general fund has been accumulated amounting to not less than five hundred thousand dollars, and sufficient for the establishment and maintenance of a medical school worthy of the reputation of this university, and fully sufficient as a means of complete medical instruction. Then, and not until then, will a medical school be opened by this university; and then, and not until then, will the gift now offered be used by this university; and then, and not until then, will the terms attached thereto be operative.

"The utility of a training school for women nurses has been demonstrated by the experience and practice of the Johns Hopkins Hospital and by the necessities of home life among our people. This board is satisfied that in hospital practice among women, in penal institutions in which women are prisoners, in charitable institutions in which women are cared for, and in private life when women are to be attended, there is a need and place for learned and capable women physicians, and that it is the business and duty of this board, when it is supplied with the necessary means for opening its proposed medical school, to make provision for the training and full qualification of such women for the abundant work which awaits them in these wide fields of usefulness. Nothing contained in this minute shall be construed as abridging, in any manner, the right of the board of trustees of the Johns Hopkins University to make such rules and regulations as they may deem necessary for the government of its school of medicine when it is organized; and in making such rules and regulations the terms of this minute shall always be respected and observed."

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# REPORTS ON THE INSTRUCTION IN THE CHIEF BRANCHES OF STUDY.

Prepared by the Principal Instructors in the several departments.

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## Mathematics and Astronomy.

### I.—ASTRONOMY.

Professor Newcomb lectured four times weekly through the year in Astronomy and examined and directed the work of the students in Astronomy. The principal work of the year was in Practical and Theoretical Astronomy, in which Mr. C. A. Borst, Assistant in Astronomy, gave the instruction in the practical use of the instruments, especially the equatorial, the meridian circle, the sextant, and the theodolite. The operations of adjusting the instruments and collimators and determining time, right ascensions, and declinations have all been practised by such of the students as desired to become proficient in instrumental astronomy. Observations were made by Mr. Borst on Comet *d*, 1889, and published in the *Astronomical Journal*.

Professor Newcomb's lectures on the subject covered most of the ground in Chauvenet's *Practical Astronomy*, Vol. I, with amplifications where necessary. The subjects of precession, nutation, aberration, and the reduction of places of the fixed stars were treated very fully, most of the students being guided through an exhaustive investigation of the subject from first principles.

Another course was given during the first half-year in the General Theory of Measuring Instruments. This course covered substantially the same ground as that given two years before on the same subject. Especial attention was devoted to the determination of errors of division, flexure, etc., the general theory of the objective including spherical and chromatic aberration, the transit instrument, clock, chronometer, spirit-level, and micrometer.

During the second half-year, a seminary course, including readings from some leading authors, was given in the History of Astronomy. This included a rapid review of the epoch-making works of the great astronomers of the past, and of the ideas which guided astronomical research at different times. As books of reference use was made of Grant's History of Physical Astronomy and Miss Clerke's History of Astronomy during the Nineteenth Century.

Besides the comet observations above mentioned, Mr. C. L. Poor made and published in the *Astronomical Journal* a careful investigation of the working and use of the reflecting zenith tube of the Royal Observatory, Greenwich, pointing out certain deficiencies in the principles on which it was used.

## II.—GRADUATE COURSES IN MATHEMATICS.

Dr. Craig gave the following courses:

**Theory of Functions.** *Three times weekly, first half-year.* This course followed mainly Hermite's *Cours professé à la Sorbonne*, introducing matter from Briot and Bouquet's *Théorie des Fonctions Elliptiques* and from memoirs by Weierstrass, Poincaré, Picard, and others. In addition to the regular course in Theory of Functions, there was given a special course of about a dozen lectures in the Theory of Series. These were given from the lecturer's notes.

**Elliptic Functions.** *Twice weekly, through the year.* The first half of this course dealt with the old theory of the elliptic functions and integrals, and was given from the lecturer's notes. The second half dealt exclusively with the modern theory of these functions as developed by Weierstrass, and was based upon Volume I of Halphen's *Traité des Fonctions Elliptiques*.

**Mechanics and Hydrodynamics.** *Twice weekly, through the year.* The course in hydrodynamics was based upon Lamb's *Treatise on the Motion of Fluids* and Basset's *Hydrodynamics*, and the course in mechanics was made up from Jacobi's *Vorlesungen über Dynamik*, Appell's *Cours de Mécanique Rationnelle*, Mathieu's *Dynamique Analytique*, and a memoir by Darboux.

**Linear Differential Equations.** *Three times weekly, second half-year.* The basis of this course was Vol. I of Craig's *Treatise on Linear Differential Equations* and memoirs by Halphen and Floquet.

**Integral Calculus, including Differential Equations.** *Three times weekly, first half-year.* This course is designed particularly for those students of physics whose previous training in the integral calculus has not been sufficient to enable them to take advantageously the advanced courses in physics.

Dr. Franklin gave the following courses:

A course covering consecutively the elements of the following subjects: Modern Algebra, Higher Plane Curves, Finite Differences and Probability. *Daily, first half-year.*

**Theory of Numbers.** *Twice weekly, first half-year.*

**Higher Plane Curves.** *Twice weekly, second half-year.* This course presupposed a knowledge of the subject equivalent to what was given in the course by Dr. Franklin first named above, and was occupied chiefly with cubic curves.

**Modern Algebra.** *Twice weekly, second half-year.* This course assumed an acquaintance with what was given upon the subject in the course by Dr. Franklin first named above. Among the subjects treated were the partition and generating-function method for binary quantics, canonical forms, and the symbolic method in the invariantive theory.

## III.—UNDERGRADUATE COURSES IN MATHEMATICS.

These courses are the same from year to year. During the year 1889-90, they were given as follows:

*First-year Course:*

Analytic Geometry (together with a very brief introduction to the Theory of Equations). *Daily, till Christmas.* Mr. Chapman.

Differential and Integral Calculus. *Daily, from January 1 to end of year.* Dr. Franklin.

*Second-year Course:*

Differential and Integral Calculus (Special Topics). *Twice weekly, till December 1.* Mr. Chapman.

Differential Equations. *Twice weekly, December 1 to end of year.* Dr. Craig.  
Determinants and Theory of Equations. *Three times weekly, till December*

1. Dr. Franklin.

Modern Plane Analytic Geometry. *Three times weekly, December 1 to end of first half-year.* Dr. Franklin.

Solid Analytic Geometry. *Three times weekly, second half-year.* Mr. Chapman.

Classes were conducted by Mr. Passano in:

Trigonometry and Analytic Geometry for Matriculation. *Three times weekly, through the year.*

The Mathematical Society met monthly, and papers were read by a number of present and former members of the University, and a few by gentlemen not connected with the University.

Four numbers, making Vol. XII of the American Journal of Mathematics, have appeared during the year. The subjects treated have been various and important. The number of papers published in the Journal is rather smaller this year than usual, though the volume is larger; this is due to the great length of several most valuable memoirs. The contributors are as follows: From the United States: Cole, Fine, Franklin. From England: Forsyth, MacMahon. From France: Appell, Poincaré. A portrait of M. Poincaré forms a frontispiece to the volume. An Index to the first ten volumes of the Journal has also appeared during the year.

S. NEWCOMB,  
*Professor of Mathematics and Astronomy.*

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## Physics.

During the past year, 1889-90, regular courses of lectures have been given as follows:

By Professor Rowland:

Lectures on Mathematical Physics, taking up Thermodynamics, Heat Conduction, and Physical Optics. *Four and five times weekly, through the year.*

By Dr. Kimball:

A course of experimental lectures in General Physics with recitations.  
*Daily, through the year.*

Lectures on Mechanics, Elementary Thermodynamics, Electricity and Magnetism, Sound, and the Wave Theory of Light. *Daily, through the year.*

The laboratory has been constantly open for the work of both advanced and undergraduate students during the year.

The advanced students have met weekly with the instructors for reading and discussion of the current physical journals.

The Physical Seminary has met weekly under the guidance of Dr. Kimball, and the following topics have been reported on and discussed:

The effect of changes of temperature on the permanent magnetism of iron and steel. Methods and results in the study of specific inductive capacities. Theories of electrolysis. The transfer of energy in the electro-magnetic field. The magnetic properties of iron and steel as studied in cycles. Electro-capillary phenomena and theories. Alternating currents and characteristic curve for dynamos. Electrical theories. Electromotive force of voltaic cells. Discharge through gases. Electromagnetic waves. Formulae relating to arrangement of lines in spectra, and on homologous lines in spectra.

The following researches have been carried on in the Physical Laboratory:

The visible and ultra violet solar spectrum has been compared with the spectra of different metals and the position of the metallic lines marked on the spectrum map with the view to identifying as many as possible of the more important lines of the solar spectrum. In this way the spectra of all known metals, with one or two exceptions, have been photographed and compared with that of the sun and its presence or absence in the sun determined. Silicon has thus been found in the sun for the first time. Many important solar lines have also been found to be due to vanadium and scandium. The presence of silver has also been definitely determined. Photographic studies have also been made of the spectra of various chemical preparations of minerals containing rare earths, with the view of isolating the spectra of the various components. This research is yet very incomplete.

The homologous lines in the spectra of zinc and cadmium have been carefully compared. The so-called "second spectrum of hydrogen" has been photographed in connection with the sun and the wave lengths determined, and the spectrum of nitrogen has been photographed and studied in the same way. The various formulae for the arrangement of lines in band spectra have been tested by means of more accurately determined wave lengths. Investigations have also been made of the effect of heat in modifying the magnetism of iron bars, of the cause of the enormous apparent values of the specific inductive capacity of amyl alcohol and certain other

imperfectly insulating liquids. A large number of diffraction gratings have been ruled on the dividing engines for the use of investigators throughout the world. A series of photographic spectra of the metals from wave length 2,000 to w. l. 6,000 has been obtained, and eye observations made on many of them to the limit of the red rays. These are in conjunction with the solar spectrum, and the original negatives are on about the scale of Angström's map. The negatives are each nineteen inches long. A micrometer has been constructed measuring wave lengths direct to  $\frac{1}{100000}$  part.

During the year there have been eighty-one students in the department, twenty of whom were graduates.

Two students have received the degree of Doctor of Philosophy, Mr. J. S. Ames, who presented as his thesis, some studies on the spectra of gases, and Mr. H. B. Loomis, whose thesis was an investigation of the cause of the variation in the permanent magnetism of soft steel with changes in temperature.

#### ELECTRICAL ENGINEERING.

During the year the following courses have been given :

By Dr. Duncan :

First year's course in Electricity and Magnetism, consisting of lectures on the general theory of the subject. *Three times weekly, through the year.*

Second year's course in Applied Electricity, consisting of lectures on the theory of dynamos and motors, the electrical transmission of energy, secondary batteries, telephone, &c., &c. Laboratory work. *Daily, through the year.*

By Mr. Hasson :

First year's course in Mechanical Engineering, including lectures and recitations on Principles of Mechanics and Applied Mechanics.

Shop work through the year.

By Mr. Aldrich :

Instruction in Mechanical Drawing through the year.

The following investigations have been carried on :

Determination of the efficiency of a 750-light alternating current electric plant of the Westinghouse Company ; the efficiency and life of incandescent lamps ; measurements of the losses in alternating current transformers ; determination of the relation between impressed magnetic force and induction in laminated iron cores for different rates of reversal ; measurement of the relative losses by eddy currents and hysteresis in armature cores.

The electrical testing bureau has standardized a large number of electrical measuring instruments and has tested cables, dynamos, batteries, &c.

HENRY A. ROWLAND,  
*Professor of Physics.*

### Chemistry.

During the past academic year, 1889-90, the work in Chemistry has been carried on essentially in accordance with the announcements. The laboratory has been constantly open for advanced and undergraduate students. Lectures and class-room instruction have been given as follows:

By Professor Remsen:

1. General Chemistry. *Three times weekly, through the year.*
2. Chemistry of the Compounds of Carbon. *Twice weekly, through the year.*
3. Theoretical Chemistry. *Twice weekly, through the year.*
4. Meetings for reading and discussing the current journals of Chemistry. *Twice weekly, through the year.*

By Associate Professor Morse:

1. Supplementary Course in Inorganic Chemistry. *Twice weekly, through the year.*
2. Reviews in Organic Chemistry. *Weekly, through the year.*

By Dr. Renouf:

1. Supplementary Course in Inorganic Chemistry for Graduate Students. *Twice weekly, through the year.*
2. Reviews in General Chemistry. *Twice weekly, through the year.*

The entire number of students who have followed the courses in chemistry during the year is one hundred and thirty-seven. Of these, thirty-eight were graduates following chemistry as their principal subject for the degree of Doctor of Philosophy; eight were graduates following chemistry as a subordinate subject; the rest were undergraduates or special students. The numbers attending the various classes included in the above list were:

Course.	Instructors.	No. Students.
General Chemistry, - - - -	Dr. Remsen,	- 83
Chemistry of the Compounds of Carbon,	Dr. Remsen,	- 56
Theoretical Chemistry, - - - -	Dr. Remsen,	- 34
Supplementary Course in Inorganic Chemistry, - - - -	Dr. Morse, -	- 28
Reviews in Organic Chemistry, - -	Dr. Morse, -	- 36
Supplementary Course in Inorganic Chemistry for Graduate Students, - -	Dr. Renouf,	- 16
Reviews in General Chemistry, - -	Dr. Renouf,	- 59

The average attendance at the Journal Meetings was twenty.

Besides the above, fifteen historical lectures were given by the most advanced students on topics selected and assigned by the Director. The lecturers and their subjects were as follows:

Mr. R. J. J. DeRoode on the substituted phosphines.

Mr. G. M. Richardson on the work of Liebig and Wöhler upon benzoyl compounds.

Mr. W. W. Randall on the work of Graham upon phosphoric acids.

Mr. H. C. Jones on dissociation.

Mr. C. H. Herty on naphthalene.

Mr. W. V. Metcalf on the discovery of the substituted amines.

Mr. J. H. Holmes on the proofs of the equivalency of the hydrogen atoms of benzene.

Mr. C. C. Blackshear on the controversy between Meyer and Ladenburg, concerning the valency of nitrogen.

Mr. C. E. Coates, Jr. on thiophene and its derivatives.

Mr. C. E. Saunders, on the structure of uric acid.

Mr. J. M. Rich on pyrazol and its derivatives.

Mr. L. L. Van Slyke on indigo.

Mr. E. T. Allen on the constitution of dextrose and levulose.

Mr. J. White, Jr. on furfural and its derivatives.

Mr. W. Jones on the constitution of the sulphonic acids.

Seven candidates presented themselves for the degree of Doctor of Philosophy. They were Messrs. C. C. Blackshear, R. J. J. DeRoode, C. H. Herty, J. H. Holmes, W. V. Metcalf, W. W. Randall, and G. M. Richardson. Their dissertations are entitled: "Dioxy-benzoyl-benzene-sulphonic acid and sulphon-fluoresceïn," "Some halogen substitution products of benzoic sulphinide," "The double halides of lead and the alkalies," "Paraxylene-disulphonic acid and some of its derivatives," "On the reaction of certain alcohols with para-diazo-metatoluene-sulphonic acid," "Ortho-sulpho-paratoluic acid and some of its derivatives," "Stannous double halide salts, with a few notes upon the cuprous double halide salts."

These will be printed in separate form as dissertations, and the essential parts will soon be published in the American Chemical Journal.

Other investigations have been carried on as follows:

"On the dissociation of the compounds of cadmium in presence of the metal," "Dissociation of cadmium sulphide," "The double halides of manganese." The results will soon be published.

The Trustees have appropriated a sufficient sum for the purpose of converting Hopkins Hall into a Chemical Lecture-room, and of fitting up additional rooms in the laboratory building for the accommodation of students. This work will be finished before the beginning of the next academic year, and it will then be possible to provide for at least two hundred students in chemistry.

IRA REMSEN,  
*Professor of Chemistry.*

### Geology and Mineralogy.

The work in Geology and Mineralogy has been carried on during the last academic year, 1889-90, as heretofore, in the brick building, No. 610 N. Howard Street, and on the upper floor of the Chemical Laboratory. The steady growth of these departments, as regards both the number of students and the size of their collections, has rendered the pressing need of more adequate accommodations very apparent. The recent alterations in the Chemical Laboratory have necessitated the removal of the mineral cabinet, and, as a result of this the building, No. 602 N. Howard Street, has been set apart by the trustees for work in mineralogy and petrography under Dr. Williams, while No. 610 N. Howard Street will in future be devoted to stratigraphical geology, paleontology, and physical geography in charge of Dr. Clark. Both of these buildings will be suitably fitted up, and it is hoped that these less crowded quarters may greatly increase the efficiency of the work in Geology and allied branches during the coming year.

During the past year regular courses of instruction have been given as follows:

(a) General Mineralogy, embracing crystallography, physical and descriptive mineralogy, by Dr. Williams. *Three lectures, one review, and one afternoon of practical work each week, throughout the year.*

(b) Dynamical Geology and Elementary Petrography, by Dr. Williams. *Three times weekly, till Christmas.*

(c) Stratigraphical Geology and Elementary Paleontology, by Dr. Clark. *Three lectures and one afternoon of laboratory work, weekly from Christmas until Easter.*

(d) Geology of Maryland, by Dr. Williams. *Three lectures weekly with field excursions, from Easter till the end of the session.*

(e) Physical Geography, by Dr. Clark, to undergraduates. (P. II. E. Course). *Once weekly, after Christmas.*

(f) Climate, a course of six lectures on, delivered in February, by Professor William M. Davis, of Harvard University.

*Original Work.* Geological work has been actively carried on both in the field and in the laboratory. A large proportion of the work has had as its object the deciphering of the geological structure of the State of Maryland.

Within the year the new topographical map of the environs of Baltimore has been engraved by the U. S. Geological Survey, and the geological work upon this sheet has been completed by Dr. Williams and Mr. N. H. Darton, of the U. S. Geological Survey. Since the completion of the Baltimore map Dr. Williams has been engaged in the study of the region about Washington, as well as in mapping other portions of the crystalline formations east of Frederick.

Dr. Clark has made frequent excursions into Southern Maryland for the purpose of carrying on investigations upon the Tertiary deposits of that

portion of the State. At the close of the last academic year he made an extended trip into the Tertiary area of the Carolinas and Georgia for the U. S. Geological Survey, and during the summer visited the Tertiary formations of the Rocky Mountain region under the same auspices. At Easter time an excursion of ten days was made under the direction of Dr. Clark, assisted by Mr. Darton, of the U. S. Geological Survey, into Southern Maryland and Virginia, the privileges of which were accepted by members of other institutions than our own.

A study of the eruptive granites of Maryland has been commenced by Mr. C. R. Keyes, who has also succeeded in making the important discovery of Trenton-Chazy fossils in the limestones of the Frederick Valley.

During five weeks in May and June Messrs. Bibbins and McCallie made extensive collections of Tertiary fossils in Southern Virginia for the University under special arrangements made by the Trustees.

Investigations carried on in the geological laboratory have embraced a study of many minerals, new to the State, including chrome-tourmaline, fuchsite, otrelite, scapolite, white augite, cerussite, anglesite, and sulphur. Papers have also been published on celestite from West Virginia, on hornblende from Northern New York, on the serpentine of Syracuse, N. Y., on the collection of Norwegian rocks, and on the eruptive pyroxenites of Maryland. Several students have investigated the crystallography and optical properties of new compounds made in the chemical laboratory, and a considerable collection of rocks gathered by the Canadian Geological Survey from the Sudbury mining district, north of Lake Huron, has been petrographically examined.

During the year Dr. Clark has continued the preparation of a report upon the Eocene formation of the United States, and also a review of the Mesozoic Echinodermata of North America.

*Collections.* On account of lack of funds no material additions have been made within the past year to the mineral collection. Some material of interest has, however, been collected, and received in exchange.

The petrographical collections have been steadily growing, and have received a very valuable addition through Mrs. H. Carvill Lewis, who has deposited with the University the scientific library, apparatus, and rock collections, which belonged to her husband, the late Professor Lewis. It is the intention of Mrs. Lewis to arrange suitable quarters for these collections in the petrographical laboratory as a permanent memorial to her husband.

Considerable additions have been made to the paleontological museum during the year. Professor O. C. Marsh, of Yale University, and Mr. Joseph Wilcox, of Philadelphia, have presented valuable collections, and Dr. Clark has personally, and with the aid of Messrs. Bibbins and McCallie, collected largely from the Tertiary deposits of Maryland and Virginia.

For the work in Physical Geography important acquisitions have been received. Messrs. E. H. Butler & Co., of Philadelphia, have loaned indefi-

nately to the University a series of plaster of Paris models of the continents, valued at \$2,000; and a series of relief maps and models, prepared by Professors Shaler and Davis, of Harvard University, has also been obtained.

GEORGE H. WILLIAMS,  
*Associate Professor of Inorganic Geology.*

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### Biology.

At the beginning of the session, a considerable rearrangement of duties between the instructors became necessary. During the summer vacation, Dr. W. H. Howell, Associate Professor of Physiology, was elected to a chair in the University of Michigan, and just as the session opened, death deprived us of the services of Mr. G. N. Moore, who had in the preceding June been appointed senior assistant in physiology. To meet these circumstances and give all the courses announced on the programme for the session, required an immediate reorganization of the staff.

Dr. E. A. Andrews, who, for some years, had been Instructor, was promoted to the position of Associate, and given chief direction of the minor course in Biology. Professor Martin delivered the lectures on Histology and Physiology in the major course, and Dr. A. C. Wightman supervised the regular undergraduate laboratory work in those subjects. Mr. E. C. Applegarth and Mr. G. P. Dreyer, Fellows in Biology, assumed at considerable personal sacrifice the duties which had been assigned to Mr. Moore, and have earned my hearty thanks.

The laboratory was open regularly to graduate and undergraduate students, and courses of lectures were delivered as stated below.

1. General Biology. *Thrice weekly, from the commencement of the session until April.* Twelve introductory and two concluding lectures by Professor Martin. Dr. Andrews delivered the other lectures in the course and had general control of the work of students taking it.

2. Osteology, Human and Comparative. Dr. W. K. Brooks. *Twice weekly, from early in November until the spring recess.*

3. Elements of Embryology. Dr. Andrews. *Thrice weekly, from the spring recess until the close of the session.*

4. Elements of Systematic and Structural Botany. Dr. Andrews. *Twice weekly, from the spring recess until the close of the session.*

The four lecture courses above described, with accompanying laboratory work during at least five hours each week, constituted the undergraduate minor course in Biology.

5. Mammalian Anatomy. Dr. Andrews. *Twelve lectures, and dissection of a dog.*

6. Animal Physiology and Histology. Professor Martin. *Thrice weekly, from early in November until the close of the session.*

7. Elements of Zoology. Dr. Brooks. *Twice weekly, from early in November until the end of the session.*

Courses 5, 6 and 7, with at least five hours' laboratory work each week constituted the major undergraduate course in Biology.

8. Professor Martin lectured once a week to advanced students in physiology. The subjects considered were physiological optics and the chemistry of nutrition.

9. Dr. Brooks conducted the Morphological Seminary, and gave a course of weekly lectures and readings on problems in heredity.

10. Special lectures for advanced students were delivered by members of the biological department as indicated below:

Dr. G. M. Sternberg, U. S. A.: Three lectures on methods of bacteriological research.

Mr. Dreyer: One lecture on the influence of bleeding and starvation on the albumens of the blood.

Mr. Applegarth: One lecture on the latent time of the "kneejerk."

Dr. Brooks: One lecture on recent researches concerning the development of the star-fish.

Mr. Watase: One lecture on the eyes of arthropods and echinoderms.

Mr. Fernald: One lecture on rectal glands of insects.

Mr. Bigelow: One lecture; notes on the physiology of physalia.

Mr. Morgan: The early stages of pycnogonids.

Dr. Brooks: On the relative variability of the skulls of men and women in the Challenger collections.

Mr. A. Cary: One lecture on the influence of sex on hereditary deafness, as shown at Chilmark, Mass.

Dr. Andrews: One lecture on the anatomy of phascolosema Gouldii.

Mr. Field: One lecture on the researches of Romanes on the echinoderms.

Dr. Brooks: Two lectures on the metamorphosis of alpheus.

11. At the request of Professor Griffin, Professor Martin, with the aid of Dr. Wightman, Mr. Dreyer, and Mr. Applegarth, gave to the graduating class twelve demonstrations illustrating the anatomy and physiology of nerve and muscle and of the sense organs. Attendance on these demonstrations was voluntary, but the majority of the class followed them.

From the interest the students took in this work it seems desirable that a demonstrator in experimental psychology should be appointed and a definite course of instruction organized for next session.

During the session, researches were made on the following subjects, and many of them have been already published:

The rate of transmission of nerve impulses in the motor nerves of the dog; the influence upon the heart and circulation of the so-called "differential respiration," the latent period of the knee-jerk phenomenon; karyokinesis and the segmentation of the ovum; structure, development and origin of eyes; embryology of cephalopods; the structure of physalia; the sense-organs of disco-meduse; the structure of cucinaria; the anatomy

and histology of gephyrea; the nephridia of amphibia; the development, of pycnogonids; the germ layers of amphibia; the reproduction of bryophyllum; the gonophores of siphonophora; the origin of the water system of echinoderms; the life-history of cestodes and nematodes; the medusæ collected by the Albatross; the budding of salpa; the development and metamorphosis of decapods; the embryology and histology of insects.

Number five of volume four of the "Studies from the Biological Laboratory" was issued in November, 1889. It contains:

I. Some observations on the Effect of Light on the Production of Carbon-dioxide Gas by Frogs. By H. Newell Martin and Julius Friedenwald.

II. On the Comparative Physiological Effects of Certain Members of the Ethylic Alcohol Series ( $\text{CH}_4\text{O}$  to  $\text{C}_6\text{H}_{12}\text{O}$ ) on the Isolated Mammalian Heart. By J. C. Hemmeter.

III. On the Ventricular Epithelium of the Frog's Brain. By A. C. Wightman. With one plate.

IV. On the Temperature Limits of the Vitality of the Mammalian Heart. By H. Newell Martin and E. C. Applegarth. With three plates.

Number six, issued in February, 1890, contains:

I. On the Morphology of the Compound Eyes of Arthropods. By S. Watase. With two plates.

II. On the Anatomy and Histology of *Cymbuliopsis Calceola*. By J. I. Peck. With two plates.

III. On the Amphibian Blastopore. By T. H. Morgan. With three plates.

IV. On a New Actinia, *Hoplophoria Corrallogens*. By Henry V. Wilson. With one plate.

Number seven is now in press.

The table in the U. S. Fish Commission Laboratory at Wood's Holl, for which the University subscribes, was occupied last summer by Mr. Bigelow; he will be succeeded this summer by Mr. Conklin, another graduate student of the University.

The Bruce Fellowship, held this year by Mr. Watase, has been awarded for the coming year to Mr. T. H. Morgan.

H. NEWELL MARTIN,  
*Professor of Biology.*

## Greek.

Under the direction of Professor Gildersleeve the advanced students have been organized into a Greek Seminary. According to the plan of the seminary the work of the year is concentrated on some leading author or some special department of literature. During the past year the centre of work was Plato.

In the seminary proper, which met twice a week during the academic year, portions of the Euthydemus, Phaidros, Gorgias, and Theaitetos were interpreted by the members of the seminary in turn, and introductions to these and other dialogues were read and discussed. Among the papers

bearing on Platonic themes may be mentioned: an examination of the Menexenos in the light of recent discussions; the test of language as applied to the Platonic canon; the myth in Plato; the dramatic and mimetic features of the Gorgias. Studies in the orators begun last year were continued into this: the phraseology of Isaios; the *Ἀόγος ἐπιτάφιος* in Greek literature; the characters in Lysias. Pausanias and Apollonios of Rhodes engaged the attention of two of the more advanced students.

With especial reference to the work of the seminary, the Director lectured once a week, during the term, on Plato with illustrative readings and analyses, and gave a course on the literature of pre-Platonic philosophy, based on the documents in Ritter and Preller, once a week from the beginning of January to the end of the session. The strictly philosophic side of the subject was treated in the course of Dr. Lefevre mentioned elsewhere.

Professor Gildersleeve also gave a course of lectures on Homer once a week from the beginning of January, and during the first quarter conducted twenty exercises in translating Greek into English and English into Greek at dictation.

Dr. W. M. Arnolt conducted a course in New Testament Greek through the year.

Dr. Spieker conducted the following undergraduate courses:

Xenophon, *Memorabilia*. *Three times weekly, first half-year.*

Aischylos, *Seven against Thebes*, and Sophokles, *Electra*. *Three times weekly, second half-year.*

Xenophon, *Oikonomikos*. *Four times weekly, first half-year.*

Homer, *Odyssey*, books i, ix, xi, and Euripides, *Hippolytos*. *Four times weekly, second half-year.*

Greek Literature. *Weekly, through the year.*

Reading at sight. *Weekly, through the year.*

Classes in Prose Composition, meeting weekly, were conducted in connection with each of the courses above named.

Students have read privately for examination the following books:

Herodotos, book ix. (5).

Aristophanes, *Clouds*. (8).

Demosthenes, *Olynthiacs*. (9).

Plato, *Apology*. (9).

Plutarch, *Nikias*. (5).

Lysias, *Epitaphios*. (5).

B. L. GILDERSLEEVE,  
*Professor of Greek.*

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### Latin.

The Latin Seminary, under the direction of Dr. Warren, met twice weekly through the year. The Roman satirists formed the centre of work, particular attention being paid to Lucilius and Horace in the first half of the year, and to Juvenal in the latter half. Select satires of Horace and Juvenal were interpreted by the members of the seminary in turn, and papers were prepared by several of the members embodying the results of special investigations. Among the subjects thus treated were: A comparison of the language of Terence with that of Horace in his *Sermones*; the etymologies and glosses found in the Commentary of Servius on Vergil's *Aeneid*; the adverbs of Horace compared with the adverbs of Juvenal; the new and rare words found in the scholia to Persius; Ovid's employment of elision and hiatus in all the poems except the *Metamorphoses*; the use of chiasmus in Caesar, Sallust, Tacitus, and Justinus; Servius' treatment of tropes and figures in Vergil; on the so-called *Sulpiciae Satira*.

In connection with the work of the seminary, Dr. Warren lectured once a week in the first half-year on Roman satire, and in the second half-year on Latin palaeography, large use being made of fac-similes of manuscripts for practice in reading.

A Journal Club, organized early in the year, met once a week to report on recent publications in the field of Latin.

In the latter half of the year all the satires of Persius were read in weekly meetings by a class of graduates under the direction of Dr. Warren.

In the Undergraduate Department Dr. K. W. Smith conducted the following courses:

Livy, books xxiii and xxiv. *Four times weekly, first half-year.*

Horace, *Select Odes, Satires, and Epistles.* *Four times weekly, second half-year.*

Terence, *Andria; Plautus, Menaechmi.* *Three times weekly, first half-year.*

Selections from Catullus and Lucretius. *Three times weekly, second half-year.*

Reading at sight. *Weekly, through the year.*

Classes in Prose Composition, meeting weekly, were conducted in connection with each of the courses above named.

Mr. C. H. Haskins conducted a course in

Tacitus. *Four times weekly, second half-year.*

Students have read privately for examination the following books:

Cicero, *Pro Roscio Amerino.* (7).

Caesar, *Bellum Civile*, book i. (7).

Horace, *Epodes.* (7).

Ovid, *Fasti*, books i and ii. (7).

Terence, *Hautontimorumenos*. (11).

Plautus, *Mostellaria*. (11).

Pliny, *Select Letters*. (11).

MINTON WARREN,

*Associate Professor of Latin.*

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### Semitic Languages.

Sixteen courses in the various branches of Semitic studies have been given during the past year. The work centred in Assyriology, especially in the Assyrian-English Lexicon, begun during the session 1888-89. The collection and arrangement of materials was continued and a considerable portion of the manuscript prepared.

The Assyrian Seminary, consisting of three advanced Assyriologists and four hearers, met, under the direction of Professor Haupt, six hours weekly during the first half-year, reading the bilingual texts in Vol. IV of Sir Henry Rawlinson's *Cuneiform Inscriptions of Western Asia*, and the great vocabularies K 40 and K 4378, as well as the cosmogonical texts in Delitzsch's *Assyrische Lesestücke*. During the second half-year one hour was devoted to the study of the Babylonian Nimrod Epic in Haupt's edition and three hours to the reading of the fourth volume of Rawlinson's work, of which there were read and indexed about fifty folio plates.

Dr. Adler met the advanced students in Assyrian, two hours weekly through the year, interpreting selected texts in Delitzsch's *Lesestücke* and Grammar, as well as the Assyrian versions of the Sumeru-Akkadian hymns and incantations in Haupt's cuneiform texts. During the first half-year Dr. Johnston, Fellow in Semitic, conducted a beginners' course in Assyrian, explaining the elements of the grammar and the great syllabary in Haupt's cuneiform texts; this class was continued during the second half-year by Dr. Adler. During the first half-year Dr. Adler gave a course of lectures on Cuneiform Inscriptions and the Old Testament.

To the study of the Old Testament there were devoted six hours weekly through the year. Professor Haupt gave a critical interpretation of the first five chapters of the book of Qoheleth. Dr. Adler conducted weekly exercises in reading selected texts at sight, besides instructing a beginners' class in the elements of Hebrew grammar, combined with readings from the Pentateuch. During the second half-year this class was under the charge of Dr. Johnston.

Post-Biblical Hebrew was studied by some advanced students, under the guidance of Dr. Adler, the Talmudic tract *Aboda Zara*, or *Idolatry*, serving as a basis. He also conducted a class on Biblical antiquities, under seminary organization. In connection with this course Mr. A. J. Leon delivered six lectures on manners and customs of the modern East. Mr. Leon also met

a class in Arabic conversation and reading at sight selected texts in the *Beirût Chrestomathy*, *Majant-el-adab*. An advanced course in classical Arabic was given by Professor Haupt through the year. Extracts from the *Travels of Ibn Batutah* were read during the first half-year, and during the second half-year selected paragraphs from Arabic geographers. Professor Haupt also conducted a series of exercises in Arabic composition.

Dr. Adler conducted a class in Ethiopic two hours weekly through the year, interpreting portions of the chrestomathy in Praetorius's Grammar and the first half of the Book of Baruch in Dillmann's Chrestomathy.

In Syriac Professor Haupt met a class weekly through the year, explaining selected portions of Roediger's Chrestomathy.

Altogether twenty hours of instruction were given weekly during the first half-year and twenty-one hours during the second half-year. The various courses were attended by thirty-five students, twelve of whom were undergraduates. One student, the Rev. A. H. Huizinga, who held a Fellowship in Semitic during the sessions 1884-5 and 1885-6, received the degree of Ph. D., having presented as his thesis a valuable investigation on Analogy in the Semitic languages, which will be printed in a forthcoming number of the *American Journal of Philology*.

Dr. Arnolt delivered a lecture before the German Branch of the Y. M. C. A. on Excavations in Assyria and Babylonia, on February 14th. Dr. Johnston addressed the University Branch of the Y. M. C. A. on the Bible and Cuneiform Research, on May 11th.

The following papers were presented before the Johns Hopkins Philological Association:

W. M. Arnolt: Semitic loan-words in Greek.

I. Casanowicz: The Fragments of Berosus with reference to parallel passages in the Bible and the cuneiform inscriptions.

C. Johnston, Jr.: The Esarhaddon oracles.

A. J. Leon (Ibn Abi Suleiman): The study of classical Arabic among the modern Arabs. (*Abstract in Univ'y Circulars*, No. 77, Dec., 1889.)

Before the American Oriental Society:

C. Adler: The Shofar. Its use and origin. (*Proc. Amer. Orient. Soc.*, Oct., 1889; *Abstract in University Circulars*, No. 77, Dec., 1889).

— Assyriology in Japan. (*Ibid.*)

W. M. Arnolt: Review of Vol. II of Schrader's Cuneiform Library.

The first part of the *Contributions to Assyriology*, published with the co-operation of the Johns Hopkins University, a volume of 368 pages, appeared at the beginning of the session. It contains papers by Delitzsch, Praetorius, Nestle, Steindorff, Flemming and Jeremias, and eight contributions by Professor Haupt, viz.:

On the nominal prefix *na* in Assyrian.

The twelfth tablet of the Babylonian Nimrod Epic.

A new collation of the Izdubar legends.

On Assyrian nouns.

On the Semitic sounds and their transliteration.

On the semi-vowels *u* and *i*.

Additions and corrections.

List of abbreviations, etc.

A portrait of the decipherer of cuneiform writing, G. F. Grotefend, forms the frontispiece to the volume. The second part, which will appear before the beginning of the next session, is in progress.

PAUL HAUPT,  
*Professor of the Semitic Languages.*

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### Sanskrit and Comparative Philology.

During the session of 1889-90 the Seminary in Vedic Sanskrit was engaged in the study of the Rig-Veda. This is the oldest and most important literary document of India. The student of Sanskrit is sooner or later led to a close and prolonged study of this Veda. It is absolutely fundamental for every branch of Indian antiquities, and perhaps still more important is the special relation of this collection to the antiquities and the oldest religious forms of the related peoples. The Veda has furnished from the start the key to the oldest documents of the Persian peoples. The Achemenidan cuneiform inscriptions—and through them all languages in wedge-form character—were deciphered by the aid of Sanskrit. The Zend-Avesta, the collection of the sacred writings of the Zoroastrians, depends largely for its exegesis upon the Veda; entire passages of one are convertible into the language of the other if certain regular phonetic changes are observed. Scarcely less important has been the influence of the study of the Rig-Veda on our knowledge of the languages, antiquities, and mythologies of the classical peoples. Almost every prominent divinity of the classical pantheon has been discovered in the Rig-Veda, frequently in more primitive form and with clearer features. In every case the comparison of Indian and classical views has been instructive, and has at least put an end to much profitless speculation.

The course was a two-fold one. First, a set of representative hymns of the Rig-Veda were read critically, with a view simply to obtain as clear an insight as possible into their meaning through independent exegesis. The second part of the work aimed to introduce the student into the native treatment of the Rig-Veda. Use was made of Śāyanas commentary and the numerous exegetical and critical helps which the Hindus themselves have constructed about the Rig-Veda. The parallel readings from the other Vedic saṁhitās, the Pada-pāṭha, the Anukramaṇī and Yāskas Nirukta were brought to bear upon the study of the hymns.

The natural supplement to the higher study of the Rig-Veda is the study of the Avesta. Systematic instruction in Zend, or Old Baktrian, was given for the first time at this University during the past year. The Avesta is to Persia what the Veda is to India. The close relation of the two collections has been briefly touched upon above. The study of the Avesta in any other way than through the channel of the Veda is a well-nigh futile undertaking. Without the aid of the Vedic language the difficult phonetic system and the decayed inflections of the Avesta are nearly unintelligible. Professor Geldner's superb edition of the text, a large part of which is in our hands, offered for the first time in many years a sound textual basis for this study. Selected portions of the text were read and analyzed with constant reference to the kindred languages.

The main work in classical Sanskrit was devoted to the study of the *Hitopadeṣa* and the law-book of Manu. The elementary courses in Sanskrit and Vedic were conducted by Mr. E. W. Fay, Fellow in Sanskrit. His instructions comprised: An introduction to the language of the Vedas, a course of easy Sanskrit readings, and practical exercises in Sanskrit grammar and prose-writing.

In Comparative Philology the work was two-fold. First, a course in the general principles of linguistic science, together with an exposition and criticism of modern methods in scientific grammar. Secondly, an elementary course in the comparative grammar of Greek and Latin. The special subject under treatment this year was the history of the consonants. The corresponding work last session was devoted to the vocalism of the classical languages. During the session of 1890-91 the subject treated will be Greek and Latin inflections. Opportunity is thus offered to the students of classical languages to become acquainted with the modern historical and comparative treatment of the sounds and inflections of these languages, in addition to the elaborate studies in syntax which are carried on in the Greek and Latin seminaries.

MAURICE BLOOMFIELD,

*Associate Professor of Sanskrit and Comparative Philology.*

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## German.

During the session 1889-90, the work has been carried forward in accordance with the announcements.

1. The Teutonic Seminary has been under the direction of Dr. Wood.

During the first half-year, Old High German language and literature were studied four hours weekly. The philological part was based chiefly upon Braune's Grammar and Reader. The following texts from the Reader were interpreted and critically examined: The Alemannic Glosses, the Benedictine Rule, Isidor, Tatian, Hildebrand's Lied, Otfried, and Notker. Of

these, Tatian and Notker received the greatest share of attention. For the literature of Old High German, Piper's *Aelteste deutsche Literatur*, Wackernagel's *Literaturgeschichte I*, and Müllenhoff and Scherer's *Denkmäler* were used as a basis. Eight lectures on literature at the court of Charles the Great were given by the director, and essays on special topics were presented from time to time by the members.

During the second half-year, the Nibelungen Lied and the Poems of Walther von der Vogelweide were each studied two hours weekly. In the Nibelungen Lied, texts A, B, and C were read and compared in detail. Each member undertook the study of some one portion of the critical literature on the poem, from the philological and metrical points of view, and reported his results to the seminary, where the different theories were then compared and discussed. The theories of Müllenhoff, Golther, and Symons, as to the origin and localization of the Sagas of Siegfried and Brunhilde, received special attention.

The Poems of Walther von der Vogelweide were read in Wilmann's second edition, with a critical comparison of the work of other editors. Particular attention was paid to the interpretation, and to the question of an appropriate English vocabulary and suitable phrasing in translations from the poet. On the metrical side, the dactylic strophes and the iambic verse of ten syllables received special study, and the relation of the earliest artistic minnesong to Provençal forms was discussed, with particular reference to the theories of Zarncke, Bartsch, and Weissenfels. The construction of the lyric strophe in Middle High German received considerable attention. Parallel to the study of Walther's poetics, the attempt was made to trace the poet's own literary development in his works. The different theories were gone through with in detail, and a number of brief studies on special points of the subject were contributed by the members.

The second section of the seminary has met fortnightly through the year in an evening session. In addition to written reports on the current journals, the following original papers were read and discussed: Word order in the Gothic Bible. The relation of Hebel's *Alemannische Gedichte* to the dialect of Hausen in Baden, (by Mr. C. F. Brédé, a former member of the seminary, who spent part of the summer of 1889 in the neighborhood of Hausen in order to study the dialect). Longfellow's translations of German poems. Arminius in German literature. The theory of the identification of Arminius and Siegfried. Ernst von Wildenbruch's dramatic style. The connection between the Richard III of Christian Felix Weissé and Shakespeare's Richard III. Popular elements in the poems of the minnesinger Bertold Steinmar von Klingnau. Goethe's use of the hexameter.

Dr. Wood gave the following courses:

2. The study of Gothic, twice weekly through the year; a further development of the subject as pursued in previous years. Braune's *Grammatik*, Douse's *Introduction to the Gothic of Ulfilas*, and Heyne's *Ulfilas* were made the basis of the work, as before, but a greater share of attention was given to the elements of comparative German grammar. Kluge's

chapters on the *Urgeschichte der altgerm. Dialekte* (in Paul's *Grundriss*) were used, and the subject of noun suffixes in Germanics was studied in Brugmann's *Grundriss*. Extensive use was made of Noreen's *Utkast till Föreläsningar i Urgermansk Judlära*. The study of Germanic etymology, from the point of view of Gothic, received special attention.

A weekly meeting of the members of the Teutonic Seminary, and of the class in Gothic, was devoted to a review of the work of each week in Gothic and the elements of comparative German grammar. This class was conducted by Mr. B. J. Vos, Fellow in German.

### 3. Readings in German Literature (16th to 18th century).

The course began with four lectures by the instructor on the "kanzleisprachen" and their influence on Luther's language and style. Luther's *An den Christlichen Adel* was read, and the differences in language—particularly in phonology—and style, between this and the reformer's later work, were pointed out in detail. Five *Fastnachtspiele* of Hans Sachs were then read; after which the period of Opitz was taken up. With Zinkgref's *Auserlesene Gedichte deutscher Poeten* as a basis, the changes in matter and style introduced by Opitz were considered. The remainder of the time was devoted to a study of Goethe's lyrical poetry before the *Journey to Italy*. The attempt was made to point out the nature, and importance for German literature, of every clearly marked change in Goethe's style in each of the periods treated.

### 4. Undergraduate courses in German.

In the major course the history of German literature was studied weekly, through the year, with Kluge's *Deutsche Nationalliteratur* as a basis, and with occasional lectures. A class in prose composition was conducted weekly, during the first half-year. The first part of Goethe's *Faust* was read twice weekly, during the first half-year. About one-third of the second part was read by the class as private reading.

In the minor course, Schiller's and Goethe's *Briefwechsel* was read weekly, through the year. The instruction was mostly confined to those portions of the correspondence in which is discussed the genesis of works which the class had read or was then reading. The lyrical productions of either poet which are the subject of criticism, were read by the class. As the course was partly an experiment, it may be mentioned that, with one or two exceptions, the members of the class showed themselves entirely able to appreciate the matter of the correspondence, and, in a satisfactory degree, its tone and style. The weekly exercises in prose composition, were conducted, with the assistance of Dr. Learned, through the year.

Dr. Learned gave the following courses:

5. The Beginnings of Middle High German Literature. Lectures. *Weekly, first half-year*. The period covered in the lectures extended from 1100 to the beginnings of the classical period, 1180.

6. German Life in the Old High German Period. Lectures. *Weekly, second half-year*.

7. Middle High German. Paul's *Grammatik* and Weinhold's *Lesebuch* were studied, after which the whole of Hartmann von Aue's *Gregorius* (ed. Paul) was read. *Weekly, through the year.*

8. Undergraduate courses in German.

Goethe's *Hermann und Dorothea*, Schiller's *Wallenstein's Lager*, and Freytag's *Aus dem Mittelalter* (70 pp.) were read in the major course, three times weekly, first half-year, and weekly, second half-year. Buchheim's *Prose Composition* (50 pp.) and Wilmann's *Deutsche Grammatik*, second part, were studied in weekly meetings. The class read the remaining parts of the Wallenstein trilogy (*Piccolomini, Wallenstein's Tod*) as private reading.

In the minor course, Goethe's *Egmont*, Schiller's *Wilhelm Tell*, Heine's *Harzreise* (half), Freytag's *Aus dem Jahrhundert der Reformation* (60 pp.) were read four times weekly, and the Second Series of Exercises in Whitney's *Grammar* were translated into German. The class read the following works of Schiller, as private reading: *Des Grafen Lamoral Egmont Leben und Tod; Die Jungfrau von Orleans.*

9. Two classes, of graduate students, in Historical and Scientific German, each meeting three times fortnightly, read Riehl's *Burg Neideck*, Virchow's *Die Urbevölkerung Europas*, Freytag's *Aus dem Staate Friedrichs des Grossen*, Storm's *Auf der Universität*, Helmholtz's *Ueber Goethe's naturwissenschaftliche Arbeiten*, Humboldt's *Ansichten der Natur.*

Dr. F. M. Warren conducted the

10. Undergraduate Minor Course B, meeting five hours weekly, through the year. In this class Otis' *Elementary German* was studied. The Exercises in Whitney's *Grammar First Series*, and *Second Series* themes 1-9, were translated into German, and the following works were read: Buchheim's *Reader*, Part II, pp. 1-88; Schiller's *Wilhelm Tell*, lines 1-2675; Goethe's *Egmont*, Acts I and II.

11. Lectures on Germany (geography, history, and the history of culture). A course of twenty lectures, open to members of the undergraduate classes in German, and to graduates in any department of study, was given by Dr. Wood and Dr. Learned. The number of students attending the lectures averaged twenty-five. The object of the course was, in the first instance, to supply elementary information about Germany, where experience has shown that American students most need it. This practical consideration alone dictated the choice of subjects. While strictly methodical treatment was nowhere aimed at, the attempt was made to embody in popular form the results of authoritative sources and studies, in a series of progressive geographical and historical sketches. Those topics most nearly connected with the history of the German language and literature and with the history of German culture, were treated with greater fullness, and recent special studies were largely made use of, where they could be made available for familiar lectures.

The following is a list of the lectures in the order given: 1. General physical features; "Hochland und Tiefland;" rivers. 2, 3. The geograph-

ical and historical relation to Germany of German lands not politically connected with the Empire: Upper and Lower Austria, Bohemia, Transylvania, Styria, Tyrol, Switzerland. 4, 5. German non-political divisions: Franconia, Swabia, the Rhenish Palatinate. 6, 7. Districts originally Slavic, Wendish, etc., and their colonization by Germans: the Altmark, Brandenburg, Posen, the Baltic Provinces. 8. The Rhine. 9. The Teutonic knights. 10. The Hansa. 11. Nuremberg. 12. Frankfort on the Main; Heidelberg. 13. Leipzig; Weimar. 14. Germany in the crusades. 15. The Reformation in Germany. 16. The thirty years' war. 17. Poetry of the "spiellente;" the 'volkslied.' 18. The early German heroic cycles. 19. The development of the New High German language through the "kanzleisprache," and by Luther. 20. Modern novelistic representations of the German Past.

Lectures 1, 2, 3, 6, 7, 9, 11, 13, 15, 17, 19, 20 were given by Dr. Wood; lectures 4, 5, 8, 10, 12, 14, 16, 18 by Dr. Learned.

HENRY WOOD,  
*Associate Professor of German.*

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## English.

### ADVANCED COURSES.

During the past academic year twenty-seven graduate students have followed advanced courses in English; twelve of these, electing English as their principal subject, have constituted the English Seminary. The work of the Seminary has been a study of the Old-English (Anglo-Saxon) poetic literature. The primary end in view has been a determination of the conditions under which this literature was produced, and of canons for its just estimation. The method of study has, accordingly, been inductive, fresh and independent knowledge of facts preceding generalization. The subject was approached through an inquiry into the causes which, in the sixteenth century, first directed the attention of scholars to Old English writers. This led to a general survey of ecclesiastical England before the Norman conquest. The more exact study of the entire period was then begun by an investigation of the period preceding the conversion of the English to Christianity. All the literature containing heathen elements, or reminiscences of continental life, was minutely explored. After this the Cædmon and Cynewulf cycles, the lesser lyric and didactic poems, the epic cycles, and the metres of Boethius were in turn investigated. Almost the entire collection of the poetic texts was read, and the theories relating to authorship and interpretation reviewed and tested.

In the second division of the Seminary, the journal meeting, papers on the following subjects were presented and discussed: The career of Samuel Daniel (Ross); the preterite present verb *mag* (Freeman); the weak

preterite in the Germanic languages (Harrison); the Anglo-Saxon byrnie and helmet (Reeves); the amulet in the saga of Weland (Freeman); *Moder of God: Chaucer vs. Occleve* (Ross); Browning's obscurity (Bright and Moffett); *A Blot in the 'Scutcheon* (Ross); literature of the old South (Smith); a letter of Emerson (Mather); song collections of the sixteenth century (Smith); Shakespeare's *Hamlet*, and Thomas Kyd (Epes); the use of "*Journey*," "*Voyage*," and "*Travel*" (Mather); the legend of Pyramus and Thisbe (Moffett); West-Germanic versification (Harrison); James Sheridan Knowles' *William Tell* (Ross); the sources of Ben Jonson's *Volpone* (Belden); the order of words in Anglo-Saxon prose (Smith).

As an adjunct to the work of the seminary, the *Béowulf* and the *Finn'sburg Fragment* were read with a class which met twice a week during the first half-year, and once a week during the second half-year. In connection with these texts a special study was made of the theories of epic composition, and lectures were given on Old English versification, and on the interpretation and criticism of the poems.

Lectures (once a week) on historical English grammar extended through the year. In the first half-year the Indo-European and the Germanic relations of Old English were treated; in the second half-year an exposition of Old English phonology was given. Weekly lectures were also given in the second half-year on topics in the history of English syntax.

#### UNDERGRADUATE COURSES.

The English major class met Dr. Bright twice weekly for the first half-year for the study of Middle English, and twice weekly for the second half-year for the study of Chaucer; the text-books used being Morris and Skeat's *Specimens*, and Skeat's edition of Chaucer's *Legend of Good Women*.

The class also met Dr. Browne once a week for the study of the Early Scottish Poets. The course comprised lectures on the rise and development of the Early Scottish Literature, with readings by the class of selections from the original texts in a chrestomathy prepared especially for their use.

The minor class studied, with Dr. Browne, the literature of the Elizabethan period twice weekly for the first half-year, and that of the fourteenth century twice weekly for the second half-year. A course of lectures and readings on the origin and transformations of English comedy was given once weekly throughout the year. This class also studied Anglo-Saxon twice weekly throughout the year with Dr. Bright, using Sweet's Reader and Siever's Grammar as text-books.

The students of the P. H. E. course (required of all undergraduates) met Dr. Browne twice weekly for a synoptical study of English Literature from the earliest period to the beginning of the present century.

JAMES W. BRIGHT,  
*Associate in English.*

WM. HAND BROWNE,  
*Associate in English.*

### Romance Languages.

The Romance Seminary met under the direction of Dr. Elliott. *Two hours a week, through the year.*

The work centred here on the *Reimpredigt*: "Grant mal fist Adam," Vol. I, of the *Bibliotheca Normannica*. An introduction was first given on the phonetic and morphological characteristics of the Anglo-Norman as contrasted with the Franco-Norman dialect. The three manuscripts used by Suchier were taken as the basis for text criticism, and these were supplemented by the material collected by Bokemüller in his *Zur Lautkritik der Reimpredigt*. On the linguistic side, the extensive apparatus existing separately or in scientific journals on special points of Anglo-Norman and Franco-Norman speech, was used to throw light on the phonology, morphology, syntax, and verse-forms of the manuscripts from which the newly-constituted text had been constructed.

In addition to this course, followed only by the most advanced students, there was held, once a fortnight, a meeting of two hours in which all special students of this department took part. The exercises consisted in the reading of original papers bearing upon linguistic and literary subjects, of extracts of important articles in Romance journals, of general reports on the journals themselves, of reports on recent publications received, and on any correspondence of a professional nature that might be suggested. By this means, students in the early part of their university studies have the benefit of direct and active association with their more experienced co-workers in the field.

#### Introduction to Old French Philology. *Weekly.*

This course, intended for first-year students, regularly follows the series of lectures on Modern French phonetics given below. A few pages of *Aucassin et Nicolette* (Suchier's edition) were critically examined with special reference to the phonology and morphology of the language. For the former, the constant application of the principles of French phonology was required; while, for the latter, the student was thoroughly drilled in the grammar of the Old French as compared with the Latin on the one hand, and with the Modern French on the other. The leading characteristic forms of the dialect represented were contrasted with corresponding ones in the Isle-de-France species. During the past year this course was continued, one hour a week, for second-year students. The exercises were of a pro-seminary character, particular attention being given to points of grammar and language for which time was wanting in the regular seminary work.

#### Introduction to Italian Philology. *Weekly.*

As a continuation of last year's course a few pages of Boccaccio's *Decameron* were critically examined. For reference, the part for Italian in Gröber's *Grundriss der romanischen Philologie* was constantly used. Attention being given wholly to the philology of the language, this course

corresponds, for Italian, to the work done in Old French philology as based on *Aucassin et Nicolette*. The student was made acquainted with the present state of linguistic investigation in this branch of the Romance idioms; his special attention was directed to the scientific application of characteristic phonetic laws in the development of grammar forms, and he was thus brought face to face with many of the difficult problems of Italian morphology and phonology. The determination of vowel-quality also formed an important factor in this work.

Reading of Old French Texts. *Weekly.*

This course was intended for first-year students, the object being to make the student acquainted, as soon as possible, with characteristic specimens of the earlier literature of the language, and to give him a ready working knowledge in the origins. For this purpose, Clédât's *Morceaux choisis des auteurs français du moyen âge* was used as a text-book, of which 380 pages were read.

Lectures: (a) Modern French Phonetics. *Weekly.*

This course in practical phonetics was intended for first-year students who desired to become specialists in Romance languages, and for those who made French a subsidiary subject for the doctor's degree. An introduction was given on the physiology of the speech organs and on the general laws of acoustics as applied to stringed and tongued instruments. After this, experimental work was entered upon in order to note the special physiological and acoustic features of French sounds, and to discriminate between them and the corresponding English sounds where differences exist.

(b) On the Langue d'Oïl Dialects. The system followed was to give a few lectures on the general characteristics and geographical distribution of the dialects, calling attention to the phonetic and morphological characteristics of each idiom to be examined, and as soon as a given dialect was thus represented, texts were translated and their peculiarities pointed out by the student. The work was confined during the past year to the Burgundian dialect. Twenty specimens were critically examined in the Fertault collection of seventeenth century *noëls* entitled, *Noël Borguignon de Gui-Barbais* (Bernard de la Monnoye). After an introduction on this species of literature, the phonetic and morphological characteristics of the language were carefully collected, each student paying attention to a given definite line of phenomena, which were then contrasted with the linguistic phenomena of other allied dialects.

(c) The Italian Dialects. *Weekly.*

This course was confined to the Tuscan system and was intended to supplement the lectures of the previous year on the Gallo-Italic group of North Italy. A general introduction was given on the popular literature of Tuscany in its relation to the classic literature, the grouping and distribution of the dialect varieties, after which the following works were examined: For West Tuscan (Pistoiese), *Saggio di uno studio sopra i parlari vernacoli della Toscana*, by Gherardo Nerucci; Central Tuscan (Fiorentino), *La Tancia*,

by Michelagnolo Buonarroti; South Tuscan (Sienese), *L'Assetta*, by Francesco Mariani. The same method of collecting material was pursued here as for the Burgundian, special attention being paid to the geographic limitations of dialect phenomena.

The study of Palæography, in the form of lectures and practical exercises conducted by Dr. Todd, was pursued during the first half-year by second and third-year graduate students. After a general introduction to the subject, including special attention to bibliography and numerous collections of fac-similes, the earliest monuments of the French language, as represented in the *Album* of the *Société des anciens textes français*, were critically studied on the palæographical side. Work was continued in Monaci's *Facsimili*. Attention was constantly directed to the practical bearings of the subject on points of textual criticism and the constitution of texts.

The study of Old Provençal was begun in the second half-year, under Dr. Todd, with the study of prose selections from Bartsch's *Chrestomathie*, and continued with more critical work on the *Boethius* fragment.

The class in Italian (three hours weekly) began with a rapid survey of the grammar in the *Italian Principia*, after which reading was at once begun, with a review drill in the paradigms and exercises extending through the year. Numerous short selections from leading authors and the whole of Goldoni's *Innamorati* were read in the first half-year. The remainder of the course was devoted (1) to Dante's *Inferno*, of which twenty cantos were studied, especial attention being paid to the broader conception and structure of the poem, as underlying the obvious narrative of the text; (2) to an introduction to the lyric poetry of Petrarca in its various forms; and (3) to an outline sketch of Italian literature as given in Sonzogno's *Letteratura Italiana*.

A similar course was pursued in Spanish two hours weekly, which was begun with Knapp's *Grammar*, and the reading of the comedy *El Barometro* and complete selections from Knapp's *Reader*. Special interest in the study of *Don Quijote* led to the concentration of the work on that masterpiece during the second half-year.

The French major (second year's) course was conducted by Dr. Todd four hours and Dr. F. M. Warren one hour. Two hours weekly were allotted to the study of Victor Hugo, the work centering in *Notre-Dame de Paris*. Attention was given chiefly to the chapters devoted to mediæval life, art and culture, and the time of instruction was occupied almost exclusively with the discussion of assigned portions of the text and with the explanation of difficulties. In the second half-year various selections from Hugo's poetical works were taken up, with an excursus among the other writers of the romantic school, as given by Crane in his *Romantisme français*. Systematic exercise in the careful rendering of French into English was afforded by a study of Molière extending through the year. The plays studied and crit-

ically rendered were *Les Précieuses ridicules*, *Le Misanthrope* and *Le Bourgeois gentilhomme*. A characteristic feature of the second year's work was a practical course devoted exclusively to the mastery of French idioms, the text-book used as a basis being Part II of Chardenal's Advanced Course. Toward the end of the year the time was given up to the reading and criticism of original essays presented by the students.

Lectures have been given on :

Italian literature from Tasso to the present day.

Provençal literature of the middle ages.

Spanish literature to Lope de Vega.

Portuguese literature in outline.

French literature of the XIV-XV centuries:

In the French minor (first year's) course, the class read two hundred pages of scientific prose; Lamartine's *Jeanne d'Arc*; Daudet, *Contes Choisis*; Augier, *Le Gendre de M. Poirier*; Sand, *La Mare au Diable*; Balzac, *Eugénie Grandet*, twenty-two chapters; Hugo, *Hernani*.

In Prose Composition the exercises in Whitney's *Grammar*, Part II, have been written. Talks on the literature of the nineteenth century have been given during the last half-year.

A. M. ELLIOTT,

*Associate Professor of the Romance Languages.*

## History and Politics.

Regular courses of instruction have been given in this department to one hundred and forty students, of whom fifty-six were graduates and eighty-four undergraduates. Forty-three of the latter took courses in Group VI (History and Politics). Thirty-six graduates pursued history or political science as their principal subject, with a view to obtaining the doctor's degree. Seven have chosen a course in this department for one of their two subsidiary studies.

In addition to the regular work of the various instructors, namely, Messrs. Adams, Ely, Emmott, Smith, Haskins, and Vincent, special courses of lectures have been given by three graduates of this University. Professor Woodrow Wilson, Ph. D., professor-elect of jurisprudence and political economy in Princeton College, gave a course of twenty-five lectures on the science of administration, and Dr. Albert Shaw, editor of the *Minneapolis Tribune*, who has recently spent a year in foreign travel and political study, gave a course of eight lectures on European cities. One of these lectures, on the city government of Glasgow, was printed in the *Century Magazine* for March, 1890. Another, on London polytechnics and peoples' palaces, is the leading article in the same magazine for June, 1890. The entire

course will ultimately be published. Dr. Walter B. Scaife, a Bachelor of Arts of this University, who received the degree of Doctor of Philosophy in the University of Vienna, gave a course of six lectures on American historical geography. In preparing this course, Dr. Scaife gave particular attention to the historical maps preserved in the Library of the State Department in Washington and to the geographical work of the U. S. Government.

Valuable single lectures have also been given by Dr. William T. Harris, Commissioner of Education, on the possibilities of universities, and by Professor Otis T. Mason on the history of the Smithsonian Institution and the National Museum. A company of graduate students subsequently visited these two institutions and the Government Printing Office, and were kindly received by the Curators of the Museum, Professor Thomas Wilson, Mr. A. Howard Clark, and Professor Mason, who explained the various collections, the modes of Museum administration, and of literary exchange through the Smithsonian Institution. Dr. J. G. Bourinot, clerk of the Canadian House of Commons, gave a lecture on Canada and the United States, a study in comparative politics. General Bradley T. Johnson, in an interesting paper, suggested a comparison between the Confederate Constitution of 1861 and the Constitution of the United States. Carl Lumholz, a graduate of the University of Christiania, gave the students an interesting talk concerning his travels in Australia and his residence among the cannibals. M. Rousiers, who had come to this country to study American social science and to prepare a book for Messrs. Firmin Didot & Co., gave some account of the methods of travel and observation instituted by Le Play.

Dr. Herbert B. Adams has directed:

1. The Seminary of History and Politics.

This co-operative society, embracing four instructors and thirty-seven graduate students, has continued its weekly sessions of two hours on Friday evenings throughout the year. Among the original papers read and discussed were: law and history, by Dr. W. B. Scaife, published in the Notes to the University Studies, November, 1889; the development of international law as to newly discovered territory, by Dr. Scaife, published in the Proceedings of the American Historical Association, Vol. iv; the responsibilities of citizenship, also by Dr. Scaife; chapters in the history of the supreme court, by W. W. Willoughby; a history of Liberia, by J. H. T. McPherson; progress of the colored people of Maryland since the war, by Dr. J. R. Brackett, published in the University Studies, July-September, 1890; the Yazoo land companies, by Charles H. Haskins; history of the public lands and agrarian laws of the Roman republic, by Andrew Stephenson; the constitutional development of Japan from 1853-1881, by T. Iyenaga; the survival of the Roanoke colony, by S. B. Weeks (who by invitation read this paper before the Maryland Historical Society); histories of higher education in Rhode Island, Connecticut, and Ohio, by W. H. Tolman, B. C. Steiner, and J. R. Commons respectively, to be published

by the United States Bureau of Education; history of early presbyterianism in Maryland, by J. William McIlvain, published in *Notes to the University Studies*, June, 1890. Besides the discussion of these original papers, members of the seminary have systematically reviewed recent contributions to historical and political science, and have supplied valuable materials for co-operative reports regarding the progress of American historical literature, (see *Revue Historique* for May and June, 1890, pp. 124-154, and *Jahresbericht der Geschichtswissenschaft*, 1888.)

Dr. Adams has given the following courses of instruction by lectures:

#### 2. Germanic History.

This course, two hours a week during the first half-year, to thirty-nine graduates, related to the Aryan migrations, Germanic settlements, conflicts with Rome, the establishment of Germanic states upon Roman territory, the history of various Germanic peoples with special reference to the Goths, Vandals, Lombards, Alamanni, Franks, Saxons, Frisians, etc.

#### 3. American History.

This course of three hours a week during the second half-year was given to a class of thirty-two graduate and eighteen undergraduate students. The instructor gave a course of introductory lectures on colonial history, followed by a written examination. The revolutionary and constitutional periods were studied systematically according to a syllabus of topics posted from week to week. Prescribed authorities, such as Johnston's *History and Constitution of the United States*, Johnston's *American Politics*, and Willoughby's *Notes on Administration* were used by the class. Oral examinations were conducted from time to time by the two Fellows, McPherson and Woodburn, and the two Scholars, Willoughby and Steiner. Single lectures were given, for the combined purpose of class instruction and the pedagogical training of graduates, by the following students: church and state in New England, Paul E. Lauer; colonial germs of federal government in America, W. C. Webster; influence of Maryland on the spirit of independence, J. W. Black; Maryland's influence upon confederation and union, W. I. Hull; the ordinance of 1787, J. A. Woodburn; early amendments to the constitution, C. H. Haskins; the Virginian and Kentucky resolutions, J. A. Woodburn; the war of 1812, B. C. Steiner.

#### 4. Undergraduate Courses in History.

Dr. Adams gave fifteen lectures introductory to ancient history to a class of forty-seven students in their first year's course. He conducted a class of thirty students, including sixteen graduates, in church history and the Renaissance, two hours a week throughout the year; and a class of thirty-one students, including thirteen graduates, in international law and diplomatic history, two hours a week throughout the year.

Mr. Emmott has given the following courses of lectures:

#### 1. History and Development of the Common and Statute Law of England.

The lectures on this subject were given to sixteen graduate and advanced students and traced the outlines of the history of the laws of England, with

special reference to those which related to real property, and set forth their leading principles, showing how those laws were until recently administered by distinct tribunals, the Courts of Common Law and the Court of Chancery, and pointing out the limits of their respective jurisdictions. The effects of the Teutonic settlement in England, and of the laws and customs of the Anglo-Saxons relating to property, together with an account of the judicial institutions of the Anglo-Saxons and of Anglo-Saxon vassalage were fully considered. He then treated of the sources of the feudal system, of the origin of feudal vassalage, and of the effects of the Norman conquest upon the pre-existing laws and institutions of England, as well as of the origin, sources and leading principles of the common law of England. Commencing with Magna Charta, the rise and subsequent development of the statute law of England, with special reference to that relating to real property, was carefully traced down to the present time, special attention being paid to the legislation of Edward I, and the rise, progress, and final establishment of the equitable jurisdiction of the Court of Chancery were indicated. In the latter part of the course the following topics were also treated at length: the development and completion of the common law; Littleton's work on tenures; origin and early history of uses or equitable interests in land; the statute of uses (27 Henry VIII, c. 10), and its principal effects on modern conveyancing; history of the law relating to wills of land; abolition of military tenures; the statute of distribution; the various titles or modes of acquisition of rights over things real. The work was treated throughout from the comparative standpoint. In connection with the lectures frequent oral and two written examinations took place upon the various topics treated by the lecturer.

## 2. English Public Law and Constitutional History.

This course, of three hours a week during the first half-year, was given to a class of nine graduate and nineteen undergraduate students. The origin and development of the English constitution and of the fundamental principles of English constitutional law were carefully and systematically traced in chronological order from the earliest period down to the present time. Taswell-Langmead's *English Constitutional History* was taken as containing an outline sketch of the ground covered, with frequent references to the standard works of Freeman, Stubbs, Hallam, Erskine, May, Dicey, Anson, Hearn, Bagehot, Traill, Spencer Walpole and other writers. The instruction was given by means of lectures delivered by the instructor, by frequent recitations, and by lectures given by the students themselves on such topics as the following: the political and constitutional effects of the Norman conquest; the immediate and remote effects of Magna Charta; the political relations of monarch and parliament from 1603 to 1642; the constitutional significance and political consequences of the revolution of 1688; the struggles of whigs and tories in the eighteenth century; the origin, development, pre-requisites and peculiar form of cabinet government in England; the reform bills of 1832, 1867, and 1884.

Dr. Richard T. Ely gave the following instruction in Political Economy:

1. Lectures to Graduates.

This course on Money and Banking was given two hours a week to twenty-three advanced students. These lectures included the treatment of recent controversies and the actual monetary situation in the principal industrial nations of the world. Examinations were held on assigned collateral reading, and occasional class lectures were given.

2. Economic Conferences.

These were held one evening in the week at Dr. Ely's house and were limited to eight graduate students. The work of the year comprised a critical study of the writings of Ricardo. The principal topics with which Ricardo deals, rent, wages, profit, value, were assigned to various members of the conference and were discussed in detail. Special attention was given to the subject of value and students were addressed on this topic by Professor Patten of the University of Pennsylvania, who presented the theories of the new Austrian school of political economy.

3. Undergraduate Instruction.

The usual class course was given five hours a week to thirty students. The course included a thorough treatment of fundamental principles, with their applications to economic questions of the day. Three objects were kept in view in this class work: 1. The mastery of general principles; 2. A comparative study of the opinions of various economists; 3. Training in theoretical and practical economics by means of student essays.

Mr. J. M. Vincent, librarian of the department, gave a course of six lectures on Books, Libraries, and Literary Methods. The history of books was traced through the periods of stone, clay, papyrus, parchment, and paper, down to the invention of printing, showing that in every age the character of the materials for writing and the ease with which books could be transcribed and disseminated, indicated the degree of civilization. Attention was then turned to the literary side of book production. The lecturer showed how material should be gathered, and how books and libraries could be best used. He gave some suggestions on note taking, the work of composition, and literary hygiene.

Dr. Albert Shaw gave a course of eight lectures upon European Municipalities. The opening lecture was introductory and described the rise of the modern industrial population centres of Europe, and the transition from the mediæval forms of town life to the new forms. The development of British municipalities was traced, and the city of Glasgow was described in detail as a type of the great industrial centres of the British Islands, comparisons also being made with Birmingham, Manchester and other English towns. London was the subject of a separate lecture. Paris and French municipal institutions; the recent progress of Italian cities; Berlin and the German municipalities, Vienna and Budapest, were treated in successive lectures. The course was based upon recent studies of municipal history, organization and functions, in all the principal European cities, and gave prominence to the social and sanitary aspects of modern municipal life.

Dr. Woodrow Wilson gave twenty-five lectures on Administration. The course consisted of two distinct parts. About one half of the lectures concerned the history, principles, and organization of cities, particularly the rise, functions, and organization of modern industrial cities. The method of presentation in this part of the course was largely descriptive and comparative of American with foreign systems of municipal government; but the purpose of both description and comparison was the elucidation of the administrative character of city government, and the discovery of the best division of functions in municipal administration. The second part of the course was devoted to a discussion of the distinction between law and ordinance, with a view to discerning the true line of division between administration and the other activities of government. It included a sketch of the history of theory in these lines, a discussion of budget legislation as a test of theory, and a general statement of conclusions. The course ended with a brief discussion of administrative courts and administrative justice.

HERBERT B. ADAMS,  
*Associate Professor of History.*

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### Logic.

The daily work of the undergraduate courses has been conducted as follows:

Both Deductive and Inductive Logic were taught two hours weekly for about twenty-seven weeks. Special reference was made to Jevons's *Elementary Lessons in Logic* and Fowler's *Elements of Inductive Logic*, with frequent references to the works of Mill, Bain, Venn, Keynes and other writers. Particular attention was given to the general theories of both deduction and induction, to the various forms of thought, notion, judgment, and reasoning; and also to the various methods of scientific investigation and proof.

Numerous exercises were given in the opposition and conversion of propositions, in indication and counter indication, in the application of the rules of the syllogism, in the detection of fallacies, and in the elimination of contradictions from thought. Forty-eight students attended the class, which was taught by short informal lectures, by frequent recitations, and by reports from some of the more advanced students on assigned topics.

GEORGE H. EMMOTT,  
*Associate Professor of Logic.*

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## Philosophy.

The undergraduate courses in Psychology and Ethics have been under my care. Three hours a week were given to the first named subject from the beginning of the year until March 7th; thereafter I met the class for the study of ethics, the number of hours per week being increased, after April 15th, to five. It has been my endeavor to keep particularly in view the needs of those to whom these subjects are new, and to make the treatment as simple and untechnical as possible, and at the same time I have sought to call attention to fundamental problems, so that the work may serve as an introduction to general philosophical study. A text-book has been used in each subject—Baldwin's *Handbook of Psychology*, and Fowler's *Principles of Morals*, Part II,—as affording definite material of acquisition; but informal lectures, discussions in the class, and passages from various authors specially assigned for reading, have been largely relied upon in the presentation. Each member of the class has been required to prepare three essays in the course of the year. The class has numbered forty-seven members.

The instruction in Psychology has attempted to give a general view of the results of the more recent methods of study. A series of lectures and demonstrations on the anatomy and physiology of the muscular and nervous systems, given by Professor Martin as a voluntary course, was attended by most of the class. Especial emphasis was laid upon the facts of conscious experience as known through introspection, the most important end to be secured being, it is believed, such an understanding of the facts and laws of mental life as shall fit one for wise self-government and effective influence. Such powers and states of mind as attention, memory, association, habit, imagination, the feelings, the will, were discussed in as concrete and practical a way as possible.

The work in Ethics was mainly confined to the theoretical and historical aspects of the subject; questions of applied ethics were, for lack of time, but slightly considered. The various forms of feeling native to our constitution and constituting the possible motives of conduct; the conditions and nature of the sense of obligation; the authority of conscience; the diversities of moral sentiment; the historic theories of morals—hedonism, utilitarianism, intuitionism; the application to ethical theory of the doctrine of evolution; the characteristic features of Christian morality: these were some of the topics discussed. While a more detailed application of the principles reached to personal and social conduct would have been desirable, the consideration of the speculative side of ethics is, as it seems to me, particularly adapted to produce a habit of moral thoughtfulness.

A brief outline of the History of Philosophy was given during the last weeks of the year, for the benefit of those who were able, at so disadvantageous a time, to attend the lectures. I hope to make hereafter more convenient provision for such a general historical survey as may be properly made a part of the undergraduate instruction.

I have conducted during the year a course in the History of Philosophy, for graduate students, consisting of the reading and discussion of representative works in modern philosophy from Descartes to Kant. The works read were as follows: Bacon's *Novum Organum*, book I and a part of book II; Descartes' *Method and Meditations*; certain portions of Spinoza's *Ethics*; Locke's *Essay on Human Understanding*, portions of books I, II, IV; Berkeley's *Principles of Human Knowledge*; Hume's *Treatise on Human Nature*, book I; a portion of Kant's *Critique of Pure Reason*. Ten students attended the course, and the class met once a week for discussion and criticism.

EDWARD H. GRIFFIN,  
*Professor of the History of Philosophy.*

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### Pathology.

The instruction in the Pathological Laboratory during the past year has been under the direction of Dr. W. H. Welch, Professor of Pathology, assisted by Dr. W. T. Councilman, Associate Professor of Anatomy and Associate in Pathology, and by Dr. A. C. Abbott, Assistant in Bacteriology and Hygiene. The fellowship in pathology has been held by Dr. A. G. Elachstein. Throughout the academic year practical courses have been conducted in Bacteriology and in Pathological Histology, combined with Demonstrations in Pathological Anatomy. Instruction has been given also in the methods of making autopsies.

In connection with the courses of medical instruction given in the Johns Hopkins Hospital during the months of January and February, weekly lectures were delivered by Dr. Welch on the Pathology of Diseases of the Heart and Blood Vessels, and by Dr. Councilman on the Pathology of Inflammation. The courses in pathological histology have been attended by twenty students, eight of whom are physicians; those in bacteriology, by six physicians. Sixteen of those who have taken these courses have been students in the biological laboratory. Satisfactory preliminary training in normal histology is required for those who are admitted to the courses in the pathological laboratory. Seventeen physicians have been engaged in special work in the laboratory.

By the opening of the Hospital the work of the laboratory has been amplified. One hundred autopsies have been made during the year. A large number of pathological specimens have been examined, often for the purpose of diagnosis. Ample material is thus afforded for studies in pathological anatomy. Fifteen young physicians serving as internes in the Hospital or on the dispensary staff have either taken practical courses in the laboratory or been engaged in special work there. Opportunity is thus afforded to those who enjoy the clinical privileges of the Hospital and the dispensary to supplement their clinical work by pathological study in their

special departments. Several interesting researches in pathology and in bacteriology have been made and will appear in the Reports of the Johns Hopkins Hospital. A large number of instructive specimens have been added to the museum during the year.

During the year a Hygienic Laboratory, under the direction of Dr. J. S. Billings and of Dr. A. C. Abbott, has been equipped by the Hospital, and opportunity is thus afforded for practical work in hygiene. Dr. Abbott has undertaken a careful study of various hygienic problems relating to the arrangements of the Hospital and will give the results in the Johns Hopkins Hospital Reports.

WILLIAM H. WELCH,  
*Professor of Pathology.*

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### Drawing.

The work in Mechanical Drawing by the students of electrical engineering has comprised: selected and useful geometric constructions, rolled and other plane curves; the elements of descriptive geometry,—simple and advanced study of projections, sections of solids by planes, intersections of solids, and developments; the technicalities in common use in engineering drawing; working drawings of mechanical elements from dimensioned sketches, from alterations of existing blue prints of typical forms of mechanical and machine details, and from study and original designs of elementary forms and members of machines; sets of working drawings of a Brush dynamo from sketches of existing machine, and diagrammatic representation of the electrical connections and parts from study and analysis of the machine.

Special Instruction has been given in descriptive geometry; advanced freehand drawing, in light and shade from casts; elements of color work, and drawing in water colors from still life and from the living natural forms.

The Undergraduate Course has included: (a) representative or freehand drawing from natural forms and geometric models, in outline and in light and shade, with pencil, pen and ink, charcoal, crayon and stump; besides the finer pen and ink work, each student has made several large charts, finished with crayon or ink-brush, such as he may be called upon to make in teaching or in illustrating lectures: (b) constructive or mechanical drawing, with exercises in the use of drawing instruments, elements of descriptive geometry,—simple projections, sections and developments, isometric projections and the elements of linear perspective.

W. S. ALDRICH,  
*Instructor in Drawing.*

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### Physical Training.

During the first-half year, ten lectures on selected topics in personal hygiene were given by me to undergraduate students of the first year. One hundred and twenty-three students have been examined in the course of the year, and the usual records of physical examinations have been made. The gymnasium has been much used, and but for the mild winter would have been taxed, during the late afternoon hours, to its utmost capacity.

Mr. W. H. Magoun, who, during my leave of absence, had charge of the gymnasium, has acted as my assistant from the beginning of the year. Mr. Magoun gave systematic instruction, with marked success, to classes in Swedish free-standing movements, and also in heavy gymnastics, three times weekly for five months. The gymnastic exhibition, given early in March, under the auspices of the Athletic Association, was excellent, in its way, and was largely attended. Despite the remoteness of the Clifton playground, there has been a marked increase in the interest shown by our students in out-of-door sports, the lacrosse team in particular has done good work. It is to be deplored that the physical training of their pupils is so generally neglected by the schools from which the majority of our undergraduates come. The gymnasium has been considerably improved by the addition of two new shower baths and the removal of all lockers from the bathing room.

The lunch room has been well patronized. The study rooms over Bentley Hall have been regularly used, and the order in them has been good.

EDWARD M. HARTWELL,  
*Associate in Physical Training.*

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## TABULAR STATEMENT OF COURSES OF INSTRUCTION, 1889-90.

INSTRUCTOR.	COURSES.	No. of hours per week.	No. of students, 1st half-year.	No. of students, 2d half-year.
<b>MATHEMATICS AND ASTRONOMY.</b>				
Newcomb.	Spherical and Practical Astronomy.	2	10	9
Newcomb.	History of Astronomy. (Second half-year.)	2		7
Newcomb.	Theory of Measuring Instruments. (First half-year.)	2	7	
Borst.	General Astronomy. (Second half-year.)	1		22
Craig.	Hydrodynamics. (First half-year.)	2	6	
Craig.	Theory of Functions. (First half-year.)	3	4	
Craig.	Elliptic Functions.	2	5	5
Craig.	Integral Calculus and Differential Equations: Advanced. (First half-year.)	3	6	
Craig.	Differential Equations: Major Course. (Second half-year.)	2		10
Craig.	Theory of Series and Linear Differential Equations. (Second half-year.)	3		5
Craig.	Dynamics. (Second half-year.)	2		6
Franklin.	Modern Algebra, Higher Plane Curves, Finite Differences and Probability. (First half-year.)	5	10	
Franklin.	Theory of Numbers. (First half-year.)	2	2	
Franklin.	Determinants, Theory of Equations, Analytic Geometry. (First half-year.)	3	12	
Franklin.	Modern Algebra. (Second half-year.)	2		9
Franklin.	Higher Plane Curves. (Second half-year.)	2		9
Franklin.	Differential and Integral Calculus. (Second half-year.)	5		24
Chapman.	Calculus. (First half-year.)	2	13	
Chapman.	Analytic Geometry. (First half-year.)	5	16	
Chapman.	Solid Analytic Geometry. (Second half-year.)	3		10
Passano.	Analytic Geometry: Elementary. (Second half-year.)	3		15
Passano.	Trigonometry. (First half-year.)	3	8	
<b>PHYSICS.</b>				
Rowland.	Thermodynamics and Heat Conduction. (First half-year.)	5	6	
Rowland.	Heat Conduction and Physical Optics. (Second half-year.)	5		4
Kimball.	Physical Seminary.	1		
Kimball.	General Physics: Major Course.	5	15	15
Kimball.	General Physics: Minor Course.	5	51	52
Duncan.	Applied Electricity. (First Year's Course.)	2	12	12
Duncan.	Applied Electricity. (Second Year's Course.)	2	7	7
Hasson.	Applied Mechanics.	2	6	8
Hasson.	Mechanism. (Second half-year.)	2		7
Rowland, Kimball, Duncan, Hasson, Ames.	Laboratory Work.		74	70

INSTRUCTOR.	COURSES.	No. of hours per week.	No. of students, 1st half-year.	No. of students, 2d half-year.
<b>CHEMISTRY.</b>				
Remsen.	Theoretical Chemistry.	2	34	33
Remsen.	Compounds of Carbon: Major Course.	2	51	49
Remsen.	General Inorganic Chemistry: Minor Course.	3	72	77
Morse.	General Inorganic Chemistry: Major Course.	2	26	27
Morse.	Reviews in the Compounds of Carbon: Major Course.	1	36	32
Renouf.	Reviews in General Chemistry: Minor Course.	2	57	57
Renouf.	Inorganic Chemistry: Advanced.	2	16	14
Renouf, Remsen, Morse, Renouf, Edmond. }	Laboratory Work.		122	125
	Historical Lectures. (Fifteen lectures, by advanced students, second half-year.)			40
	Journal Meetings.	2	20	20
<b>GEOLOGY, MINERALOGY, ETC.</b>				
Williams.	General Mineralogy.	3	25	24
Williams.	Dynamical Geology.	3	17	17
Clark.	Historical Geology and Palaeontology. (Second half-year.)	3		8
Williams.	Petrography: Laboratory Work.		14	12
Clark.	Palaeontology: Laboratory Work.		6	6
Clark.	Physical Geography. (P. H. E.) (Second half-year.)	1		48
<b>BIOLOGY.</b>				
Martin.	Physiology: Advanced Course.	1	14	12
Martin.	Physiological Seminary.	1	8	8
Martin, Andrews. }	General Biology.	3	24	23
Martin.	Animal Physiology and Histology. (Second half-year.)	3		28
Martin.	Embryology of the Chick. (Second half-year.)	3		23
Brooks.	General Zoology.	2	21	23
Brooks.	Morphological Seminary.	1	12	12
Brooks.	Morphological Readings.	1	14	14
Brooks.	Human and Comparative Osteology.	2	22	22
Andrews.	Mammalian Anatomy. (During October.)	5	21	
Andrews.	Systematic Botany. (Second half-year.)	2		22
Martin, Brooks, Andrews, } Wightman. }	Laboratory Work.		56	53
	Biological Journal Club.	1		
<b>PATHOLOGY.</b>				
Weich, Abbott. }	Bacteriology. (Second half-year.)			5
Weich, Councilman. }	Pathological Histology.		7	10
Weich, Councilman, Abbott. }	Special Research.		11	15
<b>GREEK.</b>				
Gildersleeve.	Greek Seminary: Plato.	2	27	24
Gildersleeve.	Lectures on Plato.	1	27	27
Gildersleeve.	Homer: Lectures and Readings. (Second half-year.)	1		27
Gildersleeve.	Greek Philosophy: Lectures. (Second half-year.)	1		25

INSTRUCTOR.	COURSES.	No. of hours per week.	No. of students, 1st half-year.	No. of students, 2d half-year.
Gildersleeve.	Practical Exercises. (First half-year.)	2	26	
Spieker.	Xenophon, Memorabilia. (First half-year.)	3	14	
Spieker.	Xenophon, Oeconomicus. (First half-year.)	4	8	
Spieker.	Homer; Euripides. (Second half-year.)	4		6
Spieker.	Aischylos; Sophokles. (Second half-year.)	3		13
Spieker.	Greek Literature.	1	10	10
Spieker.	Greek at Sight.	1	4	6
Spieker.	Prose Composition. (Two Classes.)	2	23	20
Arnolt.	New Testament Greek.	2	7	7
<b>LATIN.</b>				
Warren, M.	Latin Seminary: Horace and Juvenal.	2	31	24
Warren, M.	Lectures on Roman Satire. (First half-year.)	1	31	
Warren, M.	Journal Meetings.	1	22	13
Warren, M.	Latin Paleography. (Second half-year.)	1		22
Warren, M.	Persius. (Second half-year.)	1		24
Smith, K. W.	Terence; Plautus. (First half-year.)	3	11	
Smith, K. W.	Catullus; Lucretius. (Second half-year.)	3		10
Smith, K. W.	Reading at Sight.	1	11	10
Smith, K. W.	Livy. (First half-year.)	4	24	
Smith, K. W.	Horace. (Second half-year.)	4		11
Smith, K. W.	Prose Composition. (Two Classes.)	2	20	19
Haskins.	Tacitus. (Second half-year.)	4		14
<b>SANSKRIT, ETC.</b>				
Bloomfield.	Vedic Seminary: The Rig-Veda.	1	7	6
Bloomfield.	Advanced Sanskrit. (Manu.) (Second half-year.)	1		6
Bloomfield, } Fay. }	Advanced Sanskrit. (Hitopadeśa and Nala.) (First half-year.)	2	6	
Fay.	Introduction to the Rig-Veda. (Second half-year.)	1		6
Fay.	Elementary Sanskrit.	2	6	6
Bloomfield.	Introduction to Zend.	1	3	2
Bloomfield.	Introduction to the Study of Comparative Philology.	1	13	13
Bloomfield.	Comparative Grammar of Latin and Greek.	1	24	26
<b>SEMITIC LANGUAGES.</b>				
Haupt.	Assyrian Seminary.	5	7	6
Haupt.	Hebrew: Advanced Course.	3	14	17
Haupt.	Syriac.	1	7	6
Haupt.	Arabic: Advanced.	1	8	6
Adler.	Ethiopic.	2	6	4
Adler, } Johnston. }	Assyrian: Elementary.	1	4	4
Adler, } Johnston. }	Hebrew: Elementary.	2	3	6
Adler.	Mishnic Hebrew. (Second half-year.)	1		5
Adler.	Cuneiform Inscriptions and the Old Testament. (First half-year.)	1	22	
Adler.	Assyrian: Advanced.	2	5	4
Adler.	Hebrew at Sight.	1	4	6
Adler.	Biblical Antiquities. (Second half-year.)	1		17
Leon.	Arabic Conversation. (First half-year.)	1	5	
Leon.	Arabic at Sight. (Second half-year.)	1		3
Leou.	Manners and Customs of the Modern East. (Six lectures.) (Second half-year.)	1		13
<b>GERMAN.</b>				
<i>Advanced Work.</i>				
Wood.	Teutonic Seminary. (a) Old and Middle High German.	4	7	10
	(b) Journal Meeting.	1	12	11

## Tabular Statement of Courses.

INSTRUCTOR.	COURSES.	No. of hours per week.	No. of students, 1st half-year.	No. of students, 2d half-year.
Wood.	Gothic.	2	13	8
Wood.	New High German. (16th to 18th Century.)	1	18	14
Learned.	Middle High German Literature. (Lectures.) (First half-year.)	1	10	
Learned.	Middle High German: Elementary.	1	10	13
Learned.	Life in the Old High German Period. (Lectures.) (Second half-year.)	1		6
<i>Major Course.</i>				
Wood.	History of German Literature. (Lectures.)	1	18	15
Wood.	Goethe (Hermann and Dorothea, Faust), Schiller (Wallenstein's Lager.)	2	14	12
Learned.	Selected Prose Readings. (Freytag.)	1	14	12
Wood.	Prose Composition. (Buchheim.)	1	14	12
Learned.				
<i>Minor Course: Class A.</i>				
Wood.	Briefwechsel zwischen Schiller und Goethe.	1	23	25
Learned.	Selected Prose Readings. (Freytag.)	1	27	25
Learned.	Goethe (Egmont), Heine (Harzreise), Schiller (Wilhelm Tell).	2	27	25
Wood.	Prose Composition. (Whitney.)	1	27	25
Learned.				
<i>Minor Course: Class B.</i>				
Warren, F. M.	Otis, Elementary German; Goethe (Egmont). (First half-year.)	5	30	
Warren, F. M.	Buchheim, II; Prose Composition; Schiller (Wilhelm Tell.) (Second half-year.)	5		13
<i>Supplementary Courses.</i>				
Learned.	Scientific Readings. (Helmholtz, Humboldt, Storm.)	2	10	8
Learned.	Historical Readings. (Richl, Freytag, Virchow.)	2	9	4
Wood.	Lectures on Germany. (Geography, History, etc.)	1	55	25
Learned.				
<b>ROMANCE LANGUAGES.</b>				
Elliott.	Advanced Courses. (Romance Seminary, Italian Philology, Italian Dialects.)	8	6	3
Elliott.	Advanced Courses. (French Phonetics, Old French Philology, Langue d'Oïl Dialects, Old French Texts.)	4	13	12
Todd.	Italian and Spanish.	5	11	9
Todd.	French Paleogeography.	1	3	3
Todd.	French: Elementary.	3	29	25
Todd.	French: Major Course.	5	13	12
Warren, F. M.				
Warren, F. M.	Italian and Provençal Literature. (First half-year.)	2	5	
Warren, F. M.	Spanish and Portuguese Literature. (Second half-year.)	2		5
Warren, F. M.	French: Minor Course.	5	44	39
<b>ENGLISH.</b>				
Bright.	English Seminary. (Anglo-Saxon Literature.)	4	9	11
Bright.	Historical English Grammar. (Lectures.)	1	23	22
Bright.	Beowulf.	2	14	14
Bright.	Early English Syntax. (Second half-year.)	1	28	12
Bright.	Anglo-Saxon. (Sweet's Reader.)	2	23	24
Bright.	Middle English.	2	6	7
Bright.	Journal Meeting. (Alternate weeks.)	2	14	13

INSTRUCTOR.	COURSES.	No. of hours per week.	No. of students, 1st half-year.	No. of students, 2d half-year.
Browne.	Early Scottish Poets.	1	12	11
Browne.	Elizabethan Literature; English Comedy. (First half-year.)	3	17	
Browne.	Fourteenth Century Literature; English Comedy. (Second half-year.)	3		15
Browne.	General English Literature. (P. H. E. Course.)	2	45	45
<b>HISTORICAL AND POLITICAL SCIENCE.</b>				
Adams.	Seminary of History and Politics.	2	37	31
Adams.	Germanic Institutions. (First half-year.)	2	39	
Adams.	American History. (Second half-year.)	3		50
Adams.	History of Church and Empire.	2	30	29
Adams.	International Law.	2	31	25
Adams.	Oriental History. (P. H. E.) (First half-year.)	1	47	
Ely.	Political Economy: Advanced.	2	23	23
Ely.	Economic Conferences.	2	8	8
Ely.	Elements of Political Economy.	5	29	80
Emmott.	Historical Jurisprudence. (English Law.)	2	17	16
Emmott.	English Constitution. (First half-year.)	3	27	
Smith, C. L.	Continental History.	3	13	13
Smith, C. L.	European History. (P. H. E. Course.)	2	24	24
Haskins.	Greek and Roman History. (P. H. E. Course.)	2	25	24
Haskins.	Herodotus and Thucydides.	1	16	16
Wilson.	Administration. (Second half-year—five weeks.)	5		28
Vincent.	Libraries and Literary Methods. (Six Lectures.) (First half-year.)	1	25	
Shaw.	European Municipalities. (Eight Lectures.) (Second half-year.)			
Scaife.	American Historical Geography. (Six Lectures.) (Second half-year.)			
<b>PHILOSOPHY.</b>				
Griffin.	History of Philosophy.	1	11	9
Griffin.	Psychology. (L. E. P. Course.) (First half-year.)	3	47	
Griffin.	Ethics. (L. E. P. Course.) (Second half-year.)	5		45
Emmott.	Logic. (L. E. P. Course.)	2	48	45
Martin.	Physiology of the Nervous System. (L. E. P. Course.) (Twelve Lectures and Demonstrations.)	1		34
Lefevre.	Pre-Socratic Philosophy. (Twelve Lectures.) (Second half-year.)			
<b>DRAWING.</b>				
Aldrich.	Free-hand Drawing.	3	66	78
Aldrich.	Mechanical Drawing.	3	9	12
Aldrich.	Special Instruction.	3	18	8

## DEGREES CONFERRED, 1890.

### Doctors of Philosophy.

Joseph Sweetman Ames, of Faribault, Minn., A. B., Johns Hopkins University, 1886. *Subjects*: Physics, Mathematics, and Chemistry. *Thesis*: Notes on Spectrum-Analysis.

Edward Carey Applegarth, of Baltimore, A. B., Johns Hopkins University, 1887. *Subjects*: Animal Physiology, Animal Morphology, and Chemistry. *Thesis*: Latency of the Knee-jerk.

Charles Cotton Blackshear, of Macon, Ga., A. B., Mercer University, 1881. *Subjects*: Chemistry, Geology, and Mineralogy. *Thesis*: Dioxybenzoyl-benzene-sulphonic Acid and Sulphon-Fluorescein.

Charles Hiram Chapman, of Viroqua, Wis., A. B., Johns Hopkins University, 1888. *Subjects*: Mathematics, Astronomy, and Physics. *Thesis*: Riemann's P-function.

Rudolf John Julius de Roode, Jr., of Lexington, Ky., S. B., Kentucky State College, 1885. *Subjects*: Chemistry, Mineralogy, and Geology. *Thesis*: Some Halogen Substitution Products of Benzoic Sulphinide.

George Peter Dreyer, of Baltimore, A. B., Johns Hopkins University, 1887. *Subjects*: Animal Physiology, Animal Morphology, and Chemistry. *Thesis*: The Effect of Hemorrhage and Fasting on the Proteids of the Blood in Cats.

Edwin Whitfield Fay, of Gayden, La., A. M., Southwestern Presbyterian University (Tenn.), 1883. *Subjects*: Sanskrit, Greek, and Latin. *Thesis*: The Treatment of Rig-Veda Mantras in the Gṛhya-Sūtras.

Henry Torsey Fernald, of Amherst, Mass., S. B., Maine State College, 1885. *Subjects*: Animal Morphology, Animal Physiology, and Vegetable Morphology. *Thesis*: The Relationships of Arthropods.

Henry Brayton Gardner, of Providence, R. I., A. B., Brown University, 1884. *Subjects*: Political Economy, History, and Administration. *Thesis*: A History of Taxation in Rhode Island.

Charles Jaques Goodwin, of Farmington, Me., A. B., Bowdoin College, 1887. *Subjects*: Greek, Sanskrit, and Latin. *Thesis*: Apollonius Rhodius: His Figures, Syntax, and Vocabulary.

Charles Homer Haskins, of Meadville, Pa., A. B., Johns Hopkins University, 1887. *Subjects*: History, Political Economy, and Historical Jurisprudence. *Thesis*: The Yazoo Land Companies.

James Taft Hatfield, of Evanston, Illinois, A. B., Northwestern University (Ill.), 1883. *Subjects*: Latin, Sanskrit, and German. *Thesis*: A Discussion of the Literary Work of the Poet Juvencus.

John Cohn Hemmeter, of Baltimore, M. D., University of Maryland, 1883. *Subjects*: Animal Physiology, Chemistry, and Psychology. *Thesis*: The Comparative Physiological Effects of Ethylic Alcohols on the Isolated Mammalian Heart.

Charles Holmes Herty, of Milledgeville, Ga., Ph. B., University of Georgia, 1886. *Subjects*: Chemistry, Mineralogy, and Geology. *Thesis*: The Double Halides of Lead and the Alkalies.

Jesse Herman Holmes, of Lincoln, Neb., A. B., University of Nebraska, 1884. *Subjects*: Chemistry, Mineralogy, and Biology. *Thesis*: Paroxylendi-sulphonic Acid and some of its Derivatives.

Abel Henry Huizinga, of New Paltz, N. Y., A. B., Hope College, 1880. *Subjects*: Assyriology, Ethiopic and Arabic, and Greek. *Thesis*: Analogy in the Semitic Languages.

Toyokichi Iyenaga, of Yanagawa, Japan, Ph. B., Oberlin College, 1887. *Subjects*: History, Political Economy, and Administration. *Thesis*: The Constitutional Development of Japan from 1853 to 1881.

Thomas Logie, of London, Ontario, A. B., University of Toronto, 1887. *Subjects*: French, Italian and Spanish, and German. *Thesis*: Phonology of the Patois of Cachy (Somme).

Hiram Benjamin Loomis, of Hartford, Conn., A. B., Trinity College, 1885. *Subjects*: Physics, Mathematics, and Chemistry. *Thesis*: A Study of the Effects of Changes of Temperature on Permanent Magnetism.

John Hanson Thomas McPherson, of Baltimore, A. B., Johns Hopkins University, 1886. *Subjects*: History, Political Economy, and Roman Law. *Thesis*: A History of Liberia.

Herbert William Magoun, of Bath, Me., A. B., Iowa College, 1879. *Subjects*: Sanskrit, Greek, and Latin. *Thesis*: The Āsuri-Kalpa,—a Witchcraft Practice of the Atharva-Veda,—text, translation, and commentary.

Wilmot Vernon Metcalf, of Elyria, Ohio, A. B., Oberlin College, 1883. *Subjects*: Chemistry, Physics, and Botany. *Thesis*: On the Reaction of Certain Alcohols with Para-diazo-metatoluene-sulphonic Acid.

Thomas Hunt Morgan, of Lexington, Ky., S. B., Kentucky State College, 1886. *Subjects*: Animal Morphology, Animal Physiology, and Vegetable Morphology. *Thesis*: A Contribution to the Embryology and Phylogeny of the Pycnogonids.

Augustus Taber Murray, of Richmond, Ind., A. B., Haverford College, 1885. *Subjects*: Greek, Latin, and Sanskrit. *Thesis*: On the use of Paratragoedia in the Comedies of Aristophanes, with a comparison of his scenes and situations with those of the Tragic Poets.

Wyatt William Randall, of Annapolis, Md., A. B., St. John's College, 1884. *Subjects*: Chemistry, Physics, and Mineralogy. *Thesis*: Ortho-sulpho-para-toluic Acid and some of its derivatives.

George Mann Richardson, of St. Louis, Mo., A. C., Lehigh University, 1886. *Subjects*: Chemistry, Mineralogy, and Geology. *Thesis*: Stannous Double Halide Salts, with a few notes upon the Cuprous Double Halide Salts.

Joseph Samuel Shefloe, of Waukon, Iowa, A. B., Luther College, 1885. *Subjects*: French, Italian and Spanish, and German. *Thesis*: Observations on the Phonology and Inflection of the Jersey-French Dialect.

Robert Benson Steele, of Lodi, Wis., A. B., University of Wisconsin, 1883. *Subjects*: Latin, Sanskrit, and Roman Law. *Thesis*: Chiasmus in Sallust, Cæsar, Tacitus, and Justinus.

Andrew Stephenson, of Fayette, Iowa, A. B., De Pauw University, 1882. *Subjects*: History, Historical Jurisprudence, and Latin. *Thesis*: A History of the Public Lands and Agrarian Laws of the Roman Republic.

Frederick Jackson Turner, of Madison, Wis., A. B., University of Wisconsin, 1884. *Subjects*: History, Political Economy, and International Law. *Thesis*: The Character and Influence of the Fur Trade in Wisconsin.

John Martin Vincent, of Elyria, Ohio, A. B., Oberlin College, 1883. *Subjects*: History, Political Economy, and International Law. *Thesis*: Federal Government in Switzerland.

Shozaburo. Watase, of Tokio, Japan, S. B., Sapporo Agricultural College, 1884. *Subjects*: Animal Morphology, Animal Physiology, and Comparative Psychology. *Thesis*: On the Morphology of the Compound Eyes of Arthropods.

James Albert Woodburn, of Bloomington, Ind., A. B., Indiana University, 1876. *Subjects*: History, Political Economy, and International Law. *Thesis*: The History of Higher Education in Indiana.

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### Bachelors of Arts.

John McEwen Ames, of Minnesota.

William Hand Browne, Jr., of Baltimore.

James Edmund Bryan, Jr., of Delaware.

Ralph Erskine Carson, of Baltimore.

William Henry Carson, of New Jersey.

Sidney Million Cone, of Baltimore.

Vernon Cook, of Baltimore.

Lucius Bradley Dorr, of New York.

Edwin Stanton Faust, of Baltimore.

Ned Arden Flood, of Pennsylvania.

Herbert Friedenwald, of Baltimore.

Fielding Hudson Garrison, of Washington, D. C.

Joseph Philip Gerry, of Catonsville.

George William Gray, of Brooklyn, Md.

Samuel Harris Guggenheimer, of Baltimore.

Daniel Dorsey Guy, of Baltimore.

James Chew Johnston, of Kentucky.

Edward Parkin Keech, Jr., of Baltimore.

Henry McElderry Knower, of Baltimore.

Berwick Bruce Lanier, of Baltimore.

Sylvan Hayes Lauchheimer, of Baltimore.

Tilghman Brice Marden, of Baltimore.

George Clarence Morrison, of Baltimore.

Arthur Alexander Oehm, of Baltimore.

Arthur Rosewald Oppenheimer, of Baltimore.

Lyman Pierson Powell, of Baltimore.	Adolph Grant Wolf, of Washington, D. C.
Samuel Guy Snowden, of Baltimore.	Frank Alfred Wolff, Jr., of Baltimore.
James Ernest Stokes, of Govans-town.	James Homer Wright, of Pennsylvania.
Isaac Lobe Straus, of Baltimore.	Oscar Woodward Zeigler, of Baltimore.
Charles Snowden Watts, of Baltimore.	Inazo (Ota) Nitobe, of Japan, ( <i>extra ordinem</i> ).
William Wallace Whitelock, of Baltimore.	
William Whitridge, of Baltimore.	

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## STATEMENT OF THE PUBLICATION AGENCY OF THE UNIVERSITY FOR THE YEAR 1889-90.

The several periodicals, issued under the auspices of the University, have appeared at regular intervals during the year.

1. Of the American Journal of Mathematics, under the editorial direction of Professors Newcomb and Craig, four numbers, completing the twelfth volume, and containing 400 pages quarto, have been issued. A general index to Volumes I-X, 32 pages quarto, has also been published. The series of portraits of mathematicians was continued in Vol. XII with the portrait of M. Poincaré; with Vol. XIII that of Professor Cayley will be given.

2. Of the American Chemical Journal, under the editorial direction of Professor Remsen, four numbers of Vol. XI, and seven numbers of Vol. XII, 750 pages octavo, have been issued. A general index to Volumes I-X, 88 pages octavo, was prepared by Dr. W. R. Orndorff under the direction of the editor, and published during the year.

3. Of the American Journal of Philology, of which Professor Gildersleeve is the editor, four numbers of Vol. X and one number of Vol. XI, 704 pages octavo, have appeared during the year. A general index to Volumes I-X, prepared by Dr. W. M. Arnolt, was issued with the last number of Vol. X. It has also been printed in separate form.

4. Of the Studies in Historical and Political Science, edited by Professor H. B. Adams, seven numbers of the seventh series, and nine numbers of the eighth series, 760 pages octavo, have been published. Six supplementary notes and one extra volume in cloth (Brackett, Negro in Maryland) have also been issued. The reprinting of the first two series is now completed. Of this periodical, eight regular volumes, including the one now in progress, and six extra volumes have been issued. Two extra volumes are now in press.

5. Of the Studies from the Biological Laboratory, edited by Professors Martin and Brooks, Nos. 5 and 6, of Vol. IV, 163 pages octavo and 122 plates, have appeared.

6. Nos. 75-82 of the University Circulars, 118 pages quarto, have been issued during the year.

7. The first number of the Beiträge zur Assyriologie, of which Professor Haupt is one of the editors, was published in November, 1889.

8. The Fourteenth Annual Report of the President (70 pages octavo) was issued in October, and the Annual Register (132 pages octavo) in May.

9. A volume containing Professor Gildersleeve's collected literary Essays and Studies (500 pages small quarto), was issued in April and has been distributed to the subscribers.

10. The Photographic Map of the Solar Spectrum, prepared by Professor Rowland, is now complete by the issue of the tenth plate of the series, and sets have been supplied to all the subscribers.

11. A new (briefer) edition of Dr. Renouf's translation of Volhard's Experiments was issued in October.

12. A detailed price list of our publications, 32 pages octavo, has been prepared and distributed.

The Publication Agency has undertaken the issue on behalf of the Johns Hopkins Hospital of its several publications.

At the Paris Exposition awards were made to our exhibit as follows: One Grand Prize to the Johns Hopkins University; One Grand Prize and one Gold Medal to Professor Rowland for his photographic map of the solar spectrum, published by the University; One Gold Medal and one Silver Medal to the Publication Agency of the University. The exhibit of the University at Paris consisted of sets of the several journals, etc., issued here.

A silver medal was also awarded for the map of the solar spectrum at the photographic exhibition in Berlin.

By direction of the Trustees complete sets of the University publications have been brought together and bound for presentation as a gift to the University of Toronto. They have been sent forward during the last month.

During the year one hundred and fifty copies of the following theses have been received as required by the regulations:

Ames, J. S.—Notes on spectrum-analysis.

Blackmar, F. W.—Spanish colonization in the southwest.

Blackshear, C. C.—Dioxybenzoyl-benzene-sulphonic acid and sulphon-fluorescein.

Callaway, M., Jr.—The absolute participle in Anglo-Saxon.

Magoun, H. W.—The Āsurī-Kalpa: a witchcraft practice of the Atharva-Veda.

MacMechan, A.—The relation of Hans Sachs to the Decameron.

Small, A. W.—The beginnings of American nationality.

- Smith, C. L.—The history of education in North Carolina.  
 Watase, S.—On the morphology of the compound eyes of arthropods.  
 Wightman, A. C.—On the ventricular epithelium of the frog's brain.

The system of exchanges has been conducted as in previous years, and has been reported on in detail to the Librarian.

The report of the New Book Department has also been submitted to the Librarian. During the year 5,451 volumes, of the value of about \$6,700, have been received. Since the opening of the department in 1877, 53,134 volumes of new books, of the value of about \$85,000, have been received.

N. MURRAY,

*In charge of the publications of the  
 Johns Hopkins University.*

September 1, 1890.

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## LIBRARY.

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The number of bound volumes now in the Library is 36,561. The periodicals received number over 1,000 titles.

### GIFTS TO THE LIBRARY FROM SEPTEMBER 1, 1889, TO SEPTEMBER 1, 1890.

*(Exclusive of works received in exchange, and reports of public bodies gratuitously distributed.)*

- ARCHEOLOGICAL INSTITUTE OF AMERICA. Papers of the American School of Classical Studies at Athens. Boston, 1885. O.  
 BELL, C. (Author). Medico-legal Studies. New York, 1889. Q.  
 BRIGHT, Dr. J. W. Index Expurgatorius. Dublin, 1837. O.  
 Benson, T. Vocabularium Anglo-Saxonicum. Oxford, 1701. O.  
 (Anon.) Tennysonianana. London, 1879.  
 BRITISH GOVERNMENT. Reports of the Voyage of the Challenger. 8 vols. London, 1888-89. F.  
 BROOKS, Dr. W. K. Marshall and Hunt. Course of Practical Zoölogy. London, 1888. D.  
 BRYAN, J. S. (Mayor). Year-book of Charleston. Charleston, 1889. O.  
 CALVERT, Mrs. G. H. Calvert, G. H., Works. 20 vols. v. p. v. d. D.  
 CASSIDY, W. S. (Author). The Copernican System. Kitanning, 1888. O.  
 CAYLEY, A. (Author). Mathematical Works. Vol. II. Cambridge, 1889. Q.  
 CRESPO, A. F. Censo Municipal de Buenos Aires. Buenos Aires, 1889. Q.  
 CUST, R. N. (Author). Modern Languages of East Indies. London, 1878. O.  
 Modern Languages of Africa. 2 vols. London, 1883. O.  
 Essays. 2 vols. London, 1880. O.  
 Notes on Missionary Subjects. London, 1889. O.  
 Pictures of Indian Life. London, 1881. O.  
 Poems. London, 1887. O.  
 DAVIS, F. A. Annual of Medical Sciences. Philadelphia, 1889. O.  
 DE SOYRES, J. (Author). Christian Reunion. St. John, 1888. O.  
 FRIESE, P. C. (Author). Semitic Philosophy. Chicago, 1890. D.  
 GREENE, H. E. (Author). Allegory in Spenser, Bunyan & Swift. n. p. n. d. O.  
 HECTOR, J. (Author). Phormium Tenax. Auckland, 1889. O.

- HOLT, H. & Co. (Publishers). Fothergill, J. A March in the Ranks. New York, 1890. D.  
 Turgenieff, J. Annals of a Sportsman. New York, 1890. D.  
 Jerome, J. K. Three Men in a Boat. New York, 1890. D.  
 Jerome, J. K. Idle Thoughts. New York, 1890. D.  
 Jerome, J. K. Stage-Land. New York, 1890. D.
- INGHAM, W. A. Reports of the 2nd Geological Survey of Pennsylvania. 3 vols. Harrisburg, 1839. O.
- McKNIGHT, O. A. (Author). Electrical System of the U. S. Philadelphia, 1878. O.
- MARTIN, Prof. H. N. Mayo, H. Anat. and Physiol. Commentaries. London, 1822. O.  
 Bichat X. Traité des Membranes. Paris, 1802. O.  
 Hare, H. A. Diseases of the Mediastinum. Philadelphia, 1869. O.
- MERCHANT TAYLORS' COMPANY. Clode, C. M. Memorials of the Guild of Merchant Taylors. London, 1848. O.  
 Clode, C. M. Early History of the Merchant Taylors Company. 2 vols. London, 1838. O.
- MILLER-HAUFENFELS, A. R. (Author). Richtigstellen der mechanischen Wärmetheorie. Wien, 1839. O.
- NOURSE, H. S. (Author). Annals of Lancaster, Mass. Lancaster, 1839. O.
- OBSERVATORIO DE MADRID. Observaciones Meteorológicas. 12 vols. Madrid. v. d. O.
- OBSERVATORIO IMPERIAL DE RIO DE JANEIRO. Anales. 2 vols. Rio de Janeiro, 1839. Q.
- PACKER, R. W. (Author). Congenital Club-foot. London, 1837. O.
- RICCÓ, A. (Director of the Royal Observatory, Palermo).  
 Piazz, G. Lezione Elem. di Astronomia. 2 vols. Palermo, 1817. O.  
 Piazz, G. Della Cometa del 1811. Palermo, 1812. O.
- ROYAL COLLEGE OF PHYSICIANS, EDINBURGH. Library Report. Edinburgh, 1890. O.
- THOMSON, J. Descriptive Catalogue of the Library of C. H. Clark. Phila., 1839. Q.
- TOLLEMACHE, L. A. (Author). Stones of Stumbling. London, 1837. O.  
 Safe Studies. London, 1834. O.
- WALKER, J. B. (Author). New Hampshire Convention. Boston, 1838. D.
- WASHBURN, W. T. (Author). Spring and Summer. New York, 1890. D.
- WHITE, J. W. Thucydides. I. Ed. C. D. Morris. Boston, 1837. D.
- WRIGHT, T. L. Inebriism. Columbus, O., 1835. D.

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Also from various official sources, U. S. Reports and other Government Publications; Publications of the Smithsonian Institution; Official Documents of various States and cities.

WILLIAM HAND BROWNE, *Librarian.*

September 1, 1890.

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## LIST OF FELLOWS AND GRADUATES, 1876-1890.

### BRUCE MEMORIAL FELLOWS IN BIOLOGY.

This Fellowship was instituted by his mother to commemorate the name of Adam T. Bruce, Ph. D., Fellow in Biology, 1883-84, and Instructor in Osteology and Mammalian Anatomy, 1886-87. It is open only to those who have held an ordinary Fellowship in Biology.

1888. Henry Van Peters Wilson, Ph. D., (1888), Resident Naturalist of the U. S. Fish Commission, Wood's Holl, Mass.

1889. Shozaburo Watase, Ph. D., (1889), Assistant in Morphology, Clark University.

1890. Thomas Hunt Morgan, Ph. D., (1890).

### FELLOWS.

(Arranged under the date of first appointment. \*—Deceased.)

#### 1876.

Henry Carter Adams, Ph. D., Professor of Political Economy and Finance, University of Michigan.

Herbert Baxter Adams, Ph. D., Associate Professor of History (J. H. U.).

William Keith Brooks, Ph. D., Associate Professor of Morphology (J. H. U.); Director of the Chesapeake Zoölogical Laboratory.

Samuel Fessenden Clarke, Ph. D., Professor of Natural History, Williams College.

Thomas Craig, Ph. D., Associate Professor of Mathematics (J. H. U.).

Joshua Walker Gore, C. E., Professor of Natural Philosophy and Engineering, University of North Carolina.

George Bruce Haisted, Ph. D., Professor of Mathematics, University of Texas.

Edward Hart, Ph. D., Professor of Analytical Chemistry, Lafayette College.

Daniel Webster Hering, C. E., Professor of Physics, University of the City of New York.

Malvern Wells Iles, Ph. D., Chemist, Denver, Colorado.

William White Jacques, Ph. D., Instructor in Telegraph Engineering, Massachusetts Institute of Technology.

Charles Rockwell Lanman, Ph. D., Professor of Sanskrit, Harvard University.

David McGregor Means, A. B., Professor of Political and Mental Science, Middlebury College, 1877-80; Attorney at Law, New York City.

Harmon Northrop Morse, Ph. D., Associate Professor of Chemistry (J. H. U.).

Walter Hines Page, Professor in Louisville (Ky.) Male High School, 1878-79; Editor, New York City.

\*Peter Porter Poinler, M. E. *Did not enter on the fellowship.*

Erasmus Darwin Preston, C. E., U. S. Coast and Geodetic Survey, Washington.

\*Henry Joseph Rice, Sc. D., Professor of Natural Sciences, Brooklyn (N. Y.) High School, 1882-85.

Josiah Royce, Ph. D., Assistant Professor of Philosophy, Harvard University.

Alexander Duncan Savage, B. Litt., Classical Instructor, Hollins, Va.

Ernest Gottlieb Sihler, Ph. D., Classical Instructor, New York City.

Frederick Boyd Van Vorst, A. B., Attorney at Law, New York City.

\*John Henry Wheeler, Ph. D., Professor of Greek, University of Virginia, 1882-87.

## 1877.

- Francis Greenleaf Allinson, Ph. D., Classical Instructor, Baltimore.  
 Fabian Franklin, Ph. D., Associate Professor of Mathematics (J. H. U.).  
 Lyman Beecher Hall, Ph. D., Professor of Chemistry and Physics, Haverford College.  
 Allan Marquand, Ph. D., Professor of the History of Art, Princeton College.

## 1878.

- Maurice Bloomfield, Ph. D., Associate Professor of Sanskrit and Comparative Philology (J. H. U.).  
 Constantine Fahlberg, Ph. D., Chemist, Salbke-Westerhüsen, Germany.  
 Edwin Herbert Hall, Ph. D., Assistant Professor of Physics, Harvard University.  
 Edward Coles Harding, A. M., Professor of Greek, University of Louisiana, 1879-80; Baltimore.  
 Rev. Charles Robert Hemphill, D. D., Associate Professor of Biblical Literature, Southern Theological Seminary, 1882-85; Clergyman, Louisville, Ky.  
 Isaac Ott, M. D., late Lecturer on Physiology, University of Pennsylvania; Physician, Easton, Pa.  
 Henry Sewall, Ph. D., M. D., Professor of Physiology, University of Michigan, 1882-89; Physician, Saranac Lake, N. Y.  
 Christian Sihler, Ph. D., M. D., Instructor in Histology and Microscopy, Western Reserve University; Physician, Cleveland, Ohio.  
 Washington Irving Stringham, Ph. D., Professor of Mathematics, University of California.  
 Charles Ambrose Van Velzer, S. B., Professor of Mathematics, University of Wisconsin.  
 Abram Van Epps Young, Ph. B., Professor of Chemistry, Northwestern University, Illinois.

## 1879.

- Brown Ayres, S. B., Professor of Physics and Astronomy, Tulane University, New Orleans.  
 Louis Bevier, Ph. D., Adjunct Professor of Modern Languages, Rutgers College, N. J.  
 William Burney, Ph. D., Professor of Chemistry, University of South Carolina.  
 Edward Mussey Hartwell, Ph. D., Associate in Physical Training and Director of the Gymnasium (J. H. U.).  
 \*John Robin McDaniel Irby, Ph. D.  
 Mitsuru Kuhara, Ph. D., Professor of Chemistry, First Middle School of Tokio, Japan.  
 \*Oscar Howard Mitchell, Ph. D., Professor of Mathematics, Marietta College, 1882-89.  
 Edward Leamington Nichols, Ph. D., Professor of Physics, Cornell University.  
 George Frederick Nicolassen, Ph. D., Professor of Greek and Latin, Southwestern Presbyterian University, Tenn.  
 Waldo Selden Pratt, A. B., Associate Professor of Ecclesiastical Music and Hymnology, Hartford (Conn.) Theological Seminary.  
 Robert Woodworth Prentiss, S. B., Professor of Physics, Corcoran Scientific School, Columbian University.  
 William Thompson Sedgwick, Ph. D., Associate Professor of Biology, Massachusetts Institute of Technology.  
 \*Herman Voorhees, C. E. *Did not enter on the fellowship.*  
 Edmund Beecher Wilson, Ph. D., Professor of Biology, Bryn Mawr College.

## 1880.

- James Wilson Bright, Ph. D., Associate in English (J. H. U.).  
 Benjamin Chapman Burt, A. B., Assistant Professor of English and Rhetoric, University of Michigan, 1881-87; Docent in Historical Psychology, Clark University, 1889-90.  
 Robert Dorsey Coale, Ph. D., Professor of Chemistry and Toxicology, University of Maryland.  
 Lawrence Bunting Fletcher, Ph. D., Instructor in Physics, Wesleyan University, 1882-83; Marlboro, N. Y.  
 \*Spencer Hedden Freeman, A. B., Professor of Physics and Astronomy, Adelbert College, 1882-86.

Kakichi Mitsukuri, Ph. D., Professor of Zoology, University of Tokio, Japan.  
 Bernard Francis O'Connor, Ph. D., Instructor in French, Columbia College.  
 Chase Palmer, Ph. D., Professor of Chemistry, Missouri School of Mines.  
 Herbert Mills Perry, A. B., Instructor, Cascadilla School, Ithaca, N. Y.  
 Andreas Franz Wilhelm Schimper, Ph. D., Professor of Botany, University of Bonn.  
 Edward Henry Spieker, Ph. D., Associate Professor of Greek and Latin (J. H. U.).  
 Morrison Isaac Swift, Ph. D., Instructor in Philosophy, Hobart College, 1882-84; Philadelphia.

\*Arthur Wilson Wheeler, A. B.

1881.

William John Alexander, Ph. D., Professor of English, University of Toronto.  
 Edward Sanford Burgess, A. B., Instructor in Natural Sciences, Washington (D. C.) High School.  
 William James Comstock, Ph. B., Instructor in Organic Chemistry, Yale University.  
 William Cathcart Day, Ph. D., Professor of Chemistry and Physics, Swarthmore College.  
 Henry Herbert Donaldson, Ph. D., Associate Professor of Neurology, Clark University.  
 William Pitt Durfee, Ph. D., Professor of Mathematics, Hobart College, N. Y.  
 George Stetson Ely, Ph. D., Assistant Examiner, U. S. Patent Office.  
 Benjamin Ives Gilman, A. B., Lecturer on Aesthetics in Colorado College and in Princeton College.  
 John Franklin Jameson, Ph. D., Professor of History, Brown University.  
 Charles Herschel Koyl, A. B., Instructor in Physics, Swarthmore College, 1887-88; Philadelphia.  
 Henry Leslie Osborn, Ph. D., Professor of Biology and Geology, Hamline University, Minn.  
 Henry Newlin Stokes, Ph. D., U. S. Geological Survey.  
 Benjamin Willis Wells, Ph. D., Instructor in English, Friends' School, Providence, R. I., 1881-87; Student in Germany.

1882.

James McKeen Cattell, Ph. D., Professor of Psycho-physics, University of Pennsylvania.  
 Ellery William Davis, Ph. D., Professor of Mathematics and Astronomy, University of South Carolina.  
 David Talbot Day, Ph. D., U. S. Geological Survey; Special Agent and Expert in the Department of Mining, etc., U. S. Census.  
 Alfred Emerson, Ph. D., Professor of Greek, Lake Forest University, Ill.  
 William Scott Fleming, A. B., Professor of Greek and German, Davidson College, 1883-85; Wetumpka, Ala.  
 Arthur Lincoln Frothingham, Jr., Ph. D., Professor of Archæology, Princeton College.  
 Henry Root Goodnow, A. B., Brooklyn, N. Y.  
 Elgin Ralston Lovell Gould, Ph. D., Statistician, U. S. Bureau of Labor; Reader in Social Statistics (J. H. U.).  
 Arthur Stafford Hathaway, S. B., Instructor in Mathematics, Cornell University.  
 William Henry Howell, Ph. D., M. D., Professor of Physiology and Histology, University of Michigan.  
 Edward Harrison Keiser, Ph. D., Associate Professor of Chemistry, Bryn Mawr College.  
 Arthur Lalanne Kimball, Ph. D., Associate Professor of Physics (J. H. U.).  
 Harry Fielding Reid, Ph. D., Professor of Physics, Case School of Applied Science, Cleveland, O.

1883.

William Muss Arnold, Ph. D., Professor of Ancient Languages, New Windsor College, Md.; Fellow by Courtesy (J. H. U.).  
 Gustav Bissing, Ph. D., Principal Examiner, Division A, U. S. Patent Office.  
 \*Adam Todd Bruce, Ph. D., Instructor in Osteology and Mammalian Anatomy (J. H. U.), 1886-87.  
 Archibald Lamont Daniels, D. Sc., Williams Professor of Mathematics and Physics, University of Vermont.  
 John Dewey, Ph. D., Professor of Philosophy, University of Michigan.  
 \*James Reynolds Duggan, Ph. D., Professor of Chemistry, Wake Forest College, 1886-88.

- Hans Carl Günther von Jagemann, Ph. D., Assistant Professor of German, Harvard University.
- Gustav Adolph Liebig, Jr., Ph. D., Assistant in Electricity (J. H. U.), 1888-90; Fellow by Courtesy (J. H. U.).
- Charles William Emil Miller, Ph. D., Professor of Greek and Latin, Peoria (Ill.) High School.
- Charles Albert Perkins, Ph. D., Associate in Physics, Bryn Mawr College.
- Lewis Tebbetts Stevens, M. D., Lecturer on Physiological Diagnosis, St. Louis Post-graduate School of Medicine; Physician, St. Louis, Mo.
- Lewis Webb Wilhelm, Ph. D., Mathematical Instructor, Baltimore.

## 1884.

- Ethan Allen Andrews, Ph. D., Associate in Biology (J. H. U.).
- Henry Crew, Ph. D., Instructor in Physics, Haverford College.
- Homer Winthrop Hillyer, Ph. D., Instructor in Chemistry, University of Wisconsin.
- Rev. Abel Henry Huizinga, Ph. D., Clergyman, New Paltz, N. Y.
- Frederick Schiller Lee, Ph. D., Associate in Physiology and Histology, Bryn Mawr College.
- Charles Herbert Levermore, Ph. D., Assistant Professor of History, Massachusetts Institute of Technology.
- Henry Francis Nachtrieb, S. B., Assistant Professor of Biology, University of Minnesota.
- Henry Barber Nixon, Ph. D., Professor of Mathematics, Pennsylvania College, Gettysburg.
- William Noyes, Jr., M. D., Assistant Physician and Pathologist, McLean Asylum, Somerville, Mass.
- Albert Gallatin Palmer, Ph. D., Assistant Professor of Chemistry, Swarthmore College, 1886-87; Chemist, Baltimore.
- Ernest Mondell Pease, A. B., Professor of Latin, Bowdoin College.
- Albert Harris Tolman, A. B., Professor of English Literature and Rhetoric, Ripon College, Wisconsin.
- Woodrow Wilson, Ph. D., LL. D., Professor of Jurisprudence and Political Economy, Princeton College; Reader in the Science of Administration (J. H. U.).

## 1885.

- Cyrus Adler, Ph. D., Associate in the Semitic Languages (J. H. U.).
- David Barcroft, Ph. D., Berkeley, Cal.
- William Shirley Bayley, Ph. D., U. S. Geological Survey; Professor of Geology and Mineralogy, Colby University, Me.
- Louis Bell, Ph. D., Professor of Physics and Applied Electricity, Purdue University, Ind., 1888-90; Editor, New York City.
- William Henry Burnham, Ph. D., Docent in Pedagogy, Clark University.
- Frank Albert Christie, A. B., Latin and Greek Master, Lawrenceville School, N. J., 1886-89.
- Davis Rich Dewey, Ph. D., Assistant Professor of Economics and Statistics, Massachusetts Institute of Technology.
- Albert E. Egge, Ph. D., Professor of Modern Languages, St. Olaf College, Minn.
- William Henry Emerson, Ph. D., Professor of Chemistry, Georgia School of Technology.
- John Charles Fields, Ph. D., Professor of Mathematics, Allegheny College, Pa.
- Joseph Jastrow, Ph. D., Professor of Experimental and Comparative Psychology, University of Wisconsin.
- George Theophilus Kemp, Ph. D., Associate Director, Department of Physiology and Experimental Therapeutics, Hoagland Laboratory, Brooklyn, N. Y.
- Marion Dexter Learned, Ph. D., Associate in German (J. H. U.).
- Gonzalez Lodge, Ph. D., Associate in Latin, Bryn Mawr College.
- Charles Skeeel Palmer, Ph. D., Professor of Chemistry, University of Colorado.
- George Thomas White Patrick, Ph. D., Professor of Philosophy and Didactics, Iowa State University.
- Moses Slaughter, A. B., Professor of Latin, Iowa College.
- Charles Whetham, A. B., Modern Language Master, Upper Canada College, Toronto.
- Charles Baker Wright, A. B., Professor of English Literature and Rhetoric, Middlebury College, Vt.

1886.

- Edgar Pierce Allen, A. B., Pittsburgh, Pa.  
 John Pendleton Campbell, Ph. D., Professor of Biology, University of Georgia.  
 Henry Clarke, A. B., Classical Instructor, London, England.  
 Herbert Charles Elmer, Ph. D., Acting Assistant Professor of Latin, Cornell University.  
 Henry Brayton Gardner, Ph. D., Assistant Professor of Political Economy, Brown University.  
 Milton Haight, A. B., Professor of English and Mathematics, Sapporo Agricultural College, Japan.  
 John Leslie Hall, Professor of English and History, William and Mary College, Va.  
 Charles Willard Hayes, Ph. D., U. S. Geological Survey, Washington.  
 George Benjamin Hussey, Ph. D., Fellow in Archaeology, Princeton College.  
 James Hervey Hyslop, Ph. D., Tutor in Philosophy, Columbia College.  
 Andrew Cowper Lawson, Ph. D., Geological Survey of Canada, Ottawa.  
 Franklin Paine Mall, M. D., Adjunct Professor of Anatomy, Clark University.  
 Yuzero Motora, Ph. D., Professor in the Aoyama Yeiwa Gakuko, Tokio, Japan.  
 Julius Nelson, Ph. D., Professor of Biology, Rutgers College.  
 William Ridgely Orndorff, Ph. D., Assistant Professor of Chemistry, Cornell University.  
 Daniel Richard Randall, Ph. D., Attorney at Law, Annapolis, Md.  
 Henry Dallas Thompson, A. B., Tutor in Mathematics, Princeton College.  
 Edward Burr Van Vleck, A. B., Tutor in Mathematics, Wesleyan University, 1887-90; Student in Germany.  
 Amos Griswold Warner, Ph. D., Professor of Political Economy, University of Nebraska.  
 John Roaf Wightman, Ph. D., Professor of French, Iowa College.

1887.

- Joseph Sweetman Ames, Ph. D., Assistant in Physics (J. H. U.).  
 Philip Wheelock Ayres, Ph. D., Assistant Secretary, Charity Organization Society, Cincinnati.  
 William Snyder Eichelberger, A. B., Assistant in Mathematics and Astronomy, Wesleyan University, Conn.  
 Henry Rushton Fairclough, A. B., Lecturer in Greek, University College, Toronto.  
 William Curns Lawrence Gorton, Ph. D., Associate Professor of Mathematics, Woman's College of Baltimore.  
 William Herbert Hobbs, Ph. D., Curator of the Museum and Lecturer on Mineralogy and Metallurgy, University of Wisconsin.  
 Joseph Hoeing Kastle, Ph. D., Professor of Chemistry, Kentucky State College.  
 Felix Lengfeld, Ph. D., San Francisco, Cal.  
 Archibald MacMechan, Ph. D., Professor of the English Language and Literature, Dalhousie College, Nova Scotia.  
 Herbert William Magoun, Ph. D., Acting Professor of Greek, Colorado College.  
 Thomas McCabe, Ph. D., Associate in French, Bryn Mawr College.  
 John Leverett Moore, A. B., Fellow by Courtesy (J. H. U.).  
 Augustus Taber Murray, Ph. D., Professor of the Greek Language and Literature, Earlham College.  
 Edmund Clark Sanford, Ph. D., Instructor in Psychology, Clark University.  
 Charles Lee Smith, Ph. D., General Secretary, Charity Organization Society of Baltimore; Instructor in History (J. H. U.).  
 Arthur Clarence Wightman, Ph. D., Professor of Natural History, Md. Agricultural College.  
 Henry Van Peters Wilson, Ph. D., Resident Naturalist, U. S. Fish Commission, Wood's Holl, Mass.

1888.

- Charles McLean Andrews, Ph. D., Associate in History, Bryn Mawr College.  
 Frank Wilson Blackmar, Ph. D., Professor of History and Sociology, University of Kansas.  
 Charles Austin Borst, A. B., Assistant in Astronomy (J. H. U.).

William Merriam Burton, Ph. D., Chemist, Standard Oil Company, Cleveland, O.  
 Morgan Callaway, Jr., Ph. D., Associate Professor of English, University of Texas.  
 Charles Hiram Chapman, Ph. D., Instructor in Mathematics (J. H. U.).  
 Edwin Whitfield Fay, Ph. D., Instructor in Ancient Languages, University of Michigan.  
 Adam Capen Gill, A. B., Geologist, Rockford, Tenn.  
 Joseph Edward Harry, Ph. D., Professor of Greek and German, Georgetown College, Ky.  
 James Taft Hatfield, Ph. D., Professor of German, Northwestern University, Ill.  
 George Allison Hench, Ph. D., Instructor in German, University of Michigan.  
 Clifton Fremont Hodge, Ph. D., Fellow in Psychology, Clark University.  
 Cary Talcott Hutchinson, Ph. D., Electrician, New York City.  
 Alvin Frank Linn, A. B., Professor of Chemistry, Wittenberg College, O. *Resigned without entering on the fellowship.*  
 Thomas Logie, Ph. D., Instructor in Romance Languages, Williams College.  
 Alfred Edward Thayer, M. D., Physician, New York City.  
 James Starr Trueman, A. B., Professor of Greek and Latin, Allegheny College, Pa.  
 Shozaburo Watase, Ph. D., Assistant in Morphology, Clark University.

## 1889.

Edward Carey Applegarth, Ph. D., Student of Medicine, Baltimore.  
 Arthur George Blachstein, A. B., M. D., Fellow by Courtesy (J. H. U.).  
 Rudolf John Julius de Roode, Jr., Ph. D., Chemist, Experiment Station of Georgia.  
 George Peter Dreyer, Ph. D., Senior Demonstrator of Physiology (J. H. U.).  
 Hermann Louis Ebeling, A. B., Fellow by Courtesy (J. H. U.).  
 Charles Jaques Goodwin, Ph. D., Professor of Greek, Cornell College, Iowa.  
 Christopher Johnston, Jr., A. M., Fellow (J. H. U.).  
 Hiram Benjamin Loomis, Ph. D., Instructor in Physics, University of Wisconsin.  
 John Hanson Thomas McPherson, Ph. D., Instructor in History, University of Michigan.  
 Thomas Hunt Morgan, Ph. D., Bruce Fellow in Biology (J. H. U.).  
 Daniel Alexander Murray, A. B., Associate Professor of Mathematics, University of the City of New York.  
 Charles Lane Poor, S. B., Fellow by Courtesy (J. H. U.).  
 George Mann Richardson, Ph. D., Instructor in Chemistry, Lehigh University.  
 John Cunningham Robertson, A. M., Fellow by Courtesy (J. H. U.).  
 Charles Hunter Ross, S. B., Professor of English, Southwestern University, Texas.  
 Joseph Samuel Shefoc, Ph. D., Associate in French, Woman's College of Baltimore.  
 Robert Benson Steele, Ph. D., Professor of Latin, St. Olaf College, Minn.  
 Bert John Vos, A. B., Fellow (J. H. U.).  
 James Albert Woodburn, Ph. D., Professor of American History, Indiana University.

## 1890.

William Wilson Baden, A. B.	}	Now in residence at the University.
Robert Payne Bigelow, S. B.		
Edwin Grant Conklin, S. B.		
William Levering Devries, A. B.		
George Houghton Gilman, A. M.		
Thomas Perrin Harrison.		
Charles Rollin Keyes, S. B.		
Edwin Seelye Lewis, A. B.		
Arthur Stanley Mackenzie, A. B.		
Henry Parker Manning, A. B.		
Wilfred Pirt Mustard, A. B.		
Barker Newhall, A. B.		
Edward Bennett Rosa, S. B.		
Charles Edward Saunders, A. B.		
Bernard Christian Steiner, A. B.		
John White, Jr., A. B.		
Westel Woodbury Willoughby, A. B.		

DOCTORS OF PHILOSOPHY.

(When the institution is not named, the Johns Hopkins University is to be understood. (F) indicates that the person has held a Fellowship here. \*—Died.)

1878.

- Henry Carter Adams, (F), A. B., Iowa, 1874, Instructor in Political Economy, 1879-81, Lecturer and Associate Professor of Political Economy, Cornell University, 1879-87, —Professor of Political Economy and Finance, University of Michigan.
- Thomas Craig, (F), C. E., Lafayette, 1875, U. S. Coast Survey, 1879-81.—Associate Professor of Mathematics.
- Josiah Royce, (F), A. B., University of California, 1875, Assistant Professor of English Literature, University of California, 1878-82.—Assistant Professor of Philosophy, Harvard University.
- Ernest Gottlieb Sihler, (F), Concordia, 1869.—Classical Instructor, New York City. (4)

1879.

- Maurice Bloomfield, (F), A. M., Furman, 1877.—Associate Professor of Sanskrit and Comparative Philology.
- Samuel Fessenden Clarke, (F), Ph. B., Yale, 1878, Assistant in Biology, 1879-81.—Professor of Natural History, Williams College.
- George Bruce Halsted, (F), A. B., Princeton, 1875, Tutor and Instructor, Princeton, 1878-84.—Professor of Mathematics, University of Texas.
- Edward Hart, (F), S. B., Lafayette, 1874.—Professor of Analytical Chemistry, Lafayette College.
- William White Jacques, (F), S. B., Mass. Inst. of Technology, 1876.—Instructor in Telegraph Engineering, Massachusetts Institute of Technology.
- Henry Sewall, (F), S. B., Wesleyan, 1876, Hon. M. D., University of Michigan, 1888, M. D., University of Colorado, 1889, Associate in Biology, 1880-82, Professor in the University of Michigan, 1882-89.—Physician, Saranac Lake, N. Y. (6)

1880.

- Francis Greenleaf Allinson, (F), A. B., Haverford, 1876, A. B., Harvard, 1877, Assistant Professor of Latin and Greek, Haverford College, 1880-82.—Classical Instructor, Baltimore.
- Fabian Franklin, (F), Ph. B., Columbian, 1869, Assistant and Associate, 1879-82.—Associate Professor of Mathematics.

- Edwin Herbert Hall, (F), A. B., Bowdoin, 1875, Assistant in Physics, 1880-81, Instructor at Harvard, 1881-88.—Assistant Professor of Physics, Harvard University.
- Allan Marquand, (F), A. B., Princeton, 1874.—Professor of the History of Art, Princeton College.
- Washington Irving Stringham, (F), A. B., Harvard, 1877.—Professor of Mathematics, University of California. (5)

1881.

- Louis Bevier, (F), A. B., Rutgers, 1878, Instructor in French, Rutgers College, 1881-88.—Adjunct Professor of Modern Languages, Rutgers College.
- Robert Dorsey Coale, (F), Assistant in Chemistry, 1881-83.—Professor of Chemistry, and Toxicology, University of Maryland.
- Edward Allen Fay, A. B., University of Michigan, 1862.—Vice-President and Professor of Languages, National Deaf-Mute College, Washington.
- Lawrence Bunting Fletcher, (F), A. B., Columbia, 1877, Instructor in Physics, Wesleyan University, 1882-83.—Marlboro, N. Y.
- Samuel Garner, A. B., St. John's, 1871, Professor of Modern Languages, University of Indiana, 1881-87.—Assistant Professor of Modern Languages, U. S. Naval Academy.
- Edward Mussey Hartwell, (F), A. B., Anherst, 1873, M. D., Miami Medical College, 1882, Instructor in Physical Training, 1883-84.—Associate in Physical Training.
- William Thompson Sedgwick, (F), Ph. B., Yale, 1877, Assistant and Associate in Biology, 1880-83.—Associate Professor of Biology, Massachusetts Institute of Technology.
- Christian Sihler, (F), Concordia, 1866, M. D., University of Michigan, 1871, Assistant in Biology, 1879-80.—Instructor in Histology and Microscopy, Western Reserve University; Physician, Cleveland, O.
- Edmund Beecher Wilson, (F), Ph. B., Yale, 1878, Assistant in Biology, 1881-82, Lecturer in Williams College, 1883-84, Associate Professor, Bryn Mawr College, 1885-88.—Professor of Biology, Bryn Mawr College, Pa. (9)

## 1882.

James Wilson Bright, (F), A. B., Lafayette, 1877, Assistant in German, 1882-83, Instructor in English, 1885-88, Instructor in Cornell University, 1885.—Associate in English.

John Franklin Jameson, (F), A. B., Amherst, 1879, Assistant and Associate in History, 1882-88.—Professor of History, Brown University.

Mitsuru Kuhara, (F), S. B., University of Tokio, 1877, Lecturer on Organic Chemistry, University of Tokio, 1882-87.—Professor of Chemistry, First Middle School of Tokio, Japan.

Robert Wright Mahon, C. E., Lehigh, 1876, Tutor in Chemistry, Lafayette College, 1882-83, Acting Professor of Chemistry, Rose Polytechnic Institute, 1888-89.—Chemist, Pa. Steel Works, Baltimore.

\*Oscar Howard Mitchell, (F), A. B., Marietta, 1875, Professor of Mathematics, Marietta College, 1882-89. \**March* 29, 1889.

George Frederick Nicolassen, (F), A. B., University of Virginia, 1879, Assistant in Greek and Latin, 1881-82.—Professor of Ancient Languages, Southwestern Presbyterian University, Tenn.

William Albert Noyes, A. B., Iowa, 1879, Instructor in the University of Minnesota, 1882-83, Professor of Chemistry, University of Tennessee, 1883-86.—Professor of Chemistry, Rose Polytechnic Institute, Ind.

Chase Palmer, (F), A. B., 1879, Assistant, Mass. Institute of Technology, 1882-83, Professor in the Mass. State Normal School, Salem, 1883-87, Assistant in Tufts College, 1887-88, Professor in Wabash College, 1888-90.—Professor of Chemistry, Missouri School of Mines.

Edward Henry Spleker, (F), A. B., 1879, Instructor and Associate, 1882-88.—Associate Professor of Greek and Latin.

## 1883.

(9)

William John Alexander, (F), A. B., University of London, 1876, Professor in Dalhousie College, 1883-89.—Professor of English, University of Toronto.

William Cathcart Day, (F), A. B., 1880, Professor of Chemistry and Physics, St. John's College, Md., 1888-84, and University of Nashville, 1884-87.—Professor of Chemistry, Swarthmore College, Pa.

William Pitt Durfee, (F), A. B., University of Michigan, 1876.—Professor of Mathematics, Hobart College, N. Y.

George Stetson Ely, (F), A. B., Amherst, 1878, Professor of Mathematics, Buchtell College, 1883-84.—Assistant Examiner, U. S. Patent Office.

Kakichi Mitsukuri, (F), Ph. B., Yale, 1879.—Professor of Zoölogy, University of Tokio, Japan.

Bernard Francis O'Connor, (F), Bach. ès Lettres, Université de France, 1874.—Instructor in French, Columbia College.

(6)

## 1884.

Herbert William Conn, A. B., Boston University, 1881, Assistant in Biology, 1883-84, Associate Professor, Wesleyan University, 1884-88.—Professor of Biology, Wesleyan University, Conn.

Ellery William Davis, (F), S. B., University of Wisconsin, 1879, Professor in the Florida Agricultural College, 1884-88.—Professor of Mathematics and Astronomy, University of South Carolina.

David Talbot Day, (F), A. B., 1881, Teacher, Baltimore, 1885-86.—U. S. Geological Survey, Washington; Special Agent and Expert in the department of Mining, etc., U. S. Census.

John Dewey, (F), A. B., University of Vermont, 1879, Instructor, University of Michigan, 1884-87.—Professor of Philosophy, University of Michigan.

\*James Reynolds Duggan, (F), A. B., Mercer University, 1877, M. D., Jefferson Medical College, 1879, Professor of Chemistry, Wake Forest College, 1886-88. \**January* 10, 1888.

William Henry Howell, (F), A. B., 1881, M. D., University of Michigan, 1890, Assistant, Associate, and Associate Professor, 1884-89, Lecturer, University of Michigan, 1889-90.—Professor of Physiology and Histology, University of Michigan.

Hans Carl Günther von Jagemann, (F), Naumburg Gymnasium, 1876, Professor in Earlham College, 1884-85, and in Indiana University, 1885-89.—Assistant Professor of German, Harvard University.

Edward Harrison Kelsor, (F), S. B., Swarthmore, 1880, Assistant in Chemistry, 1884-86.—Associate Professor of Chemistry, Bryn Mawr College, Pa.

Arthur Lalanne Kimball, (F), A. B., Princeton, 1881, Associate, 1884-88.—Associate Professor of Physics.

Henry Leslie Osborn, (F), A. B., Wesleyan, 1878, Professor of Zoölogy, Purdue University, 1884-87.—Professor of Biology and Geology, Hamline University, Minn.

- Charles Albert Perkins, (F), A. B., Williams, 1879, Assistant in Physics, 1884-87.—Associate in Physics, Bryn Mawr College, Pa.  
 Albert Shaw, A. B., Iowa, 1879.—Journalist, Minneapolis, Minn.; Reader in Municipal Government.  
 Henry Newlin Stokes, (F), S. B., Haverford, 1879.—U. S. Geological Survey, Washington.  
 Lewis Webb Wilhelm, (F), A. B., 1880.—Mathematical Instructor, Baltimore.  
 Arthur Yager, A. B., Georgetown College, Ky., 1879.—Professor of History, Georgetown College, Ky.

(15)

1885.

- Edward Webster Bemis, A. B., Amherst, 1880, Instructor in Political Economy, Amherst, 1885-86.—Adjunct Professor of History and Economics, Vanderbilt University.  
 Gustav Bissing, (F), A. B., 1882.—Principal Examiner, Division A, U. S. Patent Office.  
 Henry Herbert Donaldson, (F), A. B., Yale, 1879, Assistant in Biology, 1883-84, Instructor and Associate in Psychology, 1885-89.—Assistant Professor of Neurology, Clark University.  
 Louis Duncan, (F), U. S. Naval Academy, 1880.—Associate Professor of Electricity.  
 Homer Winthrop Hillyer, (F), S. B., University of Wisconsin, 1882.—Instructor in Chemistry, University of Wisconsin.  
 Frederic Schiller Lee, (F), A. B., St. Lawrence University, 1878, Instructor in Biology, St. Lawrence University, 1886-87.—Associate in Physiology and Histology, Bryn Mawr College, Pa.  
 Gustav Adolph Liebig, Jr., (F), A. B., 1882, Assistant in Electricity, 1888-90.—Fellow by Courtesy.  
 James Playfair McMurrich, A. B., Toronto, 1879, Instructor, 1884-86, Professor in Haverford College, 1886-89.—Instructor in Biology, Clark University.  
 Albert Gallatin Palmer, (F), A. B., 1882, Assistant and Assistant Professor of Chemistry, Swarthmore College, 1885-87.—Chemist, Baltimore.  
 Harry Fielding Reid, (F), A. B., 1880, Assistant in Physics, 1882-84.—Professor of Mathematics (1886-89) and (now) of Physics, Case School, Cleveland, O.  
 Henry Alford Short, A. B., Columbia, 1880, Tutor in Latin, Columbia College, 1885-88.—New York City.

- Morrison Isaac Swift, (F), A. B., Williams, 1879, Instructor in Philosophy, Hobart College, 1882-84.—Philadelphia.  
 Henry Alfred Todd, A. B., Princeton, 1876, Instructor, 1883-85.—Associate in Romance Languages.

(13)

1886.

- William Shirley Bayley, (F), A. B., 1883.—U. S. Geological Survey; Professor of Geology and Mineralogy, Colby University, Me.  
 \*Adam Todd Bruce, (F), A. B., Princeton, 1881, Instructor in Osteology, etc., 1886-87. \*February 9, 1887.  
 Davis Rich Dewey, (F), A. B., University of Vermont, 1879, Instructor, Mass. Institute of Technology, 1886-88.—Assistant Professor of Economics and Statistics, Mass. Institute of Technology.  
 William Henry Emerson, (F), U. S. Naval Academy, 1880, Professor, S. C. Military Academy, 1886-88.—Professor of Chemistry, Georgia School of Technology, Atlanta.  
 Joseph Auguste Fontaine, College of Stion, Nancy, France, 1879, Instructor in the University of Nebraska, 1887-89.—Professor of Modern Languages, University of Mississippi.  
 Elgin Ralston Lovell Gould, (F), A. B., Victoria (Ont.), 1881, Instructor in History, Washington (D. C.) High School, 1884-87, Reader in Social Statistics, 1887-89.—Statistician, Bureau of Labor, Washington.  
 William Penn Holcomb, B. L., Swarthmore, 1878.—Professor of History and Political Science and Lecturer on Pedagogics, Swarthmore College, Pa.  
 Joseph Jastrow, (F), A. B., University of Pennsylvania, 1882.—Professor of Experimental and Comparative Psychology, University of Wisconsin.  
 George Theophilus Kemp, (F), A. B., 1883, Demonstrator of Physiology, University of Pennsylvania, 1886-87.—Associate Director, Department of Physiology and Experimental Therapeutics, Hoagland Laboratory, Brooklyn, N. Y.  
 Charles Herbert Levermore, (F), A. B., Yale, 1879, Instructor in Political Economy, University of California, 1886-88.—Assistant Professor of History, Mass. Institute of Technology.  
 Gonzalez Lodge, (F), A. B., 1883, Professor of Greek and German, Davidson College, 1886-88.—Associate in Latin, Bryn Mawr College.

Charles William Emil Miller, (F), A. B., 1882.—Professor of Greek and Latin, Peoria (Ill.) High School.

Henry Barber Nixon, (F), University of North Carolina, 1878.—Professor of Mathematics, Pennsylvania College, Gettysburg.

Charles Skeele Palmer, (F), A. B., Amherst, 1879.—Professor of Chemistry, University of Colorado.

Burr James Ramage, A. B., Newberry, 1880.—Attorney at Law, New York City.

Shosuke Sato, S. B., Sapporo Agricultural College, 1880.—Professor of History and Political Economy, Imperial College of Agriculture, Sapporo, Japan.

Woodrow Wilson, (F), A. B., Princeton, 1876, LL. D., Wake Forest, 1887, Associate and Associate Professor, Bryn Mawr College, 1885-88, Professor in Wesleyan University, Conn., 1888-90.—Professor of Jurisprudence and Political Economy, Princeton College; Reader in the Science of Administration.

(17)

## 1887.

Cyrus Adler, (F), A. B., University of Pennsylvania, 1883.—Associate in the Semitic Languages.

Ethan Allen Andrews, (F), Ph. B., Yale, 1881.—Associate in Biology.

Albert Clayton Applegarth, A. B., 1884.—Assistant Librarian, Md. Historical Society.

David Barcroft, (F), Ph. B., University of California, 1882.—Berkeley, Cal.

Henry Gustav Beyer, M. D., Bellevue Hospital Medical College, 1876, M. R. C. S. (London).—Passed Assistant Surgeon, U. S. N.

Richard Newman Brackett, A. B., Davidson, 1883.—Arkansas Geological Survey, Little Rock.

Henry Crew, (F), A. B., Princeton, 1882, Assistant in Physics, 1887-88.—Instructor in Physics, Haverford College.

Albert E. Egge, (F), A. B., Luther College, 1879.—Professor of Modern Languages, St. Olaf College, Northfield, Minn.

John Charles Fields, (F), A. B., Toronto, 1884.—Professor of Mathematics, Allegheny College, Pa.

Andrew Fossum, A. B., Luther College, 1882, Classical Instructor, Pottstown, Pa., 1888-90.—Student of Archaeology, Athens, Greece.

Richmond Harding, A. B., Davidson, 1880.—Professor of Greek, Davidson College.

Charles Willard Hayes, (F), A. B., Oberlin, 1883.—U. S. Geological Survey, Washington.

William Adam Hedrick, A. M., Columbian, 1884.—Instructor in the High School, Washington, D. C.

Frank Gaylord Hubbard, A. B., Williams, 1880, Instructor in Smith College, 1887-88.—Instructor in English, University of California.

George Benjamin Hussey, (F), A. B., Columbia, 1884.—Fellow in Archaeology, Princeton College.

James Hervey Hyslop, (F), A. B., Wooster University, 1877.—Tutor in Philosophy, Columbia College.

Marion Dexter Learned, (F), A. B., Dickinson, 1880.—Associate in German.

William Ridgely Orndorff, (F), A. B., 1884, Instructor in Cornell University, 1887-89.—Assistant Professor of Chemistry, Cornell University.

Daniel Richard Randall, (F), A. B., St. John's College, 1883.—Attorney at Law, Annapolis, Maryland.

Frederick Morris Warren, A. B., Amherst, 1880.—Associate in French and German.

(20)

## 1888.

William Muss Arnolt, (F), B. D., New Brunswick (N. J.) Theological Seminary, 1882.—Professor of Ancient Languages, New Windsor College, Md.

Philip Wheelock Ayres, (F), Ph. B., Cornell, 1884.—Assistant Secretary, Charity Organization Society, Cincinnati, O.

Louis Bell, (F), A. B., Dartmouth, 1884, Professor of Physics and Applied Electricity, Purdue University, 1888-89.—Editor, New York City.

Benjamin Lester Bowen, A. B., Rochester University, 1881, Professor in Bowdoin College, 1888-89.—Associate Professor of French, Ohio State University.

William Henry Burnham, (F), A. B., Harvard, 1882, Instructor in Psychology, 1888-89.—Docent in Pedagogy, Clark University.

Richard Eugene Burton, A. B., Trinity College, 1883.—New York City.

John Pendleton Campbell, (F), A. B., 1885.—Professor of Biology, University of Georgia.

Herbert Charles Elmer, (F), A. B., Cornell University, 1883.—Acting Professor of Latin, Cornell University.

Robert Orlando Graham, A. B., Amherst, 1877.—Professor of Chemistry, Illinois Wesleyan University, Bloomington.

Erasmus Haworth, S. B., Kansas State University, 1881.—Professor of Chemistry, Penn College, Oskaloosa, Iowa.

Francis Hobart Herrick, A. B., Dartmouth College, 1881.—Instructor in Biology, Adelbert College.

William Herbert Hobbs, (F), S. B., Worcester Polytechnic Institute, 1883.—Curator of the Museum and Lecturer on Mineralogy and Metallurgy, University of Wisconsin.

Joseph Hoeing Kastle, (F), S. B., Kentucky State College, 1884.—Professor of Chemistry, Kentucky State College.

Andrew Cowper Lawson, (F), A. B., University of Toronto, 1883.—Geological Survey of Canada, Ottawa.

Felix Lengfeld, (F), California College of Pharmacy.—San Francisco, Cal.

Archibald Byron Macallum, A. B., University of Toronto, 1880.—Lecturer on Physiology and Demonstrator of Histology, University of Toronto.

John Ernst Matzke, A. B., Hope College, 1882, Professor in Bowdoin College, 1889-90.—Professor of Romance Languages, Indiana University.

Thomas McCabe, (F), A. B., 1886, Instructor in the University of Michigan, 1888-89, Professor in Indiana University, 1889-90.—Associate in French, Bryn Mawr College.

Yuzero Motora, (F), Doshisha Kioto, Japan, 1879.—Professor in the Aoyama Yeiwa Gakuko, Tokio.

Julius Nelson, (F), S. B., University of Wisconsin, 1881.—Professor of Biology, Rutgers College.

George Thomas White Patrick, (F), A. B., Iowa State University, 1878, B. D., Yale, 1885.—Professor of Philosophy and Didactics, Iowa State University.

Edmund Clark Sanford, (F), A. B., University of California, 1883, Instructor in Psychology, 1888-89.—Instructor in Psychology, Clark University.

Henry Taber, Ph. B., Yale College, 1882, Assistant, 1888-89.—Docent in Mathematics, Clark University.

Amos Griswold Warner, (F), B. L., University of Nebraska, 1885, General Agent, Charity Organization Society, Baltimore, 1887-89.—Professor of Political Economy, University of Nebraska.

John Roaf Wightman, (F), A. B., University of Toronto, 1871.—Professor of French, Iowa College.

Henry Van Peters Wilson, (F), A. B., 1883, Bruce Fellow in Biology, 1888-89.—Resident Naturalist of the U. S. Fish Commission at Wood's Holl, Mass.

Thomas Kimber Worthington, A. B., Haverford College, 1883, LL. B., University of Maryland, 1890.—Attorney at Law, Baltimore. (27)

1889.

Charles McLean Andrews, (F), A. B., Trinity College, 1884.—Associate in History, Bryn Mawr College.

Frank Wilson Blackmar, (F), Ph. B., University of the Pacific, 1881.—Professor of History and Sociology, University of Kansas.

Jeffrey Richardson Brackett, A. B., Harvard, 1883.—Baltimore.

William Merriam Burton, (F), A. B., Adelbert College, 1886.—(Chemist, Standard Oil Company, Cleveland, O.

Morgan Callaway, Jr., (F), A. B., Emory College (Ga.), 1881, Professor in Southwestern University, 1889-90.—Associate Professor of English, University of Texas.

Alfred Robert Louis Dohme, A. B., 1886.—Student in Germany.

William Curns Lawrence Gorton, (F), A. B., 1886.—Associate Professor of Mathematics, Woman's College of Baltimore.

Joseph Edward Harry, (F), A. B., 1886.—Professor of Greek and German, Georgetown College, Ky.

George Allison Hench, (F), A. B., Lafayette, 1885.—Instructor in German, University of Michigan.

Clifton Fremont Hodge, (F), A. B., Ripon College, 1882.—Fellow in Psychology, Clark University.

Cary Talcott Hutchinson, (F), Ph. B., Washington University, 1886.—Electrician, New York City.

James Thomas Lees, A. B., Adelbert College, 1886.—Principal of the Latin School and Associate Professor of Classical Philology, University of Nebraska.

Archibald MacMechan, (F), A. B., University of Toronto, 1884.—Professor of the English Language and Literature, Dalhousie College, Nova Scotia.

Charles William Moulton, A. B., University of Minnesota, 1888.—Instructor in Chemistry, Shattuck School, Faribault, Minn.

Albion Woodbury Small, A. B., Colby University, 1876.—President of Colby University.

Charles Lee Smith, (F), S. B., Wake Forest College, 1884.—General Secretary, Charity Organization Society of Baltimore; Instructor in History.

Kirby Williams Smith, A. B., University of Vermont, 1884.—Instructor in Latin.

- Rev. Lemon Leander Uhl, A. B., Wittenberg College (Ohio), 1881.—Missionary in British India.
- Arthur Clarence Wightman, (F), A. B., Wofford College, 1879, Senior Demonstrator of Physiology, 1889-90.—Professor of Natural History, Md. Agricultural College.
- William Klapp Williams, A. B., 1886.—Newberry Library, Chicago. (20)
- 1890.
- Joseph Sweetman Ames, (F), A. B., 1886.—Assistant in Physics.
- Edward Carey Applegarth, (F), A. B., 1887.—Student of Medicine, Baltimore.
- Charles Cotton Blackshear, A. B., Mercer University, 1881.—Instructor in Chemistry, Bryn Mawr College.
- Charles Hiram Chapman, (F), A. B., 1888.—Instructor in Mathematics.
- Rudolf John Julius de Roode, Jr., (F), S. B., Kentucky State College, 1885.—Chemist, Experiment Station of West Virginia.
- George Peter Dreyer, (F), A. B., 1887.—Senior Demonstrator of Physiology.
- Edwin Whitfield Fay, (F), A. M., Southwestern Presbyterian University (Tenn), 1883.—Instructor in Ancient Languages, University of Michigan.
- Henry Torsey Fernald, S. B., Maine State College, 1885.—Associate Professor of Zoology, Pennsylvania State College.
- Henry Brayton Gardner, (F), A. B., Brown, 1884.—Assistant Professor of Political Economy, Brown University.
- Charles Jaques Goodwin, (F), A. B., Bowdoin College, 1887.—Professor of Greek, Cornell College, Iowa.
- Charles Homer Haskins, A. B., 1887.—Instructor in History, University of Wisconsin.
- James Taft Hatfield, (F), A. B., Northwestern University (Ill.), 1883.—Professor of German, Northwestern University.
- John Cohn Hemmeter, M. D., University of Maryland, 1883.—Physician, Baltimore.
- Charles Holmes Herty, Ph. B., University of Georgia, 1886.—Chemist, Experiment Station of Georgia.
- Jesse Herman Holmes, A. B., University of Nebraska, 1884.—Instructor in Natural Science, Washington, D. C.
- Rev. Abel Henry Huizinga, (F), A. B., Hope College, 1880.—Clergyman, New Paltz, N. Y.
- Toyokichi Iyenaga, Ph. B., Oberlin, 1887.—Counsellor and Translator, Japanese Rice Exchange, Tokio.
- Thomas Logie, (F), A. B., University of Toronto, 1887.—Instructor in Romance Languages, Williams College.
- Hiram Benjamin Loomis, (F), A. B., Trinity College, 1885.—Instructor in Physics, University of Wisconsin.
- Herbert William Magoun, (F), A. B., Iowa College, 1879.—Acting Professor of Greek, Colorado College.
- Wilmot Vernon Metcalf, A. B., Oberlin, 1883.—Instructor in Chemistry and Physics, Carleton College, Minn.
- John Hanson Thomas McPherson, (F), A. B., 1886.—Instructor in History, University of Michigan.
- Thomas Hunt Morgan, (F), S. B., Kentucky State College, 1886.—Bruce Fellow in Biology.
- Augustus Taber Murray, (F), A. B., Haverford College, 1885.—Professor of the Greek Language and Literature, Earlham College.
- Wyatt William Randall, A. B., St. John's College, 1884.—Assistant in Chemistry.
- George Mann Richardson, (F), A. C., Lehigh University, 1886.—Instructor in Chemistry, Lehigh University.
- Joseph Samuel Shefloe, (F), A. B., Luther College, 1885.—Associate in French, Woman's College of Baltimore.
- Robert Benson Steele, (F), A. B., University of Wisconsin, 1883.—Professor of Latin, St. Olaf College, Minn.
- Andrew Stephenson, A. B., De Pauw University, 1882.—Professor of History, Wesleyan University, Conn.
- Frederick Jackson Turner, A. B., University of Wisconsin, 1884.—Assistant Professor of History, University of Wisconsin.
- John Martin Vincent, A. B., Oberlin College, 1883.—Instructor in History.
- Shozaburo Watase, (F), S. B., Sapporo Agricultural College, 1884, Bruce Fellow in Biology, 1889-90.—Assistant in Morphology, Clark University.
- James Albert Woodburn, (F), A. B., Indiana University, 1876.—Professor of American History, Indiana University. (33)

BACHELORS OF ARTS.

(When the institution is not named, the Johns Hopkins University is to be understood. (F) indicates that the person has held a Fellowship here. \*—Died.)

1879.

- George Washington McCreary.—Baltimore.  
 Chase Palmer, (F), Ph. D., 1882, Assistant,  
 Mass. Institute of Technology, 1882-83,  
 Professor in Mass. State Normal School,  
 Salem, 1883-7, Assistant in Tufts College,  
 1887-8, Professor in Wabash College,  
 1888-90.—Professor of Chemistry, Mis-  
 souri School of Mines.  
 Edward Henry Spicker, (F), Ph. D., 1882,  
 Instructor and Associate, 1882-8.—Asso-  
 ciate Professor of Greek and Latin.

- Rev. Wiltz Raymond Stricklen.—Clergy-  
 man, Baltimore.  
 Lewis Webb Wilhelm, (F), Ph. D., 1884.—  
 Mathematical Instructor, Baltimore.

(16)

1881.

1880.

- Thomas Milton Beadenkopf, B. D., Yale  
 1835, Clergyman, North Waterford, Me.,  
 1835-89.—Teacher, Baltimore.  
 Allen Kerr Bond, M. D., University of  
 Maryland, 1882.—Physician, Baltimore.  
 William Cathcart Day, (F), Ph. D., 1833,  
 Professor in St. John's College, Md.,  
 1833-84, and in the University of Nash-  
 ville, 1884-87.—Professor of Chemistry,  
 Swarthmore College, Pa.  
 Henry Laurence Gantt, M. E., Stevens In-  
 stitute of Technology, 1884, Instructor,  
 McDonogh School, 1886-7.—Mechanical  
 Engineer, Nicetown, Pa.  
 Edgar Goodman, LL. B., University of Mary-  
 land, 1881.—Attorney at Law, Baltimore.  
 Rev. Carl Eckhardt Grammer, Virginia  
 Theological Seminary, 1884, Clergyman,  
 Hancock, Md., and Cincinnati, O., 1884-7.  
 —Professor of Greek and Hebrew, Vir-  
 ginia Theological Seminary.  
 Alexander Fridge Jamieson.—Instructor,  
 Lawrenceville School, N. J.  
 \*Edmund Allen Jarvis. \*October 15, 1880.  
 Stewart Brian Linthicum, LL. B., Univer-  
 sity of Maryland, 1882.—Attorney at  
 Law, Portland, Oregon.  
 John Hanson Lowe, LL. B., University of  
 Maryland, 1882.—Attorney at Law, Bal-  
 timore.  
 Rev. Leigh Clinton Morgan.—Clergyman,  
 Cleveland, O.  
 \*Nelson Palmer. \*June 12, 1886.  
 Thomas Pettigrew.—Civil Engineer, Par-  
 kersburg, W. Va.  
 Harry Fielding Reid, (F), Ph. D., 1885, As-  
 sistant, 1882-4.—Professor of Mathematics,  
 (1836-89) and (now) of Physics, Case  
 School, Cleveland, O.

- John Wilson Brown —Philadelphia, Pa.  
 David Talbot Day, (F), Ph. D., 1884, Teach-  
 er, Baltimore, 1885-6.—U. S. Geological  
 Survey, Washington; Special Agent and  
 Expert in the Department of Mining, etc.,  
 U. S. Census.

- William Henry Howell, (F), Ph. D., 1884,  
 M. D., University of Michigan, 1890,  
 Assistant, Associate, and Associate Pro-  
 fessor, 1884-9, Lecturer, University of  
 Michigan, 1889-90.—Professor of Physi-  
 ology and Histology, University of Mich-  
 igan.

- John Johnson, LL. B., University of Mary-  
 land, 1887, Instructor, McDonogh School,  
 1881-6.—Attorney at Law, Baltimore.

- James Edward Keeler, Allegheny (Pa.) Ob-  
 servatory, 1882-6.—Astronomer, Lick Ob-  
 servatory, San José, Cal.

- Rev. Edwin George Richardson.—Clergy-  
 man, Milwaukee, Wis.

- Adoniram Judson Robinson, LL. B., Uni-  
 versity of Maryland, 1885, Instructor in  
 Baltimore City College, 1881-7.—Attorney  
 at Law, Baltimore.

- \*Henry Rolando, M. D., University of Mary-  
 land, 1883, Resident Physician, Presby-  
 terian Hospital, N. Y., 1883-5. \*October  
 4, 1883.

- Lee Sale, LL. B., Washington University,  
 1885.—Attorney at Law, St. Louis, Mo.

- Mactier Warfield, M. D., University of  
 Maryland, 1884.—Physician, Baltimore.

(12)

1882.

- William Hughlett Adkins, LL. B., Uni-  
 versity of Maryland, 1883.—Attorney at  
 Law, Baltimore.

- Thomas Alexis Berry.—Baltimore.  
 Gustav Bissing, (F), Ph. D., 1885.—Prin-  
 cipal Examiner, Division A, U. S. Patent  
 Office.

Walter Bernard Clarkson, Teacher, Jacksonville, 1880-3.—Superintendent of County Schools, Jacksonville, Fla.

Hermann Louis Ebeling, (F), Teacher, Bloomfield, N. J., 1882-6.—Fellow by Courtesy.

Louis Garthe.—Baltimore.

Edward Ingle.—Editor, Richmond, Va.

Richard Fuller Kimball, LL. B., University of Maryland, 1884.—Attorney at Law, Baltimore.

Gustav Adolf Liebig, Jr., (F), Ph. D., 1885, Assistant in Electricity, 1888-90.—Fellow by Courtesy.

Charles William Emil Miller, (F), Ph. D., 1886.—Professor of Greek and Latin, Peoria (Ill.) High School.

James Page, Assistant, Astronomical Observatory, Allegheny, Pa., 1886-7.—Baltimore.

Albert Gallatin Palmer, (F), Ph. D., 1885, Assistant, and Assistant Professor of Chemistry, Swarthmore College, 1885-7.—Chemist, Baltimore.

Robert Miller Reese.—Baltimore.

Lewis Tebbetts Stevens, (F), M. D., Harvard, 1886.—Lecturer on Physiological Diagnosis, St. Louis Postgraduate School of Medicine; Physician, St. Louis, Mo.

Herbert Thorndyke Tiffany, LL. B., University of Maryland, 1885.—Attorney at Law, Sioux City, Iowa.

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1883.

William Shirley Bayley, (F), Ph. D., 1886.—U. S. Geological Survey; Professor of Geology and Mineralogy, Colby University, Me.

Maurice Fels, LL. B., University of Pennsylvania, 1886.—Attorney at Law, Philadelphia.

David Sterrett Gittings.—Baltimore.

William Beatty Harlan, LL. B., University of Maryland, 1885.—Attorney at Law, Belair, Md.

George Theophilus Kemp, (F), Ph. D., 1886, Demonstrator of Physiology, University of Pennsylvania, 1886-7.—Associate Director, Department of Physiology and Experimental Therapeutics, Hoagland Laboratory, Brooklyn, N. Y.

Gonzalez Lodge, (F), Ph. D., 1886, Professor of Greek and German, Davidson College, 1886-8.—Associate in Latin, Bryn Mawr College.

William Edgar Stratton, M. D., Harvard, 1886, Assistant Physician, Hartford, (Conn.) Hospital, 1886-7.—Physician, Brooklyn, N. Y.

Henry Winslow Williams, LL. B., University of Maryland, 1885.—Attorney at Law, Baltimore.

Henry Van Peters Wilson, (F), Ph. D., 1888, Bruce Fellow in Biology, 1888-9.—Resident Naturalist of the U. S. Fish Commission at Wood's Holl, Mass.

William John Witzzenbacher, Instructor in McDonogh School, 1883-6.—Attorney at Law, Hagerstown, Md.

1884.

(10)

Albert Clayton Applegarth, Ph. D., 1887.—Assistant Librarian, Md. Historical Society.

Charles Walter Artz, LL. B., Columbia, 1886.—Attorney at Law, New York City.

Walter Bliss Canfield.—Chemist, Pottsville, Pa.

George Gibson Carey, Jr., LL. B., University of Maryland, 1886.—Attorney at Law, Baltimore.

William Kennedy Cromwell.—Baltimore.

Charles William Remsberg Crum, M. D., University of Maryland, 1888, Instructor in Mathematics, Mercersburg College, 1889-90.—Physician, Brunswick, Md.

Harry Friedenwald, M. D., College of Physicians and Surgeons, Baltimore, 1886, Resident Physician, City Hospital, Baltimore, 1886-7.—Physician, Baltimore.

William Lindsay Glenn, LL. B., University of Maryland, 1888.—Baltimore.

John Hinkley, LL. B., University of Maryland, 1886.—Attorney at Law, Baltimore.

Charles Morris Howard, LL. B., University of Maryland, 1888.—Attorney at Law, Baltimore.

John Deering Lord, Jr., LL. B., Columbia, 1886.—Attorney at Law, Baltimore.

Jere Williams Lord, M. D., University of Pennsylvania, 1887, Resident Physician, Presbyterian Hospital, Philadelphia, 1887-8.—Physician, Baltimore.

William Patrick Lyons, LL. B., University of Maryland, 1886.—Attorney at Law, Baltimore.

Edgar George Miller, Jr., LL. B., University of Maryland, 1886.—Attorney at Law, Baltimore.

William Ridgely Orndorff, (F), Ph. D., 1887, Instructor in Cornell University, 1887-9.—Assistant Professor of Chemistry, Cornell University.

George Dobbin Penniman, LL. B., University of Maryland, 1886.—Attorney at Law, Baltimore.

William Henry Perkins, Jr., LL. B., University of Maryland, 1888.—Attorney at Law, Baltimore.

George Clement Stokes, Jr., LL. B., University of Maryland, 1888.—Attorney at Law, Baltimore.

\*William Jones Thomas. \*March 9, 1885.

\*William Ferdinand Walz. \*March 21, 1887.  
Frederick Henry Wilkens.—Student in Germany.

George Wishart Edmond, (*extra ordinem*), Assistant in Chemistry, 1889-90.

Charles Howard Shinn, (*extra ordinem*).—San Francisco, California.

(23)

1885.

John Pendleton Campbell, (F), Ph. D., 1888.—Professor of Biology, University of Georgia.

John Glenn, Jr., LL. B., University of Maryland, 1887.—Attorney at Law, Baltimore.

Rev. Junius Moore Horner, B. D., General Theological Seminary, New York, 1890.—Oxford, N. C.

James Albert Loane.—Baltimore.

Harry Wilbur Price, LL. B., Columbian University, 1887.—Attorney at Law, Chicago.  
Benjamin Titus Roberts, Jr.—North Chill, N. Y.

Moses Roth Ryttenberg, LL. B., University of Maryland, 1888.—Attorney at Law, Baltimore.

Hugo Steiner, LL. B., University of Maryland, 1887.—Attorney at Law, Baltimore.

Henry Hazlehurst Wiegand.—Baltimore.

(9)

1886.

Joseph Sweetman Ames, (F), Ph. D., 1890.—Assistant in Physics.

Rev. Wilson Lloyd Bevan, B. D., General Theological Seminary, 1889, A. M., Columbia, 1889.—Student in Oxford, England.

Thomas Hepburn Buckler, M. D., University of Maryland, 1888.—Physician, Baltimore.

Alfred Robert Louis Dohme, Ph. D., 1889.—Student in Germany.

Albert Alvin Doub.—Teacher, Frostburg, Md.

William Snyder Eichelberger, (F).—Assistant in Mathematics and Astronomy, Wesleyan University, Conn.

Harry English.—Instructor in the High School, Washington, D. C.

Abraham Flexner.—Professor of Greek, Louisville (Ky.) High School.

William Edward Gates.—Cleveland, O.

William Curns Lawrence Gorton, (F), Ph. D., 1889.—Associate Professor of Mathematics, Woman's College of Baltimore.

Joseph Edward Harry, (F), Ph. D., 1889.—Professor of Greek and German, Georgetown College, Ky.

Benjamin Henry Hartogensis.—Baltimore.  
James Shaler Hodges, Instructor in St. Paul's School, Concord, N. H., 1886-88.—Electrician, New York City.

Theodore Hough, Instructor in McDonogh School, 1886-9.—Graduate Student.

Percy Meredith Hughes.—Instructor in the High School, Washington, D. C.

John Henry Laessig, Jr.—Baltimore.

Allan McLane, Jr., LL. B., University of Maryland, 1888.—Attorney at Law, Baltimore.

John Hanson Thomas McPherson, (F), Ph. D., 1890.—Instructor in History, University of Michigan.

Colyer Meriwether.—Instructor in English, Second Middle School, Sendai, Japan.

John Pleasants.—Baltimore.

Richard Hall Pleasants, Jr., LL. B., University of Maryland, 1889.—Attorney at Law, Baltimore.

William Flood Smith, M. D., College of Physicians and Surgeons, Baltimore, 1889, Instructor in McDonogh School, 1886-7.—Resident Physician, City Hospital, Baltimore.

Michael Daniel Stein.—Oakland, Cal.

Bernard Wiesenfeld, LL. B., University of Maryland, 1889.—Attorney at Law, Baltimore.

John Whitridge Williams, M. D., University of Maryland, 1888.—Physician, Baltimore.

Langdon Williams.—Teacher, Baltimore.

William Klapp Williams, Ph. D., 1889.—Newberry Library, Chicago.

John Randolph Winslow, M. D., University of Maryland, 1888.—Physician, Baltimore.

\*Allan Chase Woods. \*September 9, 1886.

Frederick George Young.—Vice-President, State Normal School, Madison, South Dakota.

Thomas McCabe, (*extra ordinem*), (F), Ph. D., 1888, Instructor in the University of Michigan, 1888-89, Professor in Indiana University, 1889-90.—Associate in French, Bryn Mawr College.

(31)

1887.

Edward Carey Applegarth, (F), Ph. D., 1890.—Student of Medicine, Baltimore.

Richard Howard Bayard.  
 Herbert Maxwell Brune, LL. B., University of Maryland, 1889.—Attorney at Law, Baltimore.  
 Charles Edward Coates, Jr.—Graduate Student.  
 Rev. William Roswell Cole, B. D., Harvard University, 1890.—Cambridge, Mass.  
 Paul Joseph Dashiell, Instructor in Lehigh University, 1889-90.—Graduate Student.  
 George Peter Dreyer, (F), Ph. D., 1890.—Senior Demonstrator of Physiology.  
 Edward Duffy, Jr., LL. B., University of Maryland, 1889.—Attorney at Law, Baltimore.  
 James Clark Fifield.—Attorney at Law, Minneapolis, Minn.  
 Julius Friedenwald, M. D., College of Physicians and Surgeons, Baltimore, 1890.—Assistant Physician, City Hospital, Baltimore.  
 Douglas Huntly Gordon, LL. B., University of Maryland, 1889.—Graduate Student.  
 Jay Caesar Guggenheimer.—Student of Law, Columbia College.  
 Charles Homer Haskins, Ph. D., 1890, Instructor, 1889-90.—Instructor in History, University of Wisconsin.  
 George Lincoln Hendrickson.—Professor of Latin, Colorado College.  
 Franz Otto Karl Hoffmann.—Student in Germany.  
 Robert Milligan McLane, Jr.—Student of Law, University of Maryland.  
 Robert William Rogers, Instructor in Haverford College, 1887-90.—Professor of the English Bible and Semitic History, Dickinson College.  
 Henry Oliver Thompson, LL. B., University of Maryland, 1890.—Attorney at Law, Baltimore.  
 Benjamin Simon William Tuska, LL. B., Columbia College, 1889.—Attorney at Law, New York City.  
 Rev. Robert William Henry Weech.—Graduate Student.  
 Edward William Willis, M. D., University of Maryland, 1889.—Physician, Baltimore.  
 Henry Firey Wingert.—Attorney at Law, Hagerstown, Md.  
 Walter Bell Scaife, (*extra ordinem*), Ph. D., University of Vienna, 1887.—Reader in Historical Geography.  
 Albert Henry Smyth, (*extra ordinem*).—Professor of English, Central High School, Philadelphia.

(24)

## 1888.

George Henry Harold Ballard.—Instructor in Natural Science, Cathedral School of St. Paul, Garden City, L. I.  
 Edward Ambrose Bechtel.—Professor of Greek, Mt. Morris College, Ill.  
 James William Black.—Graduate Student.  
 Charles Pliny Brigham.—Graduate Student.  
 William Bronwell.—Graduate Student.  
 Hamilton McFarland Brown.—Baltimore.  
 Arthur Lee Browne.—Baltimore.  
 Charles Hamilton Carey.—Baltimore.  
 John Broughton Daish, Instructor in the Washington High School, 1888-89.—Washington, D. C.  
 William Levering Devries.—Fellow.  
 Gustav Edward Gieske.—Student of Medicine, Baltimore.  
 Raloigh Colston Gilderleeve.—Student in Berlin, Germany.  
 Harris Hancock.—Graduate Student.  
 Walter Jones.—Graduate Student.  
 William Augustine Jones.—Student of Law, University of Alabama.  
 Arthur Lincoln Lamb.—Teacher, Baltimore.  
 Charles Day Lanier.—Teacher, Baltimore.  
 John Bright Macauley.—Washington, D. C.  
 William Howard Miller.—Teacher, Centerville, Md.  
 \*George Neville Moore. \*October 29, 1889.  
 Harry O'Donovan.—Student of Medicine, University of Maryland.  
 Frank Eugene Reader.—Student of Law, New Brighton, Pa.  
 Louis Rettger.—Instructor in Mineralogy and Histology, Indiana University.  
 David Ellsworth Roberts.—Graduate Student.  
 Lessing Rosenthal.—Student of Law, Chicago, Ill.  
 Charles Edmund Simon, M. D., University of Maryland, 1890.—Interne at the Johns Hopkins Hospital.  
 Charles Kephart Swartz.—Gettysburg, Pa.  
 Robert Melvin Tarleton.—Birmingham, Ala.  
 Edward Lucas White.—Graduate Student.  
 John White, Jr.—Fellow.  
 Westel Woodbury Willoughby.—Fellow.  
 William Franklin Willoughby.—Student of Law, Washington, D. C.  
 Charles Hiram Chapman, (*extra ordinem*), (F), Ph. D., 1890.—Instructor in Mathematics.  
 Charles Collier Holden, (*extra ordinem*).—Teacher, Raleigh, N. C.

(34)

1889.

Adolph Bernhard.—Teacher of Natural Science, Milwaukee, Wis.  
 Hiram Horsburgh Bice.—Utica, N. Y.  
 John Sedgewick Billings.—Student of Medicine, New York City.  
 Walton Bolgiano.—Student of Medicine, University of Pennsylvania.  
 Theodore Cooke, Jr.—Student of Medicine, University of Maryland.  
 Frank Barnum Culver.—Baltimore.  
 Richard Edward Edes.—Morgan Fellow of Harvard University.  
 Daniel Nathan Eisendrath.—Student of Medicine, Chicago.  
 Albert Bernhardt Faust.—Graduate Student.  
 Charles Lee Fulton.—Student of Law, Elliott City, Md.  
 Joseph Elliott Gilpin.—Graduate Student.  
 Ross Granville Harrison.—Graduate Student.  
 George Newton Cressy Henschen.—Instructor in Natural Science, High School, Reading, Pa.  
 William Sadler Hilles.—Baltimore.  
 William Isaac Hull.—Graduate Student.  
 Harry Clary Jones.—Graduate Student.  
 George Charles Keidel.—Graduate Student.  
 Jesse William Lazear.—Student of Medicine, New York City.  
 Alfred Mann.—Student of Medicine, New York City.  
 Charles Carroll Marden.—Instructor in French, University of Michigan.  
 William Watson McCulloh.—Student of Law, University of Maryland.  
 Phillip Randle Moale.—Graduate Student.  
 Waldo Newcomer.—Baltimore.  
 Leonard Magruder Passano.—Graduate Student.  
 Arthur Jackson Patek.—Student of Medicine, University of Pennsylvania.  
 William Peters Reeves.—Graduate Student.  
 Legh Wilber Reid.—Alexandria, Va.  
 Ralph Robinson.—Student of Law, University of Maryland.  
 Brantz Mayer Roszel.—Graduate Student.  
 John George Sadtler.—Student of Divinity, Germantown, Pa.  
 Benjamin Bittinger Shreeves.—Student of Law, University of Maryland.  
 Robert Tunstall Taylor.—Student of Medicine, University of Virginia.  
 Walter Herron Taylor.—Student of Law, University of Virginia.

Winfield Scott Thomas.—Professor of Greek and Latin, Chaffee College, Cal.  
 Harry Ullmann.—Graduate Student.  
 Horatio Alanson Warren.—Collinsville, Conn.

(36)

1890.

John McEwen Ames.—Chemist, Chicago, Ill.  
 William Hand Browne, Jr.—Graduate Student.  
 James Edmund Bryan, Jr.—University Scholar.  
 Ralph Erskine Carson.—Teacher, Philadelphia.  
 William Henry Carson.—Student of Law, Seattle, Wash.  
 Sidney Million Cone.—Student of Medicine, University of Pennsylvania.  
 Vernon Cook.—University Scholar.  
 Lucius Bradley Dorr, M. D., University of Maryland, 1890.—Physician, Buffalo, N. Y.  
 Edwin Stanton Faust.—Student in Germany.  
 Ned Arden Flood.—Meadville, Pa.  
 Herbert Friedenwald.  
 Fielding Hudson Garrison.—Washington, D. C.  
 Joseph Philip Gerry.—Baltimore.  
 George William Gray.—Graduate Student.  
 Samuel Harris Guggenheimer.—Student of Law, Columbia College.  
 Daniel Dorsey Guy.—Student of Law, University of Maryland.  
 James Chew Johnston.—Student of Medicine, New York City.  
 Edward Parkin Keech, Jr.—Student of Law, University of Maryland.  
 Henry McElderry Knower.—Graduate Student.  
 Berwick Bruce Lanier.—Student of Medicine, University of Maryland.  
 Sylvan Hayes Lauchheimer.—University Scholar.  
 Tilghman Brice Marden.—Baltimore.  
 George Clarence Morrison.—Graduate Student.  
 Arthur Alexander Oehm.—Baltimore.  
 Arthur Roseweld Oppenheimer.—Student of Medicine, University of Maryland.  
 Lyman Pierson Powell.—University Scholar.  
 Samuel Guy Snowden.—Student in Drew Theological Seminary.  
 James Ernest Stokes.—Student of Medicine, University of Maryland.  
 Isaac Lobe Straus.—University Scholar.

<p>Charles Snowden Watts.—Graduate Student.</p> <p>William Wallace Whitelock.—Student in Germany.</p> <p>William Whitridge.</p> <p>Adolph Grant Wolf.—Washington, D. C.</p> <p>Frank Alfred Wolff, Jr.—University Scholar.</p> <p>James Homer Wright.—University Scholar.</p>	<p>Oscar Woodward Zeigler.—Student in Union Theological Seminary, New York.</p> <p>Inazo (Ota) Nitobe, (<i>extra ordinem</i>), Ph. D., University of Halle, 1890.—Associate Professor of History, etc., Imperial College of Agriculture, Sapporo, Japan.</p>	<p>37</p> <hr style="width: 20px; margin: 0 auto;"/> <p>250</p>
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SIXTEENTH  
ANNUAL REPORT

OF THE PRESIDENT OF THE

JOHNS HOPKINS UNIVERSITY

Baltimore, Maryland

1891



# ACADEMIC STAFF, 1890-91.

<p>Daniel C. Gilman, LL. D. . . . .</p> <p>J. J. Sylvester, F. R. S., D. C. L. . . . .</p> <p>Herbert B. Adams, Ph. D. . . . .</p> <p>Maurice Bloomfield, Ph. D. . . . .</p> <p>William K. Brooks, Ph. D. . . . .</p> <p>Basif L. Gilderleeve, Ph. D., LL. D. . . . .</p> <p>Edward H. Griffin, D. D., LL. D. . . . .</p> <p>Paul Haupt, Ph. D. . . . .</p> <p>Henry M. Hurd, A. M., M. D. . . . .</p> <p>Howard A. Kelly, M. D. . . . .</p> <p>H. Newell Martin, Dr. Sc., M. D. . . . .</p> <p>Simon Newcomb, Ph. D., LL. D. . . . .</p> <p>William Osler, M. D., F. R. C. P. . . . .</p> <p>Ira Remsen, M. D., Ph. D. . . . .</p> <p>Henry A. Rowland, Ph. D. . . . .</p> <p>William H. Welch, M. D. . . . .</p> <p>John S. Billings, M. D., LL. D. . . . .</p> <p>James W. Bright, Ph. D. . . . .</p> <p>William Hand Browne, M. D. . . . .</p> <p>William T. Councilman, M. D. . . . .</p> <p>Thomas Craig, Ph. D. . . . .</p> <p>Louis Duncan, Ph. D. . . . .</p> <p>A. Marshall Elliott, Ph. D. . . . .</p> <p>Richard T. Ely, Ph. D. . . . .</p> <p>George H. Emmott, A. M. . . . .</p> <p>Fabian Franklin, Ph. D. . . . .</p> <p>William S. Halsted, M. D. . . . .</p> <p>Arthur L. Kimball, Ph. D. . . . .</p> <p>Harmon N. Morse, Ph. D. . . . .</p> <p>Edward H. Spieker, Ph. D. . . . .</p> <p>Minton Warren, Ph. D. . . . .</p> <p>George H. Williams, Ph. D. . . . .</p> <p>Henry Wood, Ph. D. . . . .</p> <p>Cyrus Adler, Ph. D. . . . .</p> <p>Ethan A. Andrews, Ph. D. . . . .</p> <p>William B. Clark, Ph. D. . . . .</p> <p>Edward M. Hartwell, M. D., Ph. D. . . . .</p> <p>William F. C. Hasson, U. S. N. . . . .</p> <p>Marion D. Learned, Ph. D. . . . .</p> <p>Edward Renouf, Ph. D. . . . .</p> <p>Henry A. Todd, Ph. D. . . . .</p> <p>Philip R. Uhler. . . . .</p> <p>Frederick M. Warren, Ph. D. . . . .</p> <p>Alexander C. Abbott, M. D. . . . .</p> <p>William S. Aldrich, M. E. . . . .</p> <p>Joseph S. Ames, Ph. D. . . . .</p> <p>Bolling W. Barton, M. D. . . . .</p> <p>William J. A. Bliss, A. B. . . . .</p> <p>Charles A. Borst, A. M. . . . .</p> <p>Charles H. Chapman, Ph. D. . . . .</p> <p>George P. Dreyer, Ph. D. . . . .</p> <p>Wyatt W. Randall, Ph. D. . . . .</p> <p>Charles L. Smith, Ph. D. . . . .</p> <p>Kirby W. Smith, Ph. D. . . . .</p> <p>John M. Vincent, Ph. D. . . . .</p> <p>S. Edwin Whiteman. . . . .</p>	<p style="text-align: right;"><i>President of the University.</i></p> <p style="text-align: right;"><i>Professor (Emeritus) of Mathematics.</i></p> <p style="text-align: right;"><i>Professor of American and Inst. History.</i></p> <p style="text-align: right;"><i>Professor of Sanskrit, etc.</i></p> <p style="text-align: right;"><i>Professor of Animal Morphology.</i></p> <p style="text-align: right;"><i>Professor of Greek.</i></p> <p style="text-align: right;"><i>Dean and Professor of History of Philosophy.</i></p> <p style="text-align: right;"><i>Professor of the Semitic Languages.</i></p> <p style="text-align: right;"><i>Professor of Psychiatry.</i></p> <p style="text-align: right;"><i>Professor of Gynecology.</i></p> <p style="text-align: right;"><i>Professor of Biology.</i></p> <p style="text-align: right;"><i>Professor of Mathematics and Astronomy.</i></p> <p style="text-align: right;"><i>Professor of Medicine.</i></p> <p style="text-align: right;"><i>Professor of Chemistry.</i></p> <p style="text-align: right;"><i>Physicist.</i></p> <p style="text-align: right;"><i>Professor of Pathology.</i></p> <p style="text-align: right;"><i>Lecturer on Municipal Hygiene.</i></p> <p style="text-align: right;"><i>Associate Professor of English Philology.</i></p> <p style="text-align: right;"><i>Librarian and Associate Professor of English Literature.</i></p> <p style="text-align: right;"><i>Associate Professor of Anatomy.</i></p> <p style="text-align: right;"><i>Associate Professor of Mathematics.</i></p> <p style="text-align: right;"><i>Associate Professor of Electricity.</i></p> <p style="text-align: right;"><i>Associate Professor of the Romance Languages.</i></p> <p style="text-align: right;"><i>Associate Professor of Political Economy.</i></p> <p style="text-align: right;"><i>Associate Professor of Logic, etc.</i></p> <p style="text-align: right;"><i>Associate Professor of Mathematics.</i></p> <p style="text-align: right;"><i>Associate Professor of Surgery.</i></p> <p style="text-align: right;"><i>Associate Professor of Physics.</i></p> <p style="text-align: right;"><i>Associate Professor of Chemistry.</i></p> <p style="text-align: right;"><i>Associate Professor of Greek and Latin.</i></p> <p style="text-align: right;"><i>Associate Professor of Latin.</i></p> <p style="text-align: right;"><i>Associate Professor of Inorganic Geology.</i></p> <p style="text-align: right;"><i>Associate Professor of German.</i></p> <p style="text-align: right;"><i>Associate in the Semitic Languages.</i></p> <p style="text-align: right;"><i>Associate in Biology.</i></p> <p style="text-align: right;"><i>Associate in Paleontology.</i></p> <p style="text-align: right;"><i>Associate in Physical Training.</i></p> <p style="text-align: right;"><i>Associate in Applied Mechanics.</i></p> <p style="text-align: right;"><i>Associate in German.</i></p> <p style="text-align: right;"><i>Associate in Chemistry.</i></p> <p style="text-align: right;"><i>Associate in Romance Languages.</i></p> <p style="text-align: right;"><i>Associate in Natural History.</i></p> <p style="text-align: right;"><i>Associate in French and German.</i></p> <p style="text-align: right;"><i>Assistant in Bacteriology, etc.</i></p> <p style="text-align: right;"><i>Instructor in Drawing.</i></p> <p style="text-align: right;"><i>Assistant in Physics.</i></p> <p style="text-align: right;"><i>Instructor in Botany.</i></p> <p style="text-align: right;"><i>Assistant in Electricity.</i></p> <p style="text-align: right;"><i>Assistant in Astronomy.</i></p> <p style="text-align: right;"><i>Instructor in Mathematics.</i></p> <p style="text-align: right;"><i>Demonstrator of Physiology.</i></p> <p style="text-align: right;"><i>Assistant in Chemistry.</i></p> <p style="text-align: right;"><i>Instructor in History.</i></p> <p style="text-align: right;"><i>Instructor in Latin.</i></p> <p style="text-align: right;"><i>Instructor in History.</i></p> <p style="text-align: right;"><i>Assistant in Drawing.</i></p>
<p>David C. Bell. . . . .</p> <p>J. Franklin Jameson, Ph. D. . . . .</p> <p>John A. Kasson, LL. D. . . . .</p> <p>George Lyman Kittredge, A. B. . . . .</p> <p>Richard G. Moulton, A. M. . . . .</p> <p>James Schouler, LL. D. . . . .</p> <p>Edmund C. Stedman, A. M. . . . .</p> <p>Caleb T. Winchester, A. M. . . . .</p> <p>Woodrow Wilson, Ph. D., LL. D. . . . .</p> <p>Carroll D. Wright. . . . .</p>	<p style="text-align: right;"><i>Lecturer on the Art of Vocal Expression.</i></p> <p style="text-align: right;"><i>Lecturer on History of the Southern States.</i></p> <p style="text-align: right;"><i>Lecturer on Diplomacy.</i></p> <p style="text-align: right;"><i>Lecturer on English Literature.</i></p> <p style="text-align: right;"><i>Lecturer on English Literature.</i></p> <p style="text-align: right;"><i>Lecturer on American Political History.</i></p> <p style="text-align: right;"><i>Percy Turnbull Memorial Lecturer on Poetry.</i></p> <p style="text-align: right;"><i>Lecturer on English Literature.</i></p> <p style="text-align: right;"><i>Lecturer on Administration.</i></p> <p style="text-align: right;"><i>Lecturer on Studies in Social Science.</i></p>

SIXTEENTH

ANNUAL REPORT

OF THE PRESIDENT OF THE

Johns Hopkins University

Baltimore, Maryland

1891

---

BALTIMORE  
THE JOHNS HOPKINS PRESS  
1891

# TRUSTEES.

1890-91.

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*Treasurer:*

FRANCIS WHITE.

*Secretary:*

LEWIS N. HOPKINS.

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JOSEPH P. ELLIOTT,	J. HALL PLEASANTS,
ROBERT GARRETT,	ALAN P. SMITH,
CHARLES J. M. GWINN,	C. MORTON STEWART,
LEWIS N. HOPKINS,	JAMES CAREY THOMAS,
FRANCIS T. KING,	FRANCIS WHITE.

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*Committee in Charge of the Clifton Grounds.*

LEWIS N. HOPKINS,	FRANCIS WHITE,
GEORGE W. DOBBIN, <i>ex officio</i> .	

\* Died May 23, 1891.

# REPORT.

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TO THE TRUSTEES OF THE JOHNS HOPKINS UNIVERSITY:—

*Gentlemen:*

In presenting to you, and to the public through you, a report of the progress of the Johns Hopkins University, during the year ending September 1, 1891, it is pleasant to begin by recording the fact that the institution has been free from those financial anxieties which were felt a short time ago in consequence of the failure of dividends from certain stocks given to it by its founder. This relief has been due in no small degree to the continued expenditure of the Emergency Fund generously contributed for this very purpose. It is also due to a change in the investment of a considerable part of the original endowment, from common stock of the Baltimore and Ohio Railroad, to preferred stock of the same corporation. The timely gifts of our friends and the prompt action of our Finance Committee, supported by an increase in the charges for tuition and by willing economy in all the expenditures dependent upon the Faculty, have enabled the University to hold its own, completely, without any apparent diminution of its activity and usefulness. .

The attendance of students, for example, has never been so large as during the year now closed, and the quality of those who have entered here has never been better. The number of graduates showed a marked increase. The vari-

ous serial publications have appeared with their accustomed regularity. Instructions have been maintained in all the departments hitherto instituted. Electrical engineering has received increased attention, at a considerable though still inadequate outlay. Public lectures have been given on the Donovan and Turnbull foundations to the great satisfaction of large assemblies. The usual number of fellowships and scholarships have been awarded. Promotions have been made in the faculty and the staff of teachers has been increased by the appointment of many assistants. The library has been greatly enlarged partly by the usual appropriations and partly by generous gifts.

#### STATISTICS.

The academic staff numbered during the year sixty-six teachers, including seven physicians and surgeons attached to the Johns Hopkins Hospital. The number of students enrolled was four hundred and sixty-eight, of whom two hundred and thirty-five were residents of Maryland, and two hundred and twenty came here from thirty-six other States of the Union, and thirteen from foreign countries. Among the students were two hundred and seventy-six already graduated, coming from one hundred and twenty-two colleges and universities; there were one hundred and forty-one matriculates (or candidates for the degree of Bachelor of Arts); and there were fifty-one admitted as special students, to pursue courses of study for which they seemed fitted, without reference to graduation. The degree of Bachelor of Arts was conferred upon fifty candidates; and twenty-eight candidates were promoted to the degree of Doctor of Philosophy.

The following table indicates the enrolment of students in each year since the University was opened in the autumn of 1876 :

	Total Enrolled.	Graduates, (incl. Fellows.)	Matriculates.	Non-Matriculates.
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	127	62
1888-89	394	216	129	49
1889-90	404	229	130	45
1890-91	468	276	141	51
*1891-92	505	299	138	68

\*At the opening of the year.

During fifteen years, seventeen hundred and sixty-seven individuals have been enrolled as students, of whom seven hundred and seventy are registered as from Maryland (including six hundred and twenty-four from Baltimore), and nine hundred and ninety-seven from fifty-two other States and countries. Nine hundred and ninety-four persons entered as graduate students, and seven hundred and seventy-three entered as undergraduates. Of the undergraduates, one hundred and sixty have continued as graduate students, many of them proceeding to the degree of Doctor of Philosophy. It thus appears that eleven hundred and fifty-four persons have followed graduate studies here.<sup>1</sup>

The following table indicates the geographical distribution of the students each year since the opening, as shown by the Annual Registers :

<sup>1</sup>These figures are based on a recent review of our registration book. They differ a little from previous statements, partly because a few clergymen and other persons who have had the equivalent of a college degree, were before counted as undergraduates, and partly because some undergraduates who proceeded to graduate courses were enrolled only as graduates.

	<i>Of Maryland.</i>	<i>Not of Maryland.</i>
1876-77	59	30
1877-78	71	33
1878-79	76	47
1879-80	97	62
1880-81	95	81
1881-82	97	78
1882-83	106	98
1883-84	123	126
1884-85	130	160
1885-86	130	184
1886-87	162	216
1887-88	199	221
1888-89	183	211
1889-90	215	189
1890-91	235	233
*1891-92	254	251

\*At the opening of the year.

The attendance upon the courses given in some of the principal subjects has been as follows during the last five years :—

	1886-87.	1887-88.	1888-89.	1889-90.	1890-91.
Mathematics and Astronomy, . . . . .	76	84	82	83	85
Physics, . . . . .	73	85	74	85	98
Chemistry, . . . . .	118	119	124	137	114
Mineralogy and Geology, . . . . .	24	25	38	33	30
Biology, . . . . .	65	61	81	64	59
Pathology, . . . . .	25	15	24	34	40
Greek, . . . . .	48	61	58	55	61
Latin, . . . . .	72	74	69	69	70
Sanskrit, etc., . . . . .	37	40	39	38	35
Semitic Languages, . . . . .	14	18	43	35	26
German, . . . . .	113	130	119	116	104
French, Italian, etc., . . . . .	60	72	69	88	84
English, etc., . . . . .	90	84	94	90	84
History and Political Science, . . . . .	135	137	162	142	143
Psychology, Ethics, etc., . . . . .	65	81	48	60	72

Since degrees were first conferred, in 1878, three hundred persons have attained the Baccalaureate degree, and two hundred and twelve have been advanced to the degree of Doctor of Philosophy, as appears from the following table :

	<i>Bachelors of Arts.</i>				<i>Doctors of Philosophy.</i>			
1877-78	-	-	-	-	-	-	-	4
1878-79	-	-	-	3	-	-	-	6
1879-80	-	-	-	16	-	-	-	5
1880-81	-	-	-	12	-	-	-	9
1881-82	-	-	-	15	-	-	-	9
1882-83	-	-	-	10	-	-	-	6
1883-84	-	-	-	23	-	-	-	15
1884-85	-	-	-	9	-	-	-	13
1885-86	-	-	-	31	-	-	-	17
1886-87	-	-	-	24	-	-	-	20
1887-88	-	-	-	34	-	-	-	27
1888-89	-	-	-	36	-	-	-	20
1889-90	-	-	-	37	-	-	-	33
1890-91	-	-	-	50	-	-	-	28

DEATH OF THE PRESIDENT OF THE BOARD OF TRUSTEES.

At the beginning of the academic year the University was deprived by death of the services of Judge Brown, one of the Trustees, who had been for several years the wise and efficient Chairman of the Executive Committee. Near the close of the year, the death occurred of Honorable George W. Dobbin, President of the Board of Trustees, whose influence has been felt since the opening of the University in favor of the most enlightened policy for the advancement of knowledge and for the education of young men. His long and honorable life was commemorated by the Resolutions of the Trustees, by a meeting of the Academic Staff, and by a public eulogy delivered on Commencement Day. The Resolutions adopted in honor of his memory are printed in the *University Circulars*, July, 1891, No. 91, and also in the appendix to this report. The

proceedings of the meeting commemorative of Judge Brown, with the action of the Trustees and a biographical note, are contained in the *University Circulars*, November, 1890, No. 83.

#### RECENT APPOINTMENTS AND RESIGNATIONS.

CHARLES MORTON STEWART, Esq., has been made President of the Board of Trustees, and CHARLES J. M. GWINN, Esq., Chairman of the Executive Committee. The vacancy in the Board of Trustees occasioned by the death of JUDGE BROWN was filled by the election of JAMES L. McLANE, Esq.

The following appointments have been made during the past year in the Academic Staff:

HERBERT B. ADAMS, Ph. D., to be Professor of American and Institutional History.

WILLIAM K. BROOKS, Ph. D., to be Professor of Animal Morphology.

MAURICE BLOOMFIELD, Ph. D., to be Professor of Sanskrit and Comparative Philology.

JAMES W. BRIGHT, Ph. D., to be Associate Professor of English Philology.

WILLIAM HAND BROWNE, M. D., to be Associate Professor of English Literature.

N. MURRAY, A. B., LL. B., to be Librarian.

To be Lecturer for 1891-2 on the "Percy Turnbull Memorial" foundation, Professor R. C. JEBB, LL. D., of the University of Cambridge, England.

To be Lecturers for 1890-1 on "the Donovan foundation," Professor C. T. WINCHESTER, of Wesleyan University, Professor GEORGE L. KITTREDGE, of Harvard University, and Mr. RICHARD G. MOULTON, of Cambridge, England.

To be Associate in Physics, JOSEPH S. AMES, Ph. D.

To be Associate in Mathematics, CHARLES H. CHAPMAN, Ph. D.

To be Associate in Mechanical Engineering, WILLIAM S. ALDRICH, M. E. (By vote of October, 1891).

To be Associate in Electrical Engineering, HERMANN S. HERING, M. E.

To be Associate in the Romance Languages, JOHN E. MATZKE, Ph. D.

To be Instructor in the Semitic Languages, CHRISTOPHER JOHNSTON, JR., A. M.

To be Instructor in German, HERMANN SCHOENFELD, Ph. D.

To be Assistant in Bacteriology and Hygiene, GEORGE H. F. NUTTALL, M. D., Ph. D.

To be Instructor in Mathematics, CHARLES L. POOR, S. B.

The University has lost the services of Professor A. L. KIMBALL, who graduated here as Doctor of Philosophy in 1884, and has since discharged successively the duties of a Fellow, a Fellow by Courtesy, an Associate, and an Associate Professor of Physics to the entire satisfaction of all the authorities as well as of the students who have come under his charge. He has accepted an invitation to be Professor of Physics in Amherst College.

The Associate in Romance Languages, HENRY A. TODD, Ph. D., who received his Doctor's degree from this university in 1885, and who has been since 1883 a learned and faithful member of the Academic Staff, resigned his position at the end of the session in order to accept a professorship in the Stanford University in California.

Dr. E. M. HARTWELL, who received the degree of Doctor of Philosophy in 1881 and who has honorably discharged the duties of a Fellow, an Assistant in Biology, and an Asso-

ciate and Director of Physical Culture, by successive appointments beginning in 1879, resigned his position in December in order to become Director of Physical Training in the Public Schools of Boston.

#### PUBLIC ASSEMBLIES.

Commemoration Day, February 23, 1891, was celebrated by an assembly of the officers, students, and friends of the University in the large hall of the Peabody Institute, the use of which was kindly granted by a vote of the Peabody Trustees. After opening remarks by the President, addresses were made by Professor Osler, on Recent Advances in Medicine; by Professor Martin, on The Connection of the University with the Oyster Question; and by Professor Elliott, on Advanced Studies in the Romance Languages. These addresses are printed in the *University Circulars*, March, 1891, No. 86.

At the close of the year degrees were conferred in the Mt. Vernon Place Methodist Episcopal Church, June 11, 1891, at 5 p. m. After an address commemorating Judge Dobbin, Dr. Kimball addressed the candidates for degrees, and the Right Rev. A. M. Randolph, D. D., LL. D., and Charles Morton Stewart, Esq., acting as President of the Board of Trustees, made congratulatory addresses. The candidates for the degree of A. B. were presented by Dr. Griffin; and those for the degree of Ph. D., by Dr. Remsen. The names of the graduates of the year are given in the appendix.

At the opening of the year an address was delivered by the President, his course of thought being suggested by observations made during his recent prolonged journey in lands adjacent to the Mediterranean. Among other subjects, he referred to his presence as a delegate of the Johns Hopkins

University at the fêtes given in honor of the six hundredth anniversary of the University of Montpellier. The address is printed in the *University Circulars*, November, 1890, No. 83.

#### LECTURES.

The first course of lectures on the Percy Turnbull Memorial foundation was delivered in the month of March, by E. C. Stedman, Esq., of New York. Levering Hall was filled to its utmost capacity, and every day many who sought admission were turned away. Mr. Stedman's subject was "The Nature and Elements of Poetry." A syllabus of the course was printed in the *University Circulars*, April, 1891, No. 87. The lectures gave a high degree of literary enjoyment to all who heard them, and it is pleasant to learn that they are to be repeated in other universities before their publication.

On the Donovan foundation there were three courses of lectures during the session, all delivered in Levering Hall. The first was by Mr. R. G. Moulton, of Cambridge, Eng., on Milton's Poetic Art (four lectures), with an additional lecture on University Extension; the second by Professor Kittredge, of Harvard, on the Early English Gawain Romances (six lectures); and the third by Professor C. T. Winchester, of Wesleyan, on English Literature of the Period of Queen Anne (eight lectures), with an additional lecture on the "Lake Poets."

Several noteworthy courses of lectures were given before the students of History and Political Science by non-resident lecturers,—namely, by Hon. John A. Kasson, of Washington, formerly United States Minister in Vienna and in Berlin, on the History of Diplomacy (ten lectures); by Hon. C. D. Wright, U. S. Commissioner of Labor, on Studies in Social

Science (eight lectures); by James Schouler, Esq., of Boston, on American Political History (ten lectures); by Professor J. F. Jameson, of Brown University, on the Constitutional and Political History of the Southern States (ten lectures); and by Professor W. Wilson, of Princeton, on Administration and Public Law (twenty-five lectures). A course of ten lectures (to which many persons not connected with the department were admitted) was also given by the President of the University in the physical lecture room, on the Historical Geography of the Mediterranean and its adjacent lands.

Three lectures were delivered on the invitation of the professors in Geology, by Professor W. M. Davis, of Harvard College,—the subjects being :

(a) *Tornadoes, a Story of a long Inheritance*; (b) *The Triassic Sandstone of the Connecticut Valley*; (c) *The Physical Geography of New England*.

Mr. G. K. Gilbert, of the United States Geological Survey, delivered a lecture on Niagara Falls and the Great Lakes before the Scientific Association.

Mr. A. Melville Bell, of Washington, gave a lecture on Visible Speech before the students of languages; and his brother, Mr. David C. Bell, of Washington, gave a brief course on Vocal Culture, which was preceded by a reading from Shakespeare.

Dr. H. A. Todd gave a series of readings in Dante, which continued weekly through February, March, and April.

A course of lectures on various pedagogical themes was delivered during February and March, in Hopkins Hall. They were attended by an audience of about one hundred persons, members of the University who have been, or expect soon to be engaged in the work of collegiate instruction. The speakers and their subjects are as follows :

Professor NICHOLAS MURRAY BUTLER, of Columbia College, President of the New York College for the Training of Teachers, on The Use and Abuse of Examinations.

Hon. W. T. HARRIS, U. S. Commissioner of Education, on Books serviceable to Teachers of Colleges and High Schools at the beginning of their Career.

Hon. J. L. M. CURRY, of Washington, General Agent of the Peabody Education Fund, on the Study of Pedagogics in the University.

Professor GRIFFIN, on Books treating of the Ideal End of Education and of its Practical Method.

Professor GILDERSLEEVE, on Literature as a Science.

Professor REMSEN, on the Teaching of Science in Colleges.

Professor MARTIN, on Methods of Teaching in Science.

Professor ADAMS, on Public Speaking.

Professor D. C. BELL, of Washington, on the Art of Vocal Expression.

Several addresses were given before the Travellers' Club, namely:

Professor H. F. REID, of Cleveland, on the Muir Glacier (Alaska).

Dr. E. HAUSKNECHT, late of Tokio, on Educational Progress in Japan.

Dr. G. H. WILLIAMS, on a Geological Excursion in the Northern Appalachian Chain.

Dr. W. B. CLARK, on the Geological Features of Gay Head, Mass.

President SLOCUM, of Colorado College, on Irrigation Schemes in New Mexico.

Passed Assistant Engineer R. G. DENIG, U. S. Navy, on a Trip to Persepolis.

Dr. C. JOHNSTON, Jr., on the History of Persepolis.

The Baltimore branch of the Archæological Institute of America held three meetings within our walls, at which addresses were made by Professor J. W. Powell, of Washington, on American Ethnology; by Professor Gildersleeve, on the newly discovered fragments of Aristotle; by Professor Marquand, of Princeton, on the Rise of Ionic Architecture; by Mr. Talcott Williams, of Philadelphia, on Historical Survivals in Morocco, and on a Helmet from Lake Van. The

Annual Address, a review of archæological progress during the present century, was delivered by the President.

#### THE LIBRARY.

The Library has made rapid advances during the last few months, and the Librarian estimates that it contains an aggregate of 55,000 volumes, besides a collection of perhaps 40,000 pamphlets.

*The Bequest of Mr. John W. McCoy.*—All the books received from the estate of Mr. McCoy have been distinguished by an engraved book-plate indicating the source from which they came. Those pertaining to the history of the fine arts, and indeed all those with important engravings, together with books of travel and the rare Americana, are still kept in the room where the donor placed them. Books that are not of extraordinary value, including essays, poems, histories, etc., have been brought to the university buildings where they have greatly enriched our resources.

The more thoroughly the collection is examined, the more valuable it appears. The art books, especially, are costly, attractive, and of permanent utility.

The following statement in regard to the McCoy Library has been prepared by the Librarians, Dr. Browne and Mr. Murray.

The collection is especially rich in works treating of Art and Archæology, the history of the various great schools of Art, lives of eminent artists, and in particular, in magnificent folios of engravings, reproducing the master-pieces of the great art-galleries of Europe. Among these are represented the Pitti Palace and Medicean Gallery of Florence, the Palais Royal of Paris, and the Royal Galleries of Dresden, Munich,

Madrid, Versailles, the Hague, Turin, the Museo Borbonico of Naples, the British Museum, the galleries of the Vatican and the Campidoglio of Rome, the Vernon Gallery, the works of Raphael, Leonardo da Vinci, Albert Durer, Holbein, etc.

More modern schools of art are represented in a collection of large folios, illustrating the works of Rubens, Rembrandt, Reynolds, Canova, Thorwaldsen, Delaroche, Turner, and other great artists.

In the department of Archæology are found the twenty volumes of the *Trésor de Numismatique*, Du Sommerard, *Les Arts du Moyen Age*, Meyrick's *Ancient Armour*, Hamilton's engravings from ancient vases, Owen Jones's *Alhambra*, and many other works of great value.

The valuable and rare books in the department of English Literature form a most useful and acceptable addition to the working library of the University, but are too numerous to be specified. We may mention, however, the publications of the Camden and Percy Societies, the Fuller Worthies Library, the Bohn Libraries, and a fine collection of the English dramatists.

In Americana this library is especially rich, containing many books printed in New England in the seventeenth and early eighteenth centuries; also a valuable collection of books and pamphlets in thirty-six volumes, relating to the American Revolution. A particularly desirable accession to our shelves is found in the large number of books, many of them of great rarity, treating of the history, and especially the early history, of the Southern States.

The number of volumes in the McCoy Library is eight thousand.

*The Gift of Mr. W. A. Slater.*—The sum of two thousand dollars given to the University by William A. Slater, Esq., of

Norwich, Conn., has been expended in the purchase of costly books, not absolutely essential to our daily work but of great attraction to students. The most of the purchases were in English literature, and among them were the best library editions of Shakespeare, Beaumont and Fletcher, and other dramatists, Ascham, Milton, Evelyn, Johnson, Dryden, Pope, Scott, Wordsworth, Coleridge, Goldsmith, Lamb, Browning, Tennyson, Lowell, Longfellow, Whittier, and other writers. Duruy's History of the Greeks, the recent reprints of Washington, Franklin, and Hamilton, Clarendon's History of the Rebellion, and Shea's History of the Catholic Church in America were also purchased. In science, the collected works of Sir Humphry Davy, Clerk Maxwell, Cuvier, Dufrenoy, and others were procured. Among other costly purchases may be named Kürschner's *Deutsche Nationalliteratur*, *Les Grands Écrivains de la France*, edited by Regnier, the great descriptions by Deshayes of the fossil shells and the invertebrate animals found in and near the basin of Paris, and also Maspero's *Recueil de Travaux* (Egyptian and Assyrian Archaeology), the Voyage of the Astrolabe, and the Writings of Aldrovandus. These are only examples of the manner in which the fund was distributed; almost every department of study was benefited by it. This unsolicited generosity of Mr. Slater may suggest to other beneficent persons a mode by which any amount of money, from one hundred dollars upwards, may be advantageously employed in the enrichment of our library.

*Library of Southern History: The Gifts of Gen. Birney, Colonel Scharf, and Others.*—In January last General William Birney, of Washington, whose attention had been especially directed to the studies of American history which are here in progress, presented to the library a collection of books and pamphlets numbering over one thousand titles, chiefly rela-

ting to slavery. He and his father, the late James G. Birney, had been engaged at least since 1840 in bringing these books together. The collection is doubtless one of the most complete of its kind in the country. An account of it, prepared by Dr. J. M. Vincent, librarian of the historical seminary, will be found in the *University Circulars*, February, 1891, No. 85.

Soon afterwards Colonel J. Thomas Scharf, the well-known writer of the history of Maryland and of Baltimore, and of other volumes, presented to the University his collection of manuscripts, pamphlets, autographs, curios and other historical material, chiefly pertaining to the history of the Southern States. Mr. Powell, now librarian of the historical department, has made a careful examination of the Scharf collection, and has superintended its removal and begun its re-arrangement, with the aid of Mr. W. I. Hull. His account of the contents of this remarkable collection will be found printed in full in the *University Circulars*, June, 1891, No. 89. The most important facts are thus stated by Mr. Powell:

The collection includes a large number of unpublished manuscripts relating chiefly to the history of the Civil War. Some of these manuscripts were compiled from sources no longer accessible. There are, besides, a large number of pamphlets which treat various phases of American history. Many original letters and documents, such as marriage licenses and indentures of the last century, give the collection genealogical value. The collection includes, also, several thousand autographs and the largest collection in existence of Maryland muster rolls. Together with these manuscripts and pamphlets, the University received copies of the works of which Col. Scharf is the author, and a few other volumes.

The Scharf collection, the Birney collection, some of the books received from Mr. McCoy, and some otherwise acquired by the library, have now been placed together in one of the Monument-street houses, as their temporary home, awaiting the construction of a library building. Taken together the collection is large and valuable, ranking, it is fair to presume, among the most important collections of the kind in the country. Still it lacks many important books and pamphlets, which the friends of the University are invited to contribute. In many old mansions, sometimes in the possession of families who, by change of residence and other considerations, have no real interest in the preservation of old books and papers, valuable materials are found, which would be most welcome here. The students of Southern history, a rapidly increasing company, will turn to good account whatever material, manuscript or printed, may be entrusted to the University.

Dr. W. Hand Browne, the Librarian, prepared and distributed the following statement, to which a few responses, but not many, have been received :

"J. THOMAS SCHARF, Esq., the well-known historian, has recently presented to the Johns Hopkins University his entire collection of manuscript and other historical material.

"This noble gift is the result of thirty years' indefatigable accumulation. It comprises many thousands of manuscripts, autograph letters, original public documents, rare pamphlets, &c., dating from early colonial times to the close of the late war. In documents illustrating the history of the Southern States it is believed to be unrivalled.

"It is the purpose of the University to make this collection the centre of a library of materials for authentic Southern history, and to gather together, as far as possible, those records of the past which are now dispersed and perishing; thus doing for the South what Harvard and Yale have done for the New England States. These records will not be merely stored away, but they will be arranged and made accessible, under proper restrictions, to writers or students of history.

"Great numbers of important papers and other records must now be scattered throughout the South, in danger of destruction, and often having little value or interest for their present possessors. Such records the University will gratefully receive; and in case the present owners do not wish to alienate them permanently, they will be taken as a deposit subject to recall."

*Gifts from the French Government.*—The Government of France, through the Minister of Public Instruction, has presented to the University a large and valuable collection of the government publications in return for sets of journals and other publications which we were able to send to Paris. The University is greatly indebted, not only to the French minister, M. Léon Bourgeois, but also to the American minister, Hon. Whitelaw Reid, and the Secretary of Legation, Mr. Henry Vignaud, for their personal interest in this exchange.

*Manuscripts of M. Laboulaye.*—Not long after the gift of Professor Bluntschli's library by the German citizens of Baltimore, Mrs. Francis Lieber gave us the writings in print and in manuscript of her husband, who had been for many years the friend and correspondent of Bluntschli. Both these writers on international and constitutional law were correspondents of another distinguished publicist, Professor Laboulaye, of Paris, and, therefore, his printed writings were added to the case where the memorials of Bluntschli and Lieber were kept. But there was no manuscript of the French member of the trio. Recently, at the suggestion of two of our friends in Paris (Mr. Theodore Stanton and Dr. E. R. L. Gould), M. Paul de Laboulaye, Ambassador of France at St. Petersburg, and his brother, M. René de Laboulaye, have been so kind as to send us the manuscript lectures of their father on the Constitution of the United States, delivered in 1840 and subsequent years at the Collège de France in Paris. Thus we now have in our keeping the autograph writings on

public law of three famous professors, one speaking in France, one in Germany, and one in America.

*Other Gifts of Manuscripts.*—A remarkable collection of autograph letters, chiefly from Americans of distinction, has been presented to the Historical library by J. R. Gilmore, Esq., of New York, well known as a writer under the *nom de plume* of "Edmund Kirke." There are about twelve hundred pieces in the collection, including the autographs of presidents, senators, bishops, authors, editors, inventors, artists, etc.

The University has also received through R. A. Dobbin, Esq., from the family of Judge Dobbin, late President of the Board of Trustees, at his request, gifts which are valuable in themselves and also as tokens of the interest which the donor showed in the University, even in his last hours.

The gifts include three volumes of the manuscript records of the meetings of the "Tuesday Club," a society in Annapolis about the year 1750, and a medal of the club; the letter of Henry Clay accepting the nomination for the Presidency of the United States; a commission signed by John Hancock in the year 1781; and the original of John Quincy Adams's "Ebony and Topaz" toast in his hand-writing.

#### COLLECTIONS.

*Growth of the Geological Collections.*—Within the past year both the petrographical and palaeontological laboratories have received accessions of importance and value.

Prof. O. C. Marsh, of New Haven, has contributed a fine set of duplicates from the great collection of fossils which he is preparing for the cabinet of Yale College. Mr. Joseph Wilcox, of Philadelphia, has also presented to the University a large collection of Florida fossils—mostly pliocene. To Dr.

van Marter of Rome we are indebted for the gift of a collection of minerals from the granite and iron deposits of the island of Elba, and for a suite of rocks from Tolfa, Italy. Prof. Orville A. Derby, Director of the Brazilian Survey, has likewise contributed a set of the more interesting eruptive rocks of Brazil, which is now on its way to Baltimore. The fine set of crystal sections mounted for optical study and bequeathed to the University by the late Dr. Christopher Johnston will form a most useful addition to its mineralogical outfit.

A collection of large framed photographs of scenery has been presented by the Western Maryland and several of the Western railway companies, and go far in the decoration of the geological buildings.

Other important additions to the geological outfit have been obtained by purchase. Among these may be mentioned two new petrographical microscopes of the most recent pattern, by R. Fuess of Berlin; also a newly devised electrical apparatus for sawing and grinding rock sections. To assist the instructor in physical geography a set of Kiepert's large physiographic wall maps has been secured as follows: Eastern and Western hemispheres (spherical projection); North America; South America; Europe; Asia; Africa; England; Germany; The Alps; France; Italy; The Balkan Peninsula; Scandinavia. Four colored relief models in plaster by Professor Heim of Zurich serve to illustrate (1) the formation of a sea coast; (2) erosion by a mountain torrent; (3) a volcanic island; and (4) an Alpine glacier. These were purchased with a gift of money from the late J. A. Shriver, Esq., of Baltimore.

A large relief model of the vicinity of Baltimore on a scale of four inches to the mile and without vertical exaggeration, will shortly be hung on the walls of the Petrographical Laboratory.

Further additions have been made to the working material in both organic and inorganic geology in the way of extensive collections of fossils and of crystalline rocks and minerals from all parts of the State, as well as from North Carolina and the West.

*Growth of the Herbarium.*—Dr. Barton, Lecturer on Botany, has given me the following statement in respect to the recent growth of the Herbarium. Within the year a collection of local plants has been presented by Mr. Basil Sollers for the use of the Field Club and the biological students in general. At present this herbarium contains only the flowering plants of the environs of Baltimore. The grasses and sedges of this area are nearly all represented and it is proposed to work towards the completion of the other orders of this great group and to begin a collection of the cryptogams, a nucleus of which already exists in the valuable herbarium of mosses, given some years ago by Mr. Fitzgerald. A special collection will also be made, with notes, of the immigrant plants which arrive with ballast at Locust Point and establish themselves in that vicinity. The dispersal of these plants inland, the changes they may undergo in suiting themselves to a new home, and the opportunity which may be offered for checking the spread of dangerous foreigners, will be of special interest for years to come.

The large collection of European flowering plants presented by Dr. A. F. W. Schimper is also in place for reference in the museum of the biological department.

#### MEETINGS OF SOCIETIES.

In 1890-91, eight meetings of the Philological Association were held (104th to 111th), Professor Gildersleeve being still president. Papers were read during the year by the follow-

ing gentlemen: Messrs. M. Bloomfield, J. W. Bright, I. M. Casanowicz, A. Gudeman, P. Haupt, C. Johnston, Jr., W. L. McDowell, J. D. Prince, H. A. Todd, F. M. Warren, H. Wood.

Four meetings of the Scientific Association were held, Dr. W. K. Brooks presiding. Papers were read by the following members of the association: Messrs. J. S. Ames, W. B. Clark, W. T. Councilman, A. L. Kimball, T. H. Morgan, H. N. Morse, E. Renouf, H. A. Rowland, M. Whitney; and by Mr. G. K. Gilbert (of the U. S. Geological Survey) and Prof. W. M. Davis (of Harvard University).

The Historical and Political Science Association held meetings on Friday evenings throughout the year, under the leadership of Professor Adams, with the aid of Dr. Ely. Papers were read by the following members of the association: Messrs. H. B. Adams, J. W. Black, D. C. Branson, R. T. Ely, D. C. Gilman, D. Kinley, L. S. Merriam, M. A. Mikkelsen, G. Petrie, E. A. Ross, S. Sherwood, B. C. Steiner, W. H. Tolman, J. M. Vincent, S. B. Weeks, and A. B. Woodford; and by Messrs. C. M. Andrews (of Bryn Mawr College), R. J. Finley (of New York), Merrill E. Gates, (President of Amherst College), William Houston (of Toronto), J. F. Jameson (of Brown University), R. G. Moulton (of Cambridge, England), Inazo Nitobe (of Japan), J. C. Rose (of the Baltimore Bar), A. H. Smyth (of Philadelphia), E. L. Stevenson (of Rutgers College), Woodrow Wilson (of Princeton College).

Six meetings of the Mathematical Society were held, at which papers were read by Messrs. C. H. Chapman, F. Franklin, W. C. L. Gorton, W. W. Johnson, H. P. Manning, and J. F. Springer.

The Baltimore Naturalists' Field Club met seven times, under the presidency of Dr. B. W. Barton. Reports, papers

and addresses were presented by Messrs. E. A. Andrews, B. W. Barton, A. Bibbins, W. Brommell, G. W. Field, J. L. Kellogg, William McRoberts, T. H. Morgan, B. Sollers, P. R. Uhler, G. H. Williams.

The Young Men's Christian Association held four business meetings. Lectures and addresses were given during the year by Professor Adams, Rev. W. D. Ball, Professor Bertrand (of Paris), Professor Bloomfield, Chaplain Clark (of the U. S. Naval Academy), President Gilman, John Glenn, Esq., Dean Griffin, Rev. E. A. Lawrence, Rev. W. U. Murkland, and Joseph Packard, Esq.

#### GIFTS OF THREE PRIZES.

Three prizes have been recently offered to students in history by the liberality of friends of the University.

A lady in New England has given the sum of five hundred dollars to institute the John Marshall Prize. A bronze replica of a likeness of the Chief Justice, produced in Paris for this purpose, through the agency of George A. Lucas, Esq., will be annually given during the next ten years to that graduate student who shall write the best essay on some subject in historical or political science, ancient or modern. The further regulations for awarding the prize are to be determined by the President and academic council.

A lady of Baltimore offers for a single year a prize of one hundred dollars, to be known as the Scharf-Birney prize, for the best contribution to American history.

A member of the Baltimore bar has offered to give for three years an annual prize of fifty dollars to that member of the Johns Hopkins University who shall make the best contribution to institutional or legal history. The first award of this

prize was made on the last Commemoration Day to W. W. Willoughby, A. B., for an essay on the History of the United States Supreme Court.

#### NEED OF A NEW ACADEMIC BUILDING.

As long ago as 1885, the attention of the Trustees was directed to the need of providing more and better class-rooms and lecture-rooms for instruction in those subjects which may be called literary in contrast with those that are called scientific. The subject was again brought forward in the following year. Then came our loss of income and our consequent anxieties, during which the subject of a new building was allowed to slumber. Meanwhile the necessity has grown. The scientific laboratories called for a great deal of costly fitting, indispensable to the conduct of chemical, physical, and biological classes, but fortunately no such extraordinary outlays are required for literary courses. A very simple structure will be more convenient than any other. *Quietness* and an abundance of *space, air, and light* are the essentials. In order that the Trustees may intelligently discuss the problem the following statements have been carefully prepared.

The proposed structure is needed for class rooms in ancient and modern languages, history, literature, and philosophy; if possible, also in mathematics and perhaps geology and mineralogy; halls for the library, reading rooms, and seminaries; and, besides, a large lecture room. An auditorium for commencement exercises and other assemblies should be in a separate building. Each of these wants may be urgently presented.

In the statements which follow, the figures for 1891 are based upon the numbers in attendance in November, as this report is passing through the press.

*Class Rooms.*—The number of students now enrolled is 505, of whom 206 are undergraduate and special students and 299 are graduate or advanced students. All undergraduates are required to pursue both scientific and literary studies. Many of the graduate students likewise pursue at the same time courses in science and literature. Hence, it appears from the printed class lists that there are now :

In all laboratory courses :

Undergraduates, as stated above, - - - -	82
Special Students, - - - -	52
Graduate Students, - - - -	144
Total laboratory students, - - - -	<u>278</u>

In all non-laboratory courses :

Undergraduates, as stated above, - - - -	134
Special Students, - - - -	40
Graduate Students, - - - -	173
Total literary students, - - - -	<u>347</u>

The recent increase in the number of students is also to be considered. In 1885-6, the entire number of students was 314; it is now 505.

1885-86, - - -	314	1889-90, - - -	404
1886-87, - - -	378	1890-91, - - -	468
1887-88, - - -	420	1891-92, - - -	505
1888-89, - - -	394		

From this it is apparent that the increase during five years (1885-86 to 1890-91) has been about 50 *per cent.* If the like percentage of increase is shown during the next five years, the total number in attendance will be about 700 in the year 1895-6, and if this percentage is maintained for ten years, the total in 1900-1901 will be about 1000.

A further analysis shows the following figures :

The number of students is as follows :

In laboratory courses :

Physics and Electricity, - - - - -	134
Chemistry, - - - - -	127
Biology, - - - - -	73
Geology and Mineralogy, - - - - -	27
Astronomy, - - - - -	17

In non-laboratory courses :

History, - - -	159	Latin, - - -	67
German, - - -	117	Philosophy, - - -	57
English, - - -	89	Greek, - - -	55
Romance Languages, 86		Comparative Philol., 44	
Mathematics, - - -	80	Semitic Languages, -	18

The number of classes is as follows :

In laboratory courses :

Biology, - - -	10	Geology, - - -	5
Physics, - - -	9	Astronomy, - - -	4
Chemistry, - - -	5		
Total, - - -	33.		

In non-laboratory courses :

Semitic, - - -	17	Mathematics, - - -	10
History, etc., - - -	15	English, - - -	9
Romance Languages, 14		Comparative Philol., 6	
German, - - -	12	Philosophy, - - -	4
Greek, - - -	12	Physical Geography, 1	
Latin, - - -	10		
Total, - - -	110 classes.		

That is to say there are 110 classes in non-laboratory subjects now in progress. These classes meet in eight distinct buildings, namely, the front building, the annexes, the Friends'

School House, the Physical Laboratory, in three dwelling houses on Monument Street and one on Howard Street. The classes vary in size; some are quite small, others too large. There are 41 numbering over 20 students. Eight of the assemblies numbered as "classes" are in fact seminaries, requiring special library facilities, namely, History, 42 members; Greek, 27 members; Latin, 22; English, 17; German, 13; Romance, 12; Sanskrit, 10; Semitic, 3.

The loss of time, the exposure to bad weather, the imperfect ventilation of the rooms now employed, are serious draw-backs to the healthiness, the pleasure, the profit of an intellectual life. Every student who comes here from a distance, is amazed at the inconveniences of our literary class-rooms. Every stranger is surprised that the Johns Hopkins University is so unworthily housed. I am no advocate of extravagance in any department of the University. I think that professors, instruments, and books are of more importance than splendid buildings. With our present resources, I should be sorry to see the trustees begin the construction of such beautiful quadrangles and such halls of knowledge as adorn and ennoble other seats of learning. These, I hope, will come in the future, as the University proves itself worthy of the gifts of great benefactors. But while waiting for that golden age, we must face the fact that books must be arranged, classes taught, lectures given in comfortable, spacious, light, and closely connected rooms. It is for the trustees to determine, with the wisdom they have shown in all their concerted action, how much may be spent in such a building, what its size and character shall be. My duty ends with saying to you, and through you to the public, that the present accommodations for literary instruction are quite inadequate to the pressing necessities of the University.

*The Library.*—Our space for the library is also most inadequate. We have been warned by competent advisers that some of the rooms in which books are stored are positively unsafe. But the library is growing steadily not only from purchases, but also from the gifts of generous individuals.

In 1885-6 the number of volumes was 30,000; it is now 55,000. The pamphlet, or unbound, collection of the library is estimated at about 40,000 titles, not including those received from Col. Scharf which still await examination. The growth in the number of volumes is seen from this table:

1885-86, - - -	30,000	1889-90, - - -	36,500
1886-87, - - -	31,700	1890-91, - - -	46,000
1887-88, - - -	33,000	1891-92, - - -	55,000
1888-89, - - -	34,000		

The gifts to the library during the last five years, not including exchanges or gifts from corporate bodies, are estimated at 10,000 volumes. At this rate, the library will contain, five years hence, 75,000 volumes; and ten years hence, 100,000.

*Collections.*—It has not been the policy of this institution to establish museums of a comprehensive character, because the nearness of the great collections of Washington renders them so accessible to our students. The gentlemen at the head of the institutions of the Capitol are most liberal in their co-operation. They give to our workers all the facilities that are desired. Nevertheless for daily instruction we must have our own apparatus and our own specimens. We are building up in history, in geology, in biology, in botany, collections which require much better rooms for their arrangement and custody.

*Lecture-Rooms.*—We also need very much large lecture-rooms. The day may come when we shall have an auditorium, or great assembly room for our academic celebrations, our commemorations and commencements, and the lectures of attractive orators. But for constant uses, every week throughout the year, we need a lecture-room where six or seven hundred people may be assembled. There is now no room in which the body of students can be seated, if any occasion arises for bringing them together. When we have an interesting course of lectures, we are obliged to exclude many of the most cultivated people of Baltimore, even the parents and kindred of our students, simply because there is no room for them.

I cannot but think that if these facts were presented by the Trustees to the citizens of Baltimore, the same generosity which has come to our support during the last five years would again respond, not to meet an emergency, but to uphold, enlarge, and enrich the opportunities for education which have been so liberally initiated and which are now more hopeful and more influential than ever before.

#### WEATHER BUREAU AND THE STUDY OF THE PHYSICAL CHARACTERISTICS OF MARYLAND.

The observing station of the Signal Service of the United States Army was transferred, in May last, to the Physical Laboratory of this University, and on the subsequent organization of the Weather Bureau in the Department of Agriculture this arrangement was continued. Under the joint auspices of the United States Weather Bureau, of which Professor Harrington is the chief, the Maryland Agricultural College, of which Major Alvord is the President, and the

Johns Hopkins University, the Maryland State Weather Service has been organized. Its officers are Dr. William B. Clark, Director; Professor Milton Whitney, Secretary and Treasurer, and Mr. C. P. Cronk, of the U. S. Weather Bureau, Meteorologist in charge. By thus combining the influences and resources of three strong institutions, the interest of the entire State has been enlisted in the observation of the phenomena of the climate of Maryland and in the careful record and publication of the observations thus made. Frequent communications of the information acquired have been made to the public press, and six monthly bulletins have been published prior to November, 1891. The number of meteorological stations reporting to the director is now sixty-one, of which twenty-five are stations of observation, thirty-six are crop reporting stations, and twenty-three are stations displaying weather signals. In some cases all the services are combined.

The friends of the University will not fail to notice in this coöperation an effective mode of promoting the better understanding of the physical characteristics of the region of Maryland. From the beginning of the University this idea has always been in mind. It has led to the collection of specimens of the local flora and fauna. It has led to the study of the marine life of the Chesapeake, and especially to the admirable study of the Oyster, by Dr. Brooks. It has led to the careful observation of the geological phenomena which are of uncommon interest in the neighborhood of Baltimore, and indeed of all the crystalline rocks of Maryland, and to repeated and well organized expeditions to the southern and western parts of the State. It has led to the publication of excellent maps of the region of Baltimore, and to a model which exhibits in relief the elevations and depressions of this

vicinity. The last result to be mentioned is the preparation by the United States Geological Survey of an accurate topographical map of the State of Maryland, which may now be reproduced by photographic processes, and will ultimately be engraved and printed. I make the enumeration of these points so as to show that the scientific work of this University is closely and at many points connected with the State of Maryland. A knowledge of the characteristics of a State, its topography, climate, geological structure, vegetable and animal products, underlies the intelligent development of its varied resources, and so is related to the growth of agriculture, mining, fisheries, traffic, and commerce.

It still remains to speak of a prolonged inquiry into the physical conditions of the soil which is in progress on the estate of the University at Clifton, under the auspices of the Experiment Station of the Maryland Agricultural College, of which Major Alvord is President. The investigations at Clifton are carried on by Mr. Milton Whitney. The methods that are in progress, and the results attained, will be reported to the Agricultural College. The hospitality that the trustees have extended to this inquiry has been gratefully acknowledged by Professor Whitney in the report which will soon be submitted to the Legislature. His plan of work has been explained to the University Scientific Association in a paper of which an extract is given in the *University Circulars*, No. 90, June, 1891.

#### THE MARINE STATION.

During the past year the activity of our Marine Zoölogical Station has been renewed. Dr. Brooks and his party spent the season in Jamaica. His report will be found in the Appendix.

## RETROSPECT OF FIFTEEN YEARS.

The special attention of the Trustees is called to the very careful summaries which are given in the appendix. They are prepared by the chief instructors in each department, and, when taken in connection with the semi-annual enumeration of the classes printed in the circulars, they afford a clear and comprehensive view of the activity of the University as a place for the education of youth.

This report concludes the work of fifteen years. The Johns Hopkins University can no longer be regarded as in its tentative stage. It must be judged by its results. The quality of the students it has trained, of the publications it has encouraged, and of the investigations carried on under its auspices, are fair subjects for scrutiny.

One of the most interesting aspects of the University work may be derived from an examination of the lists of graduates printed in the annual register, where the residence and occupations are given of all who have taken degrees. The extraordinary number of students who have gone out from our walls to be teachers in other institutions, is one of the most gratifying results of the period we are reviewing. From the memoranda collected in the registrar's office, it appears that one hundred and eighty-four of our two hundred and twelve Doctors of Philosophy (that is to say eighty-seven per cent.) have engaged in teaching. Most of these have entered upon this profession as a life-work. They are to be found in nearly every state of the Union, and in the oldest as well as the newest institutions. Nearly one-third of the Bachelors have also engaged in teaching.

Information in regard to the books and papers of permanent significance issued by the members of the University

has also been collected, and, in part at least, will be presented to you in a separate publication. The lists are quite too long to be added as an appendix to this report.

Another most interesting paper is now submitted to you. It is a careful summary of the generous gifts which the University has received since its foundation. Those which can be estimated in money amount to more than six hundred thousand dollars. But the numerous tokens of good will, which cannot be stated in figures, are of inestimable value. We cannot be too grateful as a university for these constant marks of confidence and support.

The affairs of the University were never in a condition so encouraging as now at the close of fifteen years' activity.

DANIEL C. GILMAN,  
*President.*

*November 2, 1891.*

# APPENDIX.

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## IN MEMORY OF JUDGE DOBBIN.

The Hon. George W. Dobbin, President of the Board of Trustees of the Johns Hopkins University, died at his residence, The Lawn, near Baltimore Thursday, May 28, 1891, at the age of 82.\*

### RESOLUTIONS OF THE BOARD OF TRUSTEES.

At a special meeting of the Board of Trustees of the Johns Hopkins University, held on Thursday, May 28th, 1891, at 3 o'clock p. m., Hon. C. J. M. Gwinn in the chair, on motion of Mr. Francis White, it was unanimously *Resolved*, That the Board has heard, with great sorrow, that the Hon. George W. Dobbin, its venerable President, died at one o'clock this morning.

He was one of the Trustees chosen by the Founder of this University, and he devoted himself from its opening, first as Trustee, and afterwards as President of this Board, to the advancement of its interests.

The kindness of his nature, his unflinching courtesy to the members of this Board, and to all in any way connected with the University, won our affectionate regard; while the labors he performed as one of our number, his great personal interest in our work, and his past public services, commanded our admiration and respect.

*Resolved*, That the President of the University is requested to send a copy of the foregoing Resolutions to the family of the deceased.

*Resolved*, That this Board will attend his funeral in a body, if such purpose is not inconsistent with the arrangements made by the family of the deceased.

At the regular meeting of the Trustees held June 1, the President of the University communicated the action of the Faculty, (as printed below).

Whereupon it was

*Resolved*, That the proceedings held on May 28th by the members of the Staff of this University upon the occasion of the death of the Hon. George W. Dobbin, our late President, be entered upon the minutes of this Board.

In making this record we renew the expression of our personal sorrow for his loss.

### MINUTES OF A MEETING OF THE ACADEMIC STAFF.

The instructors and administrative officers of the University met in Hopkins Hall at 4 p. m., on May 28th, to decide on some method of

\* For the annals of his life, see *University Circulars*, No. 91, July, 1891.

giving fit expression to their sense of the loss the University had sustained through the death of Judge G. W. Dobbin, President of the Board of Trustees of the University.

President Gilman took the chair and stated the object of the meeting. Professor Martin was appointed to act as secretary.

Dr. Wm. Hand Browne, who had been requested to prepare, in behalf of the Faculty, a statement as to its feeling in regard to the death of Judge Dobbin, read a minute as follows:

"At the beginning of the present academic year we met to express our grief at a great and painful loss. At its close we again meet, sorrowing for another bereavement.

"Judge George Washington Dobbin, President of the Board of Trustees of this University, passed away this morning in the eighty-second year of his age.

"While Judge Dobbin's death is felt as a loss by the whole community, to us it comes as a peculiar affliction. A member of the Board of Trustees from the foundation of the University, and for ten years President, its best interests were always his care and study, and to his wisdom and fidelity its success has largely been due. His advanced age, without dimming his intellect or enfeebling his judgment, had ripened and mellowed the experience of a long and active life, and had lifted him, as it were, to a serener height of wisdom and benevolence.

"Few men have ever more clearly illustrated the power of *character*. It was impossible to know him—impossible even to converse with him—without being impressed with the nobility, the purity, and the gentleness of his nature, without recognizing the charming traits that endeared him to all, but most to those who knew him best.

"The close of a life extended beyond the ordinary span did not find him unprepared; and he met the end with serenity and faith, leaving with us who yet remain, sorrow, gratitude, a lesson and a hope."

A few words were said by Professors Gildersleeve, Remsen, Hurd, Martin, Welch and Rowland, and by President Gilman and Dr. Halsted. The speakers had in their varied relationships to the University and the Hospital come in contact with Judge Dobbin in many phases of work, and told how earnest and singlehearted and many-sided his interest in University and Hospital work had been. Those who knew him also in private life paid tribute to his lovable, trustworthy character as man, friend, and counsellor.

On motion of Professor Gildersleeve it was unanimously

*Resolved*, That the statement prepared by Dr. Browne be adopted as expressing the feeling of those present at this meeting.

On motion of Professor Remsen it was

*Resolved*, That the officers of instruction of the University meet in Hopkins Hall on Saturday, May 30, and proceed thence in a body to attend the funeral services of Judge Dobbin.

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# REPORTS ON THE INSTRUCTION IN THE CHIEF BRANCHES OF STUDY.

Prepared by the Principal Instructors in the several departments.

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## Mathematics and Astronomy.

### I.—ASTRONOMY.

During the greater part of the year Professor Newcomb was unable to lecture or give formal class instruction in person. Most of the actual instruction was, therefore, given, under his supervision and direction, by Dr. Chapman and Mr. Borst,—the former in Theoretical Astronomy and Celestial Mechanics, the latter in Practical and Spherical Astronomy and the use of instruments. During the second half-year Mr. Borst also conducted a seminary for the reading of current astronomical journals.

In Celestial Mechanics Dziobek's *Mathematische Theorie der Planeten Bewegungen* was used as a text-book for the course, being amplified by Dr. Chapman whenever necessary, especially in the direction of Theoretical Astronomy.

In Spherical and Practical Astronomy the class-work covered nearly the same ground as in former years, namely, the first volume of Chauvenet's *Manual*. But instead of using this or any other text-book the lectures as prepared were copied by the students as they went along, thus having them in effect make their own text-book. The practice with instruments was principally upon the meridian circle and transit instruments; but the use of the equatorial was not wholly neglected.

The opportunities for original work with the equatorial are found to be greatly restricted by the electric lights in the vicinity of the Physical Laboratory, which entirely prevents the observation of such faint objects as comets and new planets. The results of an important investigation of the orbit of the remarkable Comet V, 1889, have, however, been published by Mr. Charles L. Poor in the *Astronomical Journal*.

### II.—GRADUATE COURSES IN MATHEMATICS.

Dr. Craig gave the following courses:

Theory of Functions. *Three times weekly, first half-year.* This course followed mainly Hermite's *Cours professé à la Sorbonne*, introducing matter from Briot and Bouquet's *Théorie des Fonctions Elliptiques* and from memoirs

by Weierstrass, Poincaré, Picard, and others. In addition to the regular course in Theory of Functions, there was given a special course of about twelve lectures in the Theory of Series. These were given from the lecturer's notes.

Linear Differential Equations. *Twice weekly, second half-year.* The basis of this course was Vol. I of Craig's *Treatise on Linear Differential Equations* and memoirs by Halphen and Floquet.

Dynamics. *Three times weekly, throughout the year.* The authors followed were Jacobi, Appell, and Darboux's edition of Despeyrous. In addition to the regular course, about twenty lectures were given on the Theory of Attractions.

Abelian Functions. *Twice weekly, throughout the year.* The lectures were given partly from notes and partly from Clebsch and Gordan.

In addition to the courses mentioned above a number of short courses on special subjects were given, e. g.: Lindemann's and Weierstrass's investigations on the number  $\pi$ ; Hermite on the number  $e$ ; some applications of the Theory of Functions; Poinot's, Sylvester's, and Darboux's geometrical representations of the motion of a solid body, etc.

Dr. Franklin gave the following courses:

A course covering consecutively the elements of the following subjects: Modern Algebra, Higher Plane Curves, Finite Differences and Probability. *Daily, first half-year.*

Modern Synthetic Geometry. *Three times weekly, first half-year.* This course followed Chasles' *Géométrie Supérieure* and Bobek's *Projektivische Geometrie*.

Advanced Algebra. *Twice weekly, second half-year.* This course was almost entirely devoted to the Theory of Substitutions and its Applications to Algebraic Equations, Bolza's memoir in Vol. XIII of the American Journal of Mathematics being used as a guide.

Theory of Surfaces. *Three times weekly, second half-year.* This course began with an elementary treatment of the curvature of curves and surfaces, partly following Joachimsthal's book, and then took up the matters discussed in the first two parts of Vol. I of Darboux's *Théorie Générale des Surfaces*, viz.: the kinematical treatment of the curvature of curves and surfaces, some discussion of the differential equations connected therewith, systems of curvilinear coordinates, etc.

### III.—UNDERGRADUATE COURSES IN MATHEMATICS.

These courses are the same from year to year. During the year 1890-91 they were given as follows:

#### *First Year Course:*

Analytic Geometry (together with a very brief introduction to the Theory of Equations). *Daily, till Christmas.* Dr. Chapman.

Differential and Integral Calculus. *Daily, from January 1 to end of year.* Dr. Frankliu.

*Second Year Course :*

Differential and Integral Calculus (Special Topics). *Twice weekly, till December 1.* Dr. Franklin.

Differential Equations. *Twice weekly, December 1 to end of year.* Dr. Craig.

Determinants and Theory of Equations. *Three times weekly, till December 1.* Dr. Chapman.

Modern Plane Analytic Geometry. *Three times weekly, December 1 to end of first half-year.* Dr. Chapman.

Solid Analytic Geometry. *Three times weekly, second half-year.* Dr. Chapman.

Classes were conducted by Dr. Chapman in :

Trigonometry and Analytic Geometry for Matriculation. *Three times weekly, through the year.*

The Mathematical Society met monthly, and papers were read by a number of present and former members of the University, and by a few gentlemen not connected with the University.

Four numbers, making Vol. XIII of the American Journal of Mathematics, have appeared during the year. The subjects treated have been varied and important. Several new contributors have appeared, including the great Italian mathematician, Brioschi. The contributors are as follows: From the United States—Bolza, Chapman, Fields, Gorton, Haskell, Manning, Morley, Perott, Taber. From England—Cayley, MacMahon, Pearson. From France—Appell, d'Ocagne. From Italy—Brioschi. A portrait of Professor Cayley forms a frontispiece to the volume.

S. NEWCOMB,

*Professor of Mathematics and Astronomy.*

## Physics.

During the year regular courses of lectures have been given as follows:

By Professor Rowland :

Lectures on Mathematical Physics, treating the subjects of Electricity and Magnetism, with especial reference, during the latter part of the year, to electro-magnetic waves. *Four times weekly, through the year.*

By Dr. Kimball :

Lectures on Mechanics, Elementary Thermodynamics, Electricity and Magnetism, and the Wave Theory of Light. *Daily, through the year.*

Conference on questions in Electricity and Magnetism, attended by the advanced students. *Weekly, through the year.*

By Dr. Ames :

Lectures on the Mathematical Theory of Sound. *Weekly, through the year.*

By Dr. Kimball and Dr. Ames:

A course of experimental lectures in General Physics, with recitations.  
*Daily, through the year.*

The laboratory has been constantly open for the work of both advanced and undergraduate students during the year.

The advanced students have met weekly with the instructors for the reading and discussion of the current physical journals.

The Physical Seminary has met weekly under the guidance of Dr. Kimball, and the following topics have been reported on and discussed:

The kinetic theory of gases. Capillarity. Osmotic pressure. The continuity of the liquid and gaseous states. Water waves. Plateau's researches. The defining power of the spectroscope. The limit of visibility with the compound microscope. The effect of the motion of a transparent material medium on the velocity of light. Methods of measurement based on interference.

The following researches have been carried on in the Physical Laboratory:

Photographs of the solar and metallic spectra have been carefully measured on a dividing engine constructed for the purpose, with a view to making a catalogue of the wave lengths.

The study of the spectra of minerals containing rare salts has been continued, and a valuable process for separating yttrium has been developed.

A list of wave lengths of lines in the solar spectrum has been prepared for publication.

Experiments have been made preliminary to photographing the line spectrum of sulphur.

An investigation of the force of gravitation between small masses has been begun, and apparatus has been designed and constructed especially for the investigation.

A further study of the effect of a magnetic field on chemical action has been undertaken.

The specific inductive capacities of various poorly conducting liquids has been studied, and a method of investigation has been developed which promises to be fruitful.

A large number of diffraction gratings have been ruled on the dividing engines, for the use of investigators throughout the world. An instrument has also been designed and constructed for the study of the magnetic effect of electric convection currents.

During the year there were ninety-eight students in the department, forty-one of whom were graduates.

One student received the degree of Doctor of Philosophy, Mr. Edward B. Rosa, who presented as his thesis a study of the specific inductive capacities of certain liquids.

## ELECTRICAL ENGINEERING.

During the year the following courses have been given:

By Dr. Duncan:

First year's course in Electricity and Magnetism, consisting of lectures on the general theory of the subject. *Three times weekly, through the year.*

Second year's course in Applied Electricity, consisting of lectures on the theory of dynamos and motors, the electrical transmission of energy, secondary batteries, telephone, &c., &c. *Twice weekly, through the year.*  
Laboratory work. *Daily, through the year.*

By Mr. Hasson:

First year's course in Mechanical Engineering, including lectures and recitations on the Principles of Mechanics and Applied Mechanics.

Second year's course in Mechanical Engineering, including lectures on steam engines and boilers, hydraulic machinery, &c.

By Mr. Aldrich:

Instruction in Mechanical Drawing through the year.

Machine design and kinematics of machinery.

The following investigations have been carried on:

Chemical and physical actions taking place in secondary batteries. Time element in magnetization. Determination of relation between impressed magnetic force and induction in laminated iron cores for different rates of reversal. Experiments on alternating current motors.

HENRY A. ROWLAND,  
*Professor of Physics.*

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## Chemistry.

During the past academic year, the work in Chemistry has been carried on essentially in accordance with the announcements. The laboratory has been constantly open for advanced and undergraduate students. Lectures and class-room instruction have been given as follows:

By Professor Remsen:

1. General Chemistry. *Twice weekly, through the year.*
2. Chemistry of the Compounds of Carbon. *Twice weekly, through the year.*
3. Advanced Organic Chemistry. *Twice weekly, first half-year.*
4. Meetings for reports on the current journals of Chemistry. *Twice weekly, through the year.*

By Associate Professor Morse:

1. Supplementary Course in Inorganic Chemistry. *Twice weekly, through the year.*
2. Reviews in Organic Chemistry. *Weekly.*

3. Selected Topics in Analytical Chemistry. Twelve lectures for advanced students.

By Dr. Renouf:

1. Supplementary Course in Inorganic Chemistry for graduate students.
2. Lectures and reviews in General Chemistry. *Three times weekly, through the year.*

Besides the above, sixteen historical lectures were given by the most advanced students on topics selected and assigned by the Director. The lecturers and their subjects were as follows:

Mr. C. E. Saunders on Frankland's work on the organo-metallic compounds.

Mr. C. E. Coates on phenanthrene.

Mr. J. White, Jr., on quinones.

Mr. C. P. Brigham on hydrazine.

Mr. W. Jones on constitution of phthaleins.

Mr. P. J. Dashiell on ring-compounds containing nitrogen.

Dr. W. W. Randall on electro-chemical theories.

Mr. H. C. Jones on solution.

Mr. R. M. Parks on indigo.

Mr. E. P. Kohler on quinoline.

Mr. J. E. Gilpin on nitroso-compounds.

Mr. D. M. Miner on anthracene.

Mr. J. A. Lyman on hydrogen dioxide.

Mr. M. B. Stubbs on tartaric acid.

Mr. H. Ullman on ozone.

Mr. H. F. Clark on phthalyl chloride.

Six candidates presented themselves for the degree of Doctor of Philosophy. They were Messrs. C. P. Brigham, C. E. Coates, Jr., P. J. Dashiell, W. Jones, C. E. Saunders, and J. White, Jr. Their theses are entitled "Some Double Chlorides containing Bismuth;" "The Action of Aniline and of Toluidine on o-Sulphobenzoic acid and its Chloride;" "The Reaction of Para-diazo-ortho-toluene sulphonic acid with Ethyl Alcohol under various conditions of Dilution and Pressure;" "Sulphon-phthaleins obtained from o-Sulpho-p-toluic Acid;" "Researches on the Double Halides;" "Sulphon-fluorescein and other Sulphon-phthaleins." These will be printed in separate form as theses, and the essential parts will soon be published in the American Chemical Journal.

Another investigation completed during the year had for its object the redetermination of the atomic weight of cadmium. The results will soon be published.

The entire number of students who have followed the courses in Chemistry during the year, is one hundred and fourteen. Of these thirty-nine were graduates following Chemistry as the principal subject for the degree

of Doctor of Philosophy; six were graduates following Chemistry as a subordinate subject; and the rest were undergraduates and special students.

IRA REMSEN,  
*Professor of Chemistry.*

### Geology and Mineralogy.

The work in Geology and Mineralogy has been greatly facilitated during the past academic year, 1890-91, by an important enlargement of the quarters of this department. The two buildings, Nos. 602 and 610 N. Howard Street, were entirely refitted in the summer vacation of 1890, with a view to the former's accommodating the work in inorganic geology and mineralogy under Dr. Williams, and the latter, that in organic geology and physical geography under Dr. Clark. By this arrangement, with an increase of space, case room, and apparatus, the needs of a considerably greater number of students than ever before have been satisfactorily met.

During the past year courses of instruction have been given as follows:

(a) General Mineralogy, embracing crystallography, physical and descriptive mineralogy, by Dr. Williams. *Four lectures, one review, and one afternoon of practical work each week throughout the year.*

(b) Stratigraphical Geology and Elementary Palæontology, by Dr. Clark. *Three lectures and one afternoon of practical work each week during the first half-year.*

(c) Dynamical Geology and Elementary Petrography, by Dr. Williams. *Three lectures and one afternoon of practical work each week during the second half-year.*

(d) Physical Geography, by Dr. Clark. (P. H. E. Course.) *Three times weekly until Christmas.*

(e) Three lectures on geographical and geological subjects, by Prof. W. M. Davis, of Harvard University.

(f) In addition to the lecture courses the laboratories have been opened to students daily, from 9 a. m. until 5 p. m. A weekly Journal Meeting has also been held in the interests of mineralogy and petrography, and each Monday evening has been devoted to a reading upon some subject in dynamical geology (mountain building and glaciers).

*Excursions.* More than usual attention has been devoted during the past year to developing longer or shorter excursions as an integral part of the instruction in geology. The State of Maryland offers exceptional opportunities in this direction, since with an area of less than ten thousand square miles, it contains representative exposures of nearly every geological horizon from the Archean to the Quarternary. Furthermore, these are so combined in the three distinct topographical provinces of the State as to illustrate all the more important types of geological structure (implicated

in the metamorphic Piedmont Plateau; folded in the palæozoic Appalachian belt; and undisturbed in the mesozoic and cenozoic Coastal Plain). To improve these unusual facilities for geological field-work, short excursions in the vicinity of Baltimore were conducted weekly by Drs. Williams and Clark during the fall of 1890. These were chiefly devoted to an examination of the crystalline formations of the Piedmont Plateau. For a study of the palæozoic horizons of the Appalachians and the later formations of the Coastal Plain, two longer excursions, each of several days' duration, were undertaken during the spring of 1891. The first of these, under the direction of Dr. Clark, left Baltimore April 23, and included an examination of the deposits along the Chesapeake, Patuxent, and Potomac as far as Washington, where the party broke up April 30. Much of the success of this trip was due to the hearty coöperation of the Maryland Agricultural College and the U. S. Geological Survey. Special thanks are also due to the State authorities who generously placed the oyster police steamer Gov. Thomas at the disposal of the party, and thereby furnished it with a commodious, comfortable, and rapid means of transportation. The results of this expedition have been detailed by various members of the party in the *University Circulars* No. 89, June, 1891.

The second of the longer excursions was conducted by Dr. Williams during the last week of May. It extended over five days, during which time the exposures of finely folded palæozoic strata were examined as they are exposed by the Potomac river section at Harper's Ferry, Hancock, and Cumberland. Details of this trip will be given in the *University Circulars*. In addition to these regular and required excursions, which were also participated in by a number of persons coming from a distance for the purpose, advanced students have been afforded constant opportunities for work in various lines of field-geology.

*Original work.* The special investigation of the complex crystalline geology of Maryland and northern Virginia has been pursued by Dr. Williams, with assistance from Mr. C. R. Keyes, Fellow in Geology. The survey of three sections from west to east across the Piedmont Plateau brought to light facts of prime importance in the structure of the region, which were communicated to the Geological Society of America in December, 1890. During the winter laboratory studies of the rocks and minerals of Maryland were carried on. A suite of crystalline rocks collected by Prof. H. F. Reid, of Cleveland, and Mr. Cushing, of Minneapolis, at the foot of the Muir glacier in Alaska, were also microscopically studied and reported on by Dr. Williams. With a view of obtaining a wider knowledge of the crystalline belt of the eastern United States, a long excursion was made in the summer of 1890 by Dr. Williams, in company with Profs. Pumpelly and Van Hise, through Pennsylvania, New Jersey, New York, Massachusetts, Vermont, and a part of Canada. (See *University Circulars* No. 84, December, 1890.) With the same end in view, a trip was made during June, 1891, through central Virginia, and, with the coöperation of the State

geologist of North Carolina, a section 300 miles in length was run across the crystalline formations of that State from the Tennessee line to Raleigh.

The investigations by Dr. Clark upon the Eocene of the United States continued during the early portion of the academic year and a report upon the same was finished in February. It will appear as Bulletin 83 of the U. S. Geological Survey. Work upon the Mesozoic Echinodermata which Dr. Clark has had in hand for some time past, has just been completed and a report prepared, which will likewise be published by the U. S. Geological Survey.

*Coöperation in scientific work.* During the year coöperation has been effected with the Maryland Agricultural College, the U. S. Weather Bureau, and the U. S. Geological Survey, for the furtherance of scientific work in Maryland, in which each has a common interest.

The Maryland State Weather Service has been one result of this united action. An organization has been perfected with Dr. W. B. Clark, representing the Johns Hopkins University, as Director; Prof. Milton Whitney, the Maryland Agricultural College, as Secretary and Treasurer; and Dr. C. P. Cronk, the U. S. Weather Bureau, as Meteorologist in charge. After the establishment of the State Service it was deemed advisable to move the Baltimore office of the U. S. Weather Bureau to the University, and quarters were accordingly obtained in the Physical Laboratory, upon the roof of which building the instruments are placed. At present stations are being rapidly established throughout Maryland and Delaware to meet the requirements of an efficient State Weather Service.

Further coöperation with the Maryland Agricultural College has been had in the soil investigations conducted by Professor Milton Whitney, who for the greater portion of the year had quarters in the laboratory for Inorganic Geology, 602 N. Howard St. Recently, through the kindness of the Trustees, more extensive accommodations have been granted at Clifton, where the work will be prosecuted in the future.

Through the joint action of the Maryland Agricultural College, U. S. Geological Survey, and the University, a request for a vessel of the Oyster Police Navy was granted, and a successful expedition into Southern Maryland and Virginia was conducted under their auspices. [See page 42.]

*Collections.* No very important additions have been made to the apparatus or collections during the past year. Two new petrographical microscopes of new pattern have been ordered; a suite of Alaskan rocks from the foot of the Muir glacier was presented by Prof. Reid, of Cleveland, and a fine collection of minerals from Elba and rocks from Tolfa and the neighborhood of Rome has been received from Dr. Van Marter, of Rome, Italy.

Considerable collections have been made from the Tertiary of Maryland and Virginia, which have largely increased the available material for study and exchange. Prof. O. C. Marsh, of Yale University, has added still further to the collection of fossils already sent, as has Mr. Joseph Willcox, of Philadelphia.

GEORGE H. WILLIAMS,  
*Associate Professor of Inorganic Geology.*

### Biology.

Several changes in the staff of the Laboratory of Normal Biology have taken place since the last report was written. Dr. G. P. Dreyer has succeeded Dr. Wightman as Senior Demonstrator of Animal Physiology and Histology; Dr. B. W. Barton has been appointed Instructor in Botany; and during the session Associate Professor Brooks was promoted to the Professorship of Animal Morphology.

The Staff for the session was:—

Dr. H. N. Martin, Professor of Biology and Director of the Biological Laboratory.

Dr. W. K. Brooks, Professor of Animal Morphology and Director of the Marine Laboratory.

Dr. E. A. Andrews, Associate in Biology.

Dr. G. P. Dreyer, Senior Demonstrator of Animal Physiology and Histology.

Dr. B. W. Barton, Instructor in Botany.

Mr. Kellogg, Mr. Metcalf, and Mr. Hough rendered help as junior assistants.

The Laboratory was open regularly to graduate and undergraduate students from 9 a. m. to 5 p. m., with the exception of Saturdays and Sundays. Courses of lectures were delivered as stated below.

1. General Biology. *Thrice weekly, from the commencement of the session until April.* Twelve introductory lectures by Professor Martin. Dr. Andrews delivered the other lectures in the course and had general control of the work of students taking it.

2. Osteology, Human and Comparative. Professor Brooks. *Twice weekly, from early in November until the spring recess.*

3. Elements of Embryology. Dr. Andrews. *Thrice weekly, from the spring recess until the close of the session.*

4. Elements of Systematic and Structural Botany. Dr. Barton. *Twice weekly, from the spring recess until the close of the session.*

The four lecture courses above described, with accompanying laboratory work during at least five hours each week, constituted the undergraduate minor course in Biology.

5. Mammalian Anatomy. Dr. Andrews. *Twelve lectures, and dissection of a dog.*

6. Animal Physiology and Histology. Professor Martin. *Thrice weekly, from early in November until the close of the session.*

7. Elements of Zoology. Dr. Brooks. *Twice weekly, from early in November until the end of the session.*

Courses 5, 6 and 7, with at least five hours' laboratory work each week constituted the major undergraduate course in Biology.

8. Professor Martin lectured once a week to advanced students on the physiology of the peripheral nervous system.

9. Professor Brooks lectured to advanced students once a week on selected topics in relation to Zoology and Animal Morphology.

10. The physiological seminary was conducted by Professor Martin and the morphological by Professor Brooks, each meeting once a week.

11. Dr. W. S. Halsted, Surgeon to the Johns Hopkins Hospital, very kindly gave a special course of instruction in operative surgery to those graduate students who were preparing to undertake experimental physiological research.

12. At the request of Professor Griffin, Professor Martin gave to the graduating class twelve lectures and demonstrations on the physiology of the nervous and muscular systems. They were designed to supplement the psychological studies of the class, and attendance was voluntary.

I would repeat what I wrote in my report of last session, that the interest taken by students in this course proves the great desirability of the appointment of a demonstrator of experimental psychology.

13. The session of the Marine Zoological Laboratory, under the direction of Professor Brooks, commenced towards the close of May at Port Henderson, Jamaica. Professor Brooks will report at the close of the season.

During the session researches have been carried on in the Biological Laboratory in the subjects named below:

The vaso-motor nerves of the heart; the influence of "differential" respiration on the circulation; the special physiology of certain muscles of respiration; sense organs of Medusae; sense organs of Salpa; histology of the reproductive organs of the oyster; the development of Crepidula; the structure of Siphonophores; the structure and physiology of Caravelle; the Stomatopods of the Albatross collection; the anatomy and transformation of Tornaria; the development of Echinoderms; the anatomy of Lamellibranchs studied in relation to degeneration; the anatomy and embryology of Pycnogonids; the structure of Cordylophora.

Number seven of the fourth volume of the "Studies from the Biological Laboratory" and number one of volume five have been published since my last report. Number two of volume five is now in press.

Mr. T. H. Morgan has been re-elected to the Bruce Fellowship. No appointment has yet been made to the table of the University in the U. S. Fish Commission Laboratory at Wood's Holl.

The most important gift made to the Biological Laboratory during the year is a collection, almost complete, of the plants to be found within twelve miles of the Baltimore City Hall. For this gift the University is mainly indebted to Mr. Basil Sollers of Male Grammar School No. 10, and Mr. John F. Arthur of Male Grammar School No. 3. The University had already been given the Schimper collection of the flowering plants of Switzerland and the Fitzgerald collection of American mosses, both of which are almost complete and of great value. Similar gifts are sure to come to us from time to time and the necessity of more museum room will soon be imperative.

H. NEWELL MARTIN,  
*Professor of Biology.*

### Greek.

Under the direction of Professor Gildersleeve the advanced students of Greek have been organized into a Greek Seminary. According to the plan of the seminary the work of the year is concentrated on some leading author or some special department of literature, chiefly with reference to the literary form. During the past year the centre of work was Aristophanes.

In the seminary proper, which met twice a week during the academic year, "The Wasps," and "The Frogs" were interpreted by the members in turn, and all the plays of Aristophanes were analyzed and introductory lectures prepared by different members of the seminary. Among the special studies may be noted: "The Agon in the Old Comedy," "The *ἔραξ λεγόμενα* of Aristophanes," "Rhetorical Studies in Lysias and Isaios," "The Dramatic and Mimetic Features of Plato's Gorgias," "Treatment of the Inconsistencies of Homer, by the *ενοστατικοί* and *λυτικοί*," "Use of Locative Expressions in the Attic orators."

In connection with the work of the Seminary, Professor Gildersleeve gave sixteen lectures on Greek metres, with especial reference to Aristophanes, and fifteen on Old Attic Comedy.

Besides the Seminary course proper, Professor Gildersleeve delivered fifteen lectures on the Greek Tragic Poets, a course of nineteen lectures introductory to the study of Greek syntax in its relations to Greek style, and conducted twenty exercises in translating at dictation from Greek into English and from English into Greek.

During the first half-year, Dr. Alfred Gudeman, Fellow by Courtesy, conducted a course in the History of Alexandrian Literature and an interpretation of Plutarch's Life of Cicero.

Dr. W. M. Arnolt, Fellow by Courtesy, conducted a course in New Testament Greek, twice weekly through the year.

Dr. Spieker conducted the following undergraduate courses:

Thukydides, book i. *Three times weekly, first half-year.*

Aischylos, *Prometheus Vincetus*, and Sophokles, *Antigone*. *Three times weekly, second half-year.*

Isokrates, books i, iv. *Four times weekly, first half-year.*

Homer, *Iliad*, books xvi, xviii, and Euripides, *Alkestis*. *Four times weekly, second half-year.*

Greek Literature. *Weekly, through the year.*

Reading at sight. *Weekly, through the year.*

Classes in Prose Composition, meeting weekly, were conducted in connection with each of the courses above named.

Students have read privately for examination the following books:

- Herodotos, book ix. (7).  
 Aristophanes, *Clouds*. (8).  
 Demosthenes, *Olynthiacs*. (1).  
 Plato, *Apology*. (1).  
 Plutarch, *Themistocles*. (6).  
 Aeschines, in *Ctesiphontem*. (6).  
 Isocrates, *Panegyricus*. (1).  
 Plato, *Euthyphro*. (7).

B. L. GILDERSLEEVE,  
*Professor of Greek.*

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### Latin.

The Latin Seminary, under the direction of Dr. Minton Warren, held two sessions a week throughout the year, the centre of work being the Roman Historians, especially Livy and Tacitus.

Portions of the first and twenty-first books of Livy, of the *Agricola*, *Germania*, and books I and XI of the *Annales* of Tacitus were made the subject of critical interpretation by the members of the Seminary. Papers were read on the use of perfect forms in *-erunt* and *-ere* by Livy with statistics for all the books, on the syntactical usages first appearing in Tacitus, and on certain differences between the style of Livy and of Tacitus.

In connection with the work of the Seminary, Dr. Warren gave a course of twenty lectures on the Roman Historians from Fabius Pictor to Tacitus. In the second half-year he gave a course of weekly lectures on Historical Latin Grammar. A Journal Club met weekly throughout the year to report on recent philological publications of interest to Latinists.

Dr. K. W. Smith gave a course of lectures weekly during the first half-year on the Roman Elegiac Poets.

Dr. A. Gudeman, Fellow by Courtesy, interpreted during the second half-year Tacitus' *Dialogus de Oratoribus* with introductory lectures on the 'Dialogus Controversy.'

Undergraduate courses have been conducted as follows:

By Dr. Warren:

Plautus, *Amphitruo*, and Terence, *Andria*. *Three times weekly, first half-year.*

Reading at sight. *Weekly, first half-year.*

Latin Prose Composition. *Weekly, first half-year.*

Tacitus, *Agricola*, *Germania*, and *Annales*, book i. *Four times weekly, second half-year.*

By Dr. K. W. Smith :

Livy, books ii and iii. *Four times weekly, first half-year.*

Latin Prose Composition. *Weekly, through the year.*

Horace, *Select Odes, Satires, and Epistles.* *Four times weekly, second half-year.*

Juvenal and Pliny. *Three times weekly, second half-year.*

Reading at sight. *Weekly, second half-year.*

Latin Prose Composition. *Weekly, second half-year.*

By Dr. Gudeman:

Quintilian, at sight. *Weekly, second half-year.*

Students have read privately for examination the following books :

Cicero, *Select Letters.* (7).

Cicero, *De Senectute, De Amicitia.* (7).

Cæsar, *Bellum Civile,* book i. (9).

Horace, *Epodes.* (7).

Ovid, *Fasti,* books i and ii. (9).

Suetonius, *Julius Cæsar, Augustus.* (1).

Terence, *Autontimorumenos.* (8).

Plautus, *Menaechmi.* (8).

MINTON WARREN,

*Associate Professor of Latin.*

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### Semitic Philology.

Twenty-one courses in the various branches of Semitic Philology have been given during the past year, particular attention being paid to the study of the Bible and the Cuneiform Inscriptions, as well as to the study of Arabic. To the Bible there were devoted eight hours weekly through the year, which number was increased to ten for some time; to Assyriology, four hours weekly in the beginning of the session and twelve hours after the 1st of December; to Arabic, one hour weekly in the beginning and six hours after December 1st.

The presence of three Oriental students, Messrs. Leon (Ibn Abi Sulciman), Hawkes, and Prince (the first of whom possessed a native command of Arabic, while the other two had acquired a practical knowledge of Persian and Turkish during a prolonged stay in the East), made it possible to give the work greater scope by providing special courses in the modern Oriental languages, especially Arabic, Persian, and Turkish. (Cf. No. 86, p. 72, of the *University Circulars*).

Dr. Cyrus Adler, Associate in Semitic, having been granted a year's leave of absence to go to the East in the interest of the Chicago World's Fair in 1893, the courses which he had announced and begun were continued by Dr. C. Johnston, Jr., who was appointed Instructor in Semitic after having resigned his fellowship. Mr. I. M. Casanowicz took charge of Dr. Adler's course in Post-Biblical Hebrew.

Dr. Adler's absence, as well as the resignation of the principal contributor, necessitated a re-arrangement of the work for the proposed Assyrian-English Lexicon, begun during the session of 1888-89, the collection of material being continued by Dr. Johnston and Mr. Prince.

The Assyrian Seminary met, under the direction of Professor Haupt, three hours weekly through the year, studying Rawlinson's Cuneiform Inscriptions, Vol. IV., Pl. 55-68. This work was supplemented by an advanced course in Sumero-Akkadian, two hours weekly through the year, in which a number of bilingual texts in Haupt's *Keilschrifttexte*, Parts II and III, and Rawlinson's Cuneiform Inscriptions, Vol. IV., Plates 1-30, were studied. Dr. Johnston met the more advanced students in Assyrian weekly, reading selections from Haupt's texts. He also conducted a class in elementary Assyrian and a second year's course, explaining the first part of Haupt's Texts and Delitzsch's *Lesestücke*. A special course in Assyrian was given by Mr. Prince, three hours weekly during the second half-year.

In Hebrew, Professor Haupt finished the critical interpretation of the book of Ecclesiastes begun during the session 1888-89. A summary of the results of the work is given in the *University Circulars* for June. Dr. Johnston met the more advanced students in Hebrew two hours weekly, reading selected Biblical texts at sight, besides giving instruction in elementary Hebrew. He also conducted a class in Biblical Archaeology under seminary organization during the first half-year; the topics discussed were: (1) The Arch of Titus. (2) The Hittites. (3) The Siloam Inscription. (4) The Assyrian Account of the Deluge. (5) The Assyrian Account of the Creation. (6) The Tell el-Amarna Tablets. (7) The City of Lachish; its ancient history in the light of recent excavations. (8) The Moabite Stone.

Post-Biblical Hebrew was studied under the guidance of Mr. Casanowicz, Strack's unpointed edition of the Mishnic tract Shabbâth (Berlin, 1890) serving as text-book.

In Biblical Aramean, Professor Haupt gave a critical interpretation of chapters I, II, and V, of the book of Daniel.

Professor Haupt also met a class in Syriac weekly through the year, interpreting selected portions of the Syriac version of the New Testament, special stress being laid on the study of Syriac grammar from the comparative point of view.

In Arabic, both theoretical and practical instruction was given in the classical language as well as in the modern dialects.

Professor Haupt interpreted Sir William Muir's Extracts from the Coran besides conducting a series of written exercises in vowelizing unpointed Arabic texts as well as translating from English into Arabic.

Dr. Johnston gave a beginner's course in Arabic and met the more advanced students weekly, explaining selected Arabic texts, particular attention being paid to grammatical points. Dr. Leon conducted a class in Arabic conversation and reading at sight selected portions of the Arabian Nights. He also delivered a series of lectures on the Primitive History and Religion of Arabia and the Rise and Development of Islam.

For the first time since the organization of the Semitic Seminary in 1883, instruction was given in Persian and Turkish. The Rev. Jas. W. Hawkes of Hamadan, Persia, (for ten years a missionary in Persia under the auspices of the Presbyterian Board of Foreign Missions, who came to this University to avail himself of the facilities offered for the study of Arabic) gave instruction in Modern Persian during the second half-year. The course consisted in reading selections from the chrestomathy in Salemann and Shukowski's *Persische Grammatik* (Berlin, 1890) together with exercises in modern Persian conversation and composition, the material for the latter being furnished by Professor Haupt.

Mr. Prince conducted a course in Modern Turkish (Osmanli) during the second half-year, August Müller's *Türkische Grammatik* (Berlin, 1889) serving as text-book.

It might be well to state here that although Persian and Turkish do not belong to the Semitic group (the former being an Indo-European language, the latter a branch of the so-called Ural-Altai family of speech) it has always been considered necessary for advanced students of Arabic to devote attention to Persian and Turkish. In fact, an acquaintance with these two non-Semitic languages is just as important for a scholar desirous of mastering the vast field of Arabic philology, as is for a cuneiformist familiarity with the non-Semitic Sumero-Akkadian and some knowledge of the Old Persian and Susian idioms in the first and second species of the trilingual Achaemenian inscriptions.

A special committee, consisting of Messrs. Johnston, Leon, Hawkes, and Prince, was appointed by Professor Haupt for the purpose of describing the Oriental MSS. in the library of the Johns Hopkins University. The report of the committee is given in *University Circulars*, No. 90, June, 1891.

The following papers were read by members of the Semitic Seminary before the Johns Hopkins Philological Association: J. D. Prince: The Linguistic Position of Osmanli-Turkish (Abstract in *University Circulars*, No. 87, p. 80); I. M. Casanowicz: The Book of Ecclesiastes in the Septuagint Version (Abstract in *University Circulars*, No. 90, p. 117); C. Johnston, Jr.: The alleged Greek influence in the book of Koheleth; Paul Haupt: The Song of Ecclesiastes (Abstract in *University Circulars*, No. 90, p. 115); C. Johnston, Jr.: The Empires of the Book of Daniel; W. L. McDowell: Allusions to the book of Ecclesiastes in the N. T.

The first two parts of the thesis *Analogy in Semitic* by the Rev. A. H. Huizinga (who, after having held a fellowship in Semitic during the sessions '84-5 and '85-6, received the degree of Ph. D. at the beginning of 1890) have appeared in Nos. 44 and 45 of the *American Journal of Philology*. Dr. Arnolt published a series of lexicographical papers in *Hebraica* (Vol. VII, pp. 56-71; 81-103), in the *American Journal of Philology* (No. 44, pp. 495-503), and in *Modern Language Notes* (Vol. V, No. 8).

Professor Haupt published some new fragments of the Izdubar legends in Dr. Jeremias' book *Izdubar-Nimrod* (Leipsic, 1891). The second part of the

complete edition of the Babylonian Nimrod epic, begun by Prof. Haupt in 1884, is in press and will be published in the course of the summer.

The second part of the contributions to Assyriology and Comparative Semitic Grammar, published with the co-operation of the Johns Hopkins University, and edited by Professor Haupt in conjunction with Professor Delitzsch, of Leipsic, a volume of 268 pages, royal 8o., appeared during the course of the first half-year. It contains papers by Delitzsch, Flemming, Jäger, Kraetzschmar, Praetorius, Steindorff, Zehnpfund (cf. No. 84, p. 39, of the *University Circulars*). A portrait of the founder of Abyssinian philology, Job Ludolf (1624-1704), forms the frontispiece to the volume. The third part, beginning Vol. II, is now in press and will soon appear.

PAUL HAUPT,

*Professor of the Semitic Languages.*

### Sanskrit and Comparative Philology.

During the session of 1890-91 the Vedic Seminary under my direction consisted of eleven members. The subject for the entire session was: The Rig-Veda and the Atharva-Veda. The method of studying these important documents at this University deserves a few words of especial description. The effort is made to break down the somewhat artificial barrier which it has been customary to erect about the lyrical parts of the Veda, and to bring to bear upon their understanding the very important materials contained in the prose parts of the Veda, the Brāhmaṇas and Sūtras. The director of the Seminary has propounded his methods, and given practical illustration of their value in two series of Vedic studies (thirteen in number) which were published in the *American Journal of Philology* under the titles "Seven Hymns of the Atharva-Veda" (vol. vii, pp. 466-488), and "Contributions to the Interpretation of the Veda. Second Series" (vol. xi, pp. 319-356). The results of this year's investigations in the Seminary have been especially abundant, and will be published as the third and fourth series of Vedic studies. The titles of the investigations are:

1. The story of Indra and Namuci.
2. The two dogs of Yama in a new rôle.
3. The marriage of Saranyū.
4. The meaning of the root yup.
5. The legend of Soma and the eagle.

These also will be published in the current volume (xii) of the same journal.

During the last part of the session the Atharva-Veda was studied with the constant aid of the ritual literature, especially the Kāuṣika-Sūtra which is now accessible in the *editio princeps* recently published by the director and embracing the xivth volume of the Journal of the American Oriental Society. Fragments of the unpublished commentary of Sāyaṇa on the

Atharva-Veda are also in the hands of the director and are employed, where possible, to elucidate the text. In recent years members of the Seminary have been independently at work on various branches of Vedic literature and the following papers have been published by them :

- H. W. Magoun: The Āsurī-Kalpa. Proc. Am. Or. Soc. for October, 1888 (Journal vol. xiv, p. xiii, fg.); American Journal of Philology, vol. x, 165-197.
- E. W. Fay: The treatment of Rig-Veda Mantras in the Gṛhya-Sūtras. Graduating thesis for the degree of Ph. D., 1890.
- J. T. Hatfield: The Āuçanasād̄bhutāni, Proc. Am. Or. Soc. for October, 1888, p. xii, fg.; On the Numbering of the Atharvan Parīṣiṣtas, Proc. Am. Or. Soc. for October, 1889, p. clvi, fg.
- C. J. Goodwin: The Skandayāga, Proc. Am. Or. Soc. for May, 1890 (Journal, vol. xv, p. v, fg.).

The work of the Seminary during the session of 1891-92 will be in the literature of the Brāhmanas in their relation to the Vedic Mantras.

A second course of Vedic study was more elementary. Here were studied the special features of the Vedic language in their relation to the classical Sanskrit. A short preliminary course in Vedic grammar was followed by reading selected specimens of the Rig-Veda. The metres, the accent, the special Vedic forms, and the lexical peculiarities were constantly regarded. The course is preparatory to the work of the Vedic Seminary.

In the domain of classical Sanskrit the subjects were the It̄h̄opadeṣa, Kathāsaritsāgara, and Manu. Mr. W. W. Baden, Fellow in Sanskrit, conducted the elementary work, which consisted of a short course in grammar and practical exercises in prose composition. This was followed by the reading of easy Sanskrit texts.

In Comparative Philology the work was two-fold. First, a course in the general principles of linguistic science, together with an exposition and criticism of modern methods in scientific grammar. Secondly, a series of lectures through the year in the comparative grammar of Greek and Latin. The subject under treatment was the history of the formation of the substantives in Greek and Latin with reference to the related languages, especially German and Sanskrit. The influence of adaptation in the development and spread of noun-suffixes was made the subject of especial independent inquiry; it resulted in an essay of the instructor entitled 'On Adaptation of Suffixes in Congeneric Classes of Substantives' (American Journal of Philology, vol. xii, pp. 1-29). The corresponding work during the preceding session was devoted to the history of the consonants in the classical languages. During the session of 1891-92 the subject treated will be: Verbal Inflections in Greek and Latin, with especial reference to German and Sanskrit. Opportunity is thus afforded to the students of other languages to acquaint themselves with the special treatment of a single language from the broader point of view of the Indo-European languages regarded as a whole.

MAURICE BLOOMFIELD.

*Professor of Sanskrit and Comparative Philology.*

## German.

During the year 1890-91 the Teutonic Seminary met four times weekly, under the direction of Dr. Wood. The work was equally divided, as to time, between Modern German Literature and Middle High German.

In the former, Goethe's *Faust* was studied, twice weekly, on the basis of the Weimar edition, supplemented by all the critical apparatus obtainable. With the exception of three acts of the Second Part, which were read critically and commented upon, the work was limited to the First Part, the members of the class presenting essays and studies upon selected subjects. Special attention was given by the director to the 'Erdgeist' scenes and to the Walpurgisnachtstraum; and results were reached which it is expected will be published during the present year.

In Middle High German, Hartmann's *Iwein* was read entire, the text was critically examined, and questions of court-epic style were discussed. The introduction, lines 20-30, was specially considered as affording new insight into Hartmann's manner of composition, and into the order in which his works were composed. (Cf. *Univ. Circulars*, No. 90, p. 122.) This course was followed by a study of the poems of Neidhart von Reuenthal, as illustrating the decline of the minnesong and the introduction of popular elements.

The second section of the Seminary met fortnightly through the year, in an evening session. In addition to written reports on articles assigned, papers on the following subjects were presented and discussed: Two metrical tests for Hartmann von Aue. The subjunctive in Wolfram von Eschenbach. The Present Participle in the Middle High German court epic. A comparison between Neidhart and Steinmar von Klingnau. The Alexandrine in *Faust*. The Paralipomena of *Faust II*. Goethe's use of the *Knittelvers*. Goethe's *Julius Caesar*. H. L. Wagner's plagiarism, in *Die Kindermörderin*, of the Gretchen episode in *Faust*. Comparison between Grillparzer's *Ahnfrau* and Schiller's *Räuber*. Leuthold's relation to Lenau and the Swabian School. Sieger's adaptation of Heinrich von Kleist's *Kätzchen von Heilbrunn*. Beginnings of German culture in America, with a review of Margaret Fuller's *Tasso*.

The elements of Gothic were studied, twice weekly through the year, under the guidance of Dr. Wood, on the basis of Braune's *Grammatik* and Bernhardt's *Wulfila*, supplemented by the chapters of Kluge and Sievers in Paul's *Grundriss*, I, 2nd part, and by twelve lectures on verb and noun-formations in Gothic, consonant mutation, and 'Ablaut.'

The members of the Teutonic Seminary and of the class in Gothic met weekly and reviewed the work of the week in that subject, and studied selected topics from the elements of comparative German grammar. This class was conducted by Mr. B. J. Vos, Fellow in German.

Dr. Wood lectured, twice weekly, on the History of German Literature in the nineteenth century. Beginning with the Romantic School, the principal movements and tendencies in German literature were considered, down

to the year 1848. Among the subjects which received more special treatment, were the position of Justinus Kerner towards Arnim and Brentano, and Heine's relation to Goethe, Arnim, Immermann, and particularly to Kerner. (Cf. *University Circulars*, No. 90, p. 121-2.)

In the undergraduate major course, Dr. Wood conducted a class, weekly, in the History of Modern German literature, with Kluge's *Deutsche National-literatur* as a basis. The first part of Goethe's *Faust* was read, twice weekly, during the second half-year. Essays on selected topics were written by members of the class.

In the minor course, Schiller and Goethe's *Briefwechsel* was read with Dr. Wood weekly through the year. The plan and scope of this study were essentially the same as during the session 1889-90 (*Fifteenth Annual Report*, p. 44). The weekly exercises in Prose Composition were conducted, with the assistance of Dr. Learned, throughout the year.

Dr. Learned gave the following courses:

1. Introductory Course in Middle High German. Weekly. Paul's *Grammatik* was used, and the following works were read: Weinhold's *Mittelhochdeutsches Lesebuch* (the lyrical selections); Hartmann von Aue's *Armer Heinrich*, ed. Wackernagel-Toischer (in full); *St. Sylvester's Tac*; *Amicus und Amelius*; *Nibelungenlied* (two Aventiuren).

2. Old Saxon. The *Heliand* was read (2000 lines) in Heyne's text, with constant reference to the text of Sievers. Lectures were given on the MSS., Praefatio, authorship, and sources of the poem. The most important monographs on the *Heliand* were reported on by members of the class. Twice weekly, first half-year.

3. History of the German language in the Old High German period. Lectures were given on the following subjects; Primitive Germanic; East and West Germanic; High and Low German; the second mutation of consonants; the differentiation of German dialects and the criteria for such differentiation; primitive Frankish speech (the Malberg Gloss of the *Lex Salica* was compared with the speech of the Merovingian inscriptions and was presented in tabulated form); Alemannic, Bavarian, Saxon and Frankish speech in the chronological order of the monuments; Old Low Frankish, Middle and Rhine Frankish; Carolingian court speech. Twice weekly, second half-year.

4. Undergraduate courses.

Goethe's *Hermann und Dorothea*, Schiller's *Wallenstein's Lager*, Freytag's *Aus dem Mittelalter* (60 pp.) were read in the major course,—three times weekly, first half-year, and weekly, second half-year. Buchheim's *Prose Composition* (45 pp.) and Wilmann's *Deutsche Grammatik*, second part, were studied in weekly meetings. The class read the remaining parts of the *Wallenstein* trilogy (*Piccolomini*, *Wallenstein's Tod*) as private reading.

In the minor course, Goethe's *Egmont*, Schiller's *Wühelm Tell*, Heine's *Harzreise* (one third), Freytag's *Aus dem Staate Friedrichs des Grossen* were read, three times weekly, and the second series of exercises in Whitney's *Grammar* were translated into German, weekly. The class read the follow-

ing works of Schiller, as private reading: *Des Grafen Lamoral Egmont Leben und Tod*; *Die Jungfrau von Orleans*.

5. Two classes of graduate students, in Historical and Scientific German, each meeting three times fortnightly, read Freytag's *Aus dem Staate Friedrichs des Grossen*; Schiller's *Historische Skizzen*; Helmholtz' *Ueber Goethes naturwissenschaftliche Arbeiten*; F. Cohn's *Licht und Leben*, and *Ueber Bakterien*; Haeckel's *Ueber Arbeitstheilung im Thier- und Menschenleben*; Humboldt's *Kosmos* (50 pp.).

Dr. F. M. Warren conducted the undergraduate minor course B, meeting five hours weekly through the year. In this class Otis' *Elementary German* was studied; the exercises in Whitney's *Grammar* (first series, and second series themes 1-8) were translated into German; and the following works were read: Buchheim's *Reader*, Part II, pp. 1-88; Schiller's *Wilhelm Tell*, acts I-III; Goethe's *Egmont*, acts I and II.

HENRY WOOD,  
Associate Professor of German.

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## English.

### 1. Advanced Courses.

The English Seminary was conducted by Dr. Bright.

During the first half-year the work was directed to the study and investigation of English Lyric Poetry from the beginning of Middle English times to the Elizabethan period. The "Moral Ode" and the poems of MS. Harl. 2253, as published by Bøddeker, were the earliest texts upon which minute study was bestowed. The "Old English Miscellany" was reviewed while tracing the history of the relation between secular and religious lyrics. After this the works of the following writers were taken up: William of Shoreham, Laurence Minot, Thomas Occleve, John Lydgate, Stephen Hawes, John Skelton, Henry Howard Earl of Surrey, Sir Thomas Wyatt, and Thomas Sackville. "Tottel's Miscellany" and "The Paradise of Dainty Devises" were reviewed. Special attention was paid to the history of metres, to the development and transmission of poetical canons, and to literary sources. During the second half-year the earliest period of the English Drama was investigated. After a review of the liturgical drama the four great cycles of Miracle Plays, the Digby Plays, and the Book of Brome were exhaustively treated. Papers were also prepared and presented on the following topics: Dramatic elements in the liturgy; Guilds in the Middle Ages; the Boy-Bishop and St. Nicholas-Tide; the Feast of Fools; Classical influence: Plautus, Terence, Seneca; the Latin School Drama; Italian influence; the development of the Moral Plays; the Presentation of the Religious Drama; the influence of the Reformation on the Drama. As an adjunct to the Seminary, a Journal Meeting was held once a week for reports on the scientific periodicals and on recent books.

Dr. Bright lectured once a week during the first half-year on the elements of Phonetics; and once a week during the first, and twice a week

during the second half-year, on Middle English Grammar. He also conducted a class in the interpretation of the Anglo-Saxon version of Bede's Ecclesiastical History of England.

### 2. College Courses.

The English major class met Dr. Browne once a week for the study of the Early Scottish Poets. The course comprised lectures on the rise and development of the Early Scottish Literature, with readings by the class of selections from the original texts in a chrestomathy prepared especially for this purpose.

Mr. C. A. Smith conducted the class in the study of Middle English, twice weekly throughout the year, with the use of Morris and Skeat's *Specimens*, Parts I, II. The class also met Mr. Smith once a week for the first half-year for the study of rhetoric; in the second half-year, rhetorical and critical study was bestowed upon modern elegiac poems, chiefly the *Adonais* of Shelley, and Tennyson's *In Memoriam*.

The English minor class studied, with Dr. Browne, the literature of the Elizabethan period, including the prose-writers, lyrical and allegoric poetry, and the rise and development of the English drama, with a special study of Shakespeare, twice weekly for the first half-year, and the literature of the fourteenth century, twice weekly for the second half-year. A course of lectures and readings on the literature of the eighteenth century was given once weekly throughout the year. This class also studied Anglo-Saxon twice weekly throughout the year with Dr. Bright, using Sweet's Reader and Sievers' Grammar as text-books.

The students of the P. H. E. course (required of all undergraduates) met Dr. Browne twice weekly for a synoptical study of English Literature from the earliest period to the beginning of the present century.

### 3. Lectures on Literature.

The first course of the Percy Turnbull Memorial Lectures on Poetry was given in March by Mr. Edmund C. Stedman, of New York. Mr. Stedman's theme was "The Nature and Elements of Poetry," which was treated in eight lectures with the following titles: 1. Oracles, Old and New; 2. What is Poetry; 3. Creative Poetry; and the Poetry of Self-Expression; 4. Melancholia: The Poetry of Self-Expression; 5. Beauty; 6. Truth; 7. Imagination; 8. The Faculty Divine: Passion, Insight, Genius, Faith.

Mr. Richard G. Moulton, of Cambridge, England, gave four lectures, in January, on Milton's Poetic Art; Professor George Lyman Kittredge, of Harvard University, gave six lectures, in January, on the Early English Gawain Romances; and Professor C. T. Winchester, of Wesleyan University, gave eight lectures, in February, on English Literature of the Period of Queen Anne.

JAMES W. BRIGHT,  
*Associate Professor of English Philology.*

WM. HAND BROWNE,  
*Associate Professor of English Literature.*

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## Romance Languages.

The advanced courses were conducted by Dr. Elliott, as follows:

Romance Seminary. *Two hours a week through the year.*

The work centered here on the *Épopée royale*, with the *Pèlerinage de Charlemagne* as the literary product for special treatment. After an introduction to the chief characteristics of the Anglo-Norman dialect, as represented in the so-called diplomatic form published by Koschwitz, the sources of the poem were carefully studied, and then the text was taken up from the double point of view of the language proper and of text constitution. For the former, both the Isle-de-France and Franco-Norman forms were examined, where they deviate from the corresponding forms of MS., and compared with MS. equivalents; for the latter, the leading canons of text-criticism were applied in the constitution of a text less uniform than that presented by the editor, who, it is believed, has made innovations where the traditional readings might stand. The work of the Seminary was supplemented by extensive reading and by giving written digests of other poems of the *Cycle du Roi*, for the literary course under Dr. F. M. Warren.

In addition to this course, a meeting of two hours was held once a fortnight, in which the exercises consisted in the reading of original papers bearing upon linguistic and literary subjects, of extracts of important articles in Romance journals, of reports on recent publications received, and of any suggestive correspondence, of a professional nature, that might be presented.

Introduction to Old French Philology. *Two hours weekly.*

This course is intended for first-year students and runs alongside of the lectures on modern French phonetics as given below. After a critical study of the general principles of Old French Morphology as given in Schwan's *Grammatik des Altfranzösischen*, the *Aucassin et Nicolette* was taken up and these principles applied to a normalized French text founded on the third edition of Suchier. Later, when the course in physiological and historical phonetics (see below) had been presented, the phonetic side of the same text was carefully examined with a view to the practical application of the special laws of French phonetics, both historical and physiological.

Introduction to Italian Philology. *Weekly.*

This course corresponds, for the Italian, to the work done in Old French, as noted in the preceding paragraph. Boccaccio's *Decameron* was used in connection with the part for Italian in Gröber's *Grundriss der romanischen Philologie*, of which the chapter on morphology has received chief attention this year.

Lectures: (a) On Modern French Phonetics. *Weekly.*

In this course the special principles of physiological phonetics only were presented, and through a study of these the necessary preliminary training secured for a treatment of the following course.

*(b) Old French Historical Phonetics. Weekly.*

In connection with this course (a) Passy's *Sons du Français* and Beyer's *Französische Phonetik* were used; (b) a critical examination was made of the chapters bearing on this subject in Schwan's *Grammatik des Altfranzösischen*.

(c) On General Phonetics, in which Sweet's *Primer of Phonetics* was used as the background for special study. *Weekly.*

The object here was to give that general practical training which should fit students to take up the sound system of any language and study it with intelligence.

*(d) On Popular Latin. Weekly.*

The object here was to give the student an introduction to the phonetics and morphology of Folk- and Low-Latin as the common basis for a scientific study of the modern Romance idioms. Meyer-Lübke's treatment of the subject in Gröber's *Grundriss der romanischen Philologie* was taken as the starting point for this work, in connection with which selections were read in Schuchardt's *Vokalismus des Vulgärlateins*, Budinszky's *Ausbreitung der Lateinischen Sprache* and D'Arbois de Jubainville's *Déclinaison latine en Gaule*.

*Old French.*

The work in this course consisted in the critical interpretation, under the direction of Dr. Todd, of characteristic portions of Old French literature. The primary object was to aid students of Old French to a more intelligent appreciation of the literary side of the authors studied, by elucidating such peculiarities of style and syntax as are likely to escape the attention of beginners. Selections, for this purpose, were made from the *Vie de St. Alexis*, *Vie de St. Thomas de Cantorbéry*, *Iluon de Bordeaux*, *Aliacans*, *Chevalier au Lion*, *Roman de Renart*, and *Roman de la Rose*. The attempt was made to establish new views on various points of etymology and syntax.

*Old Provençal.*

An advanced (second year's) course was conducted by Dr. Todd in the study of Old Provençal texts, with especial reference to the subtler difficulties met with in the lyric compositions. The *Boethius* fragment and *Planch de S. Esteve* were interpreted, followed by selections from Guillaume IX, Marcabrun, Bernart de Ventadorn, Raimbaut III, Guillem de Cabestaing, Peire d'Alvernhe, Peire Rogier, Garin le Brun, Arnaut de Marvill, Guiraut de Borneil, Peire Vidal, and Bertran de Born.

*Italian and Spanish.*

The study of Italian and Spanish was taken up from the beginning, under Dr. Todd, the entire stress of the course being laid on the acquisition of a thorough reading knowledge of these languages. As necessary to this end, systematic, but quite subordinate, drill in the grammar (and pronunciation) of both languages was kept up through the year, together with as much of an introduction to the literature as was found practicable.

In Italian, portions of Boccaccio, Guicciardini, Machiavelli, Alfieri, and Leopardi were carefully read. Colloquial style was represented in Goldoni's comedy, *Il vero amico*. The general literature was reviewed in Sonzogno's *Storia della letteratura italiana*. Special attention was given to Dante's *Divina Commedia*, twenty-six cantos of the Purgatorio having been interpreted in a series of public readings during the second half-year.

In Spanish was read the comedy, *El Barómetro*, and considerable selections from Lorra, Selgas, and Valera. An introduction to the study of the Spanish of Cervantes was given, covering the first seven chapters of *Don Quijote*.

*French Literature.* Weekly lectures by Dr. F. M. Warren and papers presented by the class on the Carolingian Epic.

*French Major Course.*

The seventeenth century literature was studied, under Dr. Todd, in two of the representative plays of Corneille, the *Cid* and *Horace*, and in the *Avare* of Molière.

The class read, with Dr. F. M. Warren, five books of Hugo's *Notre Dame de Paris*, Hugo's *Ruy Blas*, and the more prominent poets in Fontaine's *Poètes français du XIX<sup>me</sup> siècle*. In literature there were weekly lectures and papers presented by the class on the period extending from 1550 to 1659.

Systematic study of idioms and composition was conducted by Mr. Bonnotte. Towards the end of the year original essays in French were submitted, which were discussed, criticised, and corrected in class.

*French Minor A.* Under Dr. F. M. Warren the class read Sand's *La Mare au Diable*; Balzac's *Eugénie Grandet*, twenty-one chapters; Daudet's *Contes*; Augier's *Le Gendre de M. Poirier*; Hugo's *Hernani*; and Sandeau's *Mlle. de la Seiglière*. They also studied the literature of the nineteenth century, using Warren's *Primer of French Literature*.

The same class read with Mr. Bonnotte, Michelet's *Récits d'histoire de France* and Halévy's *L'Abbé Constantin*, with especial reference to pronunciation and conversation. In composition they wrote the second part of Whitney's *French Grammar* and Grandgent's *Materials for French Composition*, Part I.

*French Minor B.*

The study of French was here taken up from the beginning, under Dr. Todd, and pushed rapidly throughout the year. Part I of Whitney's *French Grammar* was covered and reviewed, with regular exercises in composition on the basis of the English themes. The same work was continued through the most important portions of Part II. The reading of French was begun early in the course, most of the material in Super's Reader and the whole of Souvestre's *Un Philosophe sous les Toits* being carefully mastered.

A. M. ELLIOTT,  
Associate Professor of Romance Languages.

### History and Politics.

During the year 1890-91, nineteen courses of instruction in historical and political science have been given by the regular staff of five instructors and by seven lecturers. One hundred and forty-three students were enrolled for class work; of this number fifty-five graduates have devoted their principal attention to this department. Other graduates have taken subordinate courses in history or politics. Fifty-three undergraduates were enrolled in Group VI. Others have taken historical or political courses.

A very successful course on the History of Diplomacy was given by the Hon. John A. Kasson, LL. D., formerly U. S. Minister to Austria and afterward to Germany. His lectures were enthusiastically received by both graduate and undergraduate students. James Schouler, LL. D., gave to undergraduates a class course of ten lectures introductory to American Political History and to the study of his "History of the United States under the Constitution." Professor J. F. Jameson, formerly of this department and now professor of history in Brown University, gave a scholarly course of ten class lectures upon the Constitutional and Political History of the Southern States. The Hon. Carroll D. Wright, U. S. Commissioner of Labor, gave eight public lectures in Hopkins Hall on Studies in Social Science, with particular reference to phases of the labor question. Professor Woodrow Wilson, of Princeton College, gave his annual course of twenty-five lectures to graduate students upon Administration and Public Law. The President of the University gave a course of lectures and readings upon the Historical and Geographical Aspects of the Mediterranean. All of these lectures have been highly appreciated by the department.

The Seminary of History and Politics has been continued in weekly sessions of two hours throughout the year under the direction of Professor H. B. Adams. The first half-year there were forty-six members and the second half-year fifty-one members. Dr. Adams gave special attention to the history of educational institutions, with an introductory course of studies upon oriental, classical, and mediæval forms of education. Some of his modern studies upon the history of education in the nineteenth century will appear in a government report on "University Extension in England," to be published by the U. S. Bureau of Education. A paper on the "Higher Education of the People," first read before the Seminary, was afterward given in the form of a public address before the State Historical Society of Wisconsin, January 28, 1891, and has been published in their proceedings. An article on "University Extension in America" appeared in *The Forum* for July, 1891. "An American View of University Extension" was contributed to the July number of the American edition of *The Review of Reviews*, edited by Dr. Albert Shaw and Mr. R. J. Finley, former members of the Seminary. An article on "City Universities" by Dr. H. B. Adams was printed in *The Chautauquan*, July, 1891.

Special attention has also been devoted by the Seminary to the subject of social science. Members of the Seminary, under the leadership

of Dr. J. R. Brackett and Dr. A. B. Woodford, have co-operated with the Charity Organization Society of Baltimore, in a systematic study of charitable institutions in and about this city. The results of their inquiries and observations will appear in a Directory of Baltimore Charities, to be published by the Charity Organization Society. Interest in the practical study of social science is a marked characteristic of our seminarians, several of whom have proved very successful as secretaries of organized charities, for example, Rev. Horace G. Hoadley, in Waterbury, Connecticut, Dr. Philip W. Ayres, in Cincinnati, and Dr. A. G. Warner, now U. S. Commissioner of Charities in the District of Columbia. Mr. John H. Finley, formerly a member of the Seminary, has become secretary of the State Charities Aid Association in New York and has rendered good service in promoting legislation at Albany regarding State supervision of county insane asylums, work houses, etc. There is an interesting article in the June number of *The Review of Reviews* by Mr. Finley on "American Reform in the care of the Insane, with special reference to recent New York Legislation."

Valuable studies by individual members of the Seminary upon historical, educational, social, and economic topics have been discussed in the Seminary, and some of them have been printed. Reports on the Progress of Historical Literature in the United States by Dr. J. M. Vincent may be found in the *Jahresberichten der Geschichtswissenschaft*, published by the Berlin Historical Society. A report on Social Legislation in the United States for 1889 and 1890, by L. S. Merriam, was published in the *English Economic Review* in April, 1891. Mr. Merriam's paper on "The Appointment of a Receiver in the City of Nashville in 1869" appeared in the *American Law Review*, May-June, 1891. The nine doctors' theses in historical or political science for this year were reported and criticised in the Seminary or in the Economic Conference.

The principal channel of publication for Seminary work has been the Studies in Historical and Political Science, of which the ninth series is now approaching completion. Besides these monographs, four extra volumes have been published during the year 1890-91: (1) "The Supreme Court of the United States: Its History and Influence in our Constitutional System," by Dr. W. W. Willoughby, whose work was awarded a prize of \$50 as the best contribution to institutional history in the year 1890-91; (2) "The Intercourse between the United States and Japan," by Dr. Inazo (Ota) Nitobe, a former member of the Seminary for three years and now associate professor in Sapporo, Japan; (3) "State and Federal government in Switzerland," by Dr. John Martin Vincent, librarian of the department of history and politics during the past four years; and (4) "Spanish Institutions in the Southwest," by Dr. F. W. Blackmar, formerly Fellow in History, now professor in the State University of Kansas.

Regular courses of instruction to graduates and under-graduates have been given as usual. Professor Adams lectured two hours a week to fifty graduates, the first half-year, on the Early History of Institutions and Greek Politics, and two hours a week, the second half-year, to fifty-two grad-

uates on the History of Prussia. He conducted a class course in Church History two hours a week through the year for thirty-six students, fifteen of them graduates. A class in International Law with seventeen students was conducted by Dr. Adams two hours a week through the year.

Professor George H. Emmott has given the following courses of lectures: (1) Historical and Comparative Jurisprudence. The lectures on this subject were given two hours per week during the entire year to thirty-one graduate and advanced students. In the first part of the course special attention was given to tracing the rise and progress of those primitive usages, laws, and institutions which are common to the nations of the Aryan race. The Clan system was fully described, and the rise of political society and its relation to the earlier systems which prevailed were clearly indicated. The relation of Custom to Law and the growth of legal ideas were next treated of, with special reference to the early history of the family and to the origin of separate property in land. The successive periods in the history of Jurisprudence were then sketched. The work and method of the Prudentes at Rome throughout the successive stages of their history were fully treated of, and a comprehensive review was given of the condition of the Roman Law at the beginning of the 5th century. A critical examination was then made of the *Lex de Responsis Prudentum* and of the Codes of Gregorianus, Hermogenianus, and Theodosius II, and of their effect upon previously existing legislation. The following topics were then discussed from the comparative standpoint: The public law schools of Constantinople and of Rome; state of legal education in Europe throughout the early part of the Middle Ages. *Fragmenta Vaticana*, the *Mosaicarum et Romanarum legum Collatio*; the codification of the Roman law of Justinian; description of early German law; the German family; the reforms of Charles the Great; comparison between the Roman and German family; the conquest of the Western Roman Empire by the Germans; the "Barbarian" Codes; the Visigoth *Breviarium* of Alaric II.; the "Papian," or the Roman Law of the Burgundians; the edict of the Ostrogoth Theodoric; the *Lex Salica*; the *Capitularies*. The principle of the personality of the law; establishment of the Romans in Gaul; Gallo-Roman law; constitution of the Gallo-Roman family; Norman Law; sources of our knowledge of ancient Norman Customs; the Merovingian and Carolingian period; the publication of the law of Justinian in Italy; the history of the Canon Law in England and on the Continent of Europe. Revival of the study and teaching of the texts of Justinian in the 12th century. The School of Bologna and the Glossators. Codification. (2) English Constitutional Law and History. This course of three hours per week during the first half-year was given to a class of fifteen graduate and fifteen undergraduate students. The origin and development of the English constitution and of the fundamental principles of English constitutional law were carefully and systematically traced in chronological order from the earliest settlements in Britain down to the present time. Taswell-Langmead's English

Constitutional History was selected as containing an outline sketch of the ground covered, with frequent references to the works of Freeman, Stubbs, Hallam, May, Dicey, Anson, Hearn, Bagehot, Traill, Spencer Walpole, and other writers. The instruction was given by means of lectures delivered by the instructor, by frequent recitations, and by lectures given by the students themselves on such topics as the following: the Anglo-Saxon system of land tenure; the political and constitutional effects of the Norman Conquest; the immediate and remote effects of Magna Charta; the political relations of Monarch and Parliament from 1603 to 1642; the constitutional significance and political consequences of the Revolution of 1688; the struggles of Whigs and Tories in the 18th century; the origin, development, prerequisites and peculiar form of cabinet government in England; the reform bills of 1832, 1867, and 1884.

Dr. R. T. Ely has given graduate instruction in Public Finance in a course of lectures, two hours a week through the year, with from forty-one to forty-five students. The nature of public finance was discussed; the significance of public finance and the differences between public and private financiering were presented; and the connection of the evolution of taxation with the growth of constitutional government was shown. The expenditures and revenues of governments in ancient and modern times were treated, and particular attention was given to special topics. A few carefully prepared papers were presented by students and special mention may be made of the following: Public Debts, a statistical study by Mr. A. B. Woodford; River and Harbor Legislation in the United States, France, and England, by Mr. Emory R. Johnson; Sinking Funds, by Mr. E. A. Ross; and the Income Tax, by Mr. H. R. Seager. Dr. Vincent discussed some aspects of Swiss finance in financial monopolies, income and property taxes. Dr. Ely's economic conferences were held weekly, with ten students, at his own house. The regular work was the discussion of early English economists. This work, it is expected, will be completed during the coming year, and probably the results will be ultimately presented in book form. Papers were presented by Mr. Ross on Mandeville's Fable of the Bees; by Mr. Sherwood on Locke's Economic Writing; by Mr. Kinley on Sir Josiah Child; by Mr. Holbrook on Thomas Mun; and by Mr. W. A. Scott on Sir William Petty and Sir Dudley North. Essays on economic topics by Dr. Ely and others were presented. Current economic literature was discussed. Dr. Ely has conducted the usual undergraduate class in the Elements of Economics five hours a week through the year, with thirty-six students. Although this is an undergraduate course, many of the class were graduate students, who desired a general review of political economy. Dr. Ely's Introduction to Political Economy was used as a syllabus of lectures rather than as a text-book in the ordinary sense. Mill, Walker, Clark, and other writers were also studied. Various views were critically examined and the formation of an independent judgment was encouraged. Each member of the class presented two essays, and a large amount of reading was required.

Dr. J. M. Vincent, besides acting as librarian for the department, gave a course of lectures to forty-one graduate students on the Sources of History and the Science of Historical Investigation. He conducted a class of twenty-one undergraduate students in Herodotus (translation), one hour a week the first half-year, and a class of eighteen in Thucydides (translation), one hour a week the second half-year. He also conducted a class of thirty-four undergraduates in Greek and Roman History three hours weekly from January until the end of the academic year.

Dr. Charles Lee Smith gave instruction to a class of twenty undergraduates in Continental History, three hours weekly from October to January, when the class was taken by Mr. Wm. A. Scott, who also conducted a class of twelve undergraduates in the Outlines of European History, three hours weekly from January to the close of the year.

H. B. ADAMS,

*Professor of American and Institutional History.*

### Logic.

The daily work of the undergraduate courses has been conducted as follows:

Both Deductive and Inductive Logic were taught two hours weekly for about twenty-eight weeks. Special reference was made to Jevons' Elementary Lessons in Logic and Fowler's Elements of Inductive Logic, with frequent references to the works of Mill, Bain, Venn, Keynes, and other writers. Particular attention was given to the general theories of both deduction and induction, to the various forms of thought, notion, judgment, and reasoning; and also to the various methods of scientific investigation and proof.

Numerous exercises were given in the opposition and conversion of propositions, in indication and counter indication, in the application of the rules of the syllogism, in the detection of fallacies, and in the elimination of contradictions from thought. Fifty students attended the class, which was taught by short informal lectures, by frequent recitations, by discussions in the class, and by written exercises required from each member of the class.

GEORGE H. EMMOTT,

*Associate Professor of Logic.*

### Philosophy.

The undergraduate courses in Psychology and Ethics have been under the care of Professor Griffin. Three hours a week were given to the first named subject from the beginning of the year until March 15th; thereafter

the class met for the study of ethics, the number of hours per week being increased, after April 20th, to five. The endeavor has been to keep particularly in view the needs of those to whom these subjects are new, and to make the treatment as simple and untechnical as possible, and at the same time to call attention to fundamental problems, so that the work may serve as an introduction to general philosophical study. A text-book has been used in each subject—Baldwin's *Handbook of Psychology*, and Fowler's *Principles of Morals*, Part II,—as affording definite material of acquisition; but in informal lectures, discussions in the class, and passages from various authors specially assigned for reading, have been largely relied upon in the presentation. Each member of the class has been required to prepare three essays in the course of the year. The class has numbered fifty members.

The instruction in Psychology has attempted to give a general view of the results of the more recent methods of study. A series of lectures and demonstrations on the anatomy and physiology of the muscular and nervous systems, given by Professor Martin as a voluntary course, was attended by a large part of the class. Especial emphasis was laid upon the facts of conscious experience as known through introspection, the most important end to be secured being, it is believed, such an understanding of the facts and laws of mental life as shall fit one for wise self-government and effective influence. Such powers and states of mind as attention, memory, association, habit, imagination, the feelings, the will, were discussed in as concrete and practical a way as possible.

The work in Ethics was mainly confined to the theoretical and historical aspects of the subject; questions of applied ethics were, for lack of time, but slightly considered. The various forms of feeling native to our constitution and constituting the possible motives of conduct; the conditions and nature of the sense of obligation; the authority of conscience; the diversities of moral sentiment; the historic theories of morals—hedonism, utilitarianism, intuitionism; the application to ethical theory of the doctrine of evolution; the characteristic features of Christian morality: these were some of the topics discussed. While a more detailed application of the principles reached to personal and social conduct would have been desirable, the consideration of the speculative side of ethics is well adapted to produce a habit of moral thoughtfulness.

A brief outline of the History of Philosophy was given during the last weeks of the year, for the benefit of those who were able, at so disadvantageous a time, to attend the lectures.

Professor Griffin conducted during the year a course in the History of Philosophy, for graduate students, consisting of the reading and discussion of representative works in modern philosophy from Descartes to Kant. The works read were as follows: Bacon's *Novum Organum*, book I and part of book II; Descartes' *Method and Meditations*; certain portions of Spinoza's *Ethics*; Locke's *Essay on Human Understanding*, portions of books I, II, IV; Berkeley's *Principles of Human Knowledge*; Hume's *Treatise on Human Nature*, book I; a portion of Kant's *Critique of Pure Reason*. The class met

once a week for discussion and criticism. The *History of English Ethics*, from Hobbes to the present time, was studied by a number of graduate students, meeting one evening each fortnight.

EDWARD H. GRIFFIN,

*Professor of the History of Philosophy.*

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### Pathology.

The work in Pathology during the past year has consisted, as heretofore, chiefly of practical courses of instruction and of special investigation in the laboratory.

Two courses in Pathological Histology, the one beginning in October, the other in January, have been conducted by Professors Welch and Councilman. Each class has met three afternoons in the week from two until five o'clock.

Professor Welch and Dr. Abbott have directed the work in the Bacteriological Department.

The total number of students and special workers has been sixty-three. The classes in Pathological Histology have been attended by thirty-seven students, of whom eleven have been advanced students in Biology intending to study medicine, the rest being physicians. Twenty-two physicians have taken the courses in Bacteriology and seventeen have been engaged in special work. Many of those on the staff of the hospital have worked in the laboratory. The fellowship in Pathology was not filled, no nomination for this position having been made.

The number of post-mortem examinations has been about one hundred.

Among the subjects of special investigation during the year may be mentioned the form of dysentery caused by the amoeba coli, the bacteriological study of diphtheria and the histological changes in experimental diphtheria, the disinfectant power of corrosive sublimate on the micro-organisms of suppuration, the bacteriological study of infectious diseases of swine, the bacillus coli communis and the bacillus typhi abdominalis, the lesions of typhoid fever, leukaemia, tumors of the ovary, the micro-organisms of traumatic infections. The results of these and other studies have been or will be published in the *Bulletin and Reports* of the Johns Hopkins Hospital.

During January, February, and March, Professor Welch lectured in the clinical amphitheatre of the Hospital on Infectious Diseases, Dr. Councilman on the Pathology of Bright's Disease, and Dr. Abbott on subjects in Bacteriology. These lectures formed a part of the course given by the Medical Staff of the Hospital and were attended by physicians in the city as well as by those taking the courses of instruction in the Laboratory and Hospital.

WILLIAM H. WELCH,

*Professor of Pathology.*

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**Drawing.**

The following courses have been given during the year by Mr. Aldrich:

First year's course in Applied Kinematics, for the students of Electrical Engineering, consisting of lectures, recitations, and practical work in the elements of machine design, kinematic analysis, and principles of mechanism. *Twice weekly, through the year.*

Second year's course in Applied Kinematics, for the students of Electrical Engineering, consisting of lectures and practical work in designing dynamo, motor, and steam-engine details, graphical analysis of mechanisms, and kinematics of machinery. *Twice weekly, first half year.*

The Technical Course in Mechanical Drawing, conducted by Mr. Aldrich, has comprised the following work by the students of Electrical Engineering: selected geometric constructions, rolled and other plane curves; the elements of descriptive geometry, simple and advanced study of projections, sections of solids by planes, intersections of solids, and developments, isometric projections, and the elements of linear perspective; machine detail sketching; the technicalities in common use in engineering drawing; working drawings of mechanical elements from dimensioned sketches, and from study and original designs of elementary forms and members of machines, with sets of tracings and blue prints adapted to shop production. The special projects and designs, in connection with the work in Applied Kinematics, have been as follows: investigation of involute and epicycloidal tooth-outlines for gear wheels, indicator linkages, designs of steam-engine slide valve, special commutator apparatus for experimental purposes, and 15 h. p. multipolar motors.

The Undergraduate Course in Drawing, given by Mr. S. Edwin Whiteman, has included: (a) representative or freehand drawing from natural forms and geometric models, in outline and in light and shade, with pencil, pen and ink, charcoal, crayon and stump; studies of landscape contours; and large charts, finished with crayon or ink brush, such as the student may be called upon to make later on, when teaching or in illustrating lectures; (b) constructive or mechanical drawing, with exercises in the use of instruments, and elements of descriptive geometry,—simple projections, sections and developments, isometric projections, and the elements of linear perspective.

The Special Instruction in Drawing given by Mr. Whiteman has been adapted to the wants and abilities of those seeking it, and has been chiefly in the line of advanced free-hand drawing, in light and shade, from casts, and personal directions for individual improvement in some line of drawing helpful to the student in his scientific work.

W. S. ALDRICH,  
*Instructor in Drawing.*

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## TABULAR STATEMENT OF COURSES OF INSTRUCTION, 1890-91.

INSTRUCTOR.	COURSES.	No. of hours per week.	No. of students, 1st half-year.	No. of students, 2d half-year.
<b>MATHEMATICS AND ASTRONOMY.</b>				
Newcomb, Chapman, Newcomb, Borst. Newcomb, Borst. Newcomb, Borst. Craig. Craig. Craig. Craig.	Celestial Mechanics.	2	5	8
	Spherical and Practical Astronomy. (First half-year.)	2	6	
	History of Astronomy. (Second half-year.)	1		7
	Theory of Instruments and Practical Astronomy. (Second half-year.)	4		8
	Theory of Functions. (First half-year.)	3	7	
	Abelian Functions.	2	2	2
	Theoretical Dynamics and Theory of Attractions.	3	5	4
	Differential Equations: Major Course. (Second half-year.)	2		16
Craig.	Linear Differential Equations. (Second half-year.)	2		7
Franklin.	Modern Algebra, Higher Plane Curves, Finite Differences and Probability. (First half-year.)	5	7	
Franklin.	Theory of Surfaces. (Second half-year.)	3		6
Franklin.	Differential and Integral Calculus (Special Topics.) (First half-year.)	2	19	
Franklin.	Advanced Algebra. (Second half-year.)	2		5
Franklin.	Differential and Integral Calculus (Introductory.) (First half-year.)	2	10	
Franklin.	Differential and Integral Calculus. (Second half-year.)	5		42
Franklin.	Modern Synthetic Geometry. (First half-year.)	3	4	
Chapman.	Determinants, Theory of Equations, Geometry of Two Dimensions. (First half-year.)	3	17	
Chapman.	Analytic Geometry. (First half-year.)	5	21	
Chapman.	Geometry of Three Dimensions. (Second half-year.)	3		13
Chapman.	Analytic Geometry: Elementary. (Second half-year.)	3		8
Chapman.	Trigonometry. (First half-year.)	3	9	
<b>PHYSICS.</b>				
Rowland.	Electricity and Magnetism.	4	7	6
Kimball.	Physical Seminary.	1		
Kimball.	Conferences on Electricity, etc.	1		
Kimball.	General Physics: Major Course.	5	29	28
Kimball, Ames.	General Physics: Minor Course.	5	45	44
Duncan.	Applied Electricity. (First Year's Course.)	3	20	19
Duncan.	Applied Electricity. (Second Year's Course.)	2	6	6
Hasson.	Applied Mechanics. (First Year's Course.)	2	15	13
Hasson.	Applied Mechanics. (Second Year's Course.)	3	3	3
Ames.	Mathematical Theory of Sound.	1	9	8
Aldrich.	Applied Kinematics. (First Year's Course.)	2	15	13
Aldrich.	Applied Kinematics. (Second Year's Course.)	2	5	5

INSTRUCTOR.	COURSES.	No. of hours per week.	No. of students, 1st half-year.	No. of students, 2nd half-year.	
Rowland, Kimball, Duncan, Hasson, Ames, Bliss.	Laboratory Work.		87	85	
	Journal Club.	1			
<b>CHEMISTRY.</b>					
Remsen. Remsen. Remsen. Morse. Morse. Morse.	Advanced Organic Chemistry.	2	29		
	Compounds of Carbon: Major Course.	2	52	52	
	General Inorganic Chemistry: Minor Course.	2	53	54	
	General Inorganic Chemistry: Major Course.	2	31	27	
	Reviews in Organic Chemistry: Major Course. Analytical Chemistry. (Twelve lectures on selected topics.)	1	30	31	
Renouf. Remsen, Morse, Renouf, Randall.	Reviews in General Chemistry: Minor Course.	3	38	33	
	Laboratory Work.		109	105	
	Historical Lectures. (Sixteen lectures by advanced students, second half-year.) Journal Meeting.	2	20	20	
<b>GEOLOGY, MINERALOGY, ETC.</b>					
Williams. Williams. Williams. Clark.	General Mineralogy.	5	22	20	
	Dynamical Geology. (Second half-year.)	4		15	
	Petrography: Laboratory Work. Stratigraphical and Historical Geology. (First half-year.)	4	4	5	
Clark. Clark.	Falsontology: Laboratory Work.		4	4	
	Physical Geography. (P. H. E.) (First half-year.) Journal Meeting.	3	44		
		1			
<b>BIOLOGY.</b>					
Martin.	Physiological Seminary.	1	6	7	
	Physiology: Advanced Course.	1	6	7	
Martin, Andrews. Martin. Martin. Brooks. Brooks. Brooks. Brooks. Andrews. Andrews. Barton. Martin, Brooks, Andrews, Dreyer, Martin, Brooks.	General Biology.	3	24	23	
	Animal Physiology. (Second half-year.)	3		18	
	Animal Histology. (First half-year.)	3	19		
	General Zoology.	2	17	17	
	Morphological Seminary.	1	12	12	
	Advanced Morphology.	1	10	10	
	Human and Comparative Osteology.	2	25	24	
	Mammalian Anatomy. (During October.)	5	17		
	Embryology of the Chick. (Second half-year.)	3		23	
	Systematic Botany. (Second half-year.)	2		24	
				51	56
		Laboratory Work.			
		Journal Club.	1	13	13
	Marine Laboratory. (May-July.)				
<b>GREEK.</b>					
Gildersleeve. Gildersleeve. Gildersleeve.	Greek Seminary: Aristophanes.	2	29	25	
	Lectures on Greek Metres. (First half-year.)	1	27		
	Old Attic Comedy. (Second half-year.)	1		25	

## Tabular Statement of Courses.

INSTRUCTOR.	COURSES.	No. of hours per week.	No. of students, 1st half-year.	No. of students, 2nd half-year.
Gildersleeve.	Greek Tragic Poets. (Second half-year.)	1		27
Gildersleeve.	Syntactical Elements of Style. (Second half-year.)	1		27
Gildersleeve.	Practical Exercises. (First half-year.)	2	27	
Spieker.	Thukydides. (First half-year.)	3	9	
Spieker.	Isokrates. (First half-year.)	4	8	
Spieker.	Homer; Euripides. (Second half-year.)	4		8
Spieker.	Aischylos; Sophokles. (Second half-year.)	3		7
Spieker.	Greek Literature.	1	6	6
Spieker.	Greek at Sight.	1	10	9
Spieker.	Prose Composition. (Two Classes.)	2	22	22
Gudeman.	Alexandrian Literature. (First half-year.)	1	10	
Gudeman.	Plutarch's Life of Cicero. (First half-year.)	1	8	
Arnolt.	New Testament Greek.	2	6	7
<b>LATIN.</b>				
Warren, M.	Latin Seminary: Livy and Tacitus.	2	25	23
Warren, M.	Lectures on Roman Historians. (First half-year.)	1	26	
Warren, M.	Historical Latin Grammar. (Second half-year.)	1		24
Warren, M.	Journal Club.	1	14	13
Warren, M.	Latin at Sight. (First half-year.)	1	9	
Warren, M.	Tacitus. (Second half-year.)	4		18
Warren, M.	Terence; Plautus. (First half-year.)	3	9	
Smith, K. W.	Roman Elegiac Poets. (First half-year.)	1	24	
Smith, K. W.	Juvenal. (Second half-year.)	3		7
Smith, K. W.	Reading at Sight. (Second half-year.)	1		9
Smith, K. W.	Livy. (First half-year.)	4	29	
Smith, K. W.	Horace. (Second half-year.)	4		11
Warren, M. } Smith, K. W. }	Prose Composition. (Two Classes.)	2	21	22
Gudeman.	History of Classical Philology. (Second half-year.)	1		15
Gudeman.	Tacitus, Dialogus de Oratoribus. (Second half-year.)	1		13
Gudeman.	Latin at Sight. (Second half-year.)	1		13
<b>SANSKRIT, ETC.</b>				
Bloomfield.	Vedic Seminary: The Rig-Veda and the Atharva Veda.	1	7	11
Bloomfield.	Advanced Sanskrit. (Kathasaritsagara and Manu.)	1	4	5
Bloomfield.	Advanced Sanskrit. (Hitopadeça.) (First half-year.)	1	4	
Bloomfield.	Introduction to the Veda. (Second half-year.)	1		5
Bloomfield.	Introduction to the Study of Comparative Philology.	1	17	17
Bloomfield.	Comparative Grammar of Latin and Greek.	1	21	21
Baden.	Elementary Sanskrit.	2	5	5
<b>SEMITIC LANGUAGES.</b>				
Haupt.	Sumero-Akkadian.	2	7	5
Haupt.	Assyrian Seminary.	2	6	4
Haupt.	Hebrew: Advanced Course. (First half-year.)	1	14	
Haupt.	Syriac.	1	7	5
Haupt.	Arabic: Coran.	1	7	6
Haupt.	Biblical Aramean.	1	11	6
Haupt.	Old Testament Seminary. (Second half-year.)	2		10
Johnston.	Assyrian: Elementary. (Second half-year.)	1		1
Johnston.	Hebrew: Elementary.	2	1	1
Johnston.	Assyrian: Advanced. (Second half-year.)	2		4
Johnston.	Hebrew Exercises.	2	8	7
Johnston.	Biblical Antiquities. (First half-year.)	1	10	
Johnston.	Arabic: Elementary. (Second half-year.)	1		2
Johnston.	Arabic: Selected Texts. (Second half-year.)	1		3
Johnston.	Assyrian Exercises (Second half-year.)	1		4
Leon.	Arabic (Conversation. (Second half-year.)	1		4
Leon.	Arabic Exercises. (Second half-year.)	1		4

Tabular Statement of Courses.

INSTRUCTOR.	COURSES.	No. of hours per week.	No. of students, 1st half-year.	No. of students, 2nd half-year.
Leon. Prince. Prince. Hawkes. Casanowicz.	Arabic and Islam. (Lectures.) (Second half-year.) Assyrian: Special Course. Second half-year.) Turkish. (Second half-year.) Persian. (Second half-year.) Mishnic Hebrew.	1 8 1 1 1	5	11 1 3 8 2
<b>GERMAN.</b>				
<i>Advanced Work.</i>				
Wood.	Teutonic Seminary. (a) Goethe's Faust. (b) Middle High German. (c) Journal Meeting.	2 1 1	12 8 11	11 13 10
Wood. Wood. Learned. Learned.	Gothic. History of German Literature. (19th Century.) Old Saxon. (First half-year.) Middle High German: Elementary. History of the Language in the Old High German Period. (Second half-year.)	2 2 1 2	13 4 7	12 6 4
<i>Major Course.</i>				
Wood. Wood. Learned. Learned.	History of German Literature. (Lectures.) Goethe (Hermann and Dorothea), Schiller (Wal- lenstein's Lager.) Selected Prose Readings. (Freytag.) Prose Composition.	1 2 1 1	19 19 19 19	14 14 14 14
<i>Minor Course: Class A.</i>				
Wood. Wood. Learned. Learned.	Briefwechsel zwischen Schiller und Goethe. Prose Composition. Selected Prose Readings. (Freytag.) Goethe (Egmont), Schiller (Wilhelm Tell), Heine (Harzreise.)	1 1 1 2	81 31 31 31	26 26 26 26
<i>Minor Course: Class B.</i>				
Warren, F. M.	Otis, Elementary German; Goethe (Egmont.) (First half-year.)	5	23	
Warren, F. M.	Buchheim, II; Prose Composition; Schiller (Wil- helm Tell.) (Second half-year.)	5		22
<i>Supplementary Courses.</i>				
Learned.	Scientific Readings. (Helmholtz, Cohn, Haeckel, Humboldt.)	2	11	8
Learned.	Historical Readings. (Freytag, Schiller.)	2	4	3
<b>ROMANCE LANGUAGES.</b>				
Elliott.	Advanced Courses. (Romance Seminary, Italian Philology, Folk Latin.)	4	5	5
Elliott.	Advanced Courses. (French Phonetics, Old French Philology, French Morphology.)	4	12	13
Todd.	Italian and Spanish.	5	10	10
Todd.	Old French. (Second half-year.)	1	8	8
Todd.	Old Provençal. (Second half-year.)	1	2	2
Todd.	French: Elementary.	5	28	21
Warren, F. M.	French: Major Course. (Cornelle; Idioms.) French: Major Course. (Hugo; Renaissance and 17th Century Literature.)	2 3	12 15	12 14
Warren, F. M.	French Literature. (Second half-year.)	1	8	8
Warren, F. M.	French: Minor Course.	5	28	26

INSTRUCTOR.	COURSES.	No. of hours per week.	No. of students, 1st half-year.	No. of students 2nd half-year.
<b>ENGLISH.</b>				
Bright.	English Seminary. (Lyric Poetry; Early Drama.)	4	13	13
Bright.	Middle English Grammar. (Lectures.)	2	18	17
Bright.	Anglo-Saxon Prose Texts. (Beda.)	1	13	13
Bright.	Phonetics. (First half-year.)	1		20
Bright.	Anglo-Saxon. (Sweet's Reader.)	2	11	11
Bright.	Journal Meeting.	1	13	13
Browne.	Early Scottish Poets.	1	14	13
Browne.	Elizabethan Literature; XIV Century Literature.	2	10	9
Browne.	XVIII Century Literature.	1	10	9
Browne.	General English Literature. (P. H. E. Course.)	2	40	42
Smith, C. A.	Rhetoric. (First half-year.)	2	6	
Smith, C. A.	Elegiac Poems. (Second half-year.)	2		6
Smith, C. A.	Middle English.	2	8	8
<b>HISTORICAL AND POLITICAL SCIENCE.</b>				
Adams.	Seminary of History and Politics.	2	46	51
Adams.	Early Institutions and Greek Politics. (First half-year.)	2	50	
Adams.	American History. (Second half-year.)	3		26
Adams.	History of Church and Empire.	2	36	36
Adams.	International Law.	2	17	17
Adams.	Prussian History. (Second half-year.)	2		52
Ely.	Political Economy: Advanced.	2	41	45
Ely.	Economic Conferences.	2½	10	10
Ely.	Elements of Political Economy.	5	86	86
Emmott.	Historical Jurisprudence. (Roman Law.)	2	23	30
Emmott.	English Constitution. (First half-year.)	3	23	
Smith, C. L. }	Continental History.	3	20	18
Scott.				
Scott.	European History. (P. H. E.) (Second half-year.)	3		12
Vincent.	Greek and Roman History. (P. H. E.) (Second half-year.)	3		34
Vincent.	Herodotus and Thucydides.	1	21	18
Vincent.	Sources of History. (First half-year.)	1	41	
Wilson.	Administration. (Second half-year—five weeks.)	5		35
Wright, C. D.	Studies in Social Science. (Eight Lectures.) (Second half-year.)			
Schouler, J.	American Political History. (Ten Lectures.) (Second half-year.)			
Kasson, J. A.	History of European Diplomacy. (Ten Lectures.) (Second half-year.)			
Jameson, J. F.	Constitutional and Political History of the Southern States. (Ten Lectures.) (Second half-year.)			
<b>PHILOSOPHY.</b>				
Griffin.	History of English Ethics.	1	10	9
Griffin.	History of Philosophy.	1	9	9
Griffin.	Psychology. (L. E. P. Course.) (First half-year.)	3	52	
Griffin.	Ethics. (L. E. P. Course.) (Second half-year.)	5		51
Emmott.	Logic. (L. E. P. Course.)	2	49	49
Martin.	Physiology of the Nervous System. (L. E. P. Course.) (Twelve Lectures and Demonstrations.)			
<b>DRAWING.</b>				
Aldrich.	Mechanical Drawing: Advanced.	4	26	22
Aldrich.	Mechanical Drawing.	4	11	10
Whiteman.	Constructive and Representative Drawing.	6	87	71
Whiteman.	Special Instruction.	6	4	4

## DEGREES CONFERRED, 1891.

### Doctors of Philosophy.

Albert Bagby, Jr., of Stevensville, Va., A. B., Richmond College, 1885. *Subjects*: Latin, Greek, and Sanskrit. *Thesis*: Adverbs in Horace and Juvenal.

James William Black, of Baltimore, A. B., Johns Hopkins University, 1888. *Subjects*: History, Political Economy, and Roman Law. *Thesis*: Attitude of Maryland in the Struggle for the Possession of Canada.

Charles Pliny Brigham, of Baltimore, A. B., Johns Hopkins University, 1888. *Subjects*: Chemistry, Mineralogy, and Geology. *Thesis*: Some Double Chlorides containing Bismuth.

Charles Edward Coates, Jr., of Baltimore, A. B., Johns Hopkins University, 1887. *Subjects*: Chemistry, Mineralogy, and Geology. *Thesis*: Action of Aniline and the Toluidines on Ortho-sulpho-benzoic Acid and its Chloride.

Edwin Grant Conklin, of Delaware, O., S. B., Ohio Wesleyan University, 1885, and A. B., 1886. *Subjects*: Morphology, Physiology, and Geology. *Thesis*: Embryology of Crepidula.

Paul Joseph Dashiell, of Annapolis, Md., A. B., Johns Hopkins University, 1887. *Subjects*: Chemistry, Mineralogy, and Geology. *Thesis*: Reaction of Para-diazo-ortho-toluene-sulphonic Acid with Ethyl Alcohol under various conditions of Dilution and Pressure.

Herman Louis Ebeling, of Catonsville, Md., A. B., Johns Hopkins University, 1882. *Subjects*: Greek, Latin, and Sanskrit. *Thesis*: A Study in the Sources of the Messeniaka of Pausanias.

William Snyder Eichelberger, of Woodberry, Md., A. B., Johns Hopkins University, 1886. *Subjects*: Astronomy, Mathematics, and Chemistry. *Thesis*: The Orbit of Hyperion.

Thomas Perrin Harrison, of Abbeville, S. C., South Carolina Military Academy, 1886. *Subjects*: English, German, and French. *Thesis*: The So-called Separable Prefixes in Anglo-Saxon.

Walter Jones, of Baltimore, A. B., Johns Hopkins University, 1888. *Subjects*: Chemistry, Mineralogy, and Geology. *Thesis*: Sulphon-phthaleins obtained from Ortho-sulpho-para-toluic Acid.

Henry Parker Manning, of Taunton, Mass., A. B., Brown University, 1883. *Subjects*: Mathematics, Astronomy, and Physics. *Thesis*: Developments obtained by Cauchy's Theorem, with applications to the Elliptic Functions.

George Frederick Metzler, of Odessa, Ont., A. B., Albert College, 1880. *Subjects*: Mathematics, Physics, and Astronomy. *Thesis*: Invariants and Equations associated with the general Linear Differential Equations.

William McCracken Milroy, of Northwood, O., A. B., Geneva College, 1877. *Subjects*: Latin, Sanskrit, and Greek. *Thesis*: The Participle in the Vulgate New Testament.

John Leverett Moore, of Orange, N. J., A. B., Princeton College, 1881. *Subjects*: Latin, Greek, and Sanskrit. *Thesis*: Servius on the Tropes and Figures of Vergil.

Wilfred Pirt Mustard, of Uxbridge, Ont., A. B., University of Toronto, 1886. *Subjects*: Latin, Greek, and Sanskrit. *Thesis*: The Etymologies in the Servian Commentary to Virgil.

Barker Newhall, of Baltimore, A. B., Haverford College, 1887. *Subjects*: Greek, Latin, and French. *Thesis*: The Dramatic and Mimetic Features of the Gorgias of Plato.

George Petrie, of Charlottesville, Va., A. M., University of Virginia, 1887. *Subjects*: History, Political Economy, and Jurisprudence. *Thesis*: Church and State in Early Maryland.

Edward Bennett Rosa, of Wellsville, N. Y., S. B., Wesleyan University, 1886. *Subjects*: Physics, Astronomy, and Mathematics. *Thesis*: Specific Inductive Capacity of Electrolytes.

Edward Alsworth Ross, of Marion, Iowa, A. B., Coe College, 1886. *Subjects*: Political Economy, Philosophy, and History. *Thesis*: Sinking Funds.

Charles Edward Saunders, of Ottawa, Ont., A. B., University of Toronto, 1888. *Subjects*: Chemistry, Mineralogy, and Geology. *Thesis*: Researches on the Double Halides.

Sidney Sherwood, of New York City, A. B., Princeton College, 1879. *Subjects*: History, Political Economy, and English. *Thesis*: The University of the State of New York; An Historical Account of its Founding, together with a Sketch of its present Organization and Workings.

Moses Slaughter, of Grinnell, Iowa, A. B., Indiana Asbury University, 1883. *Subjects*: Latin and Greek. *Thesis*: Substantives in Terence.

Bernard Christian Steiner, of Baltimore, A. B., Yale University, 1888. *Subjects*: History, Jurisprudence, and English. *Thesis*: History of University Education in Maryland.

William Howe Tolman, of Pawtucket, R. I., A. B., Brown University, 1882. *Subjects*: History, Jurisprudence, and Administration. *Thesis*: History of Higher Education in Rhode Island.

Stephen Beauregard Weeks, of Chapel Hill, N. C., A. B., University of North Carolina, 1886. *Subjects*: History, English, and Political Economy. *Thesis*: Religious Development in the Province of North Carolina.

John White, Jr., of Poolesville, M. D., A. B., Johns Hopkins University, 1888. *Subjects*: Chemistry, Mineralogy, and Geology. *Thesis*: Sulphon-Fluorescein and other Sulphon-Phthaleins.

Westel Woodbury Willoughby, of Washington, D. C., A. B., Johns Hopkins University, 1888. *Subjects*: History, Political Economy, and Administration. *Thesis*: The Supreme Court of the United States.

Arthur Burnham Woodford, of West Winsted, Conn., Ph. B., Yale College, 1881. *Subjects*: Political Economy, Sociology, and International Law. *Thesis*: The Use of Silver as Money in the United States.

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### Bachelors of Arts.

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| Michael Alexander Agelasto, of Virginia.      | George Lefevre, of Baltimore.                |
| Delano Ames, of Washington, D. C.             | George Milton Linthicum, of Wellham's, Md.   |
| Thomas Stockham Baker, of Baltimore.          | Hugh Sisson Magruder, of Baltimore.          |
| Randolph Barton, Jr., of Pikesville, Md.      | Arthur William McDougall, of New Jersey.     |
| Daniel Base, of Baltimore.                    | Whitford Loane McDowell, of Lutherville, Md. |
| William Bissing, of Baltimore.                | James Farnandis Mitchell, of Baltimore.      |
| Frederick Foye Briggs, of Baltimore.          | Archibald Campbell Murray, of Baltimore.     |
| Shellman Baer Brown, of Baltimore.            | Charles Fairbank Painter, of Massachusetts.  |
| Thomas Morris Brown, of Baltimore.            | Alfred Wilmot Pleasants, of Baltimore.       |
| Sidney Hand Browne, of Baltimore.             | Alfred Magill Randolph, Jr., of Virginia.    |
| Henry Andrews Bumstead, of Illinois.          | William Ferdinand Rittler, of Baltimore.     |
| Frank Kenneth Cameron, of Baltimore.          | Charles James Search, of Baltimore.          |
| Malcolm John Cameron, of Baltimore.           | Alfred Jenkins Shriver, of Baltimore.        |
| George Carey, of Baltimore.                   | James Lawrenson Smiley, of Baltimore.        |
| Neilson Poe Carey, of Baltimore.              | Samuel King Smith, of Baltimore.             |
| Abraham Cohen, of Baltimore.                  | Daniel Gurden Stevens, Jr., of Baltimore.    |
| Harry Webster Cooke, of Baltimore.            | Charles Morton Stewart, Jr., of Baltimore.   |
| Arthur Aaron Dembitz, of Kentucky.            | William Stuart Symington, Jr., of Baltimore. |
| Augustus Kountze Detwiler, of Nebraska.       | Matthew Möller Johnson Vea, of Wisconsin.    |
| George W. Dobbin, of St. Denis, Md.           | Edward Louis Watson, of Baltimore.           |
| William Francis Gallaway, of Baltimore.       | Charles Joseph West, of Georgia.             |
| George Henry Heitmuller, of Washington, D. C. | Charles Francis Woods, Jr., of Baltimore.    |
| Jacob H. Hollander, of Baltimore.             |  |
| Charles McHenry Howard, of Baltimore.         |  |
| Reid Hunt, of Ohio.                           |  |
| Charles William Johnson, of Baltimore.        |  |
| Henry Webster Keating, of Centreville, Md.    |  |
| William Knower, of Baltimore.                 |  |

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## REPORT OF THE JOHNS HOPKINS PRESS FOR THE YEAR 1890-91.

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The several journals issued by The Johns Hopkins Press have appeared at regular intervals during the year.

1. Volume thirteen of the *American Journal of Mathematics*, under the editorial direction of Professors Newcomb and Craig (390 pages, quarto), has been completed. The series of portraits of mathematicians was continued in this volume with the portrait of Professor Cayley. The portrait of Professor Klein will appear in the first number of volume fourteen.

2. Of the *American Chemical Journal*, under the editorial direction of Professor Remsen, volume twelve has been completed, and six numbers of volume thirteen (510 pages, octavo) have been issued since the last report.

3. Of the *American Journal of Philology*, of which Professor Gildersleeve is the editor, volume eleven has been completed and two numbers of volume twelve (696 pages, octavo) have appeared.

4. Of the *Studies in Historical and Political Science*, edited by Professor Adams, three numbers of the eighth series and eight numbers of the ninth series (604 pages, octavo) have been published.

Of this series, four extra volumes have also been issued, viz.:—

The Supreme Court of the United States, by Dr. W. W. Willoughby, 126 pages, octavo.

The Intercourse between the United States and Japan, by Dr. Inazo Nitobe, 200 pages, octavo.

State and Federal Government in Switzerland, by Dr. J. M. Vincent, 225 pages, octavo.

Spanish Institutions of the Southwest, by Professor F. W. Blackmar, 250 pages, octavo, and 31 illustrations.

5. Of the *Studies from the Biological Laboratory*, edited by Professors Martin and Brooks, number one of volume five (76 pages, octavo, and 8 plates) has appeared.

6. Numbers 83-91 of the *University Circulars* (154 pages, quarto) were issued during the year.

7. The second number of the *Beiträge zur Assyriologie*, of which Professor Haupt is one of the editors, was published in November, 1890. This completes the first volume (640 pages, octavo).

8. The fifteenth Annual Report of the President of the University (92 pages, octavo) was issued in December, 1890, and the Annual Register (154 pages, octavo) in May, 1891.

9. The Press has continued in charge of the publications of the Johns Hopkins Hospital, viz.: The Hospital Bulletin, appearing nine times yearly; The Hospital Reports, of which four numbers have been published during the year.

10. A volume on The Oyster, with special reference to the Maryland oyster problem, written by Professor Brooks, (124 pages duodecimo, and 14 plates) was issued in April.

11. There have been received, in accordance with the regulations, one hundred and fifty copies of the theses accepted for the degree of Ph. D. from the following named gentlemen:

Brigham, C. P.—Some Double Chlorides containing Bismuth.

Chapman, C. H.—Riemann's P-Functions.

Coates, C. E., Jr.—Action of Aniline and Toluidine on Orthosulphobenzoic Acid and its Chloride.

Dashiell P. J.—Reaction of Para-diazo-ortho-toluene-Sulphonic Acid with Ethyl Alcohol.

De Roope, R.—Some Halogen Substitution-Products of Benzoic Sulphinide.

Fernald, H. T.—The Relationships of Arthropods.

Harry, J. E.—A Rhetorical Study of the Leptinean Orations.

Hench, G. A.—The Monsee Fragments: Newly collated Text, with Notes and a Grammatical Treatise.

Herty, C. H.—The Double Halides of Lead and the Alkali Metals.

Holmes, J. H.—Paraxylenesulphonic Acid.

Iyenaga, T.—The Constitutional Development of Japan.

Jones, W.—Sulphon-Phthaleins derived from Ortho-sulpho-para-toluic Acid.

Lees, J. T.—Dikanikos Logos in Euripides.

Manning, H. P.—Developments obtained by Cauchy's Theorem with application to the Elliptic Functions.

Metcalf, W. V.—On the Reaction of certain Alcohols with Para-diazo-meta-toluene-Sulphonic Acid.

Moore, J. L.—Servius on the Tropes and Figures of Vergil.

Morgan, T. H.—A Contribution to the Embryology and Phylogeny of the Pycnogonids.

Murray, A. T.—Parody and Paratragoedia in Aristophanes.

Newhall, B.—The Dramatic and Mimetic Features of the Gorgias of Plato.

Randall, W. W.—Ortho-sulpho-para-toluic Acid and some of its derivatives.

Richardson, G. M.—Stannous Double Halide Salts.

Saunders, C. E.—Researches on the Double Halides.

Smith, K. W.—Archaisms of Terence mentioned in the Commentary of Donatus.

Steele, R. B.—Chiasmus in Sallust, Cæsar, Tacitus, and Justinus.

Steiner, B. C.—The History of University Education in Maryland.

Uhl, L. L.—Attention.

Vincent, J. M.—State and Federal Government in Switzerland.

White, J., Jr.—Sulphon-Fluorescein and other Sulphon-Phthaleins.

Williams, W. K.—The Communes of Lombardy from the VI to X century.

Willoughby, W. W.—The Supreme Court of the United States.

Woodburn, J. A.—Higher Education in Indiana.

12. The system of exchanges has been conducted as in previous years and has been reported on in detail to the Librarian.

13. The report of the New Book Department has also been submitted to the Librarian. Five thousand six hundred and fifty volumes, of the value of six thousand six hundred and sixty-one dollars, have been received during the year. Since the opening of this department in 1877, fifty-eight thousand seven hundred and eighty-four volumes of new books, of the value of about ninety-four thousand five hundred dollars, have been received.

N. MURRAY.

1891, September 1.

## LIBRARY.

### GIFTS TO THE LIBRARY FROM SEPTEMBER 1, 1890, TO SEPTEMBER 1, 1891.

- ACLAND, H. W. (Author). *Memoir on the Cholera* at Oxford. London, 1856. Q.
- ASSOCIATION FRANÇAISE POUR L'AVANCEMENT DES SCIENCES. *Comptes Rendus XVIII.* 1-2. Paris, 1890.
- AVERY, JAS. W. Linton, W. J. *The Masters of Wood Engraving*. New Haven, 1889. F.
- BATAVIAN GOVERNMENT. Verbeck, R. D. M. *Krakatau*. Text and Atlas. Batavia, 1836. O. and F.
- BIRNEY, WM. *His collection of works on Slavery*:—  
This contains 345 volumes and over 300 pamphlets, on the subject of Slavery. [An account of the collection is given in *University Circulars*, Nos. 85 and 86.]  
Mr. Birney also presented to the library 17 volumes of newspapers (1830-65) and 83 volumes of miscellaneous books.
- BLACKMAR, F. W. *Kansas State School Reports*. 6 vols.
- BOYLE, MRS. J. W. *International Marine Conference*. 8 vols. Washington, 1890. O.
- BROWN, MRS. GEO. WM. (From Library of Judge Geo. Wm. Brown.) *The Nation*, 1876-1886. 22 vols. Q.
- Eighteen volumes of works of general literature, principally historical.  
A large number of miscellaneous pamphlets.
- BURR, HORACE. *Records of Holy Trinity (Old Swedes) Church, 1697-1773*. Historical Society of Delaware, 1890. O.
- 250th Anniversary of the First Swedish Settlement in America. Minneapolis, 1889. D.
- CARNEGIE, PHIPPS & CO. (Publishers.) *Album of Full-size Sections*. Pittsburgh, 1888. F.
- Tables of Weights of Steel-plates*. Pittsburgh, n. d. D.
- Pocket Companion Tables of Iron and Steel*. Pittsburgh, 1890. D.
- CARTER, A. M. *Fuller and Wayland on Slavery*. Boston, 1845. S.
- The Hireling and the Slave*. Charleston, 1855. S.
- CAYLEY, A. (Author). *Collected Mathematical Papers*. Vol. III. Cambridge, 1890. Q.
- CHAPIN, F. H. (Author). *Mountaineering in Colorado*. Boston, 1889. D.
- CUST, R. N. (Author). *Linguistic and Oriental Essays*. London, 1891. O.
- DAWSON, S. E. (Author). *Study of Tennyson's Princess*. Montreal, 1884. D.

- EDINBURGH ROYAL SOCIETY. Catalogue of the Crawford Library of the Royal Observatory of Edinburgh. Edinburgh, 1890. Q.  
 Index to Transactions, 1785-1888. Edinburgh, 1890. Q.
- ELY, R. T. (Author). Introduction to Political Economy. New York, 1889. D.
- JEVONS, W. S. Theory of Political Economy. London, 1879. O.
- KNOX, J. J. United States Notes. New York, 1888. D.
- COSSA, L. Scienza delle Finanze. Milan, 1887. S.
- CLARK, J. B. Philosophy of Wealth. Boston, 1887. D.
- CHILDS, G. W. Recollections. Philadelphia, 1890. S.
- EVERTS, W. W. (Author). Life of W. W. Everts, D. D. Philadelphia, 1890. D.
- FOSTER, J. E. Raud, S. P. Dictionary of the Language of the Micmac Indians. Halifax, 1888. Q.
- FRIEDENWALD, H. Cohen, J. The Delcides; an Analysis of the Life of Jesus. Baltimore, 1873. S.
- FRENCH (ENSGIN). Le Gras, A. Examination of the Mediterranean Sea. Washington, 1870. O.
- GILDERSLEEVE, PROFESSOR B. L. Brinton, D. G. Ancient Nahuatl Poetry. Philadelphia, 1887. O.
- Binet, A. Psychic Life of Micro-organisms. Chicago, 1889. D.
- Hardy, A. S. Elements of Analytical Geometry. Boston, 1889. O.
- Macfarlane, A. Elementary Mathematical Tables. Boston, 1889. O.
- GILMAN, PRESIDENT D. C. Absaraka, Home of the Crows. Philadelphia, 1868. D.
- American Review of History and Politics. Vols. I-IV. Philadelphia, 1811. O.
- Bonstetten, C. V. de. The Man of the North and the Man of the South. New York, 1864. D.
- Cicero, M. T. Ed. C. F. A. Nobbe. Lipsiae, 1850. Q.
- Coggeshall, G. History of the American Privateers. New York, 1861. O.
- Cullum, G. W. Campaigns of the War of 1812-15. New York, 1879. O.
- Dwight, H. E. Travels in the North of Germany. New York, 1829. O.
- Gregory, G. Dictionary of Arts and Sciences. 3 vols. Philadelphia, 1816. Q.
- Hartwig, G. The Polar World. New York, 1869. O.
- Hopkins, S. W. Life Among the Plutes. Boston, 1883. D.
- Mease, J. Geological Account of the United States. Philadelphia, 1807. D.
- McCulloch, J. R. Dictionary of Commerce. Philadelphia, 1840. O.
- Republic of Letters. New York, 1834. Q.
- Seabury, S. Theory and Use of the Church Calender. New York, 1872. O.
- Smith, R. D. History of Guilford, Connecticut. Albany, 1877. O.
- Wilkinson, W. C. Preparatory Greek Course. New York, 1883. D.
- Map of Algeria. 3 sheets.  
 Map of Tunis.
- Portraits in the Gallery of the Chamber of Commerce, New York. New York, 1888. O.
- Virginia Historical Collections. Vols. 1, 2, 7, 8, 9. O.
- Memorial of Stephen Salisbury. Worcester, 1855. O.
- A large number of pamphlets.
- GINN & Co. (Publishers). Biological Lectures delivered at Woods Holl. Boston, 1891. D.
- Wentworth, G. A. Algebraic Analysis. Boston, 1889. D.
- GREEN, S. A. Bunker Hill Memorial Tablets. Boston, 1889. Q.
- A large number of miscellaneous pamphlets.
- GREEN, S. S. Suffolk Deeds. Vol. V. Boston, 1890. O.
- HALSTED, G. B. (Translator). Lobatschewsky, N. Researches on the Theory of Parallels. Austin, 1891. O.
- HARMAN, H. M. (Author). Introduction to the Study of the Holy Scriptures. New York, 1884. O.
- HARRISON, H. (Author). Life of Bishop Pinkney. Baltimore, 1891. S.
- HENRY, Mrs. J. Henry, J. Scientific Writings. Vols. I-II. Washington, 1886. O.  
 2 copies.
- Memorial of Joseph Henry. Washington, 1880. O. 2 copies.

- HOLT, H., & Co. (Publishers). Champlin, J. D., and Bostwick, A. E. *Young Folks' Cyclopædia of Games*. New York, 1890. D.
- Kemble, F. A. *Further Records of a Girlhood*. New York, 1891. D.
- Meyer, A. N. *Woman's Work in America*. New York, 1891. D.
- Perry, T. S. *History of Greek Literature*. New York, 1890. O.
- Shigimi, S. *A Japanese Boy*. New York, 1890. D.
- Taine, H. A. *The Modern Régime*. New York, 1890. D.
- Williams, R. O. *Our Dictionaries*. New York. D.
- JASTROW, J. (Author). *Time-relations of Mental Phenomena*. New York, 1890. D.
- JEWETT, A. S. *Town Records of Manchester*. 1889. O.
- JOHNSTON, Dr. CHR. Dana, E. S. *Text-book of Mineralogy*. New York, 1882. O.
- Loimmel, E. *Nature of Light*. New York, 1879. D.
- Rammelsberg, C. F. *Handbuch der Krystallographisch-physikalischen Chemie*. Leipzig, 1881. O.
- Rousseau, L. F. E. *Système dentaire chez l'homme*. Paris, 1827. O.
- Vigo, J. *Chirurgery*. Translated by B. Traberan. London. F.
- In addition to these 29 other books, mostly on medical subjects.
- KEELER, J. E. (Donor). *Papers of the Astronomical Society of the Pacific*. San Francisco, 1889. O.
- KENNEDY, J. S. *Columbus' Letter announcing the Discovery of the New World*. Facsimile. New York, 1890. D.
- LITTLEHALES, G. W. (Author). *The Average Form of Isolated Submarine Peaks*. Washington, 1890. O.
- MAC ALISTER, J. (Author). *Supplement to Catalogue of the Pedagogical Library in the Office of the Superintendent of Public Schools of Philadelphia*. Philadelphia, 1890. D.
- MAXWELL MEMORIAL COMMITTEE. Maxwell, J. C. *Scientific Papers*. Vols. I and II. Cambridge, 1890. Q.
- McLAREN, D. Gray, A. *Manual of the Botany of the Northern United States*. New York, 1890. O.
- MILLER, J. B. (Author). *Trade Organizations in Politics*. New York, 1887. O.
- MOSSO, A. (Author). *Laboratoire de Physiologie de l'Université de Turin. Travaux de l'année 1889*. Turin, 1890. O.
- NICHOLS, H. (Author). *Psychology of Time*. New York, 1891. O.
- PENNSYLVANIA HISTORICAL SOCIETY. *The Charlemagne Tower Collection of Colonial Laws*. Philadelphia, 1890. Q.
- PERRY, Mrs. B. F. Perry, B. F. *Reminiscences*. Greenville, 1889. O.
- POWELL, A. H. *A Complete View of Baltimore*. Baltimore, 1833. 82mo.
- RADCLIFFE TRUSTEES. *Radcliffe Astronomical and Meteorological Observations for 1886*. Oxford, 1890. D.
- RANDALL, D. R. *Daily National Intelligencer, 1807-26*. 17 vols. F.
- Richmond Enquirer, 1806-14*. 7 vols. F.
- REMSEN, Professor I. (Author). *Inorganic Chemistry*. New York, 1890. O.
- RICCO, A. Piazzi, G. *Lezioni Elementari di Astronomia*. Palermo, 1817. O.
- ROSENGARTEN, J. G. (Author). *The German Soldier in the Wars of the U. S.* 2d Edition. Philadelphia, 1890. D.
- BOWELL, J. C. *Contents-Index of Library of University of California*. Vol. I. Berkeley, 1889-90. O.
- SALAZAR, A. E., y NEWMAN, C. (Authors). *Examen de las Aguas Potables*. London, 1890. O.
- SCHARF, J. THOMAS. *A Large Collection of Manuscripts, Pamphlets, etc., relating to American History*.
- [An account of the collection is given in *University Circulars, No. 89.*]
- SKOTTOWE, B. C. (Author). *Short History of Parliament*. New York, 1887. D.
- SMITH, S. K. (Author). *Life of D. Howard Smith*. Louisville, 1890. O.
- STABLER, EDWARD, JR. *Baltimore American, 1864-5*. 2 vols. F.
- STICKNEY, J. HENRY. *Celebration of the Completion of the National Monument to the Pilgrims*. Plymouth, 1889. O.

- TRELEASE, W. (Author). The Missouri Botanical Garden. St. Louis. O.  
 Also a number of unbound pamphlets.
- TYSON, Miss. ISABELLA. Journal of the Franklin Institute. 14 vols. Philadelphia, 1832-40. O.  
 Analectic Magazine. Vols. I-IV. Philadelphia, 1813-14. O.  
 Analytical Review. Vols. XI-XIX. London, 1791-94. O.  
 Laws of Maryland. Annapolis, 1787. F.  
 Literary Magazine, Vols. I-IV. Philadelphia, 1803-06. O.  
 Select Reviews. Vols. VII and VIII. Philadelphia, 1812. O.
- U. S. SURGEON-GENERAL'S OFFICE. Index Catalogue to the Library of the Surgeon-General's Office. Vol. XI. Washington, 1890. Q.
- WHITE, E. A. The Colonial Records of North Carolina. Collected and edited by William L. Saunders. 10 vols. Raleigh, 1886-90. Q.
- WHITING, H. (Author). Experiments in Physical Measurements. I and II. Cambridge, 1890 and 1891. D.
- WILLIAMS, G. H. (Author). Elements of Crystallography. New York, 1890. D.
- WISCONSIN, STATE HISTORICAL SOCIETY OF.  
 Wisconsin Historical Collections. Vols. 1, 2.  
 Reports Farmers Institutes. 3 vols. 1887-89.  
 Transactions of the Wisconsin Academy of Sciences. Vols. 1-7. O.  
 Wisconsin Blue Books. 5 vols. 1882-89.  
 Penney. Fathers of Wisconsin. 1 vol. O.
- WOODRUFF, WILFORD. The Story of the Book of Mormon, by Elder Reynolds. Salt Lake City, 1888. O.  
 Bancroft, H. H. History of Utah. San Francisco, 1890. O.

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Also from various official sources, U. S. Reports and other Government Publications; Publications of the Smithsonian Institution; Official Documents of various States and cities.

WM. HAND BROWNE, *Librarian.*

1891, September 1.

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## REPORT OF WORK ON SOIL INVESTIGATIONS.

TO PRESIDENT DANIEL C. GILMAN, LL. D.

*Dear Sir:*—In accordance with your request, I submit the following statements in regard to my work on soil investigations for the Maryland Agricultural College and Experiment Station.

In October, 1890, when the work was to be started in its application to the soils of this state, the Director of the U. S. Geological Survey informed me that all the available data in regard to the geology of the state, upon which the area and distribution of the soil formations depend and upon which our work must be based, was in the hands of the professors of geology of the Johns Hopkins University. He advised a co-operation with these gentlemen, and the Trustees of the Maryland Agricultural College and Experiment Station authorized me to compile a geological map of the state and to locate my work at the University. All the available and reliable data has been placed upon the map, but the map is still incomplete, as the geology of part of the state is being worked out.

There remained, also, some problems on the physical properties of the soil, requiring the use of very expensive apparatus only to be found in a well equipped physical laboratory. The Trustees of the Maryland Agricultural College and Experiment Station authorized me to continue the work at the University, where a room had been placed at my disposal in the Geological Building.

The work soon outgrew these limited accommodations and there was need of space where observations could be made upon the soil in its natural position in the field. The Trustees of the University then gave us the use, without charge, of their large estate at Clifton on the Harford Road, with ample room in the large mansion for laboratories, offices and living accommodations.

The Weather Bureau of the Department of Agriculture has requested of us a full report or monograph, upon our soil investigations, to be ready for publication by the first of July. They have placed a sum of money at my disposal which enables me to employ three assistants to finish up a large amount of work on hand which is needed to bring up my work for a full preliminary report.

The nature of the work itself is a study of the physical properties of soils in their relation to plant growth. We have attempted a classification of the soils of the state into a few general types of great soil formations, the classification being upon a geological and botanical basis.

We have shown that there is a marked difference in the rate of movement or circulation of water within the soil of these different types, and we have made a broad generalization to the effect that the relation of these soil types to crop production is due to this difference and to the ease with which the soil can furnish the crop with its needed water supply, rather than to the available food supply within the soil.

We have gone further in showing that the application of the ordinary fertilizing materials changes the texture of these soils and the rate of circulation of water within them. We are led to believe that the use of fertilizers and manures is largely based upon a possible control of the rate of circulation of water within the soil to adapt it to the needs of a given crop, rather than to the actual amount of plant food thus incidentally added to the soil.

If these conclusions, or generalizations, are confirmed by further investigations the present theory of fertilization will need to be much modified.

I am glad to have this opportunity of thanking you for the many courtesies and for the support you have tendered me and for the interest you have shown in the work itself. I may say that without the facilities to which I have had access at the University the work could not have progressed as it has done.

Very Respectfully,

MILTON WHITNEY, *Professor of Geology,  
Maryland Agricultural College. Physicist,  
Agricultural Experiment Station, and Special  
Agent U. S. Department of Agriculture.*

## REPORT ON METEOROLOGICAL WORK.

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TO THE PRESIDENT OF THE UNIVERSITY:—

*Sir*—In the early part of May, after consultation with Gen'l A. W. Greeley, then chief of the Weather Bureau, an organization known as the Maryland State Weather Service, was instituted under the joint auspices of the Johns Hopkins University, the Maryland Agricultural College, and the U. S. Weather Bureau. As the meteorological work was to be directly under the supervision of the chief of the Baltimore office of the U. S. Weather Bureau, it was deemed advisable to move that office to the University, and accordingly rooms were assigned in the Physical Laboratory, upon the roof of which building the instruments are now displayed. Two men were added to the corps of four, then in charge of the Baltimore office, and more elaborate apparatus supplied. Arrangements were immediately perfected by which the few scattered observers in Maryland and Delaware should report to the Central office at the Johns Hopkins University, and already the number has been largely increased, so that every county in the State is represented. It is the intention to continue to add to the number of observers until every locality shall have its reporting station. The observers are of three classes: 1st, those who report meteorological facts only; 2d, those who send crop notices; 3d, those who display signals.

In some instances the same man officiates in all three capacities. Upon the data obtained from these three classes of observers, two series of reports have been published: First, the monthly Meteorological Report, which began with May of this year, and second, the weekly Crop Bulletin, the first issue of which appeared on June 26, and was continued on every succeeding Saturday until September 25. These reports have been sent widely throughout the State and have elicited much favorable comment from the people and the press. A feature of the State Service, which has been started and will be much more fully developed in the future, is the establishment of signal stations at numerous points along the shores of the navigable waters of the State, by which warnings may be given to the masters of vessels.

The apparatus and methods of Weather Bureau work are introduced as part of the instruction in Physical Geography, and the system of weather prognostication explained. In this respect the establishment of the State Weather Service, outside of its great value to the agricultural and commercial interests of the State at large, has added an important feature in university study.

Yours respectfully,

WILLIAM B. CLARK,  
*Director, Maryland State Weather Service.*

October 1, 1891.

## REPORT OF MARINE LABORATORY. SESSION OF 1891.

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TO THE PRESIDENT OF THE JOHNS HOPKINS UNIVERSITY:

*Sir*:—I beg leave to submit the following report of the session of the Marine Zoölogical Laboratory.

Early in May, 1891, some of the members of our party went to Jamaica, which had been selected as our field of work for the season, while others joined us later on.

Our party was as follows:

W. K. BROOKS, *Director*.

E. A. Andrews, Associate in Biology.

R. P. Bigelow, Graduate Student in Biology.

J. P. Campbell, Professor of Biology, Athens, Georgia.

G. W. Field, Graduate Student in Biology.

J. C. Gifford, Special Student in Pathology.

R. G. Harrison, Graduate Student in Biology.

H. M. Knower, " " "

M. M. Metcalf, " " "

T. H. Morgan, Adam T. Bruce Fellow.

G. C. Price, Graduate Student in Biology.

John Stuart, Teacher of Science, Hope School, Jamaica.

Charles Taylor, Kingston, Jamaica.

B. W. Barton, Lecturer in Botany.

Basil Sollers, Teacher, Baltimore.

The two last named devoted themselves to botanical exploration and study in the interior of the island, and they did not visit the laboratory at the seashore.

After a preliminary exploration of different seaports, we selected Port Henderson as our station. This is a seaside resort in Kingston Harbor, opposite Port Royal, and about nine miles by water from Kingston. Here we found two partially furnished houses suitable for a laboratory and lodgings, and we rented and occupied them for about fourteen weeks, from May 26th to September 1st.

The establishment of a party in a new home at a remote point in a strange country is a task which, in the mid-summer climate of the tropics, is most severe and exhausting. Of this, I was entirely relieved by Dr. Morgan and Mr. Bigelow, who themselves attended to all the preliminary work with

great efficiency, and I take this opportunity to thank them for their willing help, which contributed in no small degree to the success of our expedition.

Our summer was devoted, in great part, to the collection and preservation of material for embryological work at home, and, as the members of the party are still employed in preparing and studying it, the results are not yet far enough advanced for reporting. There are a few noteworthy points of interest, however. Among them are the following:

Soon after we settled at Port Henderson, Mr. Field found near our laboratory in an enclosed lagoon of dense salt water, a very remarkable rhizostomatous medusa belonging to the genus *Cassiopea*. No species of this genus, as limited by Haeckel, has heretofore been found anywhere in the Atlantic. It is a South Pacific form, and the known species are from this region or from the Indian Ocean and the Red Sea. A species of a closely related genus, *Polyclonia frondosa*, was found by L. Agassiz on the coast of Florida, and was referred by him to the genus *Cassiopea*, although it is not a true *Cassiopea*. *Polyclonia frondosa* is found in Jamaica also, and we obtained specimens in Port Royal Harbor. It is also found in the Bahamas, and Professor H. V. Wilson has given to me the notes and drawings which he made from specimens which he obtained at Green Turtle Key.

The medusa which we found at Port Henderson is not a *Polyclonia* but a true *Cassiopea*, and the only one as yet found in the Atlantic. As it is very abundant and conspicuous, its escape from the notice of naturalists for such a long time is remarkable, for it is so well known to the negro fishermen of Jamaica that they have a name for it—the Guinea Corn Blubber. As it is one of the most common and characteristic marine animals of these waters, I have proposed to call it, after the Indian name of the island, *Cassiopea Xamacha*. While it is able to swim slowly by the pulsations of its bell, it is usually found fixed upon the smooth chalky bottom by the flat sucker-like surface of its exumbrella, and in some places the bottom was so completely covered with them that their circular discs were actually touching each other, while the interspaces were filled in by smaller specimens.

Our knowledge of the life history of the rhizostomatous medusae is very incomplete, and is based entirely upon the study of the Mediterranean *Colytorhiza tuberculata*, a species which belongs to a more specialized division of the group than *Cassiopea*, although it was formerly called *Cassiopea Borbonica*. Many fundamental points in the development of the rhizostomes, and in fact, of the *Discomedusae* in general, are still in dispute, and at my suggestion Mr. Bigelow undertook to trace the life history of our *Cassiopea*, a line of research for which the studies which he has pursued for nearly three years under my direction, on the structure of *Discomedusae*, rendered him well qualified. He found the larvae of *Cassiopea* on marine plants among the adults, and as these lived in captivity and set free peculiar planula-like buds, which also lived and grew in small aquaria in the house, he was able to obtain a fairly complete series of young stages. The most interesting results of his study of the living larvae, are the discovery of this peculiar method of budding, and the settlement of the ques-

tion as to the origin and homology of the sense organs of adult Discomedusae, which he has proved to be the modified basal portions of certain tentacles of the attached larvae. This is supplementary to, and an amplification of, Mr. Bigelow's former work on the development of the sense organs in other groups of medusae. While at Port Henderson he watched the larvae undergo their metamorphosis, and he made drawings from life of the important stages. He is now completing his work by the study of serial sections of the larvae, and of the organs of the adult. This work, which is now well under way, gives promise of results of very great interest, and I regard it as a very noteworthy piece of work, as it will be, when completed and published with ample illustrations, a permanent and valuable addition to our knowledge of the medusae.

As I had hoped to find Chiton with eggs, Mr. Metcalf went to Jamaica prepared to study its development. We found several species of Chiton in great abundance on the rocks at Port Henderson, close to our laboratory. Within a few hours after his arrival he obtained the eggs, and soon had a series of larvae, at all stages of development, living in the house in small aquaria. He devoted the season to the study of the living larvae, and to the preservation of material for sections. He is now continuing the work at our laboratory in Baltimore, and he has constructed a series of enlarged models from his sections, to exhibit the process of segmentation of the egg of Chiton.

We found ourselves well placed at Port Henderson for studying the Termites, or so-called *white ants*, and Mr. Knower, who had at my suggestion prepared himself for this work before leaving Baltimore, spent his summer in observing their habits, and in collecting the eggs and larvae, as well as the adults of the different castes. He preserved a fine collection of these specimens, for embryological and anatomical work, and he is now engaged in the prosecution of this portion of his research.

Mr. Field continued at Port Henderson the study of the embryology of Echinoderms, upon which he has been engaged for two years past, and he added to his collection the eggs and larvae of a number of forms of which he previously had no representation.

Mr. Morgan spent a great deal of his time in gathering and studying material bearing on the problem of metamerization in animals, and in this connection he collected the adults and embryos of Chiton, Ophiurans, &c. He also obtained at several places in the interior of the island a number of eggs from a species of tree frog, which has no tadpole stage, but hatches from the egg as a little frog. Some of these were kept in the laboratory in wet moss until they hatched, while others were preserved at successive embryonic stages. He was so fortunate as to obtain a very complete series of stages, and inasmuch as its development has never been studied, there is every reason to hope that most valuable results will be obtained by the thorough study of this material.

Some ten years ago I found at Beaufort an interesting Crustacean, Lucifer, whose metamorphosis is most remarkable and instructive. I ob-

tained a few eggs, and reared the newly hatched larvae, and traced the metamorphosis with exhaustive minuteness from the time of hatching to maturity; and my results, with ample illustrations, were presented to the Royal Society of London by Professor Huxley, and were published in the *Philosophical Transactions*. This work, which was among the first fruits of our marine laboratory, is now embodied in all the standard text books.

I was not able, at Beaufort, to obtain enough eggs of *Lucifer* to study the embryology, although the few which I did find showed that this part of its life history is fully as important as the metamorphosis. I have been upon the watch ever since for a chance to obtain a supply of eggs, in order to supplement my first memoir on the metamorphosis by a second on the embryology; but while I have occasionally found *Lucifer* with eggs, out at sea, I have had no opportunity to study it, as the preparation of the material presents such difficulties that it cannot be carried on at sea. The adult animals are so small that they are almost invisible, and the eggs, which are microscopic, are so loosely attached and so delicate, that they are lost in the act of capturing the adults. I was greatly pleased to find *Lucifer* in abundance, and by going out in a boat and collecting the adults with great care, and taking them carefully home, I was so fortunate as to find some thirty or forty with eggs, and these I kept in aquaria long enough to obtain a tolerably complete series of stages in the embryonic development. I am now engaged in the study of this material, and I hope to have an account of the embryology of *Lucifer* completed within a year. My success in obtaining these eggs is an ample return for the expedition to Jamaica.

These are some of the subjects upon which we hope to contribute original scientific knowledge, as the result of our summer in Jamaica; but, besides its value to science, the expedition had very great educational value to all of us. We saw for ourselves an endless variety of most interesting and instructive natural objects, which we had previously known only from books or preserved specimens, and every hour was filled with most delightful experiences of the greatest value to naturalists and teachers of natural science. I am sure that all the members of our party will be glad to join me in expressing our high appreciation of the great advantage which we have enjoyed in the opportunity to spend a summer in laboratory work at the seaside in Jamaica.

After our return to Baltimore a series of public lectures, illustrated by specimens and photographs, was given by members of the party, under the auspices of the Naturalists' Field Club of the University.

The lectures were as follows: The Aspects of Nature in Jamaica, by W. K. Brooks; the Zoölogy of Jamaica, by E. A. Andrews; the Natural History of Termites, by H. M. Kowner; the Botany of Jamaica, by B. W. Barton; and the People of Jamaica, by Basil Sollers.

W. K. BROOKS.

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