UNITED STATES BUREAU OF EDUCATION
BULLETIN, 1909: NO. 2 WHOLE NUMBER 399

ADMISSION OF CHINESE STUDENTS TO AMERICAN COLLEGES

By JOHN FRYER
PROFESSOR OF ORIENTAL LANGUAGES AND LITERATURE, UNIVERSITY OF CALIFORNIA

WASHINGTON
GOVERNMENT PRINTING OFFICE
1909

CONTENTS.

LETTER OF TRANSMITTAL.

DEPARTMENT OF THE INTERIOR,
BUREAU OF EDUCATION,
Washington, February 5, 1909.

SIR: Inquiries have been made from time to time with reference to the opportunities open to Chinese students in American colleges and universities. Such inquiries have of late been urgently presented by representatives of the United States in the Chinese Empire, who have taken a deep interest in the progress and influence of American educational ideas among the Chinese people. The recent negotiations with reference to an educational use of that portion of the Boxer indemnity which has been remitted by the United States Government have given new point to these inquiries. I have accordingly requested Prof. John Fryer, of the University of California, to prepare an account of the educational advantages and opportunities offered to Chinese students in a number of our American institutions. Inquiries sent out from this office have brought replies from many sources, giving an abundance of such information as has been desired. The information thus obtained has been collated and edited by Professor Fryer, and in this form is transmitted herewith. I beg to recommend that it be published as one number of the Bulletin of the Bureau of Education for the year 1909.

The editor of this work, Prof. John Fryer, was for thirty-five years a resident of the Chinese Empire, where he held important official positions under the Imperial Government. He rendered extraordinary service in the introduction of western science into that Empire, was the author and editor of a large number of important works in the Chinese language, and received distinguished recognition of an official character. For the past twelve years he has been Agassiz professor of Oriental languages and literature in the University of California. His wide acquaintance with educational conditions in both China and America has fitted him to an unusual degree for the present undertaking.

It is fair to expect that this publication will be widely useful in fostering the new educational relations between the American and the Chinese peoples. I may add that the time is undoubtedly near at

hand when similar publications will be needed to set before the people of other nations the opportunities for advanced study which this country affords. American students have long enjoyed the hospitality of various European universities and schools of the several arts. Already the return wave of student attendance has set in, and a considerable number of students from foreign countries are enrolled in American institutions of learning. It is gratifying to note a growing disposition on the part of South American students, as well as those from European countries and from the three remaining continents, to seek in this country certain educational advantages which we now have to offer.

A recent inquiry revealed the fact that in nine of the institutions mentioned in this publication there were last year 942 foreign students enrolled. They were distributed as follows: From other countries of North America 344, from South America 74, from Europe 202, from Asia 249, from Africa 16, from Australia 57. The table presented by Rudolf Tombo, jr., in Science for October 30, 1908, shows 1,262 students from foreign countries enrolled for the year 1907–8 in 27 of our leading colleges and universities. While the number of Chinese students in this country is not definitely known, it is probable that, including those attending both elementary and higher institutions, it is now over three hundred. Mr. George Marvin, in an article in The Outlook for November 28, 1908, reports the attendance during the preceding year of 155 Chinese students at American institutions, on foundations provided by either the imperial or the provincial governments. Of these all but about 20 were in institutions of collegiate or university grade.

A more general setting forth of the opportunities which are already at hand in this country and those which will undoubtedly be developed in the immediate future can hardly fail to increase this tendency of foreign students to come to our seats of learning. The movement is wholesome and stimulating in a great variety of ways. I anticipate, accordingly, that the publication here offered will be but the beginning of a series of similar publications which may serve to strengthen the spiritual bonds between this nation and the other nations of the world.

Very respectfully, ELMER ELLSWORTH BROWN,
Commissioner.

The SECRETARY OF THE INTERIOR.

INTRODUCTION.

Five weeks' residence in Shanghai and a five weeks' tour in northern China have recently given me valuable opportunities of again coming into touch with the chief educational centers and of investigating the main features of what is known as the "new learning." My last visit to China was five years ago, and during this period the conservatism which characterized the national education in past centuries seems to have disappeared. In its place there is what may almost be called a "wild craze" for western learning pervading all classes of society.

To satisfy this growing demand an elaborate national educational system has been organized, covering almost every branch of instruction from the elementary to the most advanced. This system is now being carried out as far as circumstances will permit under the direction of the central board of education at Peking, with a provincial board in each Province. The most strenuous endeavors are being made and great sums of money expended to establish new schools and colleges. Almost as much seems to be done by private individuals as by the Government itself.

From the very outset it was felt that the masses of the people could be instructed only through the medium of their own language. Hence the want of competent Chinese teachers and suitable Chinese text-books has been keenly realized. To provide these in sufficient numbers and of adequate grade, as well as to keep China in touch with the progress of western civilization, many of the most intelligent young men and women have been sent to study abroad. It was found that these required a thorough Chinese education to begin with, together with good elementary attainments in a foreign language and in some of the branches of western learning before leaving China.

It was easily seen that such students, entering the universities of America and Europe and graduating after a full course of study, would be able, on returning to China, to prepare text-books and fill all important positions in schools and colleges under the boards of education, while many of them could hold offices in the various branches of the civil service where a knowledge of sciences and arts or of international affairs is indispensable. With such pioneers as a basis it appeared possible to educate the whole country through the medium of its own language in a comparatively short time.

Within the few years that have elapsed since this new educational movement has commenced, hundreds of promising young men and a few young women have gone from China to Europe and America on their own account to complete their education. At first it was thought that Japan was able to furnish the desired instruction, and accordingly thousands of students flocked to Tokyo, only to meet with disappointment. A residence there of a year or two at the most sufficed to show that since America and Europe have been the sources from which Japan has obtained her instruction, it would be preferable for China also to get her knowledge from those countries at first hand. Hence the tide has now turned in the direction of America and Europe.

For many reasons, which it is not necessary to particularize, America is the favorite country for Chinese students, notwithstanding the many drawbacks which have existed in former years, but which have fortunately now been almost entirely removed. Every year is certain to find an increasing number of young people, the flower of the eighteen Provinces of China, desirous of wending their way to "the beautiful country," or to the country of the "flowery flag," as they call the United States. It is for such persons that this bulletin has been published by the United States Bureau of Education, to impart necessary information so as to avoid mistakes or delays.

Furthermore, there is a strong desire on the part of the American people to be on the most friendly terms with their Chinese neighbors on the other side of the Pacific. This is shown not only in the recent relinquishing of the Boxer indemnity money in the hope that it will be applied to the purposes of western learning, but also in the willingness expressed by the leading colleges and universities in America to receive Chinese students on the most friendly terms and to aid them in every possible way.

The bulletin has been specially prepared to show the character of the entrance requirements of a number of typical institutions and the special facilities offered to Chinese students by certain of the higher educational establishments in the different States. Serving thus as a guide to all prospective students, it will enable them without difficulty to decide beforehand where it will be most suitable and advantageous for them to proceed and how to arrange their studies.

Among other organizations that are rendering assistance in this connection it may be mentioned that the "Chinese Students' Alliance," through the publications of its various branches, has imparted much valuable information and advice, while the Chinese Young Men's Christian Association and the Chinese Young Women's Christian Association are now fostering this educational movement in China as far as circumstances permit. They have endeavored to pro-

vide not only reliable information, but also suitable escorts and advisers, introductions to colleges and universities, the arrangements for finances, and various other matters of importance. Students wishing to proceed to America on their own resources, or with government assistance, would therefore do well to inquire of the nearest branch of the Chinese Young Men's Christian Association or Young Women's Christian Association for whatever information of a more personal and practical character they may desire, and which the bulletin necessarily does not attempt to cover.

JOHN FRYER,

Professor of Oriental Languages and Literature, and Special Commissioner of Oriental Educational Investigation, University of California.

SHANGHAI, CHINA. *November 30, 1908.*

ADMISSION OF CHINESE STUDENTS TO AMERICAN COLLEGES.

THE AMERICAN COLLEGE SYSTEM.

The universities and colleges of the United States in their number and complete lack of coördination seem to present at first sight a very complex phenomenon. In no other country are so many colleges to be found, each with a tradition and individuality of its own. In no other country perhaps are there such varied opportunities of higher education offered. Yet each college and university stands by itself, unrelated to any other, and its distinctiveness is maintained amidst a generous feeling of rivalry. The American student, once attached to his "Alma Mater," becomes her devoted partisan; and this very partisanship, carried often through life, helps to keep up the sense of individuality and distinctiveness with which each college is endowed. Such terms as "Yale man," or "Harvard man," of little or no meaning to the uninitiated, come to bear a curious import when the friendly rivalry between the two is understood, a rivalry which springs from a deep feeling of loyalty and attachment on the part of a student to his college.

The case may be stated another way by saying that one can not adopt an impersonal view toward different American colleges; each is much more than a mere institution; it is a being with a character of its own; and the instruction which each offers is, often enough, less considered than the spirit which it imparts. Yet this intangible difference between one college and another must, let us admit, be most bewildering to a foreigner; and while it is the one characteristic thing about the American college system, it is, at the same time, the one feature most difficult to describe.

Certain differences may be accounted for, in part, by diversity of origin. Some of the largest institutions were created and endowed by private citizens of great wealth, as, for example, the University of Chicago in the city of Chicago, and the Leland Stanford Junior University, near San Francisco, Cal. Others were founded through religious denominations; and with the gradual movement of population from the East to the West, institutions of this kind have multi-

76049—No. 2—09——1

plied extensively. Most of these still retain a denominational character; a few have relaxed their denominational strictness and their tone inclines to be secular, especially in the older and larger colleges. A third class of college is distinctly secular in origin; such is the state university type to be found in the West, the Middle West, and on the Pacific coast. Supported by state or public taxation, which practically does away with tuition fees, these institutions are preeminently democratic in tone, and their popular character helps them to keep closely in touch with popular educational needs, especially in the fields of professional and technical education. Many of them have carried technical education and the various branches of applied science to a high degree of perfection. and their equipment for such studies often compares most favorably with that of older and wealthier institutions.

In general, it may be said that the oldest and largest institutions, and, with one or two exceptions, the best equipped, are to be found in the Eastern States. In the West and Middle West small denominational colleges are, indeed, very numerous and very well attended, but here university education is, for the most part, in the hands of the state universities.

From the confusion which so frequently arises in the minds of those not used to the American system by the indiscriminate use of such terms as "university," "college," and "school," it may be useful to explain the different usages to which the terms are put. Adopting European precedent, education in America was originally organized as follows: At the top stood the learned professions, comprising theology, law, and the various branches of medicine. Each subject was taught by a corps of instructors corporately known as a faculty. Each separate faculty with its body of students was termed sometimes a college, sometimes a school. A student normally proceeded to one of the three learned professions after three or four years devoted to liberal culture. The latter, consisting of many branches, such as literature, philosophy, history, mathematics, and natural science, had its own corps of instructors organized into a faculty. To this faculty, commonly known as the faculty of arts, the term "college" was particularly applied; as, for example, Yale College or Harvard College. "University" was the term assumed by an institution which had two or more distinct faculties, one of which was the faculty of arts, or the college proper. Thus, for example, Harvard University consisted of Harvard College and the three "schools" of divinity, law, and medicine. The term "university," therefore, implies an aggregate of two or more faculties, and whenever it is used instruction in one or more of the learned professions is ordinarily implied. An institution confined to one faculty

only kept the title of college, school, or sometimes institute, as, for example, Haverford College, Massachusetts Institute of Technology, etc.

The normal university course usually consisted of from three to four years of study under the faculty of arts, during which period the student was designated an "undergraduate." At the completion of this part of his work he became a graduate, with the degree of bachelor of arts. If, on the one hand, he then chose to continue an arts course as a graduate student, he might attain the degree of master of arts, and still further, the degree of doctor of philosophy. If, on the other hand, he chose to enter one of the learned professions, he enrolled with one of the other faculties. Until recently, even in the larger universities, a student might commence the study of one of the learned professions without the preliminary course in arts; but the tendency within the past few years has been to bring professional studies within the category of graduate work; that is, a full or partial undergraduate course in arts is deemed prerequisite.

The development of the various branches of applied science, especially within the past fifty years, and their introduction as subjects of instruction into the curriculum of colleges have necessitated a general reorganization and redistribution of undergraduate study. A more or less strict line of demarcation has come to be drawn between studies in arts proper and studies in applied science. Some institutions accept this broad general division; thus, the undergraduate work at Harvard University has hitherto been shared between Harvard College and the Lawrence Scientific School, a coordinate part of the university. Yale University makes a similar division of its undergraduate work between the college proper and the Sheffield Scientific School. But other institutions have carried out this subdivision and differentiation more minutely. Thus, the University of California, to take a typical example, divides its undergraduate study as follows: The Colleges of Letters, Social Sciences, Natural Sciences, and Commerce; the College of Agriculture; and the Colleges of Mechanics, Mining, Civil Engineering, and Chemistry; in all nine coordinated colleges offering undergraduate study.

Admission to any college or scientific school offering undergraduate work is usually gained only after the successful completion of preparatory studies specially designed to fit a student for college instruction. The nature of this preparation, and the general standard of scholarship expected, will naturally be of interest to the Chinese student purposing to come to the United States. These requirements will be found fully and minutely stated, subject by subject, in the following pages, with a special discussion of the provisions made for the admission of Chinese students.

COLLEGE ENTRANCE REQUIREMENTS.

(A) GENERAL REQUIREMENTS FOR AMERICAN STUDENTS.

Nothing shows more clearly the lack of coordination among American colleges than the fact that no uniform system of entrance requirements has yet come into force. Quite recently an attempt in the direction of a uniform system has been made in the establishment of a college entrance examination board, which conducts matriculation examinations without reference to any particular college, and which issues certificates to successful candidates, which are honored by some of the leading colleges, in lieu of their own examinations. References to this board will be found below. In general, each college or technical school conducts its own entrance examinations, and maintains its own standard of matriculation. Most American students, therefore, arrange their preparatory studies having in view the specific requirements of some particular college. Thus a student is said to "prepare for Pennsylvania" or to "prepare for Michigan."

It has been thought best, in order to make perfectly clear to Chinese students the matriculation standards exacted by American colleges, to reprint in full the entrance requirements of some of the larger and better known institutions. A perusal of these will explain perhaps better than anything else the exact scope of preparatory study which college instruction implies. The list has been chosen partly because it includes colleges at which Chinese students are already in attendance in fairly large numbers, and partly because the colleges themselves may be regarded as typical of certain general broad divisions of the country. The data in each case are taken from the latest authoritative statement which the institution in question has issued.[a]

---

(1) HARVARD UNIVERSITY.[b]

HARVARD COLLEGE.

ADMISSION.

A student who wishes to enter Harvard College as a candidate for a degree must ordinarily pass examinations for admission, either those of the university or those of the college entrance examination board; but if he comes from

[a] Certain changes have been made in the entrance requirements of some of the institutions selected since the preparation of this bulletin was completed, and further changes may be expected to be made from time to time. It will accordingly be understood that the requirements here given are designed to be typical of existing conditions, and can not be depended upon as representing the actual requirements in any individual case, though more or less closely approximating to them. Students preparing for any particular institution should therefore procure its latest schedule of requirements before committing themselves to any line of study.—EDITOR.

[b] From the Harvard University Catalogue, 1907–8, pp. 462–492.

another college or scientific school, he may be admitted without examination. Special students also—that is, students not members of a college class—may be admitted without examination.

GENERAL REGULATIONS.

Registration for examination.—Candidates for admission by examination are required to register for examination on blank forms, which may be obtained from the secretary. In order to facilitate preparations for the proper conduct of examinations, it is desired that candidates register as early as possible. Candidates who wish to be examined in June should register by June 10; those who wish to be examined in September, by September 10.

Fees.—Each registration for examination must be accompanied by an examination fee of $5. This fee can not be accepted in advance of registration. It must be sent, *with the registration blank*, by check, post-office order, or registered letter to Charles F. Mason, bursar, Dane Hall, Cambridge, Mass.

Division of examinations.—A candidate may, with the approval of his school, divide his examinations among several examination periods.

Certificates.—The university does not accept certificates of secondary schools in place of entrance examinations. The testimony of teachers is, however, highly valued and is given special consideration in all cases in which the evidence of examinations appears inconclusive. On the receipt of each application for admission a blank form will be sent to the head master of the school, requesting the candidate's record and any facts about his character and scholarship which will be helpful to the committee on admission.

Certificates for preliminary examinations.—A preliminary examination is an examination taken at any period (June or September) antecedent to the final examination at which the candidate completes his admission record. If a candidate divides his examinations among several periods, those of every period except the last are preliminary. At each registration for preliminary examinations the candidate must present a certificate from his school or tutor naming the subjects in which he is recommended. A candidate passing preliminary examinations will be credited only with those subjects in which he is recommended.

Certificates of honorable dismissal.—Every candidate for admission is required to furnish a certificate of honorable dismissal from the school or college he has attended or from the tutor with whom he has studied. If a candidate has within a year left one school for another, or for a private tutor, any certificate received from the second school or private tutor must be accompanied by the written consent of the principal of the first school.

Good English.—Clear and idiomatic English is expected in all examination papers and notebooks written by candidates for admission. Teachers are requested to insist on good English, not only in translations, but in every exercise in which the pupil has occasion to write or to speak English.

Laboratory examinations.—A candidate who is examined in any study in which a laboratory examination is held will hand in his laboratory notebook at *the hour of the laboratory examination.* Laboratory notebooks will be deposited, after examination, in the college office, where they will be kept for one year, subject to the order of the owners.

A candidate examined in June at any place where a laboratory examination is not provided will be required to take such an examination in Cambridge in the autumn of the year in which he enters college; but if he passes the writ-

ten examination in June, the subject will be temporarily counted in his favor in determining the question of his admission to college.

Examination papers.—A set of recent examination papers will be sent free to any address, on application to the publication agent of the university, No. 2 University Hall. Separate papers may be had in quantities of not less than *six* copies of any *one* paper (not one each of six different papers) at 10 cents a dozen.

STUDIES IN WHICH EXAMINATIONS ARE HELD.

Examinations for admission to Harvard College will be held in the studies contained in the following list and in accordance with the requirements in each study therein defined. For the terms of admission, see pages 20–24.

1. English.

A candidate for admission to Harvard College may take either of the examinations described below. If he passes English A he is exempt from the prescribed English of the freshman year (English A); but if he passes it with Grade D he is required to take before the end of his second year a half course in English composition in addition to his regular elective courses; furthermore, on the evidence of his examination book, he may be credited with an ungraded mark of "pass" in elementary English, but required to take the prescribed English of the freshman year.

ELEMENTARY ENGLISH.

The examination will test, by means of short compositions, the candidate's spelling, punctuation, use of capital letters, grammatical accuracy, use of words, structure of sentences and of paragraphs, and in general the quality of his English. He is also expected to have a knowledge of good literature at least equal to that prescribed by the requirements in English adopted by the commission of colleges in New England.

These requirements include two lists of books, all of which the candidate is expected to read. He should read them as he reads other books; he is expected not to know them minutely, but to have freshly in mind their most important parts. In connection with the reading and study of the prescribed books he should read other books as parallel or subsidiary reading, and should commit to memory a considerable amount of English poetry.

The books for reading in 1908 are—

Shakespeare's Macbeth and Merchant of Venice; The Sir Roger de Coverley Papers in the Spectator; Irving's Life of Goldsmith; Coleridge's Ancient Mariner; Scott's Ivanhoe and Lady of the Lake; Tennyson's Gareth and Lynette, Lancelot and Elaine, and Passing of Arthur; Lowell's Vision of Sir Launfal; George Eliot's Silas Marner.

The books for study in 1908 are—

Shakespeare's Julius Cæsar; Milton's L'Allegro, Il Penseroso, Comus, and Lycidas; Burke's Speech on Conciliation with America; Macaulay's Essays on Addison and Life of Johnson.

The books for reading in 1909 are—

Group I (two to be selected).

Shakespeare's As You Like It, Henry V, Julius Cæsar, Merchant of Venice, Twelfth Night.

Group II (one to be selected).

Bacon's Essays; Bunyan's Pilgrim's Progress, Part I; The Sir Roger de Coverley Papers in the Spectator; Franklin's Autobiography.

Group III (one to be selected).

Chaucer's Prologue; Spenser's Faerie Queene (selections); Pope's Rape of the Lock; Goldsmith's Deserted Village; Palgrave's Golden Treasury (First Series), Books II and III, with especial attention to Dryden, Collins, Gray, Cowper, and Burns.

Group IV (two to be selected).

Goldsmith's Vicar of Wakefield; Scott's Ivanhoe; Scott's Quentin Durward; Hawthorne's House of the Seven Gables; Thackeray's Henry Esmond; Mrs. Gaskell's Cranford; Dickens's Tale of Two Cities; George Eliot's Silas Marner; Blackmore's Lorna Doone.

Group V (two to be selected).

Irving's Sketch Book; Lamb's Essays of Elia; De Quincey's Joan of Arc and English Mail Coach; Carlyle's Heroes and Hero Worship; Emerson's Essays (selected); Ruskin's Sesame and Lilies.

Group VI (two to be selected).

Coleridge's Ancient Mariner; Scott's Lady of the Lake; Byron's Mazeppa and Prisoner of Chillon; Palgrave's Golden Treasury (First Series), Book IV, with especial attention to Wordsworth, Keats, and Shelley; Macaulay's Lays of Ancient Rome; Poe's Poems; Lowell's Vision of Sir Launfal; Arnold's Sohrab and Rustum; Longfellow's Courtship of Miles Standish; Tennyson's Gareth and Lynette, Lancelot and Elaine, and Passing of Arthur; Browning's Cavalier Tunes, Lost Leader, How They Brought the Good News from Ghent to Aix, Evelyn Hope, Home Thoughts from Abroad, Home Thoughts from the Sea, Incident of the French Camp, The Boy and the Angel, One Word More, Hervé Riel, Pheidippides.

The books for study in 1909 are—

Shakespeare's Macbeth; Milton's Lycidas, Comus, L'Allegro, and Il Penseroso; Burke's Speech on Conciliation with America, or Washington's Farewell Address and Webster's First Bunker Hill Oration; Macaulay's Life of Johnson, or Carlyle's Essay on Burns.

ENGLISH A.

The examination will be adapted to the proficiency of those who have studied English composition and literature in a systematic course of three school hours or periods a week for four years, and will consist of questions in rhetoric,[a] questions in literary history from the time of Shakespeare, and compositions based on the following works:

Palgrave:
Golden Treasury (First Series).

Shakespeare:
Julius Cæsar,
The Merchant of Venice,
Macbeth,
Twelfth Night, *or* As You Like It,
King Lear, *or* Hamlet.

Milton:
L'Allegro,
Il Penseroso,

Milton—Continued.
Comus.

Bunyan:
The Pilgrim's Progress, *or*
Defoe:
Robinson Crusoe.

Dryden:
Alexander's Feast,
To the Memory of Mr. Oldham,
Upon the Death of the Earl of Dundee.

[a] A. S. Hill's Principles of Rhetoric is used for the corresponding study in Harvard College, and is recommended for use in preparation for this examination.

Swift:
The Voyage to Lilliput.

Addison and Steele:
The Sir Roger de Coverley Papers.

Pope:
Epistle to Arbuthnot.

Goldsmith:
The Vicar of Wakefield,
The Deserted Village.

Scott:
The Lady of the Lake,
Ivanhoe,
Quentin Durward.

Macaulay:
Life of Johnson,
Lays of Ancient Rome.

Byron:
Mazeppa,
The Prisoner of Chillon.

Irving:
The Legend of Sleepy Hollow,
Rip Van Winkle,
Tales of a Traveler.

Thackeray:
Henry Esmond.

Dickens:
A Tale of Two Cities, *or* David Copperfield.

Browning: Selections; for example,
Cavalier Tunes,
The Lost Leader,
How They Brought the Good News from Ghent to Aix,
Evelyn Hope,
Home Thoughts from Abroad,
Home Thoughts from the Sea,
Incident of the French Camp,
The Boy and the Angel,
One Word More,
Hervé Riel,
Pheidippides.

Tennyson: Selections; for example,
Enid,
Elaine,
The Passing of Arthur,
The Lady of Shalott,
The Lotus Eaters,
Ulysses,
Tithonus,
The Revenge.

Franklin:
Autobiography.

Hawthorne:
The House of the Seven Gables.

Longfellow:
Tales of a Wayside Inn.

Lowell:
The Vision of Sir Launfal.

The candidate is expected to read all the books prescribed.[a] He should read them as he reads other books, not trying to remember them in detail, but regarding each work as a whole and giving it such appreciation as shall enable him to write about it intelligently. In every case the examiner will regard knowledge of the books as less important than ability to write English; if the examination book in English affords insufficient evidence, he will examine the written work of the candidate in other subjects.

No candidate will be accepted in English whose work is seriously faulty in spelling, grammar, punctuation, or division into paragraphs.

Throughout the course frequent short composition should be required as well as occasional long ones. Topics should be chosen by the pupil himself whenever that is possible; and the topics assigned by the instructor should be within the range of the pupil's knowledge and sympathies, and should be such as to awaken interest and stimulate intelligence. Criticism should be constant and thorough; it should take account of merits as well as of faults, and should never interfere with the honest expression of opinion or with the free play of individuality in thought and expression. Mechanical methods of every kind should be avoided; and attention should be fixed on principles rather than rules.

As to the right way of studying rhetoric, attention is called to the following extract from the Report of the Vassar Conference:[b]

"Though it is clear that the power to write a language can be obtained only by unremitting practice, yet, in the opinion of the conference, such practice may properly be accompanied and illustrated by a course in elementary rhetoric. This course should include not only the principles of clearness, force, and good taste, but the principles of the arrangement of clauses in the sentence and of sentences in the paragraph. The teacher should bear in mind that any body of written English, of whatever length, is an organic unit, with principles that apply as well to the arrangement of the minor elements as to the grouping of the larger divisions of essay or book. Especial care should be taken that rhetoric is not studied by itself or for its own sake. Its connection with the pupil's actual written or spoken exercises should be kept constantly in view."

---

[a] In connection with the prescribed books, parallel or subsidiary reading should be encouraged, and a considerable amount of English poetry committed to memory.

[b] Report of the Committee of Ten, p. 95, sec. 8.

2, 3. GREEK.

2. ELEMENTARY GREEK.

The examination will be adapted to the proficiency of those who have studied Greek in a systematic course of five exercises a week, extending through at least *two* school years. The two parts of the examination can not be taken separately:

(*a*) The translation at sight of simple Attic prose. (The passages set for translation must be rendered into simple and idiomatic English.)

(*b*) A thorough examination on a prescribed portion of Xenophon (about 30 pages[a]), directed to testing the candidate's mastery of the ordinary forms, constructions, and idioms of the language; the test to consist, in part, of writing simple Attic prose, involving the use of such words, constructions, and idioms only as occur in the portion of Xenophon prescribed.

The portion of Xenophon prescribed for this examination is the first book of the Anabasis, chapters i–viii. Two years' notice will be given of any change in the selection.

3. ADVANCED GREEK.

The examination will be adapted to the proficiency of those who have studied Greek in a systematic course of five exercises a week, extending through at least *three* school years. The second part of the examination (Greek Composition) is optional, but candidates are advised to try this part of the paper, since a fair translation will offset deficiencies in the preceding part.

(*a*) The translation at sight of Attic prose and of Homer, with questions designed to test the candidate's understanding of the passages set, and questions on ordinary forms, constructions, and idioms, and on prosody. There will also be questions on the Homeric poems and Homeric life. (The passages set for translation must be rendered into simple and idiomatic English.)

(*b*) The translation into Attic prose of a short passage of connected English narrative. (The passage set for translation will be based on some portion of the Greek prose works usually read in preparation for college, and will be limited to the subject-matter of those works.)

The estimate of the periods of study necessary to prepare for the elementary and advanced examinations in Greek is based on the assumption that the candidate has begun the study of Latin at least a year earlier, and has continued it along with his Greek course; otherwise the periods specified would not be sufficient.

In preparation for the elementary examination in Greek, candidates should read from 130 to 170 pages[a] of Attic prose. For the advanced examination candidates should read from 30 to 50 pages more of Attic prose, and from 3,000 to 5,000 verses of Homer. The reading of Homer may be advantageously begun with a thorough study of Iliad, Books I and II (to the catalogue of ships).

The pupils should be constantly guided in proper methods of reading, and trained to read the Greek intelligently, as Greek, before undertaking to render it into idiomatic English. There should be constant practice in reading aloud, with due expression, and in hearing the language read. In connection with the reading, to insure thoroughness and accuracy in the pupil's understanding of the language, the study of grammar, with some practice in writing Greek, should be maintained throughout the course. There should also be frequent written translations into idiomatic English.

To prepare for the examination in Greek Composition, pupils should be trained, from an early stage of the preparatory course, to render into Greek not merely detached sentences, illustrative of constructions, but also passages of connected narrative or description, prepared by the teacher on the basis of the prose authors read.

---

[a] The pages of the more recent Teubner text editions are taken as a standard in this statement.

4, 5. LATIN.

4. ELEMENTARY LATIN.

The examination will be adapted to the proficiency of those who have studied Latin in a systematic course of five lessons a week, extending through at least *three* school years. The passages set for translation must be rendered into simple and idiomatic English. The three parts of the examination can not be taken separately:

(*a*) The translation at sight of simple Latin prose.

(*b*) An examination (which may include translation) on the first four books of Virgil's Aeneid, or on selected myths from Ovid's Metamorphoses, or on selected speeches of Cicero, with questions on the subject-matter and on literary and historical allusions. Two years' notice will be given of any change in these alternative requirements.

(*c*) An examination directed to testing the candidate's mastery of the ordinary forms, constructions, and idioms of the language; the test to consist, in part, of writing simple Latin prose.

5. ADVANCED LATIN.

The examination will be adapted to the proficiency of those who have studied Latin in a systematic course of five lessons a week, extending through at least *four* school years. The passages set for translation must be rendered into simple and idiomatic English. The two parts of the examination can not be taken separately:

(*a*) The translation at sight of Latin prose and verse, with questions on ordinary forms, constructions, and idioms, and on prosody.

(*b*) The translation into Latin prose of a short passage of connected English narrative. (The passage set for translation will be based on some portion of the Latin prose works usually read in preparation for college, and will be limited to the subject-matter of those works.)

The estimate of the periods of study necessary to prepare for the examinations in Latin is made with reference to schools which have a four years' course. Schools which have a five years' course may more advantageously provide for beginning the study of Latin in the first year, with some diminution, if necessary, of the time devoted to it in the last years of the course.

The course of reading pursued in preparation for the examinations in Latin should include—

(*a*) Easy reading, included in or following a suitable introductory book (Latin Lessons), amounting to from 30 to 40 pages;[a]

(*b*) Nepos (Lives) and Cæsar (Gallic War), 90 to 120 pages;

(*c*) Cicero, 90 to 120 pages, including the speech on the Manilian Law, the four speeches against Catiline, the Defense of Archias, and the Defense of Marcellus, with additional speeches selected by the teacher;

(*d*) Virgil and Ovid, 6,000 to 10,000 verses, including the first six books of the Aeneid.

Preparation for the elementary examination alone should include (*a*) and (*b*), about 40 pages of Cicero, and either the first four books of Virgil's Aeneid, or the speeches of Cicero on the Manilian Law, Catiline, Archias, and Marcellus, or the following myths from Ovid's Metamorphoses: Deucalion, Daphne, Phaethon, Cadmus, Pyramus, Andromeda, Proserpina, Niobe, Medea, Meleager, Philemon, Atalanta, Midas, Alcyone, Galatea.

The pupil should be constantly guided in proper methods of reading, and trained to read the Latin intelligently, as Latin, before undertaking to render it into idiomatic English. There should be constant practice in reading aloud, with due expression, and in hearing the language read. In connection with the reading, to insure thoroughness and accuracy in the pupil's understanding of the language, the study of grammar, with some practice in writing Latin, should be maintained throughout the course. There should also be frequent written translations into idiomatic English.

[a] See footnote, p. [illegible]

To prepare for the advanced examination in Latin composition, pupils should be trained, from an early stage of the preparatory course, to render into Latin not merely detached sentences, illustrative of constructions, but also passages of connected narrative or description, prepared by the teacher on the basis of the prose authors read.

6, 7. GERMAN.

6. ELEMENTARY GERMAN.

(*a*) The translation at sight of simple German prose. (The passages set for translation must be rendered into simple and idiomatic English.)

(*b*) The translation into German of simple English sentences, or of easy connected prose, to test the candidate's familiarity with elementary grammar.

The passages set for translation into English will be suited to the proficiency of candidates who have read not less than 200 pages of easy German (including reading at sight in class).

Grammar should be studied concurrently with the reading as an indispensable means of insuring thoroughness and accuracy in the understanding of the language. The requirement in elementary grammar includes the conjugation of the weak and the more usual strong verbs; the declension of articles, adjectives, pronouns, and such nouns as are readily classified; the commoner prepositions; the simpler uses of the modal auxiliaries; the elements of syntax, especially the rules governing the order of words.

Pronunciation should be carefully taught, and the pupils should have frequent opportunities to hear German spoken or read aloud. The writing of German from dictation is recommended as a useful exercise.

7. ADVANCED GERMAN.

(*a*) The translation at sight of ordinary German. (The passages set for translation must be rendered into simple and idiomatic English.)

(*b*) The translation into German of a connected passage of English prose, to test the candidate's familiarity with grammar. Proficiency in grammar may also be tested by direct questions.

The passages set for translation into English will be suited to the proficiency of those who have read, in addition to the amount specified under elementary German, not less than 500 pages of classical and contemporary prose and verse. It is recommended that the reading be selected from such works as the following: Riehl, *Culturgeschichtliche Novellen*; Freytag, *Bilder aus der deutschen Vergangenheit, Die Journalisten*; Kohlrausch, *Das Jahr 1813*; Schiller, *Der dreissigjährige Krieg, Wilhelm Tell, Maria Stuart, Die Jungfrau von Orleans*; Göthe, *Hermann und Dorothea, Egmont, Iphigenie*; Lessing, *Minna von Barnhelm*. About one-half of the amount read should be nineteenth century prose.

In the translation into German, candidates will be expected to show a thorough knowledge of accidence, the elements of word-formation, the principal uses of prepositions and conjunctions, and the essentials of syntax, especially the uses of the modal auxiliaries, and of the subjunctive and infinitive modes.

It is recommended that the candidate be trained to follow a recitation conducted in German and to answer in that language questions asked by the instructor.

8, 9. FRENCH.

8. ELEMENTARY FRENCH.

(*a*) The translation at sight of ordinary nineteenth century prose. (The passages set for translation must be rendered into simple and idiomatic English.)

(*b*) The translation into French of simple English sentences or of easy connected prose, to test the candidate's familiarity with elementary grammar. Proficiency in grammar may also be tested by direct questions, based on the passages set for translation under (*a*).

The passages set for translation into English will be suited to the proficiency of candidates who have read not less than 400 pages (including reading at sight in class) from the works of at least three different authors. It is desirable that a portion of the reading should be from works other than works of fiction.

Grammar should be studied concurrently with the reading as an indispensable means of insuring thoroughness and accuracy in the understanding of the language. The requirement in elementary grammar includes the conjugations of regular verbs, of the more frequent irregular verbs, such as *aller, envoyer, tenir, pouvoir, voir, vouloir, dire, savoir, faire,* and those belonging to the classes represented by *ouvrir, dormir, connaître, conduire,* and *craindre;* the forms and positions of personal pronouns and of possessive, demonstrative, and interrogative adjectives; the inflection of nouns and adjectives for gender and number, except rare cases; the uses of articles, and the partitive constructions.

Pronunciation should be carefully taught, and pupils should have frequent opportunities to hear French spoken or read aloud. The writing of French from dictation is recommended as a useful exercise.

9. ADVANCED FRENCH.

(*a*) The translation at sight of standard French. (The passages set for translation must be rendered into simple and idiomatic English.)

(*b*) The translation into French of a connected passage of English prose, to test the candidate's familiarity with grammar. Proficiency in grammar may also be tested by direct questions.

The passages set for translation into English will be suited to the proficiency of candidates who have read, in addition to the amount specified under Elementary French, not less than 600 pages of prose and verse from the writings of at least four standard authors. A considerable part of the amount read should be carefully translated into idiomatic English.

Candidates will be expected to show a thorough knowledge of accidence and familiarity with the essentials of French syntax, especially the uses of tenses, modes, prepositions, and conjunctions.

It is recommended that the candidate be trained to follow a recitation conducted in French and to answer in that language questions asked by the instructor.

10, 11. HISTORY (INCLUDING HISTORICAL GEOGRAPHY).

10. ELEMENTARY HISTORY.

Either of the two following groups, each including two fields of historical study:

1. *Greek and Roman History.*—(*a*) Greek history to the death of Alexander, with due reference to Greek life, literature, and art. (*b*) Roman history to the accession of Commodus, with due reference to literature and government.

2. *English and American History.*—(*a*) English history, with due reference to social and political development. (*b*) American history, with the elements of civil government.

For preparation in each of the two historical fields presented, a course of study equivalent to at least three lessons a week for one year will be necessary.

The candidate will be expected to show on examination such general knowledge of each field as may be acquired from the study of an accurate text-book of not less than 300 pages, supplemented by suitable parallel readings amounting to not less than 500 pages. The examination will call for comparison of historical characters, periods, and events, and in general for the exercise of judgment as well as of memory. Geographical knowledge will be tested by means of an outline map.

In the judgment of the department of history it is desirable that Greek and Roman history be offered as a part of the preparation of every candidate.

11. ADVANCED HISTORY.

Any one of the three courses of study which follow:

1. Greek history to the destruction of Corinth and Roman history to the death of Constantine (open to those candidates only who have offered English and American history as an elementary study).

2. English history and American history (open to those candidates only who have offered Greek and Roman history as an elementary study).

3. European history from the Germanic conquests to the beginning of the seventeenth century.

Candidates may obtain credit for advanced history (2 points) by passing any one of these three examinations, if they take or have taken elementary Greek and Roman history.

In every case the candidate will be expected to show on examination such an acquaintance with the whole field as may be gained from the study of good text-books, together with substantial parallel readings, and, further, such a detailed knowledge of some part of the field as may be gained from suitable topical study. A higher standard of acquirement and of power to combine results will be expected than in the elementary requirement.

As further evidence of the candidate's proficiency satisfactory written work, done at school and certified by the teacher, must be submitted at the time of the examination. It must be presented in the form of a notebook (or bound collection of notes), containing not less than 50 written pages on each historical field offered, and must show practice in some of the following exercises:

(*a*) Notes and digests of the pupil's reading outside of the text-books.

(*b*) Brief written tests requiring the application to new questions of knowledge previously acquired.

(*c*) Parallels between historical characters or periods.

(*d*) Short studies of topics limited in scope, prepared outside of the class room and illustrated by some reference to contemporary material.

(*e*) Historical maps or charts showing exploitations, migrations, conquests, territorial changes, or social conditions.

12, 13. Music.

12. HARMONY.

The examination will be adapted to the proficiency of those who have studied harmony in a systematic course of three lessons a week through one school year, who are proficient in pianoforte playing, and who have the ability to read chorals and moderately easy piano pieces at sight. The examination will test

I. The accuracy of the candidate's knowledge of the following points:

(*a*) Notation; clefs; signatures; diatonic and chromatic intervals and their inversions; consonance and dissonance; major and minor diatonic scales; chromatic scale; natural harmonic series.

(*b*) Triads of the major and minor modes.

(*c*) Rules of chord connection; range of voices; open and close harmony; tonality.

(*d*) Inversions of triads; principles of doubling voices in chords, especially in successive sixth chords.

(*e*) Chords of the dominant seventh and diminished seventh; preparation and resolution.

(*f*) Secondary seventh chords.

(*g*) Principles of key relationship; simple modulation.

II. His analytical knowledge of ninth chords, altered chords (including augmented chords), nonharmonic tones, suspensions, and pedal point. (Students should be encouraged to apply this knowledge in their harmonization.)

Preparation for this examination should consist of systematic practice in the harmonization of simple melodies in soprano and in bass. All exercises should be written in a clear and well-formed notation. "Modern Harmony, by Foote and Spalding, is used in the college course corresponding to this requirement, and is recommended for use in preparation for the examination.

13. COUNTERPOINT.

The examination will be adapted to the proficiency of those who have studied counterpoint in a systematic course of three lessons a week through one school year, and presupposes training in pianoforte playing. As counterpoint applies the principles of harmony to the melodious treatment of the several voice parts in combination, and as the art of musical composition begins properly with this

study, the work should consist principally of written exercises on given themes, in the following order:

Chorals and melodies harmonized, with a free use of passing notes; the several orders of counterpoint in two, three, and four voices, with and without *canius firmus;* double counterpoint; free imitative counterpoint; analysis of the two-part inventions and fugues of Sebastian Bach; simple forms of free composition, organ preludes, two-part inventions, and part songs.

Students should use as models simple organ compositions and part songs of modern composers. For the exercises in counterpoint the alto and tenor clefs should be used.

14–17. MATHEMATICS.

A thorough practical acquaintance with ordinary arithmetic is assumed as underlying all preparation in mathematics. Knowledge of the fundamental principles of arithmetic and careful training in accurate computation with whole numbers and with vulgar and decimal fractions form an essential part of early school work. But the pupil's time should not be wasted in the solution by arithmetic of puzzling problems which properly belong to algebra, or in complicated and useless reductions, or in the details of commercial arithmetic. It is desirable that some familiarity with algebraic expressions and symbols, including the methods of solving simple equations, be acquired in connection with the course in arithmetic.

ELEMENTARY MATHEMATICS.

14. *Elementary Algebra.*—Algebra through Quadratic Equations.

The requirement in algebra includes the following subjects: Factors, common divisors and multiples, fractions, ratios, and proportions; negative quantities and the interpretation of negative results; the doctrine of exponents; radicals and equations involving radicals; the binomial theorem for positive integral powers of the binomial, and the extraction of roots, arithmetical and geometrical progressions; putting questions into equations and the reduction of equations; the ordinary methods of elimination and the solution of both numerical and literal equations of the first and second degrees with one or more unknown quantities and of problems leading to such equations.

The student should cover carefully the whole ground here specified, and should acquire a thorough understanding not only of the practice, but of the reasons involved in the elementary algebraic rules; for example, in the rules of multiplication, of signs, and of exponents, in the rules for fractions, and in those relating to the reduction and solution of equations. He should train himself to practical skill by the solution of a large number of examples, and should learn to do his work with reasonable quickness, as well as with confidence, accuracy, and clearness. The solution of fairly complicated literal quadratics, the various methods of elimination for equations of the first two degrees, the putting of problems in a neat manner into equations, and the working of the various algebraic operations both for integral and fractional expressions may be mentioned as important subjects of attention. The student should be taught to arrange his work in a clear, orderly, and compact fashion.

The time supposed to be devoted to the systematic study of the requirement in algebra is the equivalent of a course of three lessons a week through two school years.

15. *Geometry.*—Plane and solid geometry, including problems in mensuration of plane and solid figures, and original propositions in plane geometry.

Geometric education should begin in the kindergarten or primary school, where the child should acquire familiarity through the senses with simple geometric forms, by inspecting, drawing, modeling, and measuring them, and noting their more obvious relations. This study should be followed in the grammar school by systematic instruction in concrete (or observational) geometry, of which geometric drawing should form a part. Such instruction should include the main facts of plane and solid geometry, treated as matters of observation, and not as exercises in logical deduction, without, however, necessarily excluding the beginnings of deductive proof as soon as the pupil is ready for them. Concrete geometry is believed to have important educational value, and to prepare an excellent foundation for the later study of formal geometry. It belongs, however, to the earlier stages of school work, and should not be postponed until the time that belongs to direct preparation for college or the scientific school.

In teaching formal geometry, stress should be laid from the outset on accuracy of statement and elegance of form, as well as on clear and strict reasoning. As soon as

the pupil has begun to acquire the art of rigorous demonstration his work should cease to be merely receptive; he should be trained to devise constructions and demonstrations for himself, and this training should be carried through the whole of the work in plane geometry. Teachers are advised, in their selection of a text-book, to choose one having a clear tendency to call out the pupil's own powers of thought, prevent the formation of mechanical habits of study, and encourage the concentration of mind which it is a part of the discipline of mathematical study to foster. The subject of geometry, not a particular treatise, is what the pupil should be set to learn; and its simpler methods and conceptions should be made a part of his habitual and instinctive thought. Lastly, the pupil should be stimulated to good work by interest in the study felt and exhibited by the teacher.

The requirement in geometry embraces the following topics: The general properties of plane rectilinear figures; the circle and the measure of angles; similar polygons; areas; regular polygons, and the measure of the circle; the relations of planes and lines in space; the properties and measure of prisms, pyramids, cylinders, and cones; the sphere and the spherical triangle. The propositions required under these several heads are those only which are contained in the older treatises, and which are recognized as constituting the elements of geometry. The examination does not include the additions introduced into some recent text-books, although most of those additions are in themselves valuable for the student who has time and taste for extra study in this field. A syllabus of the required propositions has been prepared. [This syllabus may be obtained, price 10 cents, at the Publication Office, 2 University Hall, Cambridge.]

The examination in geometry also includes original propositions in plane geometry, based on the propositions named in the syllabus, and problems in mensuration in both plane and solid geometry; but excellence in bookwork and in exercises immediately illustrating bookwork will be allowed to offset in part any lack of skill in original work.

The time which it is recommended to assign to the systematic study of the requirement in formal geometry is the equivalent of a course of five lessons a week for one school year, but it is believed to be advisable to extend this allowance of time over two years.

15a. Plane geometry.—The requirement in plane geometry is stated on pages 1 to 14 of the syllabus mentioned above.

ADVANCED MATHEMATICS.

15b. Solid geometry.—Chauvenet's Geometry, revised and abridged (Philadelphia: J. B. Lippincott & Co.), Books VI, VII, VIII, and IX, will serve to indicate the nature and amount of the requirement in solid geometry.

16. Logarithms and trigonometry.—The theory of logarithms and the use of logarithmic tables. Plane trigonometry. The solution of the right spherical triangle. Applications to simple problems.

No technical knowledge of the subjects of surveying and navigation, such, for instance, as the methods of parallel or middle latitude sailing, will be required, but such terms as latitude, longitude, angle of elevation or depression, bearing, etc., should be understood. At the examination, candidates are furnished with four-place tables belonging to the university, and are not allowed to use their own tables. Two sets of tables will be provided: (1) The regular sexagesimal tables;[a] (2) a set of tables in which the degree is divided into tenths and hundredths instead of into minutes and seconds.[b] The questions will be so worded that the candidate may use, with equal facility, whichever set of tables he prefers. The tables provided are distributed before the hour of examination, so that candidates may have at least an hour for becoming acquainted with their arrangement and use. Teachers who wish a still earlier opportunity of seeing these tables should write to the secretary.

17. Advanced algebra.—The requirement in advanced algebra includes the following subjects:

(a) Simultaneous quadratics and equations solved like quadratics; properties of quadratic equations; addition, subtraction, multiplication, and division of complex quantities; inequalities; variations; arithmetical and geometrical progressions; mathematical induction; simple problems in choice and chance; continued fractions; scales of notation.

---

[a] Special reprints from pp. 2–5, 8–15 of J. M. Peirce's "Four-Place Tables" (Ginn & Co., Boston), not obtainable separately.

[b] "Four-Place Tables," abridged edition, compiled by E. V. Huntington (for sale by the Harvard Coöperative Society).

(b) Determinants, not including the multiplication theorem; simple applications of determinants to linear equations; the solution of numerical equations of higher degree, and so much of the theory of equations (not including multiple roots or Sturm's theorem) as is necessary for this purpose.

The topics included under (a) may be treated briefly. About half the time devoted to the requirements should be spent on the topics included under (b).

18–24. Physical Science.[a]

ELEMENTARY PHYSICAL SCIENCE.

18. Elementary physics.—A course of study dealing with the leading elementary facts and principles of physics, with quantative laboratory work by the pupil.

The instruction given in this course should include qualitative lecture-room experiments, and should direct especial attention to the illustrations and applications of physical laws to be found in everyday life. The candidate is required to pass a written examination, the main object of which will be to determine how much he has profited by such instruction. This examination may include numerical problems. It will contain more questions than any one candidate is expected to answer, in order to make allowance for a considerable diversity of instruction in different schools.

The pupil's laboratory work should give practice in the observation and explanation of physical phenomena, some familiarity with methods of measurement, and some training of the hand and the eye in the direction of precision and skill. It should also be regarded as a means of fixing in the mind of the pupil a considerable variety of facts and principles. The candidate is required to pass a laboratory examination, the main object of which will be to determine how much he has profited by such a laboratory course.

The candidate must name as the basis for his laboratory examination at least thirty-five exercises selected from a list of about sixty described in a publication issued by the university under the title "Descriptive List of Elementary exercises in Physics." [This list may be obtained, price 40 cents, at the Publication Office, 2 University Hall, Cambridge.] In this list the divisions are mechanics (including hydrostatics), light, heat, sound, and electricity (with magnetism). At least ten of the exercises selected must be in mechanics. Any one of the four other divisions may be omitted altogether, but each of the three remaining divisions must be represented by at least three exercises.

The candidate is required to present a notebook in which he has recorded the steps and the results of his laboratory exercises, and this notebook must bear the indorsement of his teacher, certifying that the notes are a true record of the pupil's work. It should contain an index of the exercises which it describes. These exercises need not be the same as those upon which the candidate presents himself for the laboratory examination, but should be equivalent to them in amount and grade of quantitative work.

The notebook is required as proof that the candidate has formed the habit of keeping a full and intelligible record of laboratory work through an extended course of experiments, and that his work has been of such a character as to raise a presumption in favor of his preparation for the examination. But much greater weight will be given to the laboratory examination than to the notebook in determining the candidate's attainments in physics. Experience has shown that pupils can make the original record of their observations entirely presentable, so that copying will be unnecessary, and they should in general be required to do so.

This course, if taken in the last year of the candidate's preparation, is expected to occupy in laboratory work, recitations, and lectures, five of the ordinary school periods, about fifty minutes in length, per week for the whole year. With few exceptions exercises like those in the Descriptive List already mentioned can be performed in a single school period, but for satisfactory results it will often be necessary to repeat an exercise. Two periods per week for the year should be sufficient for the laboratory work proper. If the course is begun much earlier than the last year of the candidate's preparation, as it well may be, it will require more time.

19. Chemistry.[b]—A course of at least sixty experiments performed at school by the pupil and accompanied with systematic instruction in principles and their applications, in accordance with directions given in a pamphlet entitled "An

[a] For rules relating to the time of handing in notebooks and to candidates examined in June in places where no laboratory examination is provided, see pp. 5–6.

[b] The course will be mainly an experimental course in theoretical chemistry, but there will be experiments covering all branches of pure chemistry.

Outline of Requirements in Chemistry," issued by the university for *the use of teachers only.*

The candidate is required to pass both a written and a laboratory examination. The written examination will test his acquaintance with the facts and principles of chemistry. The laboratory examination will test both his skill in performing experiments and his grasp of the principles involved in them. The candidate is further required to present the original notebook in which he recorded the steps and results of the experiments which he performed at school, and this notebook must bear the indorsement of his teacher, certifying that the notes are a true record of the pupil's work. It should contain an index of the exercises which it describes.

The notebook is required as proof that the candidate has formed the habit of keeping a full and intelligible record of laboratory work through an extended course of experiments, and that his work has been of such a character as to raise a presumption in favor of his preparation for the examination. But much greater weight will be given to the laboratory examination than to the notebook in determining the candidate's attainments in chemistry.

20. Physiography.—A course of study equivalent to that described in a pamphlet entitled "An Outline of Requirements in Physiography," issued by the university.

For the form of examination see note under Astronomy, below.

After 1908 the examinations in physiography and meteorology will be withdrawn, and in place of them will be substituted an examination in geography.

20a. Geography.—A course of study equivalent to that described in a pamphlet entitled "An Outline of Requirements in Geography," issued by the university.

21. Anatomy, physiology, and hygiene.—A course of study and laboratory work equivalent to that described in a pamphlet entitled "An Outline of Requirements in Anatomy, Physiology, and Hygiene," issued by the university.

The candidate will be required to pass both a written and a laboratory examination. The written examination will test the range and thoroughness of his knowledge of the elements of anatomy, physiology, and hygiene. The laboratory examination will test (*a*) his ability to perform the experiments described in the Outline of Requirements, and (*b*) his knowledge of the first aids to be rendered to the injured.

At the time of the laboratory examination the candidate must present the original notebook containing (with dates) the notes and drawings he has made in the course of his laboratory work, and bearing the indorsement of his teacher, certifying that the book is a true record of the pupil's own observations and experiments. An index of subjects should be appended.

23. Meteorology.—A course of observational study equivalent to that described in a pamphlet entitled "An Outline of Requirements in Meteorology," issued by the university.

This course requires a knowledge of elementary physics. (For the form of examination see under Astronomy, below.)

After 1908 the examinations in physiography and meteorology will be withdrawn, and in place of them will be substituted an examination in geography. (See *20a.*)

24. Astronomy.—A course of observational study equivalent to that described in a pamphlet entitled "An Outline of Requirements in Astronomy," issued by the university.

This course requires a knowledge of geometry.

In physiography, meteorology, and astronomy, the candidate will be required to take both a written and a laboratory or practical examination. The written examination may test his understanding of observational methods appropriate to the subject, but will call chiefly for a knowledge of facts and principles. The laboratory or practical examination will test his skill in observation as well as his grasp of principles. This examination can be taken in Cambridge only; for those who are examined elsewhere in June, it will be postponed to September.

76049—No. 2—09——2

The laboratory examination in physiography may include the description, explanation, and comparison of geographical features shown in photographs, maps, and models. The laboratory examination in meteorology may include the use of instruments, the discussion of observations, and the construction and interpretation of weather maps and climatic charts. The practical examination in astronomy may call for an ability to make simple naked-eye and instrumental observations, and to establish the simpler generalizations of astronomy by discussion of these observations.

The candidate in these subjects will be required to present, at the time of the laboratory or practical examination, the original notebook in which he recorded, with dates, the steps and results of the observations which he made at school. This book must bear the indorsement of his teacher, certifying that the notes are a true record of the pupil's work. An index of subjects should be appended. The notebook is required as proof that the candidate has formed the habit of keeping a full and intelligible record of his work through an extended course of observational study, and that his work has been of a satisfactory character; but greater weight will be given to the practical or laboratory examination than to the notebook in determining the candidate's attainments.

The following studies may be presented by candidates for the degree of S. B.:

25, 26. Botany and Zoology.

25. Botany.—A course of study and laboratory work equivalent to that indicated in an "Outline of Requirements in Botany," issued by the university. The course should extend through at least half of a school year, with five lessons a week. The laboratory work is to be directed especially to the external anatomy and the activities of our common plants.

26. Zoology.—A course of study and laboratory work equivalent to that described in a pamphlet entitled "An Outline of Requirements in Zoology," issued by the university. The course should extend through at least half of a school year, with five lessons a week, and should include the laboratory study of at least ten types of animals, with special reference to their external anatomy and their activities. These types are to be selected in accordance with directions to be given in the pamphlet named.

In botany and in zoology the candidate will be required to pass both a written and a laboratory examination. The written examination will test the range and thoroughness of his knowledge of the subject. The laboratory examination will test his skill in observation and experimentation, and his ability to apply names properly to the parts of the organisms studied.*

At the time of the laboratory examination the candidate must present the original notebook containing (with dates) the notes and drawings he has made in the course of his laboratory work, and bearing the indorsement of his teacher, certifying that the book is a true record of the pupil's own observations and experiments. An index of subjects should be appended.

After 1908 the examination in zoology will be based on the requirement in zoology of the college entrance examination board. This requirement is in accordance with the report of a committee appointed by the American Society of Zoologists.

27–30. Shopwork.

A course of instruction in the use of tools and in the ordinary processes employed in the working of wood or metal, equivalent to that described in a pamphlet entitled "An Outline of Requirements in Shopwork," issued by the university. The course may embrace one or more of the following divisions:

27. *Woodworking.*
28. *Blacksmithing.*
29. *Chipping, filing, and fitting.*
30. *Machine-tool work.*

The candidate must be familiar with the names, construction, and operation of the tools commonly used in these processes, and will be expected to read ordinary mechanical drawings and to make free-hand sketches of articles which are to be produced in the workshop.

---

* For rules relating to laboratory examinations and notebooks, see pp. 5–6.

The candidate is required to pass both a written and a laboratory examination.[a] The written examination will test his knowledge of tools and mechanical processes, and of the properties of materials of common use in construction. He will be expected to show familiarity with approved methods for simple work in the branch in which he presents himself for examination, and to write an intelligible description of those methods, illustrated by such sketches as may be necessary to make them clear. The laboratory examination will test the candidate's skill in the use of tools. He will receive the materials and specifications for a piece of work, and will be expected to select his tools, preparing them for use if necessary, and to demonstrate satisfactorily his knowledge and skill.

Every candidate is further required to present the original notebook in which he entered the descriptions and sketches of the work he performed at school; and with this he may present, as evidence of his skill in the workshop, the models made by him at school. Both the notebook and the models must be accompanied by the indorsement of his teacher, certifying that the book is a record, and that the models are specimens of the pupil's own work.

31, 32, 33. Drawing.

A course of drawing, in either or both of the following branches, equivalent to that described in an "Outline of Requirements in Drawing," issued by the university:

31. Freehand drawing.—The representation of simple objects, in outline and with shading.

Accuracy of delineation, correctness of proportion, and good quality of line are desired, rather than any attempt at elaboration. The aim should be to express as much as possible with the fewest lines. The examination will consist of the drawing, first, of a group of geometrical solids, and, second, of either a simple piece of machinery or a simple piece of architectural ornament (such as a Greek anthemion), as the candidate may elect. Every candidate is further required to present a set of plates or drawings made by him at school, showing that he has completed a thorough course in this subject; and these drawings must be accompanied by the certificate of his teacher stating that they are the pupil's own work.

32. Projections.—The projection in plan and elevation of geometrical figures and of simple parts of architectural subjects or machinery.

The examination will test the candidate's knowledge of principles and methods. Every candidate is expected to bring to the examination the ordinary drawing instruments and lead pencils; drawing board and paper will be supplied. Every candidate is further required to present a set of plates or drawings prepared by him at school, sufficient to demonstrate his understanding of the subject and his familiarity with instruments, including the use of the right-line pen; and these drawings must be accompanied by the certificate of his teacher stating that they are the pupil's own work.

33. Architectural drawing. (This subject will be discontinued after the year 1909.)—Elementary shades, shadows, and perspective. Thorough study of the forms of the Tuscan, the Greek Doric, the Ionic, and the Corinthian orders.

This course requires a knowledge of projections. Every candidate is expected to bring to the examination the ordinary drawing instruments and lead pencils; drawing board and paper will be supplied. Every candidate is further required to present a set of plates or drawings prepared by him at school, sufficient to demonstrate his understanding of the subject and his familiarity with instruments, including the use of the right-line pen; and these drawings must be accompanied by the certificate of his teacher stating that they are the pupil's own work.

The candidate will be required to pass a two-hour written examination and a three-hour examination in drawing. The written examination will test his knowledge of the principles of shades, shadows, and perspective, and his understanding of the simple forms of the orders and their moldings. In the drawing examination the candidate will be required to draw from description in plan and elevation a simple architectural composition (such as a doorway) involving the use of an order. The drawing will be

[a] For rules relating to laboratory examinations and notebooks, see pp. 5–6.

made in pencil with cast shadows in wash. The examination in drawing will be held in Cambridge only.

34, 35. Government and Economics.

34. Civil government.—Civil government in the United States (national, state, and local); its constitution, organization, and actual working.

The candidate will be expected to show, on examination, such general knowledge of the field as may be acquired from the study of a good text-book of not less than 300 pages, supplemented by collateral reading, and discussion. The examination will call for familiarity with constitutional questions and with the procedure of legislative bodies.

For preparation in this subject, a course of study equivalent to at least three lessons a week for one year will be necessary.

35. Economics.—The candidate will be expected to show, on examination, a knowledge of the leading facts and principles of economics, including such subjects as division of labor, the factors of production, the laws of diminishing returns, demand and supply, value and price, wages, interest, rent and profits, credit, and international trade. For this part of the study one of the better grade of manuals in current use will serve as a basis, but it must be supplemented with collateral reading, discussion, and practical exercises. In addition to the study of principles, the student will be expected to have acquired a fair knowledge of elementary banking operations, and of the banking and monetary history of the United States since 1860.

For preparation in this subject, a course of study equivalent to at least three lessons a week for one year will be necessary.

TERMS OF ADMISSION.

General Statement.

To be admitted to Harvard College from a secondary school as a candidate for a degree a student must present himself for examination in studies ordinarily taught in high schools and academies. To each study is assigned a value, expressed in "points," which indicates the relative weight given to that study in determining the question of a candidate's fitness for admission.

If the student wishes to enter as a candidate for the degree of A. B., the studies in which he presents himself for examination should include English, one ancient language (Greek or Latin), one modern language (German or French), history, algebra, plane geometry, an elementary science or sciences counting two points, and elective studies counting eight points, four of which must be in advanced work; in all, studies counting 26 points.

If the student wishes to enter as a candidate for the degree of S. B., the studies in which he presents himself for examination should include English, modern languages counting 4 points, history, algebra, plane and solid geometry, an elementary science or sciences counting 2 points, and elective studies counting 9 points; in all, studies counting 26 points.

The difference between the requirements for admission for a candidate for the degree of A. B. and those for a candidate for the degree of S. B. is as follows: The candidate for the degree of A. B. must take one ancient language (Greek or Latin) and one modern language (German or French); the candidate for the degree of S. B. is not required to take Greek or Latin, but must take both elementary German and French, or both elementary and advanced German, or both elementary and advanced French. The candidate for the degree of A. B. is required to take algebra and plane geometry, whereas the candidate for the

degree of S. B. must take algebra and plane and solid geometry. Again the candidate for the degree of A. B. is required to take elective studies counting 8 points, 4 of which must be in advanced work, whereas the candidate for the degree of S. B. is required to take elective studies counting 9 points, none of which need be in advanced work. Moreover, the range of election for candidates for the degree of S. B. is wider than that for candidates for the degree of A. B. Of the elective studies civil government, economics, botany, zoology, drawing, and shopwork are open to candidates for the degree of S. B., but not to candidates for the degree of A. B.

Candidates who fail to meet in full the requirements indicated above may be admitted under conditions which require them to do extra college work or to pass certain examinations later. In admitting students with conditions the committee on admission take into account not only the number of examinations or "points" that a student passes, but also the quality of his work as shown both by his examinations and by his school record. It is impossible, therefore, to define the requirements for admission with conditions in terms of "points." The requirements for admission without conditions are so defined, but the requirements for admission with conditions vary with individual records. With the evidence afforded by examinations and by school records the committee on admission endeavor to consider each case on its merits.

Detailed Statement for Candidates for the Degree of A. B.

The studies which may be presented in satisfaction of the requirements for admission by candidates for the degree of A. B. are named together in the following lists. The figure attached to each study indicates the relative weight which will be given to that study in determining the question of the candidate's fitness for admission:

Elementary.

English (4)
Greek (4)
Latin (4)
German (2)
French (2)

History (2) — *One of the following two:*
- Greek and Roman
- English and American

Harmony (2)
Algebra (2)
Geometry (3), *or*
Plane geometry (2)

Physics (2)
Chemistry (2)
Geography (1), *or*
Physiography (1)
Anatomy, etc. (1)

Advanced.

Greek (2)
Latin (2)
German (2)
French (2)

History (2) — *One of the following five:*
- Ancient
- English and American
- English
- American
- of Europe

Counterpoint (2)
Algebra (1)
Logarithms and trigonometry (1)
Solid geometry (1)
Astronomy (1)
Meteorology (1)

A candidate for admission must offer from this list studies amounting to twenty-six points, of which points at least four must be in advanced studies. The studies offered must include—

English	4
One ancient language (Elementary Latin or Elementary Greek)	4
One modern foreign language (Elementary German or Elementary French)	2
Elementary history	2
Algebra	2
Geometry or plane geometry	3 or 2
Studies amounting to two points from the following sciences: Elementary physics, chemistry, geography or physiography, anatomy, physiology, and hygiene	2
	19 or 18

No candidate may offer an advanced study who does not at the same time or earlier offer the corresponding elementary study; but physics is considered elementary with respect to meteorology, and geometry or plane geometry, with respect to astronomy.

Candidates who are looking forward to the extended study of English or of any other modern literature are advised to acquire a knowledge of Greek as well as of Latin.

Detailed Statement for Candidates for the Degree of S. B.

The studies which may be presented in satisfaction of the requirements for admission by candidates for the degree of S. B. must be chosen from the studies named in the following list in accordance with the requirements set forth on the next page.

The figure attached to each study indicates the relative weight (termed *points*) which will be given to it in determining the question of the candidate's fitness for admission:

Elementary.

English (4)
Greek (4)
Latin (4)
German (2)
French (2)

History (2) { *One of the following two:* Greek and Roman; English and American

Economics (1)
Harmony (2)
Algebra (2)
Geometry (3), *or* Plane geometry (2)
Physics (2)
Chemistry (2)
Geography (1), *or* Physiography (1)

Advanced.

Greek (2)
Latin (2)
German (2)
French (2)

History (2) { *One of the following five:* Greek and Roman; English and American; English; American; of Europe

Counterpoint (2)
Algebra (1)
Logarithms and trigonometry (1)
Solid geometry (1)
Astronomy (1)
Meteorology (1)

Elementary—(Continued.)	*Advanced*—(Continued.)
Anatomy, physiology, and hygiene (*1*)	
Civil government (*1*)	
Botany (*1*)	
Zoology (*1*)	
Drawing. { Freehand (*1*); Projections (*1*)	Architectural drawing (*2*)
Shopwork. { Wood-working (*1*); Blacksmithing (*1*); Chipping, filing, and fitting (*1*); Machine-tool work (*1*)	

A candidate for admission must offer from this list studies amounting to 26 points. These studies must include—

English	4
Modern languages	4
Elementary history	2
Algebra	2
Plane geometry[a]	2
Solid geometry[a]	1
Studies amounting to two points from the following sciences: Elementary physics, chemistry, physiography or geography, anatomy, etc., zoology, botany, astronomy	2
	17

Optional Examinations.

A candidate who has extended his studies beyond the requirements for admission may present himself for examination in additional studies and thus qualify himself to pursue more advanced courses in those subjects in college and anticipate work which counts toward a degree, but no extra admission subject will be counted as a course or half course toward a degree unless offered in advance as the equivalent of a college course and unless the examination book has been read with that end in view and marked not lower than C. Examinations in elective studies that are not equivalent to admission studies may also be taken, provided the courses are of such a character that they may properly be anticipated by examination, but the number of courses that may thus be anticipated is very small. Such examinations are held only in the first fortnight of the academic year and only at Cambridge. Written notice of intention to take these examinations must be in the hands of the secretary not later than September 10.

COLLEGE ENTRANCE EXAMINATION BOARD.

In June, 1908, papers of the College Entrance Examination Board may be substituted for corresponding papers set for the separate admission examinations held by Harvard University, but no candidate may offer both Harvard and board examinations in the same subjects. For more particular information apply to Mr. J. G. Hart, secretary, 20 University Hall, Cambridge.

The examination fee is $5 for all candidates examined at points in the United States and Canada, and $15 for all candidates examined at points outside of the United States and Canada. The fee (which can not be accepted in advance of the application) should be remitted by postal order, express

[a] The requirement in geometry may be satisfied by passing either in geometry (*2*) or in plane geometry (*1*) and solid geometry (*1*).

order, or draft on New York, to the order of the College Entrance Examination Board.

A list of the places at which examinations are to be held by the board in 1908 may be obtained by addressing the secretary of the board, Prof. N. G. McCrea, post-office substation 84, New York, N. Y.

ADMISSION OF SPECIAL STUDENTS.

The courses of study provided by the Faculty of Arts and Sciences are open to persons who give satisfactory evidence of their fitness to pursue the particular courses they elect, although they have not passed the usual examinations for admission. These students are known as special students. They may become candidates for a degree by satisfying the requirements for admission to the freshman class. To be recommended for a degree, however, they must have been registered as candidates for that degree for at least one year.

Candidates for admission as special students may obtain from the secretary blank forms of application, which should be duly filled and returned to the secretary. They are advised to apply before September 1; but applications will be considered at any time of the year.

Special students in Harvard College are subject to all the regulations of the college. Each student is under the particular supervision of a member of the faculty, who acts as his adviser. Every special student is required to meet his adviser before the beginning of the academic year, at a time and a place to be announced on the official bulletin boards, and to submit his choice of studies for approval.

Grades are assigned to special students in the several courses; and special students are subject to all requirements affecting the courses which they take. The names of special students who attain Grade A or Grade B in any course are entered, at the end of the year, in the printed list of distinguished students in the course, and this list is sent to the father or recognized guardian of every student.

A special student who has passed in twelve elective courses, and has stood above Grade C in six courses (or their equivalent) without falling below Grade C in any course, may on application receive a certificate to this effect on Commencement Day, and be named in the commencement programme as the recipient of such certificate. If he has received honors in any department or honorable mention in any study, that fact will be stated in his certificate and will be mentioned in the commencement programme and in the next annual catalogue.

ADMISSION FROM OTHER COLLEGES AND SCIENTIFIC SCHOOLS.

Graduates of other colleges and scientific schools and students who have completed creditably the work of at least one year at other colleges or scientific schools may be admitted without examination to the standing for which their previous training seems to qualify them.

Every person wishing to enter under this provision must make a complete written statement of the work on which he bases his application. Blank forms of application for admission may be obtained from the secretary.

Much importance is attached to the quality of the work offered. The applicant should furnish: (1) Official statements of his rank or grade in his various college studies; (2) letters, or other evidence, showing the opinion his instructors have formed of his character and scholarship; (3) a letter of honorable dismissal from the college whence he comes.

(2) UNIVERSITY OF MICHIGAN.[a]

DEPARTMENT OF LITERATURE, SCIENCE, AND THE ARTS.

ADMISSION OF CANDIDATES FOR A DEGREE.

Applicants for admission as undergraduates must be at least 16 years of age, and must have completed the requirements for admission, as here described. These requirements are stated in units, a unit meaning a subject of study pursued through a school year, with not less than four recitation periods each week. The subjects from which choice may be made, and the number of units which will be accepted in each subject, are as follows:

English composition and literature, 3 or 4 units.
Mathematics (algebra and geometry), 3 units.
Physics, 1 unit.

Greek, 2 units.	Botany, 1 unit.
Latin, 2, 3, or 4 units.	Zoology, 1 unit.
French, 2, 3, or 4 units.	Biology, 1 unit.
German, 2, 3, or 4 units.	Physiography, 1 unit.
History, 1, 2, or 3 units.	Physiography, ½ unit.
Chemistry, 1 unit.	Trigonometry, ½ unit.

Fifteen units are required for admission. These 15 units must include 3 units in English composition and literature, 3 units in mathematics, 1 unit in physics, and at least two units in Latin, French, or German. The other 6 units may be selected by the applicant from the foregoing list.

Applicants who offer trigonometry may complete the unit by offering one-half year's work in physiography. For the full unit in physiography the text-book work must be supplemented by work in the laboratory and in the field.

Biology is defined as one-half year of botany and one-half year of zoology, hence it can not be accepted from an applicant who offers at the same time either, or both, of those subjects.

SCOPE OF THE PREPARATORY WORK.

The following descriptive outline indicates the amount of preparation expected in each of the subjects named:

ENGLISH COMPOSITION AND LITERATURE.

The 3 units in English composition and literature should cover the following subjects:

Composition.—As preparation for this requirement, it is expected that the student will have prepared, under the direction of a competent instructor, one or more written exercises each week for at least three years. A sufficient number of these exercises should be corrected by the teacher and revised by the student to secure the desired accuracy. It is highly desirable that longer and more carefully planned papers should be a feature of the fourth year. The subjects upon which the student writes should not be drawn exclusively from literature; a considerable proportion of them should be so distributed as to give proper training in the various types of discourse, namely, description, narrative, argument, and exposition.

The student's credentials should show the amount and character of the work in composition.

[a] From the Calendar of the University of Michigan for 1907–8, pp. 73–74.

Rhetoric.—The student should be grounded in the essentials of rhetoric, but those principles should receive emphasis which are most likely to be of service to him in his practice in writing, such as the principles of sentential structure, paragraphing, and the outlining of the essay. The correction of stock specimens of bad English is not recommended, and will form no part of the entrance requirement.

Grammar.—The applicant should be prepared to state intelligently the essential principles of grammar and to explain the syntactical structure of any sentence encountered in his reading.

Reading of classics.—The following books are recommended by the Joint Conference on Uniform Entrance Requirements in English:

1906–1911. For reading, ten books selected from the following list:

Group I (two to be selected):

Shakespeare's As You Like It, Henry V, Julius Cæsar, The Merchant of Venice, Twelfth Night.

Group II (one to be selected):

Bacon's Essays; Bunyan's The Pilgrim's Progress, Part I; The Sir Roger de Coverley Papers in The Spectator; Franklin's Autobiography.

Group III (one to be selected):

Chaucer's Prologue; Spenser's Faerie Queene (selections); Pope's The Rape of the Lock; Goldsmith's The Deserted Village; Palgrave's Golden Treasury (first series), Books II and III, with especial attention to Dryden, Collins, Gray, Cowper, and Burns.

Group IV (two to be selected):

Goldsmith's The Vicar of Wakefield; Scott's Ivanhoe; Scott's Quentin Durward; Hawthorne's The House of the Seven Gables; Thackeray's Henry Esmond; Mrs. Gaskell's Cranford; Dickens's A Tale of Two Cities; George Eliot's Silas Marner; Blackmore's Lorna Doone.

Group V (two to be selected):

Irving's Sketch Book; Lamb's Essays of Elia; De Quincey's Joan of Arc and The English Mail Coach; Carlyle's Heroes and Hero Worship; Emerson's Essays (selected); Ruskin's Sesame and Lilies.

Group VI (two to be selected):

Coleridge's The Ancient Mariner; Scott's The Lady of the Lake; Byron's Maseppa and The Prisoner of Chillon; Palgrave's Golden Treasury (first series), Book IV, with special attention to Wordsworth, Keats, and Shelley; Macaulay's Lays of Ancient Rome; Poe's Poems; Lowell's The Vision of Sir Launfal; Arnold's Sohrab and Rustum; Longfellow's the Courtship of Miles Standish; Tennyson's Gareth and Lynette, Lancelot and Elaine, and the Passing of Arthur; Browning's Cavalier Tunes, The Lost Leader, How They Brought the Good News from Ghent to Aix, Evelyn Hope, Home Thoughts from Abroad, Home Thoughts from the Sea, Incident of the French Camp, The Boy and the Angel, One Word More, Hervé Riel, Pheidippides.

For *study and practice:* Shakespeare's Macbeth; Milton's Lycidas, Comus, L'Allegro, and Il Penseroso; Burke's Speech on Conciliation with America, or Washington's Farewell Address and Webster's First Bunker Hill Oration; Macaulay's Life of Johnson, or Carlyle's Essay on Burns.

It is expected that the applicant will have read these books appreciatively and will have made himself familiar with the subject-matter and the form of each work. The reading should be connected, in reasonable measure, with the lives and characters of the authors read and with the history of their times.

Although the books mentioned above are recommended as preparation for this part of the requirement, they are not prescribed. Books of equal merit covering a similar range of literary types, will be accepted as equivalents.

It is recommended that in connection with the reading of classics, the memorizing of notable passages, in both prose and poetry, should form a regular exercise throughout the whole preparatory period. This is all-important for the development of a correct taste in language and literature.

History of English Literature.—The applicant who offers four units in English composition and literature should have pursued the study throughout the four years of the high-school course. In addition to the foregoing requirement his preparation should include a systematic study of the outlines of English literary history. Due emphasis should be laid upon the division of the subject into periods; and the leading characteristics of each period should be studied and, as far as is possible, illustrated by the reading of representative authors. Any of the current manuals of English literature may serve as the basis of this part of the work, which should occupy the third or fourth year of the course. The historical study should, however, be associated as closely as possible with the reading of classics.

Applicants who present themselves for examination will be asked to write two essays of not less than 200 words each, one upon a subject drawn from the books of the foregoing list, and the other upon a subject drawn from experience or observation. The language of these essays must be grammatical and clear. The spelling, punctuation, and capitalizing must be correct. The applicant must show ability to discriminate in the use of words and to construct well-organized sentences and paragraphs. A topical outline should accompany each essay. The applicant should also be prepared to answer questions upon the fundamental principles of grammar and rhetoric. Additional questions in the history of English literature will be given to applicants for four units.

MATHEMATICS.

The three units in mathematics required of all applicants include algebra through quadratics, and geometry, both plane and solid (including spherical). Beman and Smith's Elements of Algebra, and the same authors' New Plane and Solid Geometry are mentioned to indicate the scope and character of the work required.

TRIGONOMETRY.

The one-half unit in trigonometry should cover the work in plane trignometry as given in Crockett's Trigonometry or an equivalent in other authors.

PHYSICS.

The required unit in physics includes an amount represented by Carhart and Chute's High School Physics. The instruction in the class room should be supplemented by work in the physical laboratory to the extent of at least one period a week throughout the school year.

GREEK.

The two units in Greek should be made up of grammar, prose composition, and reading, as follows:

Grammar.—Goodwin's or Hadley's. The inflections must be thoroughly mastered.

Prose Composition.—Jones's Exercises, with special reference to the writing of Greek with the accents, and to the general principles of syntax. Woodruff's Greek Prose Composition is taken as an equivalent.

Reading.—Three books of Xenophon's Anabasis and two books of Homer.

The so-called continental sound of the vowels and diphthongs and pronunciation according to the written accents are preferred.

LATIN.

An applicant offering two units in Latin should have completed Jones's First Latin Book or an equivalent amount in some other introductory text-book; and should have read four books of Caesar's Gallic War, or an equivalent; and he should, further, be prepared to meet one-half of the requirement in Latin prose composition described below.

N. B.—This preparation is sufficient to enable the student to enter Latin A or B in the university.

An applicant offering three units in Latin should have completed the foregoing requirements for two units. He should, in addition, have read not less than six orations of Cicero or six books of Virgil's Aeneid, or an equivalent. And he should, further, be prepared to meet the requirement in Latin prose composition described below.

The four units in Latin should be made up of grammar, prose composition, and reading, as follows:

Grammar.—A thorough preparation in the elements of etymology, syntax, and prosody.

Prose Composition.—Applicants will be asked to translate into Latin a passage of connected English narrative, based upon some portion of the Caesar or Cicero read. As a text-book, Jones's, Collar's, Daniell's, or Bennett's is recommended. Special care should be taken with the training in prose composition.

Reading.—Four books of Cæsar's Gallic War, six select orations of Cicero, and six books of Virgil's Aeneid. For any two books of the Aeneid, 1,500 lines of Ovid may be substituted. The books named may serve to indicate the amount and kind of text adapted to give the ability to read passages of moderate difficulty at sight, which is what the university requires.

The Roman method of pronouncing Latin is used at the university.

FRENCH.

The applicant who offers 2 units in French will be expected to pronounce French intelligibly and with some fluency, to understand French when spoken in simple phrases and about familiar subjects, to read ordinary prose easily and accurately, and to write correctly in French simple sentences based on texts studied. This ability demands a firm grasp of the elements of grammar (such as the conjugation of the verb, both regular and irregular, the use of auxiliaries, the forms of the pronoun, the agreement of adjectives and participles, the main uses of the articles, and the order of words in the sentence), and such a familiarity with the structure of the sentence and common turns of expression and such command of vocabulary as may be given by the careful, well directed reading of 300 or 400 pages of easy prose.

The applicant who offers 3 units in French should be able to read ordinary prose rapidly at sight, with clear understanding of the distinctions of tense and mode and all the common points of syntax, to reproduce in simple but connected French the substance of a narrative or dramatic text, and to follow ordinary explanations and commentaries made orally in French. In acquiring this ability accent should be laid on the rapid understanding of the French phrase, whether it be addressed to the eye or the ear. Much should be read, spoken, and dictated. At least 600 pages of prose should be read, and in the end it should not be too easy.

The applicant who offers 4 units in French should be able to read at sight any French not offering very unusual difficulties of vocabulary or syntax, to translate into French a passage of simple English, and to carry on a conversation in French upon a familiar subject. He should have read, in addition to

what is required for 3 units, at least 1,000 pages of French chosen from standard authors, and he should be able to answer questions on the content and meaning of the works read as well as upon the language in which they are written.

GERMAN.

The applicant who offers 2 units in German should be able to pronounce German correctly and should be thoroughly familiar with the everyday facts of the grammar. He should have read about 300 to 350 pages of standard modern prose and should be able to take part in a simple conversation in German on topics drawn from the works read. He should also be able to translate easy English prose into German.

The applicant who offers 3 units in German should, in addition to the work described above, be prepared as follows: He should have read two classics selected from the works of Lessing, Goethe, and Schiller, and about 250 pages of standard prose fiction and history. He should have a good knowledge of German syntax and should be able to write a short essay on some subject taken from the works read. He should also be able to translate ordinary English into German and to express himself in German grammatically and with ease on topics connected with his reading.

The 4 units in German include the foregoing requirements and additional preparation as follows: The reading of five standard dramas (exclusive of those read in the third year) selected from the works of Goethe, Schiller, Lessing, Heinrich v. Kleist, and Grillparzer; a thorough command of German grammar, and the ability to speak and write German with considerable ease and correctness. The applicant should have written several longer essays on the works read.

HISTORY.

The applicant who offers 1, 2, or 3 units in history may select from the following list:

Ancient history to the year 800 A. D., 1 unit.
Mediæval and modern history, 1 unit.
English history, 1 unit.
United States history and government, 1 unit.

A year's work in general history, with the use of such a book as Myers's General History, will still be accepted as 1 unit, though it is believed that better results will be obtained if a year is given to ancient history down to the fall of the Roman Empire (or, preferably, to the year 800 A. D.), and a year to mediæval and modern history.

PHYSIOGRAPHY.

The applicant who offers one-half unit in physiography is expected to have studied one of the following books for a half year: Dryer's Lessons in Physical Geography; Gilbert and Brigham's Introduction to Physical Geography; Davis's Elementary Physical Geography; or Tarr's New Physical Geography. In this connection field excursions are earnestly recommended.

The applicant who offers 1 unit in physiography should have a thorough course in the subject, extended over a year and supplemented by field excursions.

The ability to read a topographic map is essential in physiographic study; teachers will find the topographic maps issued by the United States Geographical Survey an important aid.

CHEMISTRY.

The nature and extent of the requirement in this subject are indicated by the mention of Remsen's Introduction to the Study of Chemistry. The study of the text should be accompanied by laboratory work.

BOTANY.

The unit required of those who offer botany for admission is expected to include as much as a competent teacher, trained in laboratory methods, can accomplish with his classes in a year. No attempt is here made to indicate the exact extent of the ground to be covered, for the teacher should have large liberty in selecting material and topics as occasion requires; but it is recommended that one half year be given to the form, structure, and habits of flowering plants, while the other half year may be given to the natural groups of plants, physiology, and the adaptation of form and structure to environment.

The following text-books are recommended as offering numerous and helpful suggestions: Atkinson's Elementary Botany, Bailey's Botany, Barnes's Plant Life, Bergen's Foundations of Botany, Coulter's Plant Relations and Plant Structures, Spalding's Introduction to Botany, Stevens's Introduction to Botany. Ganong's Teaching Botanist is one of the most useful books for the teacher.

ZOOLOGY.

An applicant who offers a unit in zoology will be expected to have a knowledge of at least eight of the following animal types: (1 and 2) Two protozoa: Amœba, Paramœcium, Vorticella, Stentor, Volvox; (3) a sponge: Spongilla or Grantia; (4) a hydroid: Hydra, to be compared with a medusoid form; (5) an echinoderm: starfish or sea-urchin; (6) an annelid: the earthworm or the leech; (7) a crustacean: crayfish, lobster, or crab; (8) an insect: butterfly, (including immature stages), grasshopper, cricket, cockroach, or other insect; (9) a mollusk: the fresh-water mussel or one of the snails; (10) a fish: minnow or perch; (11) an amphibian: frog, toad, tree toad, salamander (Amblystoma), or mudpuppy (Necturus).

These forms must be studied by the laboratory method. Laboratory work should be directed not merely toward a study of animal structure, but as far as practicable toward the study of habits and reactions. It should furnish the basis for the class room discussion of principles; especially of evolution. Of the four periods per week that must be given to the work, two at least should be laboratory periods of two hours each, and the other two should be given to recitations or other class exercises. Careful original notes and drawings must be presented by applicants as part of the examination.

The mention of the following books may serve to indicate the character of the work required: Needham's Elementary Lessons in Zoology, Davenport's Introduction to Zoology, Jordan and Kellogg's Animal Life, French's Animal Activities.

BIOLOGY.

One-half of the work above outlined in botany, together with one-half of that outlined in zoology, will meet the requirements in biology.

DIVISION OF THE EXAMINATION.

The applicant may divide the examination into two parts, taking one part either a year or a semester before the date of his admission and the second part at the time of admission. But if he fail to secure the requisite number of

units within the specified time he forfeits all credits for the subjects he may have passed.

Conditional Admission.

An applicant who fails in some part of the examination may, at the discretion of the faculty, be admitted conditionally; but any condition thus incurred must be removed at one of the next two regular examinations for admission. No student who has an admission condition outstanding at the beginning of his second year of residence will be allowed to enter his classes until such condition is removed.

Admission on Diploma.

The privilege of sending pupils for admission on diploma is limited to schools that have been approved by the faculty. On request of the proper authorities, the faculty sends an officer of the university to visit a school and report upon its condition. If satisfied from the report of this officer that the school is taught by competent instructors and is furnishing a good preparation to meet the requirements for admission, then the faculty places the school on the approved list for a period not exceeding three years (inclusive of the year of visitation); reserving, however, the right to require another inspection if, within the period specified in each case, important changes affecting the course of study in the school or the efficiency of the instruction seem to make an examination necessary.

The superintendent of each approved school is expected to send to the president of the university annually, at a date not later in the year than March 1, a catalogue of the school; or, if no catalogue is published, he is expected to send a statement giving the names of the teachers, the number of pupils, and a description of the courses of study.

Graduates of schools that have been placed by the faculty on its approved list are admitted without examination on presenting a recommendation, signed by the principal of the school, certifying that they have satisfactorily done all the work required for admission. The recommendation must be made on a blank form furnished by the university.

The principals of approved schools are urged to send to the dean on or before September 15 the recommendation of each graduate intending to enter this department of the university at the beginning of the ensuing college year. If, on inspection, the recommendation is found satisfactory, the dean will forward to the applicant a certificate, entitling him to admission without examination. Such certificate, or an original recommendation, must be presented to the dean at his office in University Hall as early as the day preceding the opening of the academic year.

Admission to Advanced Standing.

1. A student who brings a certificate of standing from an approved college or university, showing that he has satisfactorily completed at least one year of the curriculum of the institution from which he comes, may be admitted without examination to equal standing in this department of the university. A graduate of one of the stronger courses of an approved normal school, who brings an official certificate explicitly describing the extent and character of his work, may be given, without examination, such advanced standing as is justified by the course he has completed.

The certificates above referred to must be presented to the dean of the department as early as the 15th of October (or, if the student enter at the beginning of the second semester, as early as the 1st of March).

2. All other applicants for advanced standing must present to the registrar as early as the 15th of October (or, if they enter at the beginning of the second semester, as early as the 1st of March) a statement showing the amount of work done in the subjects in which credit is asked. The registrar will thereupon furnish a blank form for presentation to the professors in charge of the several subjects designated in the blank, who will by examination determine the amount of credit to which the applicant is entitled.

Credits must be secured and returned to the registrar as early as the 1st of November (or, if the student enter at the beginning of the second semester, as early as the 15th of March). An account once closed can not be reopened without special permission of the dean.

ADMISSION OF STUDENTS NOT CANDIDATES FOR A DEGREE.

Persons over 21 years of age who wish to pursue studies in this department, without becoming candidates for a degree, may be admitted as special students, provided they pass an examination in English, and show that they are qualified to pursue profitably the studies they may desire to take up. In the examination in English applicants will be asked to write brief essays on subjects that will be assigned, and to answer questions on the rudiments of English grammar.

Should a special student subsequently become a candidate for graduation, he must pass all the examinations for admission required of such a candidate, at least one year before the time when he proposes to graduate.

Special students who wish credit for studies pursued before admission are referred to the rules relating to advanced standing given above.

---

(8) TULANE UNIVERSITY OF LOUISIANA.

REQUIREMENTS FOR ADMISSION.

The board of administrators and the several faculties of the Tulane University of Louisiana all now require for admission to the freshman class a preparation equivalent to a four-year course in high-school work.

Applicants for admission to the freshman class of any department of the university must be not less than 16 years of age.

The requirements for admission to all departments of the Tulane University of Louisiana, have been placed upon a basis of "units" as follows:

1. "A unit" is a subject pursued through one school year, with not less than five recitation periods per week.

2. Fifteen units are required for full entrance.

3. Applicants presenting 12 units may be admitted to partial standing, with the condition that they make up the deficiencies.

4. Applicants presenting less than 12 units will not be received.

5. All applicants for admission must offer 3 units in English, 3 in mathematics, and at least 2 in Latin or French or German.

6. Applicants entering for the degree of bachelor of arts must offer 3 units in Latin and 2 in Greek. For the Greek 1 unit in history and 1 unit in science may be substituted.

7. Applicants entering for the degree of bachelor of science or bachelor of engineering must offer 2 units in science and 2 in history. For the 2 units in

science 1 additional unit in mathematics and 1 in the language selected under 5 may be substituted.

8. The units not specified above must be chosen from the table below, making in all 15 units for full standing:

1. English composition	2	15. American history	1
2. English literature	1 or 2	16. Physics	1
3. Elementary algebra [a]	2	17. Chemistry	1
4. Plane geometry	1	18. Biology (botany and zoology)	1
5. Solid geometry [b]	½	19. Botany	1
6. Trigonometry	½	20. Zoology	1
7. Latin	2, 3, or 4	21. Physiology	1
8. Greek	2 or 3	22. Physiography	1
9. French	2 or 3	23. Free-hand drawing	1
10. Spanish	1 or 2	24. Mechanical drawing	½
11. German	2 or 3	25. Wood working	½
12. Ancient history	1	26. Foundry work	½
13. Mediæval and modern history	1	27. Forge work	½
14. English history	1	28. Machine-tool practice	1

9. No entrance credit will be allowed for any subject pursued for less than one school year.

10. Certificates for work done in affiliated preparatory schools will be accepted only in the case of *graduates* of those schools. Applicants for admission who *have not graduated* from an affiliated school will be admitted only upon examination.

11. Recommendations (not required):

(*a*) Students preparing to enter for the degree of bachelor of science are recommended to offer one unit in drawing.

(*b*) Students preparing to enter for a degree in architecture are recommended to offer one unit in chemistry and one-half unit in each of the following subjects: Freehand drawing, mechanical drawing, wood-working, and forge work.

(*c*) Students preparing to enter the college of technology are recommended to offer one-half unit in freehand drawing and one-half unit in mechanical drawing.

(*d*) Students preparing to enter the medical department are recommended to study especially Avery's or Gage's Physics; Witthaus's Manual of Chemistry; Morris's or Gray's Anatomy; Brubaker's or Kirke's Physiology; or any other standard works on these four subjects.

The study of physics is especially urged on all intending to enter a medical college.

1. English Composition.

Preparation equivalent to the following will be required for admission:

As much as five recitations a week should be devoted to English composition for two years of the high school course, or the equivalent may be attained through giving two hours a week for two years, and three hours a week for two years more. The greater part of this time should be devoted to practice in writing. Close attention should be given to spelling, sentence structure, and division into paragraphs. The candidate will be required to show a good knowledge of the principles of English grammar and the fundamental principles of

[a] Beginning October 1, 1910, elementary algebra will count for but 1½ units.

[b] Beginning October 1, 1910, solid geometry will be required of all students seeking admission to the university.

rhetoric, and an ability to think consecutively and express himself clearly on simple subjects. (Two units.)

2. ENGLISH LITERATURE.

As much as three hours a week for one year and two hours a week for one year more should be devoted to the study of English literature. (One unit.)

This requirement would be doubled for 2 units.

No candidate will be accepted whose work is notably deficient in point of spelling, sentence structure, or division into paragraphs. A good knowledge of the principles of English grammar will be exacted. The candidate will be required to present evidence of a good knowledge of the subject-matter of the books named below as "To be read" and of the lives of the authors. The test will be the writing of short exercises on two topics chosen by the candidate from a large number set in the examination. The treatment of these topics is designed to test the candidate's power of clear and accurate expression, and will call for an accurate knowledge of the substance of the books.

The candidate is urgently advised to cultivate the habit of clear, simple, easy expression. As a means to this end, it is suggested that he train himself by writing frequent short exercises upon themes drawn from striking descriptive and narrative portions of the books named as "To be read." In these exercises the details of correct grammar, spelling, sentence structure, punctuation, and paragraphing should receive close attention.

The books under "Study and practice" will be for more thorough examination as to subject-matter, form, and structure.

No candidate markedly deficient in English will be admitted to any course in the university.

For 1908—

Study and practice: Shakespeare's Julius Cæsar; Milton's L'Allegro, Il Penseroso, Comus, and Lycidas; Burke's Speech on Conciliation with America; Macaulay's Essays on Addison and Life of Johnson, and Essay on Milton.

To be read: Addison's De Coverley Papers; Coleridge's Ancient Mariner; George Eliot's Silas Marner; Irving's Life of Goldsmith; Lowell's Vision of Sir Launfal; Scott's Ivanhoe and Lady of the Lake; Shakespeare's Merchant of Venice and Macbeth; Tennyson's Princess, Gareth and Lynette, Lancelot and Elaine, and the Passing of Arthur; Goldsmith's Vicar of Wakefield.

3. ELEMENTARY ALGEBRA.

The candidate should possess a thorough knowledge of all the fundamental processes of algebra from simple addition through quadratic equations of one or more unknown quantities, as found in a text of the grade of Hall and Knight's College Algebra. He must be able to factor any ordinary product; to find the greatest common divisor or the least common multiple; to solve simple or simultaneous equations of the first degree, especially those involving fractions; to extract the square or cube root; to solve any quadratic by completing the square, as well as by other methods; to solve the type equations in simultaneous quadratics; to handle fractional and negative exponents, and to interpret their meaning; to solve equations involving such exponents or involving radicals. He must know how to solve problems from the statement of the conditions. He must be able to do this work with ease and accuracy and must show the familiarity of constant and abundant practice. Beginning October 1, 1910, elementary algebra will include, in addition to the above, ratio and proportion, the progressions, and the binomial theorem, and will count 1½ units, instead of 2 units. (Two units.)

4. PLANE GEOMETRY.

The requirements in this cover not only the whole of the text of plane geometry, but also a sufficient number of original problems to enable the student to solve such problems readily and accurately. (One unit.)

5. SOLID GEOMETRY.

The relation of lines and planes; the properties of prisms, pyramids, cylinders, and cones; the sphere and the spherical triangle, with original exercises in all these subjects. (One-half unit.)

6. TRIGONOMETRY.

This includes the theory and use of logarithms; the proof of the general formulæ of plane trigonometry, and the use of these formulæ in original problems, especially in the numerical solution of triangles. (One-half unit.)

7. LATIN.

All candidates for admission should present a statement from their former teacher of the amount of Latin read and the text-books used.

a. Elementary.—Grammar, inflections, and the essentials of syntax; Cæsar's Gallic War, Books I–IV, or an equivalent; Latin prose composition. The preparation should include an accurate knowledge of the forms of the language; the ability to pronounce Latin with proper attention to the quantity of the syllables; the ability to translate easy Latin prose into good, idiomatic English; the ability to turn simple English sentences into Latin. (Two units.)

b. Intermediate.—In addition to the requirement under *a*, the candidate for admission should have had continued training in Latin forms and syntax; he should have read six orations of Cicero, or an equivalent, with at least one exercise each week in turning into Latin connected English of simple style, and some training in translating easy Latin at sight. (One unit.)

c. Advanced.—Continued training in Latin forms and syntax; at least six books of Vergil's Aeneid, or an equivalent. It should include a knowledge of the rules of prosody and ability to read hexameters metrically; also a review of prose syntax through systematic work in Latin writing. (One unit.)

8. GREEK.

a. Elementary.—Grammar, phonetics, inflections, formation of words, and the essentials of syntax; Xenophon's Anabasis, I–IV, or an equivalent; Greek prose composition, once a week in connection with the reading of the text. The candidate for admission should be able to read Greek aloud without stumbling and to translate simple, easy prose at sight.

Text-books suggested:

Ball, Elements of Greek, or Benner-Smyth, Beginner's Greek Book.
Hadley-Allen or Goodwin, Greek Grammar.
Goodwin-White or Smith, Xenophon's Anabasis.
Jones or Gleason or Collar-Daniell, Greek Prose Composition.

(Two units.)

b. Advanced.—Homer, Iliad, I–III, or an equivalent; advanced prose composition. The candidate must show a thorough acquaintance with the forms and syntax of Homeric Greek, and must be able to read metrically, with accurate

attention to quantities and rhythm, any given passage of Homer. He should have, in addition to the requirements under *a*, at least one exercise each week in turning English into Greek. (One unit.)

9–10. FRENCH AND SPANISH.

a. Elementary.—The elementary study of the languages, covering two years of daily recitations, should lay stress on the following points: (1) An accurate knowledge of the forms of the language, including the inflections, conjugations, and principal parts of verbs. Particular attention should be devoted to this part of the subject; constant drill in the verbal inflections, both written and oral, and dictation exercises are recommended. (2) The elements of syntax, such as the use of the article, the personal pronouns, the subjunctive, the partitive construction, and the agreement of the participle. (3) The ability to turn easy English prose into French or Spanish. (4) The ability to translate ordinary French or Spanish into idiomatic English. (5) The ability to pronounce French or Spanish correctly.

The reading in the elementary course should cover not less than 400 duodecimo pages chosen from the works of at least three different authors. (Two units.)

One-half the stipulated amount of Spanish may be offered for 1 unit.

b. Advanced.—The advanced requirements are intended to represent a third year of daily recitations. The specific demands are: (1) A thorough knowledge of modern French syntax. (2) The ability to turn modern French at sight into idiomatic English. (3) The ability to translate connected English prose into French. (4) The ability to write French from dictation.

The reading in the advanced course should cover not less than 400 pages of prose and verse, a portion to be in the dramatic form. (One unit.)

11. GERMAN.

The requirements in German are essentially those recommended by the committee on college entrance requirements of the National Educational Association.

All candidates should present a statement from their former teacher of the amount of German read and the text-books used.

a. Elementary.—The ability to translate easy German prose and verse at sight; an accurate knowledge of the principles of grammar, embracing especially inflections, word order, syntax, the composition of words, and the force of prefixes and suffixes; the ability to translate easy prose from English into German; the ability to pronounce German and to recognize German words and simple sentences when spoken. Careful attention should be given to the rules for pronunciation and accentuation, to insure the fluent and intelligent reading of the German texts used in the class room. This preparation would be represented, approximately, in reading, by material of the character of Thomas and Hervey's Reader, and the careful study of one or more modern dramas (about 200 duodecimo pages of easy German), supplemented by the reading of German poems, lyrics as well as ballads, a number of which should be memorized; *in Composition*, by the first 26 exercises in Harris's German Prose Composition, or an equal amount of work based on texts read in class. These exercises, the original work done by the student, followed by the corrected work approved by the teacher, should be written in ink and preserved for inspection. (Two units.)

b. Advanced. The ability to translate ordinary German prose and verse at sight; a thorough knowledge of word-formation, derivatives, and the relation

of the English and German consonantal changes; advanced German syntax, with special reference to the uses of the tenses and cases, the modal auxiliaries, and the moods; the ability to translate into German easy connected English prose.

It is believed that this preparation can be acquired by the careful reading of 500 duodecimo pages of classical and contemporary prose and verse, in addition to the reading required for Elementary German. It is recommended that one half of this reading be selected from the following classics: Lessing's Minna von Barnhelm, Goethe's Egmont or Götz von Berlichingen, Schiller's Wilhelm Tell or Jungfrau von Orleans; the other half from more recent writers, such as Grillparzer, Freytag, Keller, Storm, etc. It is further recommended that particular attention be paid to the literary value of the works read. For the preparation in translation from English into German the first 50 pages on Von Jagemann's or Poll's German Prose Composition, or its equivalent, is recommended. This work should be preserved in the manner suggested under Elementary German. It is desirable that candidates should acquire the ability to follow a recitation conducted in German, and to answer in simple German sentences.

(One unit.)

12–15. HISTORY.

While text-book knowledge is valuable, candidates for credit in entrance history must submit evidence of a certain amount of work done outside the text-books. They must have received training in map drawing and in the investigation of topics requiring supplementary reading. They must show a considerable knowledge of the supplementary reading given below, with analysis of specified chapters.

The evidence of such work may be presented in the form of a notebook, containing the exercises of the student in any one of the four history subjects, or in the form of a detailed statement made by his teacher.

12. ANCIENT HISTORY.

Text-books: The Oriental Nations—West, Ancient History, 1–75; or Myers, General History, 1–86, or an equivalent. Greece—Myers, History of Greece; or Botsford, History of Greece, or an equivalent; Rome—Myers, Rome; or West, Ancient History; or Botsford, Rome, or an equivalent.

For supplementary reading: Munro, Source Book of Roman History; Cox, General History of Greece (Student's Series); Pelham, Outlines of Roman History; Abbott, Roman Political Institutions; Ginn & Co., Classical Atlas.

(One unit.)

13. MEDIÆVAL AND MODERN HISTORY.

Text-books: Myers, Mediæval and Modern History; or Robinson, History of Western Europe, or an equivalent.

For supplementary reading and reference: Robinson, Readings in European History; West, Modern History; Adams, Civilization during the Middle Ages; Fyffe, History of Modern Europe (popular edition); University of Pennsylvania, Translations and Reprints; Putzger, Historischer Schul-Atlas.

(One unit.)

14. ENGLISH HISTORY.

Text-books: Andrews, History of England; Coman and Kendall, History of England; or Ransom, Advanced History of England, or an equivalent.

For supplementary reading: Green, Short History of the English People; Traill, Social England; Adams and Stephens, Select Documents of English

Constitutional History; Kendall, Source Book of English History; Lee, Source Book of English History; University of Pennsylvania, Translations and Reprints; Gardiner, School Atlas of England. (One unit.)

15. AMERICAN HISTORY.

Text-books: Chambers, History of the United States; or Montgomery, American History, or an equivalent; and Hart, Actual Government; or Ashley, American Federal Government, or an equivalent.

For supplementary reading and reference: "Epochs of American History" series; Hart, American History told by Contemporaries; MacDonald, Select Charters, Select Documents, and Select Statutes; McCoun, Historical Geography of the United States. (One unit.)

16. PHYSICS.

An elementary course covering the whole range of the subject, and occupying at least five hours a week for one year, one-third to two-fifths of the time being devoted to laboratory work, mostly quantitative, by the student. The instruction should include abundant qualitative lecture room experiments, and should devote special attention to the illustrations of physical principles to be found in every-day life. The scope of the work required is about that indicated by the text-book of Carhart and Chute, that of Millikan and Gale, or that of Mann and Twiss, together with at least thirty-five or forty laboratory experiments similar to those of the Laboratory Course of Millikan and Gale, or the National Physics Course. A properly certified notebook containing the records of these experiments must be submitted. (One unit.)

17. CHEMISTRY.

The applicant for admission offering chemistry as one unit should have mastered the elementary principles of inorganic chemistry and learned the chemical characteristics of a few of the common metals and nonmetals. He should be able to express his thoughts clearly and to understand and employ chemical symbols and equations.

If the high school course has been fully illustrated by means of lecture experiments, it is not absolutely necessary that the applicant himself should have worked in a laboratory, though this is, of course, greatly to be desired. In the latter case, unless coming from an approved school, he should submit a properly certified laboratory notebook on work covering not less than three-fourths of the list of experiments recommended by the "Committee of Ten." (One unit.)

18. BIOLOGY (BOTANY AND ZOOLOGY).

One year's work divided between botany and zoology, according to the scheme presented under 19 (botany) and 20 (zoology).

Text-books suggested: Leavitt, Outlines of Botany, and Chapin and Rettger, Zoology. (One unit.)

19. BOTANY.

Structure and classification of the flowering and higher orders of the non-flowering plants. A working knowledge of the compound microscope.

Text-book suggested: Bergen, Elements of Botany. (One unit.)

20. Zoology.

A thorough knowledge of animal life in general, such as may be obtained by out-door observations of the habits of wild and domestic animals under the guidance and supervision of a competent instructor.

As a text-book: Davenport, Introduction to Zoology; Alvin Davison, Practical Zoology, or an equivalent. (One unit.)

21. Physiology.

The structure and functions of the human body. Text-books suggested: Martin, The Human Body (briefer edition, fifth revised edition); Lincoln, Hygienic Physiology, or Smith, The Human Body and its Health.

Candidates for entrance who have taken only the work in elementary physiology and hygiene done in the grammar or intermediate grades are not prepared to offer the subject for entrance credit. The elementary physiology and hygiene of the grammar grades in this regard are in the same category as are the other subjects studied in the grammar grades, such as arithmetic and geography, which are assumed as preliminary to the subjects offered for entrance. (One unit.)

22. Physiography.

The equivalent to Davis, Physical Geography, with a laboratory and field course of exercises actually performed by the candidate. The original note-book, certified by the teacher and recording, with dates, the steps and results of the observations made by the candidate, should be submitted as evidence of the nature of the work. (One unit.)

23. Freehand Drawing.

a. College of Technology.

The ability to sketch with neatness and accuracy, and to dimension and letter properly is expected of a candidate for admission to the College of Technology.

The course should have included practice in free-hand drawing of straight lines, curves, and balanced geometrical figures. Simple objects and machine parts should be drawn and dimensioned. Special attention should be given to lettering and to the arrangement of the various views of an object.

Samples of work, duly certified by his teacher, should be presented by the candidate. As an examination the candidate may be called upon to make a simple drawing embodying the points mentioned above.

b. College of Arts and Sciences.

The candidate for entrance to the scientific course should prove ability to draw with some shading from usual plaster cast of ornament or from the object, the ability to draw from simple objects in perspective, and the ability to mix and apply water colors in plant drawing. (One unit.)

24. Mechanical Drawing.

The candidate is expected to have acquired neatness and accuracy in the use of drawing instruments. His course should have included practice in line work, lettering and dimensioning simple mechanical drawing, and tracing.

He should present for inspection as much of his work as possible, duly certified by his teacher. As an examination the candidate may be called upon to make a simple working drawing of some specified object. (One-half unit.)

25. WOODWORKING.

The ability to recognize the common varieties of wood and some knowledge of their physical properties, such as ease of working, strength, toughness, hardness; etc., is expected. Candidates must have a thorough knowledge of and skill in the use of all bench tools used in the construction of the various joints and fastenings, proficiency in the use of wood-turning tools, and skill in the construction and finishing of patterns and core boxes. They should be familiar with the operation of the lathe, band and circular saws, and planing machines.

(One-half unit.)

26. FOUNDRY WORK.

The candidate must have a comprehensive knowledge of and experience in general foundry practice, embracing the making of molds and cores, the care of the cupola in the melting of metals, and the pouring and mixing of metals.

(One-half unit.)

27. FORGE WORK.

This demands an elementary knowledge of the properties of wrought iron and steel and of the proper heats at which to work them. The management of forge and fire and the nature and uses of all the ordinary blacksmithing tools should be known. The candidate must be proficient in the operations of drawing out, upsetting, bending, and twisting of metal into simple designs, the art of welding, and the proper treatment of steel in the forging and tempering of tools.

(One-half unit.)

28. MACHINE-TOOL PRACTICE.

To obtain a credit of one unit in machine-tool practice a student must have acquired the arts of chipping, filing, and scraping, also experience in laying out work and the manipulation of the lathe, planer, and scraper, and the ability to produce machine work of a simple character.

Technique is considered of prime importance in the above requirements.

(One unit.)

---

(4) UNIVERSITY OF PENNSYLVANIA.[a]

ADMISSION TO COLLEGE.

Candidates for admission to the freshman class in the college may satisfy the scholastic requirements for admission either: (1) By passing the entrance examinations; or (2) by being able to show by the *record of their work in school* that they have covered these requirements in a manner satisfactory to the committee on admission.

Every candidate for admission is also required to furnish a testimonial of honorable dismissal from the school or college which he last attended, or from the tutor with whom he has studied. He must also refer to two persons, preferably his teachers or employers, from whom information may be obtained. Testimonials and references must be sent to the dean not later than the first day of the entrance examinations in June and September (June 18 and September 17, respectively, in 1908).

[a] From the University of Pennsylvania Catalogue, 1907–8, pp. 69–90.

I. Admission by Examination.

Candidates may attend either the examinations conducted by the university in Philadelphia or the examinations of the College Entrance Examination Board (referred to below by the initials C. E. E. B.). The university conducts entrance examinations in Philadelphia in January, June, and September. The time schedules of these examinations for 1908 are given on pages 70–72.

Candidates for admission to the college wishing to be examined away from Philadelphia will take the examinations conducted by the C. E. E. B. Information concerning the time and place of these examinations may be had from the Secretary of the Board, P. O. Substation 84, New York City.

Preliminary examinations.—Candidates may present themselves at any of the regular examinations held not more than two years and four months in advance of their admission to college for examination in any portion of the subjects required for admission to the course they propose to enter. *Every candidate for such preliminary examinations must present to the dean of the college a certificate of preparation from the principal of his school, or from his tutor, naming the subjects in which he is prepared, before he can be admitted to the examination. When a candidate, however, has been in regular attendance at a school or academy during the year preceding his application for admission to preliminary examination, a certificate from a private tutor will not in itself be sufficient.*

Blanks for this purpose may be obtained upon application to the dean.

A candidate who presents himself for preliminary examinations in June may not present himself at the entrance examinations in the September following with the view of taking examinations in addition to those stated in the preliminary certificate received from his school in June. This rule, however, is not to be construed as forbidding a candidate for admission in any year from dividing his examinations between June and September of that year, if he so desires.

II. Admission Upon School Record.

Under the following regulations candidates may receive credit without examination for the entrance requirements in whole or in part. A statement of the candidate's school record, certified by the principal of the school, is required to be sent to the dean of the college. This statement must give full information regarding each subject which the candidate has studied in school, in the manner called for on the blank provided for this purpose, together with the marks or grades which he has received in each subject during at least the last two years. This statement of school record is referred by the dean to a committee of the college faculty, which decides for each candidate for what subjects, if any, the candidate will receive credit.

To secure consideration of his school record a candidate must have completed a regular course of study (*i. e.*, not a special or partial course) in the school which he last attended, he must have attended that school for *at least one year*, he must have completed his course there not more than one year prior to the date of his application for admission to college, and the school must be one with regard to whose standing the university is satisfied. Subjects which have been studied *privately*, outside of the regular school curriculum, even if under the direction of members of the school staff, will not be considered as forming part of the school record.

The fact that candidates from a given school may have previously been admitted on their records does not establish any right to which a candidate may

appeal for the acceptance of his own record. The case of each individual is decided absolutely on its own merits.

All applications for admission upon school record should be in the hands of the dean as early as possible in June, for decision in the spring; should this, for good reasons, be impossible, then not later than September 1. *Principals of schools will appreciate the importance of sending in the applications of candidates at as early a date as possible, when they understand that until their credentials are acted upon, and the decision announced, candidates will not know in what subjects they will be required to take examinations.*

The candidate must not fail to appear at the September examinations if he has not been informed of the decision in his case before the date when the examinations begin. For this date consult the university calendar.

Schools with the results of whose work in preparing students for college the university is not familiar, must notify the dean before May 1 in any year if they wish to have students apply for admission in that year on their school record.

REQUIREMENTS FOR ADMISSION TO EACH COURSE.

ARTS AND SCIENCE.

Each candidate must offer subjects amounting to 23 points, as determined by counting up the point values attached to the subjects in the following lists:

LIST OF SUBJECTS WHICH MAY BE OFFERED IN 1908 AND THEREAFTER FOR ADMISSION TO THE COURSE IN ARTS AND SCIENCE.

N. B.—The designations and definitions of these requirements are identical with those of the college entrance examination board.

I.

Each candidate must offer English A, B, two branchese of history, and mathematics A, C, amounting altogether to 10 points.

	Points.
English:	
A—Reading and practice	2
B—Study and practice	2
History:	
A—Ancient history	1
B—Mediæval and modern history	1
C—English history	1
D—American history and civil government	1
Mathematics:	
A—Elementary algebra	2
C—Plane geometry	2

II.

Each candidate must offer two of the four languages contained in this group, and he must offer as much of the two selected as is stated here.

	Points.
Latin:	
B—Cæsar, Gallic War, books I–IV	1
C—Cicero, Six Orations	2
D—Virgil, Æneid, books I–VI	2
L—Prose composition	1
M—Sight translation of prose	1

	Points.
Greek:	
B—Xenophon, Anabasis, books I–IV	2
C—Homer, Iliad, books I–IV	2
F—Prose composition	1
G—Sight translation of prose	1
French:	
A—Elementary French	3
German:	
A—Elementary German	3

Candidates who do not offer Latin and Greek in (II) which make, with the 10 points contained in (I), the required number of 23 points, must make up the required number of points by offering additional subjects. These may be selected from subjects in (I) and (II) which have not been offered otherwise, and from list (III) given below. If a candidate offer Latin or Greek as a third language, he must offer at least three points in that language.

III.

	Points.
French B—Intermediate French	2
German B—Intermediate German	2
Spanish	2
Mathematics B—Higher algebra	1
Mathematics D—Solid geometry	1
Mathematics F—Plane trigonometry	1
Physics B	2
Chemistry	2
Botany	2
Zoology	2

COLLEGE COURSES FOR TEACHERS.

The requirements are the same as for the course in arts and science.

FINANCE AND COMMERCE (THE WHARTON SCHOOL).

Candidates must offer all the subjects contained in list I, and two languages as in list II, or they may substitute for one of the languages Mathematics D, E, and Physics A (see pp. 49 and 50).

BIOLOGY.

Candidates must offer all the subjects contained in list I, and two languages as in list II.

COURSE IN MUSIC.

(See under "Admission to special and partial courses.")

ARCHITECTURE.

Candidates must offer all the subjects contained in list I, French A or German A (see pp. 47–48), Mathematics D, and Physics A (pp. 49 and 50).

N. B.—It is *strongly recommended* that candidates for admission to the course in Architecture offer *French* rather than German.

CHEMISTRY, CHEMICAL ENGINEERING, CIVIL ENGINEERING, ELECTRICAL ENGINEERING, AND MECHANICAL ENGINEERING.

Candidates for any of these courses must offer all of the subjects contained in list I, French A or German A (see pp. 47 and 48), Mathematics D, E, and Physics A (see pp. 49 and 50).

DESCRIPTION OF THE DIFFERENT SUBJECTS IN WHICH ADMISSION EXAMINATIONS ARE HELD.

I.

SUBJECTS REQUIRED OF ALL CANDIDATES.

ENGLISH.

No candidate will be accepted in English whose work is notably defective in spelling, punctuation, idiom, or division into paragraphs.

A. (1) Grammar and analysis, as in any advanced course in English grammar, analysis, and composition; (2) the writing of several paragraphs, correct in spelling, punctuation, grammar, and expression, written on subjects taken from the following works, a general knowledge of which is required:

For 1908: Shakespeare's Macbeth and The Merchant of Venice; the Sir Roger de Coverley Papers in The Spectator; Irving's Life of Goldsmith; Coleridge's Ancient Mariner; Scott's Ivanhoe and The Lady of the Lake; Tennyson's Gareth and Lynette, Lancelot and Elaine and The Passing of Arthur; Lowell's Vision of Sir Launfal; George Eliot's Silas Marner.

In 1909, 1910, and 1911 the student will be given some choice in the reading for A (2). The form of examination will be the writing of a paragraph or two on each of several topics chosen by the candidate from a considerable number—perhaps 10 or 15—set before him in the examination paper. The treatment of these topics is designed to test the candidate's power of clear and accurate expression, and will call for only a general knowledge of the substance of the books.

The list for 1909, 1910, 1911, follows:

Group I (two to be selected).

Shakespeare's As You Like It, Henry V, Julius Cæsar, The Merchant of Venice, Twelfth Night.

Group II (one to be selected).

Bacon's Essays; Bunyan's The Pilgrim's Progress, Part I; the Sir Roger de Coverley Papers in The Spectator; Franklin's Autobiography.

Group III (one to be selected).

Chaucer's Prologue; Spenser's Faerie Queene (selections); Pope's The Rape of the Lock; Goldsmith's The Deserted Village; Palgrave's Golden Treasury (first series), Books II and III, with especial attention to Dryden, Collins, Gray, Cowper, and Burns.

Group IV (two to be selected).

Goldsmith's The Vicar of Wakefield; Scott's Ivanhoe; Scott's Quentin Durward; Hawthorne's The House of the Seven Gables; Thackeray's Henry Esmond; Mrs. Gaskell's Cranford; Dickens's A Tale of Two Cities; George Eliot's Silas Marner; Blackmore's Lorna Doone.

Group V (two to be selected).

Irving's Sketch Book; Lamb's Essays of Elia; De Quincey's Joan of Arc and The English Mail Coach; Carlyle's Heroes and Hero Worship; Emerson's Essays; Ruskin's Sesame and Lilies.

Group VI (two to be selected).

Coleridge's The Ancient Mariner; Scott's The Lady of the Lake; Byron's Mazeppa and The Prisoner of Chillon; Palgrave's Golden Treasury (first series), Book IV, with especial attention to Wordsworth, Keats, and Shelley; Macaulay's Lays of Ancient Rome; Poe's Poems; Lowell's The Vision of Sir Launfal; Arnold's Sohrab and Rustum; Longfellow's The Courtship of Miles Standish; Tennyson's Gareth and Lynette, Lancelot and Elaine, and The Passing of Arthur; Browning's Cavalier Tunes, The Lost Leader, How They Brought the Good News from Ghent to Aix, Evelyn Hope, Home Thoughts from Abroad, Home Thoughts from the Sea, Incident of the French Camp, The Boy and the Angel, One Word More, Hervé Riel, Pheidippides.

B. A *special* knowledge of the subject-matter, form, and structure of the following works:

For 1908: Shakespeare's Julius Cæsar; Milton's Lycidas, Comus, L'Allegro, and Il Penseroso; Burke's Speech on Conciliation with America; Macaulay's Essays on Addison and Life of Johnson.

For 1909, 1910, 1911: Shakespeare's Macbeth; Milton's Lycidas, Comus, L'Allegro and Il Penseroso; Burke's Speech on Conciliation with America or Washington's Farewell Address and Webster's First Bunker Hill Oration; Macaulay's Life of Johnson, or Carlyle's Essay on Burns.

Candidates who pass the examinations of the C. E. E. B. in English A and B will be given credit for English A and B.

History.

Each candidate is examined in two of the four subjects, A, B, C, D.

Outline maps will be furnished for the questions in historical geography which will form a part of each paper.

Extra credit will be given for student notebooks giving abstracts of collateral reading, notes of lectures, or digests of the text-book used. Such books should be certified by the candidate's teacher.

A. Ancient history, with special reference to Greek and Roman history, and including also a short introductory study of the more ancient nations and the chief events of the early Middle Ages, down to the death of Charlemagne (814).

B. Mediæval and modern European history, from the death of Charlemagne to the present time.

C. English history, with due reference to social and political development.

D. American history. The questions will be upon the four following topics:

1. Historical geography. Questions are to be answered by drawing on an outline map certain geographical boundaries.

2. The colonial period.

3. The Revolutionary period.

4. The constitutional period. Under this topic will be a few questions on civil government.

Candidates who pass the examinations of the C. E. E. B. in history A, B, C, D will be given credit for the corresponding subjects above, viz: History A, B, C, D, respectively.

Mathematics.

A. Elementary Algebra.

(1) *Algebra to quadratics.*—The four fundamental operations for rational algebraic expression. Factoring, determination of highest common factor and lowest common multiple by factoring. Fractions, including complex fractions.

ratio and proportion. Linear equations, both numerical and literal, containing one or more unknown quantities. Problems depending on linear equations. Radicals, including the extraction of the square root of polynomials and of numbers. Exponents, including the fractional and negative.

(*ii*) *Quadratics and beyond.*—Quadratic equations, both numerical and literal. Simple cases of equations with one or more unknown quantities, that can be solved by the methods of linear or quadratic equations. Problems depending on quadratic equations. The binomial theorem for positive integral exponents. The formulas for the *n*th term and the sum of the terms of arithmetical and geometric progressions, with applications.

C. PLANE GEOMETRY.

The usual theorems and constructions of good text-books, including the general properties of plane rectilinear figures; the circle, and the measurement of angles; similar polygons; areas, regular polygons, and the measurement of the circle. The solution of numerous original exercises, including loci problems. Applications to the mensuration of lines and plane surfaces.

Candidates who pass the examinations of the C. E. E. B. in mathematics A (*i*), A (*ii*), and C will be given corresponding credit.

II.

ANCIENT AND FOREIGN LANGUAGES (IN PART).

GREEK.

NOTE.—Questions on inflection, derivation, composition of words, and on syntax will be asked under B and C.

B. *Xenophon.*—The first four books of the Anabasis.

C. *Homer.*—The first three books of the Iliad (omitting II. 484–end).

F. *Prose composition.*—Continuous prose based upon Xenophon and other Attic prose of similar difficulty.

G. *Sight translation of prose* of no greater difficulty than Xenophon's Anabasis.

Candidates who pass the examinations of the C. E. E. B. in Greek B, C, F, G will be given corresponding credit.

LATIN.

NOTE.—Questions will be asked under B, C, and D on the inflection, derivation, and composition of words, on syntax, and on geography, history, and mythology.

B. *Cæsar.*—Four books on the Gallic war, preferably the first four.

C. *Cicero, Six Orations.*—The order of preference is indicated in the following list: The four against Catiline, those of Archias, the Manilian law, Marcellus, Sextus Roscius, Milo, Sestius, Ligarius, and the fourteenth Philippic.

D. *Virgil.*—The first six books of the Æneid, with the scanning of the dactylic hexameter.

M. *Translation at sight.*—Prose of no greater difficulty than the easier passages in Cicero's Orations.

L. *Prose composition.*—The translation into Latin of continuous English prose based upon passages of moderate difficulty in Cæsar or Cicero.

Candidates who pass the examinations of the C. E. E. B. in Latin B, C, D, L, M will be given corresponding credit.

FRENCH.

A. ELEMENTARY FRENCH.

Preparation for this examination should comprise: (1) Careful drill in pronunciation; (2) the rudiments of grammar, including the inflection of the regular and the more common irregular verbs, the plural nouns, the inflection of adjectives, participles, and pronouns; the use of personal pronouns, common adverbs, prepositions, and conjunctions; the order of words in the sentence, and the elementary rules of syntax; (3) abundant easy exercises, designed not only to fix in the memory the forms and principles of grammar, but also to cultivate readiness in the reproduction of natural forms of expression; (4) the reading of from 100 to 175 duodecimo pages of graduated texts, with constant practice in translating into French easy variations of the sentences read (the teacher giving the English), and in reproducing from memory sentences previously read; (5) writing French from dictation.

During the second year the work should comprise: (1) The reading of from 250 to 400 pages of easy modern prose in the form of stories, plays, or historical or biographical sketches; (2) constant practice, as in the previous year, in translating into French easy variations upon the texts read; (3) frequent abstracts, sometimes oral and sometimes written, of portions of the text already read; (4) writing French from dictation; (5) continued drill upon the rudiments of grammar, with constant application in the construction of sentences; (6) mastery of the forms and use of pronouns, pronominal adjectives, of all but the rare irregular verb forms, and of the simpler uses of the conditional and subjunctive.

Suitable texts for the second year are: About's Le roi des montagnes, Bruno's Le tour de la France, Daudet's easier short tales, La Bédollière's Le Mère Michel et son chat, Erckmann-Chatrian's stories, Fos's Contes biographiques and Le petit Robinson de Paris; Foncin's Le pays de France, Labiche and Martin's La poudre aux yeux and Le voyage de M. Perrichon, Legouvé and Labiche's La cigale chez les fourmis, Malot's Sans famille, Mairet's La tâche du petit Pierre, Mérimée's Colomba, extracts from Michelet, Sarcey's Le siège de Paris, Verne's stories.

Candidates who pass the examinations of the C. E. E. B. in French A will be given corresponding credit.

GERMAN.

A. ELEMENTARY GERMAN.

The preparation for this examination should comprise: (1) Careful drill upon pronunciation; (2) the memorizing and frequent repetition of easy colloquial sentences; (3) drill upon the rudiments of grammar, that is, upon the inflection of the articles, of such nouns as belong to the language of everyday life, of adjectives, pronouns, weak verbs, and the more usual strong verbs; also upon the use of the more common prepositions, the simpler uses of the modal auxiliaries, and the elementary rules of syntax and word order; (4) abundant easy exercises designed not only to fix in mind the forms and principles of grammar, but also to cultivate readiness in the reproduction of natural forms of expression; (5) the reading of from 75 to 100 pages of graduated texts from a reader, with constant practice in translating into German easy variations upon sentences selected from the reading lesson (the teacher giving the English), and in the reproduction from memory of sentences previously read.

During the second year the work should comprise: (1) The reading of from 150 to 200 pages of literature in the form of easy stories and plays; (2)

accompanying practice, as before, in the translation into German of easy variations upon the matter read and also in the offhand reproduction, sometimes orally and sometimes in writing, of the substance of short and easy selected passages; (3) continued drill upon the rudiments of the grammar, directed to the ends of enabling the pupil, first, to use his knowledge with facility in the formation of sentences, and, secondly, to state his knowledge correctly in the technical language of grammar.

The following reading recommended in the report of the Committee of Twelve will furnish matter from which selections may be made by the teacher: Andersen's Märchen and Bilderbuch ohne Bilder; Arnold's Fritz auf Ferien; Baumbach's Die Nonna und Der Schwiegersohn; Gerstäcker's Germelshausen; Heyse's L'Arrabbiata, Das Mädchen von Treppi, and Anfang und Ende; Hillern's Höher als die Kirche; Jensen's Die braune Erica; Leander's Träumereien, and Kleine Geschichten; Seidel's Märchen; Stökl's Unter dem Christbaum; Storm's Immensee and Geschichten aus der Tonne; Zschokke's Der zerbrochene Krug; Hauff's Das kalte Herz. Among shorter plays the best available are perhaps Benedix's Der Prozess, Der Weiberfeind, and Günstige Vorzeichen; Elz's Er ist nicht eifersüchtig; Wichert's An der Majorsecke; Wilhelmi's Einer muss heiraten.

Candidates who pass the examinations of the C. E. E. B. in German A will be given corresponding credit.

III.

FOREIGN LANGUAGES, ADVANCED MATHEMATICS, AND SCIENCE.

FRENCH.

B. INTERMEDIATE FRENCH.[a]

Preparation for this examination should comprise the reading of from 400 to 600 pages of French of ordinary difficulty, a portion to be in the dramatic form; constant practice in giving French paraphrases, abstracts, or reproductions from memory of selected portions of the matter read; the study of a grammar of modern completeness; writing from dictation.

Suitable texts are: About's stories, Augier and Sandeau's Le gendre de M. Poirier, Béranger's poems, Corneille's Le Cid and Horace, Coppée's poems, Daudet's La Belle-Nivernaise, La Brète's Mon oncle et mon curé, Madame de Sévigné's letters, Hugo's Hernani and La chute, Labiche's plays, Loti's Pêcheur d'Islande, Mignet's historical writings, Molière's L'avare and Le bourgeois gentilhomme, Racine's Athalie, Andromaque and Esther, George Sand's plays and stories, Sandeau's Mademoiselle de la Seiglière, Scribe's plays, Thierry's Récits des temps mérovingiens, Thiers's L'expédition de Bonaparte en Egypte, Vigny's La canne de jonc, Voltaire's historical writings.

GERMAN.

B. INTERMEDIATE GERMAN.[b]

The preparation for this examination should comprise, in addition to the elementary course, the reading of about 400 pages of moderately difficult prose and poetry, with constant practice in giving, sometimes orally and sometimes in writing, paraphrases, abstracts, or reproductions from memory of selected portions of the matter read; also grammatical drill upon the less usual strong

[a] For the requirement in elementary French (French A) see p. 47.
[b] For the requirement in elementary German (German A) see p. 47.

verbs, the use of articles, cases, auxiliaries of all kinds, tenses and modes (with special reference to the infinitive and subjective), and likewise upon word order and word formation.

The intermediate course is supposed to be the elementary course, plus one year's work at the rate of not less than four recitations a week. Suitable reading matter for the third year can be selected from such works as the following: Freytag's Die Journalisten and Bilder aus der deutschen Vergangenheit—for example, Karl der Grosze, Aus der Kreuzzügen, Doktor Luther.

Spanish.

The preparation for this examination should comprise: (1) Careful drill in pronunciation; (2) the rudiments of grammar, including the conjugation of the regular and the more common irregular verbs, the inflection of nouns, adjectives, and pronouns, and the elementary rules of syntax; (3) exercises containing illustrations of the principles of grammar; (4) the reading and accurate rendering into good English of from 100 to 175 duodecimo pages of graduated texts, with translation into Spanish of easy variations of the sentences read; (5) writing Spanish from dictation.

During the second year the work should comprise: (1) The reading of from 250 to 400 pages of modern prose from different authors; (2) practice in translating Spanish into English, and English variations of the text into Spanish; (3) continued study of the elements of grammar and syntax; (4) mastery of all but the rare irregular verb forms and of the simpler uses of the modes and tenses; (5) writing Spanish from dictation; (6) memorizing of easy short poems.

Suitable texts for the second year are: Valera's El Pájaro verde; Alarcón's El final de Norma; Valdés's José; Galdós's Doña Perfecta, Marianela.

Mathematics.

B. ADVANCED ALGEBRA.

Permutations and combinations, limited to simple cases. Complex members, with graphical representation of sums and differences. Determinants, chiefly of the second, third, and fourth orders, including the use of minors and the solution of linear equations. Numerical equations of higher degree, and as much of the theory of equations, with graphical methods, as is necessary for their treatment, including Descartes' rule of signs and Horner's method, but not Sturm's functions or multiple roots.

D. SOLID GEOMETRY.

The usual theorems and constructions of good text-books, including the relations of planes and lines in space; the properties and measurement of prisms, pyramids, cylinders, and cones; the sphere and the spherical triangle. The solution of numerous original exercises, including loci problems. Applications to the mensuration of surfaces and solids.

E. RUDIMENTS OF PLANE TRIGONOMETRY.

Including the definitions and relations of the six trigonometrical functions as ratios; proof of elementary formulas; theory and practice of the use of tables of logarithms; solution of right and oblique plane triangles.

NOTE.—Mathematics E is exclusively for candidates for admission to the courses in engineering, chemistry, and finance and commerce who offer trigonometry. Candidates for admission to the course in arts and science who offer trigonometry as an entrance requirement, or who offer this subject for advance credit will take mathematics F.

F. PLANE TRIGONOMETRY.

Definitions and relations of the six trigonometric functions as ratios; circular measurement of angles. Proofs of principal formulas; in particular for the sine, cosine, and tangent of the sum and the difference of two angles, of the double angle and the half angle, the product expressions for the sum or the difference of two sines or of two cosines, etc.; the transformation of trigonometric expressions by means of these formulas. Solution of trigonometric equations of a simple character. Theory and use of logarithms (without the introduction of work involving infinite series). The solution of right and oblique triangles, and practical applications.

SCIENCE.

PHYSICS A.

As in Carhart and Chute's, or Gage's Elements of Physics.

Although at present no laboratory work is included in the requirement in physics A, yet a notebook, properly certified in accordance with the regulations of the College Entrance Examination Board, will be given due consideration.

NOTE.—Physics A is exclusively for candidates for admission to the courses in engineering, chemistry, architecture, and finance and commerce who offer physics. Candidates for admission to the course in arts and science who offer physics as an entrance requirement will take physics B.

PHYSICS B.

It is recommended that the candidate's preparation in physics should include:

(*a*) Individual laboratory work, comprising at least 35 exercises selected from a list of 60 or more, not very different from the list given below.

(*b*) Instruction by lecture-table demonstrations, to be used mainly as a basis for questioning upon the general principles involved in the pupil's laboratory investigations.

(*c*) The study of at least one standard text-book, supplemented by the use of many and varied numerical problems, "to the end that a pupil may gain a comprehensive and connected view of the most important facts and laws in elementary physics."

FIRST PART.

Mechanics and hydrostatics:

1. Weight of unit volume of a substance.
2. Lifting effect of water upon a body entirely immersed in it.
3. Specific gravity of a solid body that will sink in water.
4. Specific gravity of a block of wood by use of a sinker.
5. Weight of water displaced by a floating body.
6. Specific gravity by flotation method.
7. Specific gravity of a liquid; two methods.
8. The straight lever; first class.
9. Center of gravity and weight of a lever.
10. Levers of the second and third classes.
11. Force exerted at the fulcrum of a lever.
12. Errors of a spring balance.
13. Parallelogram of forces.
14. Friction between solid bodies (on a level).
15. Coefficient of friction (by sliding on incline).

Light:

16. Use of photometer.
17. Images in a plane mirror.
18. Images formed by a convex cylindrical mirror.
19. Images formed by a concave cylindrical mirror.
20. Index of refraction of glass.
21. Index of refraction of water.
22. Focal length of a converging lens.
23. Conjugate foci of a lens.
24. Shape and size of a real image formed by a lens.
25. Virtual image formed by a lens.

SECOND PART.

Mechanics:

26. Breaking strength of a wire.
27. Comparison of wires in breaking tests.
28. Elasticity: Stretching.
29. Elasticity: Bending; effect of varying loads.
30. Elasticity: Bending: effect of varying dimensions.
31. Elasticity: Twisting.
32. Specific gravity of a liquid by balancing columns.
33. Compressibility of air; Boyle's law.
34. Density of air.
35. Four forces at right angles in one plane.
36. Comparison of masses by acceleration test.
37. Action and reaction: Elastic collision.
38. Elastic collision continued: Inelastic collision.

Heat:

39. Testing a mercury thermometer.
40. Linear expansion of a solid.
41. Increase of pressure of a gas heated at constant volume.
42. Increase of volume of a gas heated at constant pressure.
43. Specific heat of a solid.
44. Latent heat of melting.
45. Determination of the dew point.
46. Latent heat of vaporization.

Sound:

47. Velocity of sound.
48. Wave length of sound.
49. Number of vibrations of a tuning fork.

Electricity and magnetism:

50. Lines of force near a bar magnet.
51. Study of a single-fluid galvanic cell.
52. Study of a two-fluid galvanic cell.
53. Lines of force about a galvanoscope.
54. Resistance of wires by substitution; various lengths.
55. Resistance of wires by substitution; cross-sections and multiple arc.
56. Resistance of Wheatstone's bridge; specific resistance of copper.
57. Temperature coefficient of resistance in copper.
58. Battery resistance.
59. Putting together the parts of a telegraph key and sounder.
60. Putting together the parts of a small motor.
61. Putting together the parts of a small dynamo.

LABORATORY NOTEBOOK.

Every candidate must present at the time of and as part of the examination in physics a notebook containing in the candidate's own language a description of his laboratory exercises, the steps, observations, and results of each exercise being carefully recorded. The record should be well-ordered, plainly legible, and concise. Simple drawings are the briefest and best descriptions of most apparatus. Mere repetitions of directions or descriptions given elsewhere should be avoided, but the notebook must afford clear evidence of the pupil's ability to make accurate observations and to draw correct conclusions.

The notebook must contain an index of experiments, and must bear the indorsement of the teacher, such indorsement being written in ink on the inside of the cover. The indorsement must be in effect as follows:

> I certify that this notebook is a true and original record of experiments actually performed by ------ in the physical laboratory of ------ school during the year 190--.
>
> ------ ------,
> *Instructor in Physics.*

The ratio of counts for laboratory notebook and for examination shall be as 30 to 70.

The laboratory notebook will be returned to the candidate upon request at any time within one year after the examination. Laboratory notebooks will not in general be preserved longer than one year.

CHEMISTRY.

The following outline includes only the indispensable things which must be studied in the class room and laboratory. The material is, for the most part, common to all elementary text-books and laboratory manuals. Each book makes its own selection of facts beyond those which may be necessary for the illustration of the principles of the science. The order of presentation will naturally be determined by the teacher.

OUTLINE.

The chief physical and chemical characteristics, the preparation and the recognition of the following elements and their chief compounds: *Oxygen*, *hydrogen*, *carbon*, *nitrogen*, *chlorine*, *bromine*, *iodine*, *fluorine*, *sulphur*, phosphorus, silicon, potassium, *sodium*, calcium, magnesium, *zinc*, copper, mercury, silver, aluminum, *lead*, tin, *iron*, manganese, chromium.

More detailed study should be confined to the italicized ELEMENTS (as such) and to a restricted list of compounds such as water, hydrochloric acid, carbon monoxid, carbon dioxid, nitric acid, ammonia, sulphur dioxid, sulphuric acid, hydrogen sulphide, sodium hydroxid.

Attention should be given to the atmosphere (constitution and relation to animal and vegetable life), flames, acids, bases, salts, oxidation and reduction, crystallization, manufacturing processes, familiar substances (illuminating gas, explosives, baking powder, mortar, glass, metallurgy, steel, common alloys, porcelain, soap).

Combining proportions by weight and volume; calculations founded on these and Boyle's and Charles's laws; symbols and nomenclature (with careful avoidance of special stress, since these are nonessentials); atomic theory, atomic weights and valency in a very elementary way; nascent state; natural grouping of the elements; solution (solvents and solubility of gases, liquids, and solids, saturation); ionization; mass action and equilibrium; strength (activity) of acids and bases; conservation and dissipation of energy; chemical energy

(very elementary); electrolysis. Chemical terms should be defined and explained, and the pupil should be able to illustrate and apply the ideas they embody. The theoretical topics are not intended to form separate subjects of study, but should be taught only so far as is necessary for the correlation and explanation of the experimental facts.

The facts should be given as examples from various classes, and not as isolated things. Thus, to speak of a "standard method of preparing hydrogen," whereby the action of zinc on hydrochloric acid is meant, shows narrow and infertile teaching. It should be shown that all acids are acted upon by certain classes of metals to produce hydrogen. Examples of both classes of metals should be given and the general principles derived. The reason for using zinc and hydrochloric acid in the laboratory can then be stated.

It is recommended that the candidate's preparation in chemistry should include:

(*a*) Individual laboratory work, comprising at least 40 exercises selected from a list of 60 or more, not very different from the list given below.

(*b*) Instruction by lecture-table demonstrations, to be used mainly as a basis for questioning upon the general principles involved in the pupil's laboratory investigations.

(*c*) The study of at least one standard text-book, to the end that the pupil may gain a comprehensive and connected view of the most important facts and laws of elementary chemistry.

LIST OF EXPERIMENTS.

General:

1. Composition of the atmosphere.
2. Dissociation of mercuric oxide, and study of resulting products.
3. Burning of magnesium, sodium, and potassium in air, and of iron in oxygen, with study of resulting products.
4. Combination of substances produced in (3) with water, and study of results.
5. Burning of sulphur and phosphorus in air; study of products.
6. Combination of substances produced in (5) with water; study of products.
7. Treatment of substances resulting from (3) and (4) with hydrochloric acid, and examination of final products.

Laws of gas volumes and vapor tension:

8. Boyle's law.
9. Charles's law.
10. Vapor tension as related to temperature.

Common elements and compounds:

11. Preparations and study of oxygen.
12. Weight of a liter of oxygen under standard conditions.
13. Preparation of hydrogen by action of sodium on water. Careful study of by-product.
14. Preparation of hydrogen by zinc and acid. More thorough study of hydrogen in larger quantities. Study of by-product.
15. Weight of a liter of hydrogen under standard conditions. (Optional for best students.)
16. Proportion by weight in which hydrogen and oxygen unite. (Lecture demonstration with eudiometer.)
17. Proportion by weight in which hydrogen and oxygen combine.
18. Study of boiling point, freezing point, action on litmus, and taste of substance produced by combining oxygen and hydrogen.

Common elements and compounds—Continued.

19. Electrolysis of water, resulting gases being accurately measured and tested.
20. Vapor density of water, conclusion as to formula for water. (Optional for best pupils.)
21. Study of sodium, potassium, lithium, strontium, calcium, and barium compounds. Detection of presence of these metals by flame tests, and by spectroscope.
22. Study of salts of cobalt, copper, nickel, manganese, chromium, iron. Tests for these metals and those mentioned in 21 in unknown mixtures.
23. Study of compounds of aluminum, magnesium, and zinc. Tests for these in mixtures of 21 and 22.
24. Tests for silver, lead, and bismuth in unknown mixtures of 21, 22, and 23.
25. Tests for mercury and arsenic in unknown mixtures of 21, 22, 23, and 24.
26. Preparation and study of chlorine gas.
27. Weight of a liter of chlorine.
28. Combustion of chlorine in hydrogen.
29. Preparation of hydrochloric acid and study of properties.
30. Decomposition of hydrochloric acid gas by sodium amalgam, and conclusions as to percentage composition. Avogadro's law.
31. Preparation and study of at least three chlorides.
32. Preparation and study of bromine.
33. Preparation of at least three bromides.
34. Preparation and study of iodine.
35. Preparation of at least three iodides.
36. Comparative study of the chemism of chlorine, bromine, and iodine by mutual displacement.
37. Study of hydrofluoric acid and fluorides.
38. Determination of the combination proportion of chlorine and zinc and the atomic weight of zinc.
39. Atomic weight of zinc from specific heat. Law of Dulong and Petit.
40. Atomic weight of silver by displacement of zinc.
41. Study of forms of sulphur.
42. Direct formation of sulphides.
43. Study of sulphurous oxide.
44. Preparation of sulphurous and sulphuric acids.
45. Preparation of at least two sulphites and two corresponding sulphates. Comparative study of these.
46. Decomposition of ammonium nitrate and study of nitrous oxide.
47. To determine the composition of nitrous oxide. Gay-Lussac's law.
48. Preparation and study of nitric acid.
49. Preparation of three nitrates in three different ways.
50. Composition of gas formed by action of cold dilute nitric acid on copper.
51. Composition of gas formed by union of nitric oxide and oxygen.
52. Preparation of chromic anhydride, chromic acid, and potassium chromate.
53. Changing potassium chromate to potassium bichromate and back again. Oxidation and reduction in solutions.
54. Chromium as an acid-forming and as a base-forming element. Preparation of chromium sulphate.
55. Preparation of ferrous and ferric salts.

Carbon and some carbon compounds:

56. Product of burning charcoal. Tests.
57. Test for presence of carbon in wood, paper, kerosene, coal gas, alcohol.
58. Preparation of three carbonates.
59. Solubility of carbonates in the presence of carbon dioxide.
60. Effect of heat on suspension of carbonates in solution.
61. Carbon dioxide from fermentation.
62. Alcohol from fermentation.
63. Preparation of ether by alcohol and sulphuric acid.
64. Preparation of alkaline salts of fatty acids, or soap making.

LABORATORY NOTEBOOK.

Every candidate must present at the time of and as part of the examination in chemistry a notebook containing, in the candidate's own language, a description of his laboratory exercises, the steps, observations, and results of each exercise being carefully recorded. The record should be well ordered, plainly legible, and concise. Simple drawings are the briefest and best descriptions of most apparatus. Mere repetitions of directions or descriptions given elsewhere should be avoided, but the notebook must afford clear evidence of the pupil's ability to make accurate observations and to draw correct conclusions.

The notebook must contain an index of experiments, and must bear the indorsement of the teacher, such indorsement being written in ink on the inside of the cover. The indorsement must be in effect as follows:

I certify that this notebook is a true and original record of experiments actually performed by ------ in the chemical laboratory of ------ school during the year 19--.

------ ------,
Instructor in Charge.

The ratio of counts for laboratory notebook and for examination shall be as 30 to 70.

The laboratory notebook will be returned to the candidate upon request at any time within one year after the examination. Laboratory notebooks will not in general be preserved longer than one year.

Botany.

Lecture and laboratory study extending over at least five hours per week for a year, conducted under definite instruction aided by text-book study. The scope of the work to be estimated in part by notebooks, with outline drawings included. The studies should comprise the structure of the cell, the formation of tissue, the general morphology, physiology, and ecology of the seed, seedling, and mature plant in the higher types. The broad principles governing plant classification should be thoroughly understood, and selected types similar to those recommended by the college entrance examination board in botany should be studied alike with text-book and laboratory aid. The lecture and laboratory work should be supplemented in all cases by studies made in the garden and the field. For more detailed information reference should be made to the detailed outline of study recommended by the college entrance examination board.

Zoology.

Preparation in this subject presupposes a full year's course of five hours per week, not less than two-thirds of the time being devoted to laboratory work guided by definite directions. This should be supplemented by the study of some good elementary text-book, such as Parker and Parker, Practical Zoology, or Linville and Kelly, General Zoology.

The scope of the course should be similar to that outlined in the text-books named. Each student should keep a laboratory notebook in which to enter from day to day a record of the laboratory work done; this record should consist of carefully labeled outline drawings of the chief structures studied, and accurate notes of all observations, experiments, or demonstrations which can not be recorded by drawings. This notebook, properly certified by the teacher, must be submitted by the applicant for admission. The requirements here outlined are essentially the same as those specified by the college entrance examination board for the subject of zoology, to which reference should be made for a more detailed description.

ADMISSION TO ADVANCED STANDING.

(1) Students who present themselves for admission to advanced standing, will be required: (*a*) To satisfy the requirements for admission to the freshman class; and (*b*) to take examinations in those subjects in the course for which the applicant desires to receive advance credit.

At its option, the committee on admission to advanced standing may accept, in the case of students who come from other colleges, the work done at such colleges in any subject or subjects in lieu of examination, provided a statement is submitted, properly certified by the authorities of such colleges, stating in detail the extent and character of the work done and the grades attained.

(2) Every applicant for admission to advanced standing who comes from another college must present a letter of honorable dismissal from such college. Applicants who do not come from other colleges must conform in this regard to the regulations governing admission to the freshman class.

(3) A graduate of another college of sufficient standing may be admitted without examination to the senior class as a regular student, provided: (*a*) That his previous course has been such that in the judgment of the committee on admission to advanced standing he will be able to complete in one year the work required for the bachelor's degree, in the course which he proposes to enter; and (*b*) that the professors in charge of the subjects which he proposes to take find that he has had the requisite preparation.

(4) No student may be admitted as a candidate for a degree after the beginning of the senior year.

ADMISSION TO SPECIAL AND PARTIAL COURSES.

Every applicant for admission as a special or partial student is required to fill out a blank containing such questions as may seem necessary to determine his general educational fitness, the reasonableness of his application, and the propriety of entertaining it. An application for admission to a special or partial course must be accompanied by certificates covering the prescribed requirements and must be received in time to have these certificates verified and approved before the beginning of the course for which application is made. The committee on admission to special and partial courses may make supplementary inquiries of former teachers of the applicant, and of others to whom it may be referred.

In the case of special courses for which technical requirements are prescribed, or partial courses involving subjects requiring technical preparation, the head of the department concerned decides whether these requirements are satisfied. His decision on this point is final.

The committee, with this additional evidence, accepts or rejects the application, or makes the admission of the candidate conditional on his passing such entrance examinations as it may see fit to prescribe.

The requirements for admission to the several authorized special courses are as follows:

Special Course in Architecture.

Candidates for admission to the two-year special course in architecture must be at least 21 years of age (unless graduates of public high schools), and must have spent two years at work in the office of a practical architect, or must have had such other technical training as may, in the judgment of the professor of architecture, be considered an equivalent.

They must further pass examinations in Mathematics A (*i*), C and D, and in freehand and instrumental drawing. Those who desire to take the optional work in mechanics of materials are required to pass entrance examinations also in Mathematics E.

Candidates who do not at the time of admission satisfy fully the requirements in Mathematics A (*i*), C and D, and in freehand drawing, must postpone work for which these are directly preparatory until a subsequent examination is passed.

Special Course in Biology.

The candidate must be at least 18 years of age, and must satisfy the requirements for admission to the regular course, except in Latin, when only B and C or D are required. (For admission to the regular course in biology see p. 43.)

Special Course in Business Practice and Banking.

A two-year special course is offered in business practice and banking.

A candidate must fulfill one of the following requirements:

1. If he be 21 years of age or over, the admitting committee will require him to satisfy the professors in charge that he is qualified to take the work.

2. If he be under 21 years of age he must have graduated from a public high school which has a course of at least three years in length and he must have had two years of business experience of a grade satisfactory to the professors in charge.

---

(5) COLUMBIA UNIVERSITY.

ENTRANCE EXAMINATIONS.

GENERAL STATEMENT.

There are no examinations for admission to the schools of law, political science, philosophy, pure science, and fine arts (courses leading to degrees), or to teachers' college. For the requirements for admission to these departments see the separate announcements of the schools and faculties concerned.

Examinations for admission to Columbia College, Barnard College, the College of Physicians and Surgeons, the College of Pharmacy (university course), the Schools of Applied Science, and the Schools of Fine Arts (courses leading to certificates) are held each year in January, June, and September.

In June the examinations are those of the College Entrance Examination Board, of which Columbia University is a member. The university accepts the

numerical ratings of the board, but fixes a uniform passing mark for the several colleges and schools.

In January and September the examinations will be held only at the university. The board *at present* holds examinations only in June.

While all persons taking the January examinations will receive due credit for the results of the examinations, students may be admitted, at the beginning of the second half year, only to Columbia College and Barnard College.

All correspondence with the College Entrance Examination Board, all requests for its publications, etc., should be addressed to its "Secretary, Post-Office Substation 84, New York, N. Y."

All correspondence with the university should be addressed to the secretary of the university.

Examination Fee.

Every application for examination in June must be accompanied by a fee of $5 for all candidates examined at points in the United States and Canada, and $15 for all candidates examined at points outside of the United States and Canada.

Every application for examination in January or September must be accompanied either by a fee of $5, by a receipt from the Bursar for an examination fee previously paid, or by the receipt issued by the secretary of the College Entrance Examination Board for the June examinations immediately preceding. *The latter will be accepted in either September or January, but not in both; and a single fee paid to the university will cover only two consecutive series of examinations, namely, January and September or September and January.*

If a late application is accepted, either by the College Entrance Examination Board or by the university, a second fee of $5 must be paid.

The examination-fee receipt should be carefully preserved. It must be presented by the candidate to the supervisor in charge of the examinations which he attends as evidence that he is entitled to be admitted to the same. No candidate will be admitted to the January or September examinations upon the receipt of the board, unless that receipt bears the certification of the registrar of Columbia University that the candidate's application has been filed.

Division of Examination.

A candidate may present himself at any of the scheduled series of examinations, subject to the following restrictions:

(1) He may not present himself at more than four series of examinations except by special consent of the committee on admissions of the school which he purposes to enter.

(2) At the first and second series credit will be given only for such subjects or lettered (or numbered) parts of a subject as are approved by his principal instructor.

(3) The results of an examination shall stand to his credit for twenty-eight months, but no longer.

Places of Examination.

In June, 1908, entrance examinations will be held at a large number of widely distributed points, a list of which will be published by the board about March 1. Requests for examinations at particular points should reach the secretary of the board not later than February 1.

In January and September, 1908, examinations will be held only at the university.

Examination Subjects.

Columbia University recognizes the following examination subjects, which may be offered for admission to one or more of the colleges and schools included in the university, each subject counting for a specific number of points as indicated below:

English	3	Musical appreciation	1
Elementary French	2	Musical performance [a]	2
Elementary German	2	Physiography	1
Elementary Greek	3	Shopwork [a]	1
Elementary history	2	Zoology	1
Elementary Italian [a]	2	Intermediate French	1
Elementary Latin	4	Intermediate German	1
Elementary mathematics	3	Advanced English [a]	1
Elementary physics	1	Advanced Greek [a]	1
Elementary Spanish	2	Advanced history [a]	1
Botany	1	Advanced Latin [a]	1
Chemistry	1	Advanced mathematics	1
Drawing	1	Advanced physics [a]	1
Harmony	1		

The combinations of subjects for admission to the several colleges and schools are indicated in the pages devoted to each college or school, under the heading "Admission."

Submission of Notebooks, Drawings, etc.

All work submitted must be duly certified to in ink by the teacher in the following form:

I certify that this is a true and original record of work actually performed by_____ while in attendance at_____ during the year 19____

*Instructor in*_____

Drawings should bear a similar certification, or in case of work not done under instruction should be accompanied by the candidate's own signed declaration.

All notebooks unless otherwise specified should be submitted at the time for examination. Candidates desiring their return should apply for the June examinations to the secretary of the college entrance examination board; for the September and January examinations, to the secretary of the university.

English exercise books, submitted in lieu of examination, advanced English essays, or advanced history and advanced physics notebooks, should be sent to the secretary of the university at least two weeks before the examinations begin. Within ten days the candidate will be informed whether or not the work submitted has been accepted. English exercise books will not be returned to the writers.

Definitions of Requirements.[b]

(Specimens of the question papers set by Columbia University may be obtained from the secretary upon application. The question papers set by the

[a] Candidates will be examined in this subject only in January and September.

[b] The several subjects are stated in terms of units; the unit is a course of five periods weekly throughout an academic year of the preparatory school; the subjects are assigned units in accordance with the time required to prepare adequately upon them for college entrance.

college entrance examination board are published annually in book form by Ginn & Co., Boston, Mass.)

The following abridged statements are intended merely to indicate the general scope of the requirements. The official definition of each requirement is printed in full in the bulletin of entrance examinations, and any person who intends to take the examinations himself or to prepare others for them, should procure this bulletin. The current edition of the bulletin and specimen question papers may be obtained from the secretary of Columbia University upon application.

Botany [a] (one point).—(1) Structure and life history of 16 or more types of representative families of plants, 10 of them seed plants; (2) elementary plant physiology; (3) elementary natural history (ecology of plants). Requiring one year of laboratory and class-room instruction for the course.

Chemistry [a] (one point).—Preparation and properties of the common elements and their important compounds.

Mastery of the more usual chemical terms and ability to make simple calculations and explanations of chemical processes. Preparation should include lectures and demonstrations, study of standard elementary text-books, and 40 or more laboratory exercises.

Drawing [a] (one point).—The ability to sketch free-hand with reasonable accuracy—(*a*) From dictation, simple geometrical figures; (*b*) from the object, a vase, household utensil, or other familiar object; (*c*) from the copy, enlarging or reducing simple pieces of machinery or architectural or decorative detail. (At least 20 free-hand drawings must be submitted.)

English (three points).—(*a*) Reading and practice (this part of the test may be fulfilled in whole or in part by an exercise book; see p. 59). A test of training in English composition. A list of the books prescribed for reading appears in the bulletin. (*b*) Study and practice. The subject-matter, form and structure of certain specified works, and incidentally English grammar and English literary history. Prescribed for 1908: Julius Cæsar; Lycidas; Comus; L'Allegro and Il Penseroso; Burke on Conciliation; Macaulay's Addison and Life of Johnson. (For succeeding years see bulletin.)

English, advanced (one point).—The equivalent of English A1–A2. (1) English composition, presupposing the elements of rhetoric; (2) general history of English literature, and selected works (a list of which may be obtained from the secretary of the university). Ten essays of at least 500 words each must also be submitted. (See p. 59.)

French, elementary (two points).—Accurate pronunciation and the ability to read at sight easy prose and to put into French simple English sentences. The rudiments of the grammar, involving all but the rare irregular verb forms and the simpler uses of conditional and subjunctive. The preparation should include, beside the mastery of a good elementary text-book, the reading of 300–600 pages of easy French.

French, intermediate (one point).—Additional reading, 400–600 pages, including dramatic works. Grammar completed. Further drill in composition.

German, elementary (two points).—Accurate pronunciation and the ability to read easy dialogue and narrative prose, and a working knowledge of grammar and composition adequate for the putting into German of simple English sentences based upon a familiar vocabulary. The preparation should include, beside the mastery of a good elementary text-book, the reading of 150–200 pages of easy German.

[a] A certified and indexed notebook must be submitted. (See p. 59.)

German, intermediate (one point).—Additional reading, 400 pages of moderately difficult prose and poetry. Further drill in grammar and composition, with special reference to syntax.

Greek, elementary (three points).—(*a*) 1 and 2. Attic grammar and elementary composition, based on Anabasis I–II; (*b*) Anabasis I–IV; (*c*) Iliad I–III (except II 494–end) with tests concerning constructions, poetic forms, and prosody; (*f*) translation into Greek of simple continuous English prose; (*g*) translation into English at sight of continuous Greek prose.

Greek, advanced (one point).—The equivalent of Greek 3–4 (see p. 93): At least 1,600 additional lines in Homer and eight orations of Lysias. Also at least 20 exercises in writing connected narrative Greek prose.

History, elementary (two points, i. e., a and b, or c and d, or (for applied science) one point, i. e., a or b or c or d).—Either: (*a*) Ancient, beginning with brief study of oriental peoples and coming down to the death of Charlemagne, with reference to art, literature, and government; (*b*) from 800 on including growth of the state system; (*c*) English history, including social and political developments; (*d*) American history with the elements of civil government.

Each field may best be covered by an accurate text-book of 300 pages plus, say, 300 pages of selected supplementary reading.

History, advanced (one point).[a]—(To be taken in the group not offered for elementary history.) Equivalent to history A1–A2. Supplementary reading emphasizing the significance of historical phenomena. The candidate must present at least 5,000 words of notes on each historical field offered, and show practice in making historical parallels, in preparing digests of outside reading, and in the use of historical maps.

Italian, elementary (two points).—The requirement corresponds to that in elementary French. (See p. 60.)

Latin, elementary (four points), i. e., a, c, d, l, and m, or two points, i. e., a and either c or d, or (except for Columbia College and Barnard College, and Schools of Music and Design—courses leading to a certificate in music or design) b. (*a*) i and ii—elementary grammar and prose composition; (*b*) any four books of Cæsar's Gallic War, preferably I–IV; (*c*) Cicero, any six orations, preferably the four orations against Catiline, Archias, and the Manilian Law; (*d*) Virgil, the Æneid I–VI, with incidental prosody; (*l*) translation into Latin of simple continuous English prose; (*m*) translation into English at sight of continuous Latin prose.

Latin, advanced (one point).—Equivalent to Latin A1–A2. Horace, Odes Books I and III, with incidental prosody, and Livy, Book XXI, and chapters 41–53, Book XXII. Twenty exercises from Part I of Gildersleeve and Lodge's Prose Composition.

Mathematics, elementary (three points).—(*a*) Elementary algebra, including i—the four fundamental operations for rational expressions, and such topics as lowest common multiple, ratio and proportion, linear equations, radicals, fractional and negative exponents; ii—quadratic equations, arithmetic and geometric progressions, the binomial theorem for positive integral exponents, the use of graphical methods; (*b*) plane geometry—original exercises, loci, mensuration of lines and plane surfaces.

Mathematics, advanced (one point).—(*d*) Solid geometry, original exercises, loci problems, mensuration of surfaces and solids; (*e*) trigonometry, the principal formulas, simple equations and triangles, theory and use of logarithms (without infinite series).

[a] A certified notebook must be submitted. (See p. 59.)

Music. NOTE.—A candidate for admission to Columbia College may offer either a or b. A candidate for admission to the School of Music (courses leading to a certificate in music) may offer either a or b or both—with or without the addition of musical performance.

(*a*) Musical appreciation (not involving ability to perform nor to read from printed music) (one point).—(1) The principal musical forms and their historical development; (2) the lives and environment of Bach, Mozart, Beethoven, Schubert, and Chopin, and five other composers; (3) familiarity with certain compositions designated in Bulletin.

(*b*) Harmony (one point).—The elements of simple harmonization.

(*c*) Musical performance (two points).—The candidate should communicate with the School of Music regarding this requirement.

Physics (one point).[a]—The most important facts and laws in elementary physics. Preparation should include the mastery of a standard text-book supplemented by numerical problems, instruction by lecture with demonstrations and individual laboratory exercises—say mechanics, 13; sound, 3; heat, 5; light, 6; electricity, 8.

Physics, advanced (one point).[a]—Equivalent to physics 3–4. Requires 30 additional and more advanced experiments.

Physiography (one point).[a b]—Preparation includes modern text-books and at least 40 individual laboratory and field exercises—say, earth as a globe, 5; ocean, 5; atmosphere, 12; land, 18.

Shopwork (one point).—Involving in each subject 180 laboratory hours, examination, both written and practical, on the use and structure of tools, nature of shop processes, methods of construction, and properties of materials. Authenticated models may be presented as evidence of technical skill.

The candidate may offer either: (*a*) Woodwork—i. joinery; ii. turning and patternmaking; (*b*) forging; or (*c*) machine work.

Spanish, elementary (two points).—The requirement corresponds to that in elementary French (see p. 60).

Zoology (one point).[a]—Laboratory and field study, supplemented by text-book and further reading: (1) General natural history of common American animal types; (2) classification of animals into phyla and leading classes; (3) structure of typical animals—say, frog or fish, decapod, earthworm, hydra, protozoon; (4) physiology of the types studied and comparison of life-processes of animals and plants; (5 and 6) (in a very elementary way) reproduction, embryology and (optional) elements of cytology; (7) optional biological history.

SCHOOL OF APPLIED SCIENCE.

The faculty of applied science has charge of the following schools:

The School of Mines, with four-year courses leading to the degrees of engineer of mines and metallurgical engineer.

The schools of engineering, with four-year courses in civil engineering, electrical engineering, and mechanical engineering, the first two leading to the degree of civil engineer, and the others to the degree of electrical engineer and mechanical engineer, respectively.

[a] A certified and indexed notebook must be submitted. (See p. 50.)

[b] This corresponds to the subject called geography by the College Entrance Examination Board.

The School of Chemistry, with four-year courses leading to the degrees of chemist and chemical engineer.

These courses are intended to meet the requirements of the several professions indicated. Many of the courses permit a certain amount of specialization, particularly in the fourth year.

ADMISSION.

The committee on admissions of the schools of mines, engineering, and chemistry has charge of all matters relating to this subject. Candidates for admission to the first-year class should be at least 18 years of age at the time of matriculation.

COLLEGIATE PREPARATION RECOMMENDED.

The liberal training offered by the preliminary collegiate course is quite as important to engineers, metallurgists, and chemists as to lawyers, physicians, or clergymen, and is strongly recommended by the faculty of applied science. This, however, does not and should not involve a residence of eight years in college and technical school before a candidate receives the professional degree.

A graduate of any good college who has selected his course with reference to future work in applied science is able to complete the requirements for a degree in the schools of mines, engineering, and chemistry in less than four years after receiving the bachelor's degree. The opportunities for close articulation between Columbia College and these schools are particularly good.

REQUIREMENTS FOR ADMISSION FOR STUDENTS WITHOUT COLLEGIATE PREPARATION.

Every candidate must offer at the entrance examinations (see below) subjects amounting to 15 points. A point represents a course of five periods a week for one year in the secondary school.

The candidate *must* offer:	Counting in points.
Chemistry	1
Drawing	1
Elementary French *or* Elementary German	2
English	3
Mathematics	4
Physics	1

and three points from the following, subject to the restriction that to offer an advanced subject will involve offering either at the same time or earlier the corresponding elementary subject:

	Points.
Elementary German *or* Elementary French — *see above*	2
Elementary Spanish	2
Elementary Latin	2
Intermediate French	1
Intermediate German	1
Ancient history	1
Modern and mediæval history	1
American history	1
English history	1
Botany	1
Physiography	1

Zoology 1
Shopwork 1
Advanced physics 1

All candidates for degrees of engineer of mines, metallurgical and chemical engineer, or chemist, are recommended to offer elementary and intermediate German.

Admission to Advanced Standing.

Candidates for admission from other universities or colleges, and those desiring to be admitted to advanced standing on examination, should make application as early as possible in writing to the chairman of the committee on admission of the schools of mines, engineering, and chemistry.

The application should be accompanied by:

1. A catalogue of the institution for work in which credit is desired. The courses which the candidate has completed must be distinctly marked in this catalogue.
2. Properly certified official statements of his standing in the subjects which he offers.
3. Letters or other evidence vouching for his character and honorable dismissal from the institution from which he comes.

Each candidate for a degree seeking admission to advanced standing must show that he has attained proficiency in the equivalents of:

1. The requirements for admission to the first year class.
2. All the prescribed studies already pursued by the class to which he seeks admission.

A candidate may be admitted notwithstanding deficiencies in some of these studies, but no candidate will be recommended for a professional degree until he shall have completed all the studies required for that degree.

No applicant will be allowed to enter the fourth-year class as a candidate for a degree after October 15 in any year.

The committee on admission will notify the candidate by mail at the address[a] given in his letter what courses, of those offered, are accepted as equivalent to courses at Columbia University. The committee gives credit for complete courses only. In cases where the work previously done by the candidates has not been accepted by the committee, the candidate may present himself for examination during the week immediately preceding the opening of the University at the times and places at which the regular fall examinations are held. When no examination is scheduled for the course at this time, the candidate may present himself at the office of the dean, who will arrange for the necessary examination. The schedule of fall examinations is to be obtained from the registrar. A fee of $5 is charged for these examinations to all applicants who do not take them at the regular time.

Admission to Special Courses.

Graduates of the schools of mines, engineering, and chemistry, and of other institutions of equal grade, may pursue any subjects taught in the schools for which they are properly qualified.

Persons of mature age who are not graduates, but who show special qualifications, are sometimes permitted to pursue special courses, but this permission is not given to others.

---

[a] When the candidate is at a considerable distance from the university, his application should be made as early as possible in order that he may receive the reply in time to present himself at the university on September 14, 1908.

COLUMBIA COLLEGE.

ADMISSION.

Candidates are admitted by the committee on admissions under the following regulations:

Except for reasons of weight, candidates for admission to the freshman class must be at least 15 years of age at the time of matriculation and correspondingly older for admission to advanced standing. Each candidate must before admission present a certificate of good moral character from his last teacher or from some citizen of good standing. Students from other colleges or universities must bring certificates of honorable dismission.

All requests for information regarding admission should be addressed to the secretary of the university.

To the Freshman Class.

Every candidate must offer at the entrance examinations (see below) subjects amounting to 15 points. The point here represents the number of years, at the rate of five periods a week, which will normally be required in the secondary school to prepare adequately for the college examination.

The candidate *must* offer—

	Counting in points.
English	3
Elementary mathematics	3
and in the case of candidates for the A. B. degree	
Elementary Latin	4
or, *beginning June, 1908*, in the case of candidates for B. S. degree *either*,	
elementary Latin	4
or Chemistry	1
or Elementary physics	1
or Intermediate or advanced subjects	2

The candidate may offer any of the following subjects without other restriction than that to offer an advanced subject will involve offering either at the same time or earlier the corresponding elementary subject:

Elementary Greek	3
Elementary history	2
Drawing	1
Music	1
Intermediate French	1
Intermediate German	1
Advanced English	1
Advanced Greek	1
Advanced history	1
Advanced Latin	1
Advanced mathematics	1
Advanced physics	1
and in the case of candidates for the B. S. degree	
Elementary Latin (see p. 61)	4 or 2

The candidate may offer not more than 4 points in all from the four subjects following:

Elementary French	2
Elementary German	2
Italian	2
Spanish	2

76049—No. 2—09——5

The candidate may offer not more than 3 points in all from the six subjects following:

Elementary physics	1
Chemistry	1
Botany	1
Physiography	1
Shopwork	1
Zoology	1

Acceptance of Certificates.

Columbia College accepts, in lieu of its entrance examinations, no credentials of any sort except the regents' academic diploma, the regents' collegiate entrance diploma (for details see the Announcement of Columbia College), and the certificates of approved colleges, and these only for the subjects which they specifically cover. Certificates of the preparatory or high-school departments of universities and colleges are not accepted.

Candidates must take the regular entrance examinations in the subjects in which their certificates are not deemed adequate.

All certificates so offered must be received by the college committee on admissions at least one week before the first day of the entrance examinations.

To Advanced Standing.

Candidates for admission to advanced standing upon the basis of certificates from other colleges must fill out the appropriate application blank, to be obtained from the secretary of the university, and file it with the committee on admissions one week before the 1st day of the September or January entrance examinations. Each candidate must also present, at that time, an official transcript of his academic record, together with a marked catalogue of the institution that he leaves.

Candidates for admission to the freshman class offering for entrance more than the required 15 points receive credit for this extra work toward a degree, on a basis to be determined by the committee on admissions; but not more than 18 of the 124 points required for a degree may be made in this way.

To Special Courses.

Special courses are offered to young men of good character, at least 18 years of age, who wish without reference to any degree to make a serious study of any subject or group of subjects. Such men are designated "nonmatriculated students," and are expected to fulfill the requirements for admission to the freshman class. Applications must be made, on blanks to be obtained from the secretary of the university, at least one week before the entrance examinations begin.

Except for reasons of weight no one will be admitted as a special student who, within ten months of the time of his application, has been refused admission, or has failed in his work, as a candidate for a degree.

Persons who wish to pursue merely elementary subjects, such as may be offered for admission, are not received as nonmatriculated students.

Applications from men of maturity who have been several years out of school or college, and have had a valuable educative experience in practical life, will be considered on their merits.

On Probation.

Every freshman admitted conditionally will be held under probation during the first half year of residence. Not later than at the end of this period the dean, on the basis of reports from the head of each department in which the student is registered, will decide whether he shall be admitted to full standing, have his period of probation extended, or be dropped from the roll. The mark C, B, or A, obtained in any subject at the end of the first half year of residence, will be regarded as removing an entrance condition on that subject, unless the condition was incurred in a part of the subject not directly involved in the work of the college course. Any condition not so removed must be satisfied by formal examination.

---

(6) YALE UNIVERSITY.

YALE COLLEGE.

TERMS OF ADMISSION.

Candidates are admitted to the freshman class on passing a satisfactory examination in the subjects listed in detail below, under the following six heads: (i) Latin, (ii) Greek or substitutes for Greek, (iii) French or German, (iv) English, (v) mathematics, (vi) ancient history.

In 1908, and thereafter until further notice, candidates may meet the requirements also by passing with satisfactory grades the equivalent subjects in the examination set by the college entrance examination board and presenting their board certificates for credit. (A candidate may take his preliminary examination with the board and his final in the Yale examination, or *vice versa*. A combination of the Yale examination and the board examination *in June of the same year*, however, is not allowed, and a candidate who offers such a combination will be judged solely by his work in the Yale examination. In no case will board papers be reread by the Yale examiners.) A detailed list of the equivalent subjects in the board examination is given below, immediately after the detailed statement of the subjects of the Yale examination. Board certificates may be sent for exchange to the registrar of Yale College, New Haven, Conn. Credits, both preliminary and final, will be granted in accordance with the regulations which govern the Yale examination; for example, at least five subjects must be satisfactorily passed in order to secure a preliminary certificate. Requests for blank forms of application for admission to the board examination may be sent to the secretary of the college entrance examination board, Substation 84, New York City.

SUBJECTS OF THE YALE EXAMINATION.

I. Latin.

1. Latin grammar and composition. In three parts (which, however, may not be taken separately): (a) Question on forms; (b) Questions on syntax; (c) A connected passage of English prose to be translated into Latin.

The examination in 1908 will be based upon the second, third, and fourth orations of Cicero against Catiline.

2. The translation, at sight, of passages from Cæsar and Nepos.

8. Cicero: The orations against Catiline and for Archias, and, in addition, either the Milo, or the Manilian Law, or the Cato Maior, or both the Marcellus and the 14th Philippic.

4. Virgil: The first six books of the Æneid (including prosody), and, in addition, either the Bucolics or the eighth and ninth books of the Æneid.

NOTES ON ALL THE CLASSICAL PAPERS.

In the examinations in Latin and Greek much weight is given to the papers in grammar and composition (papers 1 and 5). Deficiencies in these subjects render it difficult or impossible to take up and carry on successfully the work in Latin or Greek of freshman year. The questions on forms and syntax call for a good knowledge of all regular inflections and all common irregular forms, and of the ordinary syntax of Cicero and of Xenophon, respectively. The passages for translation into Latin and Greek call further for acquaintance with the ordinary vocabulary of Cicero and of Xenophon, respectively; but the chief object of this part of the examination is to supplement the examination in formal grammar by testing the candidate's *working knowledge* of inflections, syntax, and the most common forms of sentence connection. Teachers are urged to combine exercises in composition, both oral and written, with all the prose reading of the school course. Frequent short exercises in retroversion should have a prominent place among the means of obtaining the needed facility.

On the other classical papers grammatical questions are asked only to test the candidate's understanding of a passage, or on poetic forms and constructions (including prosody) in Virgil and Homer. But good translation, even of prepared passages, requires a practical knowledge of grammatical principles.

The translations of Latin and Greek at sight (paper 2 and parts of papers 6 and 7) are read with especial care, as testing the candidate's ability to get at the author's meaning without help. It is intended to give on the papers the meanings of such words (if there be any) as the candidate can not fairly be expected to know. Exercises in reading at sight should begin early in the school course, and from the outset particular attention should be given to developing the ability to take in the full meaning of each word—and so, gradually, of the whole passage—just as it stands, i. e., in the original order and with full appreciation of the force of each word as it comes, both as to its dictionary meaning and as to its relation to, and force in, its context. The habit of reading in this way should, in fact, be encouraged and cultivated in all the translating that the student has to do. But no translation should be a mere loose paraphrase. The full meaning of the passage to be translated, gathered in the way described above, should be expressed in clear and natural English.

A written examination can not test the ear and tongue, but proper instruction in any language will necessarily include the training of these organs. The school work in Latin and Greek, therefore, should include much reading aloud, writing from dictation, and translating from the teacher's reading. Learning fine passages by heart is also very useful and should be more practiced.

In order to allow the schools freedom in arranging their courses of work, alternative equivalents are provided in the authors set. Thus, the paper on Cicero contains questions on all the orations named in the list above, and in the Virgil paper passages are set from the eighth and ninth books of the Æneid as a substitute for the Bucolics. Papers will be prepared also on other parts of Virgil, on other orations of Cicero, on other portions of the works of Xenophon than the first four books of the Anabasis, and on other books of Homer than the first three of the Iliad and the first four of the Odyssey, provided information be given to the registrar of the college, before May 1 of the calendar year in which the examination is to be taken, that such a paper is desired.

II. Greek or Substitutes for Greek.

GREEK.

5. Greek grammar and composition. In two parts (which, however, may not be taken separately): (*a*) Questions on forms and syntax; (*b*) a passage of simple English prose to be translated into Attic Greek.

The examination in 1908 will be based upon the first three books of Xenophon's Anabasis.

6. Xenophon: four books of the Anabasis. This paper includes also a passage from some work of Xenophon to test the candidate's ability to read easy Greek at sight.

7. Homer: Three books of the Iliad (including prosody). This paper includes also a passage from the poems of Homer to be translated at sight. Four books of the Odyssey may be submitted for three books of the Iliad.

Notes on all the classical papers are given above.

SUBSTITUTES FOR GREEK.

In place of Greek (papers 5–7) the following substitutes are accepted:

A candidate who wishes to omit only Homer must offer two of the three parts of Mathematics A1, described below. It is to be noted that under (3) there is an option between advanced algebra and analytical geometry. A candidate who wishes to omit the entire Greek requirement (papers 5–7, above, *but not Greek history, which is required of all candidates*) must offer both French (*a*) and German (*a*) and, in addition, one of the three following alternatives:

1. Two of the three parts of mathematics A1 and either French (*b*) or German (*b*).
2. French (*b*) and German (*b*).
3. German (*b*) and German (*c*).

The requirements in these substitutes are as follows:

MATHEMATICS A1.

N. B.—A candidate who expects to continue mathematics in college and who offers two of the three parts of mathematics A1 in partial satisfaction of the entrance requirement should offer parts (1) and (2).

(1) Solid geometry: The usual text demonstrations, omitting the theorems on spherical angles and triangles.

(2) Plane trigonometry: Fundamental definitions and properties of the trigonometric functions, with the usual formulæ; application of the same to simple problems of reduction; solution of trigonometric equations; solution of right and oblique triangles by use of natural or logarithmic tables.

(3) Advanced algebra *or* analytical geometry:

Advanced algebra: Properties of quadratic equations, permutations and combinations, principles of logarithms, partial fractions; graphical representation of functions of one variable and approximation to incommensurable roots; simple theorems regarding the relation between the roots of an equation and its coefficients and factors.

Analytical geometry: Plotting of equations in rectangular and polar coordinates; intersection of loci and interpretation of the same; equation of straight line in its various forms and problems involving parallelism and perpendicularity of lines; equations of circle and conic sections in rectangular and polar coordinates; transformation of coordinates and reduction of general equation of second degree to normal forms.

FRENCH.

French (*a*). See under III. French or German, below.

French (*b*). In addition to the elementary requirements, candidates who offer French for advanced standing, or as a partial substitute for Greek at entrance, are expected to possess a thorough knowledge of French grammar and idioms and the ability to translate connected passages from English into French, and to have read the following texts: Hugo's Les Misérables, pp. 1-124 of Super's edition (Heath & Co.); Zola's La Débâcle, pp. 1-155 of Wells's edition (Heath & Co.); Dumas fils's La Question d'Argent; Daudet's Contes, pp. 1-133 of Cameron's edition (Holt & Co.). Equivalents: Balzac's Eugénie Grandet, pp. 1-115 of Bergeron's edition (Holt & Co.) is accepted for Hugo; Sandeau's Mlle. de la Seiglière is accepted for Dumas fils.

Practice in reading French aloud and in writing from dictation is recommended.

[Credit is not given for French (*b*) before French (*a*) is passed.]

GERMAN.

German (*a*). See under III. French or German, below.

German (*b*). The examination is designed to test the proficiency of those who have read, in addition to the amount specified under German (*a*), not less than 350 pages of classical and contemporary prose and verse. It consists of two parts (which, however, may not be taken separately):

(i) The translation at sight of ordinary German.

The suggestions of the report of the committee of twelve as to reading matter for the intermediate course in German should be followed in general. The following selection is recommended: (1) One of Riehl's or Keller's tales; (2) Freytag's Die Journalisten or Lessing's Minna von Barnhelm; (3) Heine's Poems and Prose (such extracts, for example, as are contained in Die Harzreise, Buch Le Grand, and Englische Fragmente in ordinary school editions of Heine's Prose); (4) Goethe's Hermann und Dorothea.

(ii) The translation into German of a connected passage of simple English prose, to test the candidate's familiarity with grammar. Proficiency in grammar may be tested also by direct questions.

In the translation into German, candidates are expected to show a thorough knowedge of accidence, the elements of word-formation, the principal uses of prepositions and conjunctions, and the essentials of syntax, especially the use of the modal auxiliaries and of the subjunctive and infinitive moods.

[Credit is not given for German (*b*) before German (*a*) is passed.]

German (*c*). The examination is designed to test the proficiency of those who have read, in addition to the amounts specified under German (*a*) and German (*b*), about 500 pages of difficult prose and of good literature in prose and verse. (The reading should be done with a view to acquiring facility in reading German for advanced work in other subjects, and to gaining an intelligent general appreciation of the purely literary works read.) The examination consists of two parts (which, however, may not be taken separately):

(i) The translation at sight of difficult German prose (not technical) and verse, whether recent or classical.

The suggestions of the report of the committee of twelve as to reading-matter for the advanced course should be followed in general, though greater stress should be laid upon acquiring facility in translating and understanding German prose, such as would be necessary for advanced work in other branches.

(ii) The translation into German of a connected passage of ordinary English prose, or the writing in German of a short theme upon some assigned topic.

[Credit is not given for German (*c*) before German (*a*) and (*b*) are passed.]

III. French or German.

8. French (*a*) *or* German (*a*). The candidate is at liberty to decide for himself in which of the two languages he shall be examined.

FRENCH.

French (*a*), *Elementary*. Candidates are required to translate simple prose selections from French authors (Kuhns's French Reading and Mérimée's Colomba are suggested), and to show familiarity with the elements of French grammar; that is, with the forms of the articles, adjectives, nouns, and pronouns, with the conjugation of the regular and the most frequent irregular verbs, and with ordinary syntactical constructions. Simple English sentences are set to be rendered into French, and the candidate's knowledge of the principles of pronunciation is tested.

GERMAN.

German (*a*), *Elementary*. The examination is designed to test the proficiency of those who have studied German in the equivalent of a systematic course of five periods a week for one year. It consists of two parts (which, however, may not be taken separately):

(i) The translation at sight of a passage of easy prose containing no rare words.

The passages set for translation are suited to candidates who have read (including sight-reading done in class) not less than 200 duodecimo pages of simple German, chiefly narrative prose. It is important that all translation be done into clear and idiomatic English.

(ii) The translation into German of simple English sentences, to test the candidate's familiarity with elementary grammar.

Elementary grammar is understood to include the conjugation of the weak and the more usual strong verbs; the declension of articles, adjectives, pronouns, and such nouns as are readily classified; the uses of the more common prepositions; the simpler uses of modal auxiliaries; the elements of syntax and word order. Proficiency may be tested also by direct questions.

Practice in pronunciation by reading aloud as much as possible from the texts used in the class is recommended; also the writing of German from dictation.

IV. English.

No candidate is accepted in either English (a) or English (b) whose work is notably defective in point of spelling, capitalization, punctuation, idiom, or division into paragraphs. An entrance condition imposed in English (a) is removed only upon evidence of marked improvement in the ability to write English correctly.

9. English (*a*). The candidate should read the books prescribed below with a view to understanding and enjoying them. The examination is designed especially to test the candidate's power of clear and accurate expression, but calls also for a reasonable degree of familiarity with the substance of the books read. The form of the examination is usually the writing of a paragraph of two or

each of several topics, to be chosen by the candidate from a considerable number set before him in the examination paper.

The books set for this part of the examination are as follows:

For the preliminary examination in 1907, for the class entering in 1908: Shakespeare's Macbeth and Merchant of Venice; the Sir Roger de Coverley Papers in The Spectator; Irving's Life of Goldsmith; Coleridge's Ancient Mariner; Scott's Ivanhoe and Lady of the Lake; Tennyson's Gareth and Lynette, Lancelot and Elaine, and Passing of Arthur; Lowell's Vision of Sir Launfal; George Eliot's Silas Marner.

For the preliminary examination in 1908, for the class entering in 1909: Shakespeare's Merchant of Venice and Julius Cæsar; Bunyan's Pilgrim's Progress, Part I; the Sir Roger de Coverley Papers in The Spectator; Scott's Ivanhoe and Lady of the Lake; Irving's Sketch Book; Macaulay's Lays of Ancient Rome; Tennyson's Gareth and Lynette, Lancelot and Elaine, and Passing of Arthur; George Eliot's Silas Marner.

For the preliminary examination in 1909, for the class entering in 1910: Shakespeare's Merchant of Venice and Julius Cæsar; the Sir Roger de Coverley Papers in The Spectator; Franklin's Autobiography; Scott's Ivanhoe and Lady of the Lake; either Irving's Sketch Book or Hawthorne's House of the Seven Gables; Macaulay's Lays of Ancient Rome; Tennyson's Gareth and Lynette, Lancelot and Elaine, and Passing of Arthur; either George Eliot's Silas Marner or Dickens's Tale of Two Cities.

For the preliminary examination in 1910, for the class entering in 1911: Shakespeare's Merchant of Venice and Julius Cæsar; the Sir Roger de Coverley Papers in The Spectator; either Franklin's Autobiography or Goldsmith's Vicar of Wakefield; Scott's Ivanhoe and Lady of the Lake; Hawthorne's House of the Seven Gables; Macaulay's Lays of Ancient Rome; Tennyson's Gareth and Lynette, Lancelot and Elaine, and Passing of Arthur; either George Eliot's Silas Marner or Dickens's Tale of Two Cities.

10. English (*b*). The candidate should read the books prescribed for this part of the examination with the view of acquiring such knowledge of their contents as will enable him to answer specific questions with accuracy and some detail. The examination tests also the candidate's ability to express his knowledge with clearness and accuracy. It is not designed, however, to require minute drill in difficulties of verbal expression, unimportant allusions, or technical details.

The books set for this part of the examination are as follows:

For the final examination in 1908: Shakespeare's Julius Cæsar; Milton's Lycidas, Comus, L'Allegro, and Il Penseroso; Burke's Speech on Conciliation with America; Macaulay's Essays on Addison and Life of Johnson.

For the final examinations in 1909, 1910, and 1911: Shakespeare's Macbeth; Milton's Lycidas, Comus, L'Allegro, and Il Penseroso; either Burke's Speech on Conciliation with America, or both Washington's Farewell Address and Webster's First Bunker Hill Oration; either Macaulay's Life of Johnson or Carlyle's Essay on Burns.

NOTES ON THE ENGLISH REQUIREMENTS.

Preparation in English has two main objects; (1) Command of correct and clear English, spoken and written; (2) power to read with intelligence and appreciation. To secure these ends, training in grammar and the simpler principles of rhetoric, and the writing of frequent compositions, are as essential as the study of the books specified above. After the year 1908 the English (*b*) paper may contain specific questions upon the essentials of English grammar, including ordinary grammatical terminology, inflections, and syntax. See also the paragraph in italics above at the head of this section (IV. English).

For candidates who take the complete examination in English at a single session, this examination covers the books set for the final examination in that year, together with those set for the preliminary examination in the preceding year; for example, the complete examination in 1909 will cover the books set for the final examination in 1909, together with those set for the preliminary examination in 1908.

The lists in English (*a*) for 1908, 1909, and 1910, for the classes entering in 1909, 1910, and 1911, are selected from the list adopted by the conference on uniform entrance requirements in English, at a meeting held at Newark, N. J., February 22, 1905. Candidates may make other selections from that list, provided they notify the registrar of the college before February 1 of the calendar year in which the examination is to be taken.

V. Mathematics.

11. Algebra (*a*): Fundamental operations, factoring, highest common factor, least common multiple, fractions; equations of the first degree in one or more unknown quantities, problems which lead to equations of the first degree, powers and roots, fractional and negative exponents, reduction of radicals, including the extraction of the square root of numbers.

12. Algebra (*b*): Quadratic equations in one or two unknown quantities, ratio and proportion, arithmetical and geometrical progressions, binomial theorem for positive integral exponents.

13. Plane geometry: Demonstrations of theorems and constructions, and demonstrations of problems which are contained in the standard texts; simple exercises in construction and demonstration; numerical problems, of which some are stated in terms of the metric system of weights and measures, relating to the mensuration of the triangle, parallelogram, trapezoid, regular polygons, and circle. For this examination the candidate must provide himself with compasses and ruler.

Special emphasis is laid upon accuracy in reckoning, both in algebra and in geometry.

VI. Ancient History.

14. Greek and Roman history: From the earliest times to the death of Augustus.

The examination in this subject may not be divided.

College Entrance Examination Board Equivalents.

The subjects in the College Entrance Board Examination which, as stated above, may be offered as substitutes for the Yale requirements are as follows:

I. Latin.

Yale Requirements.	*Board Examination.*
1. Latin grammar and composition.	(*a*) i. Grammar. ii. Elementary prose composition *and* (*l*) Prose composition.
2. Cæsar and Nepos.	(*b*) Cæsar *and* (*c*) Cornelius Nepos.
3. Cicero.	(*c*) Cicero.

4. Virgil.

- (*d*) Virgil's Æneid *and either*
- (*g*) Ovid *or* (*q*) sight translation of poetry. } *or*
- (*dq*) Æneid and sight translation.

II. GREEK OR SUBSTITUTES FOR GREEK.

GREEK.

5. Greek grammar and composition.

- (*a*) i. Grammar.
  ii. Elementary prose composition
  and
- (*f*) Prose composition.

6. Xenophon.

- (*b*) Xenophon
  and
- (*g*) Sight translation of prose.

7. Homer.

- (*c*) Homer's Iliad
  and
- (*h*) Sight translation of Homer. } *or*
- (*ch*) Iliad and sight translation.

SUBSTITUTES FOR GREEK.

For Homer—
Any two of the three parts of mathematics A1, as follows:
(1) Solid geometry,
(2) Plane trigonometry,
(3) Advanced algebra *or* analytical geometry.

- For Homer—
  Any two of the three following:
- (*d*) Solid geometry.
- (*f*) Plane trigonometry.
- (*b*) Advanced algebra.

For the entire Greek requirement—
Both
Elementary French
and
Elementary German
and, in addition, any two of the three following:

- For the entire Greek requirement—
  Both
- (*a*) Elementary French
  and
- (*a*) Elementary German
  and, in addition, any two of the following groups:

French (*b*).

- (*b*) Intermediate French
  and
- (*c*) Advanced French.

German (*b*).

- (*b*) Intermediate German
  and
- (*c*) Advanced German.

Any two of the three parts of mathematics A1 (as above).

- (*d*) Solid geometry,
- (*f*) Plane trigonometry,
  and
- (*b*) Advanced algebra.

III. FRENCH OR GERMAN.

8. French (*a*) *or* German (*a*).	(*a*) Elementary French *or* (*a*) Elementary German.

IV. ENGLISH.

9. English (*a*)	(*a*) Reading and practice.
10. English (*b*).	(*b*) Study and practice.

V. MATHEMATICS.

11. Algebra (*a*)	(*a*) i. Algebra.
12. Algebra (*b*)	ii. Algebra.
13. Plane geometry.	(*c*) Plane geometry.

VI. ANCIENT HISTORY.

14. Greek and Roman history.	(*a*) Ancient history.

CERTIFICATES OF STANDING ELSEWHERE.

Certificates of standing elsewhere are not accepted for admission in lieu of examinations, except in certain cases when a candidate brings evidence that he has passed the whole of freshman year in good standing at another college. A blank form of application will be furnished by the registrar of the college upon request. Each application must be accompanied by a certificate of honorable dismission and a detailed statement of the applicant's entrance credits and work completed in college, both signed by the dean or other proper officer of the college from which the student comes. Each application is judged on its merits; in every case the amount of work certified must be more than equivalent to the Yale entrance requirements, usually by a year's work.

ADMISSION TO, AND DIVISION OF, THE EXAMINATION.

The examination may be taken either all at one time or in parts, at two or more different times. Candidates, certificates, and examinations are accordingly designated as either "preliminary" (i. e., other than final) or "final." The requirements for admission to an examination and for the granting of a certificate, together with the regulations under which the examination may be divided, are as follows:

1. Every candidate for admission is expected to send to the registrar of the college, not later than May 15, a written notification of his intention to take the examination, stating also whether he is a preliminary or a final candidate and at what place he will take the examination. Upon receipt of this notification the registrar will send a letter of instructions and a blank form for the required recommendation (see paragraph 5, below).

2. At a preliminary examination a candidate, whether he already holds a preliminary certificate or not, must present a definite statement from his instructor or instructors, specifying the subjects in which he is prepared to offer himself for examination. No candidate is accepted in a subject in which he is not so authorized before the close of the examination.

3. To obtain a preliminary certificate, a candidate must, as a rule, pass at one time in not less than five subjects in which he is duly authorized. To obtain an addition to the list of subjects credited on such a certificate, he must pass at one time in not less than three authorized subjects.

4. In general there must be an interval of not less than a school year between two parts of an examination; but a candidate who has received a preliminary certificate at the June examination may at the next September examination add to the list of subjects credited thereon, provided he present evidence of work done during the summer and pass in not less than three subjects.

5. At the final examination a candidate must bring from his instructors satisfactory documents, *covering the whole of the preceding school year, September–June, whether this has all been spent in one school or not*, under the following three heads: (1) the work that has been done by him; (2) the subjects in which he is recommended for examination; (3) his moral character.

ANTICIPATION OF FRESHMAN COURSES.

Courses regularly offered to the freshman class (described on later pages) may be anticipated by members of the incoming class under the following regulations: (1) application must be made in writing to the registrar before September 1; (2) a fee of $5 for each course (made payable to the college bursar, Mr. H. M. Osborn) must accompany the application; (3) the applicant must present himself for examination at the time of the entrance examination in September. If the examination is satisfactorily passed, the student may take in place of the anticipated work an equal number of hours from the courses open to freshmen or to sophomores, if he is otherwise qualified to do so; and the anticipated course or courses may, if a grade of C or higher is obtained therein, count as part of the sixty hours required for graduation.

ADMISSION TO ADVANCED STANDING.

Examinations for admission to advanced standing will be held at Alumni Hall in June and September. *All applicants must give evidence of having satisfied the regular requirements for admission to the freshman class.*

A student from another college is admitted *ad eundem* only on passing a satisfactory examination on the studies of freshman year, and upon other courses sufficient to make up the number of hours of class-room work already completed by the class which he wishes to enter.

Applications for admission to advanced standing without examination are received from graduates and undergraduates of approved colleges who expect to fall back one or more years in their class rating. Each case, however, is judged on its merits. Either a diploma of graduation or a statement from the dean or other proper officer of the college from which the student comes must be handed in with each application. Blank forms of application may be obtained by writing to the dean of the college.

No one is admitted to the senior class after the beginning of the second term.

AGE, TESTIMONIAL, AND BOND.

No one is admitted to the freshman class until he has completed his 15th year, nor to a higher class without a corresponding increase of age.

A satisfactory testimonial of good moral character is in every case required, before a certificate of admission in full is granted. Students from other colleges, as well as those who have been members of a school at any time during the preceding year, must present certificates of dismission in good standing.

Every person, on being admitted, must give to the college bursar a bond, executed by his parent or guardian, for $500, as security for the payment of charges arising under the laws of the college. A blank form for this purpose is provided at the time of admission.

SHEFFIELD SCIENTIFIC SCHOOL.

REQUIREMENTS FOR ADMISSION OF SPECIAL STUDENTS.

Those students who, being fully qualified, desire to pursue particular studies without reference to the obtaining of a degree are received in most of the departments of the school as special students; not, however, in the course in selected studies in language, history, and the natural and social sciences, nor in the freshman class. It should be distinctly understood, however, that these opportunities are designed especially to aid those who, having received a sufficient preliminary education elsewhere, desire to increase their proficiency in special branches.

To gain admission to such a special course of study it is necessary for the student to show, either by examination or by submitting credentials from other scientific schools or colleges, that he has the preliminary training requisite for the successful pursuit of the course chosen. The plan of studies elected must meet with the approval of the professor in charge of the course. A special student may at any time become a regular student and candidate for a degree by making up all deficiencies in the requirements for admission and in the required course subjects.

REQUIREMENTS FOR ADMISSION TO THE FRESHMAN CLASS.

SUBJECTS OF EXAMINATION.

All candidates for admission to the freshman class are examined in the following subjects:[a]

1. ENGLISH GRAMMAR.

Whitney's Essentials of English Grammar, or an equivalent.

2. ENGLISH LITERATURE (A).

The candidate should read the books prescribed below with a view to understanding and enjoying them. The examination is designed especially to test the candidate's power of clear and accurate expression, but calls also for a reasonable degree of familiarity with the substance of the books read. The form of the examination is usually the writing of a paragraph or two on each of several topics, to be chosen by the candidate from a considerable number set before him in the examination paper.

The books set for this part of the examination are as follows:

For the preliminary examination in 1907, for the class entering in 1908: Shakespeare's Macbeth and Merchant of Venice; the Sir Roger de Coverley Papers in The Spectator; Irving's Life of Goldsmith; Coleridge's Ancient Mariner; Scott's Ivanhoe and Lady of the Lake; Tennyson's Gareth and Lynette, Lancelot and Elaine, and Passing of Arthur; Lowell's Vision of Sir Launfal; George Eliot's Silas Marner.

For the preliminary examination in 1908, for the class entering in 1909: Shakespeare's Merchant of Venice and Julius Cæsar; Bunyan's Pilgrim's Progress, Part I; the Sir Roger de Coverley Papers in The Spectator; Scott's Ivanhoe and Lady of the Lake; Irving's Sketch Book; Macaulay's Lays of

[a] Certificates of examination of the College Entrance Examination Board of the Middle States and Maryland are accepted so far as such certificates cover the requirements here set forth. (See p. 88.)

Ancient Rome; Tennyson's Gareth and Lynette, Lancelot and Elaine, and Passing of Arthur; George Eliot's Silas Marner.

For the preliminary examination in 1909, for the class entering in 1910: Shakespeare's Merchant of Venice and Julius Cæsar; the Sir Roger de Coverley Papers in The Spectator; Franklin's Autobiography; Scott's Ivanhoe and Lady of the Lake; either Irving's Sketch Book or Hawthorne's House of the Seven Gables; Macaulay's Lays of Ancient Rome; Tennyson's Gareth and Lynette, Lancelot and Elaine, and Passing of Arthur; either George Eliot's Silas Marner or Dickens's Tale of Two Cities.

For the preliminary examination in 1910, for the class entering in 1911: Shakespeare's Merchant of Venice and Julius Cæsar; the Sir Roger de Coverley Papers in The Spectator; either Franklin's Autobiography or Goldsmith's Vicar of Wakefield; Scott's Ivanhoe and Lady of the Lake; Hawthorne's House of the Seven Gables; Macaulay's Lays of Ancient Rome; Tennyson's Gareth and Lynette, Lancelot and Elaine, and Passing of Arthur; either George Eliot's Silas Marner or Dickens's Tale of Two Cities.

3. ENGLISH LITERATURE (B).

The candidate should read the books prescribed for this part of the examination with the view of acquiring such knowledge of their contents as will enable him to answer specific questions with accuracy and some detail. The examination tests also the candidate's ability to express his knowledge with clearness and accuracy. It is not designed, however, to acquire minute drill in difficulties of verbal expression, unimportant allusions, or technical details.

The books set for this part of the examination are as follows:

For the final examination in 1908: Shakespeare's Julius Cæsar; Milton's Lycidas, Comus, L'Allegro, and Il Penseroso; Burke's Speech on Conciliation with America; Macaulay's Essays on Addison and Life of Johnson.

For final examinations in 1909, 1910, and 1911: Shakespeare's Macbeth; Milton's Lycidas, Comus, L'Allegro, and Il Penseroso; either Burke's Speech on Conciliation with America, or both Washington's Farewell Address and Webster's First Bunker Hill Oration; either Macaulay's Life of Johnson or Carlyle's Essay on Burns.

NOTES ON THE ENGLISH REQUIREMENTS.

Preparation in English has two main objects: (1) command of correct and clear English, spoken and written; (2) power to read with intelligence and appreciation. To secure these ends, training in grammar and the simpler principles of rhetoric, and the writing of frequent compositions, are as essential as the study of the books specified above. After the year 1908 the English (*B*) paper may contain specific questions upon the essentials of English grammar, including ordinary grammatical terminology, inflections, and syntax.

No candidate is accepted in either English (*A*) or English (*B*) whose work is notably defective in point of spelling, capitalization, punctuation, idiom, or division into paragraphs. An entrance condition in English (*A*) is removed only upon evidence of marked improvement in the ability to write English correctly.

For candidates who take the complete examination in English at a single session, this examination covers the books set for the final examination in that year, together with those set for the preliminary examination in the preceding year; for example, the complete examination in 1908 will cover the books set for the final examination in 1908, together with those set for the preliminary examination in 1907.

The lists in English (*A*) for 1908, 1909, and 1910, for the classes entering in 1909, 1910, and 1911, are selected from the list adopted by the conference on uniform entrance requirements in English, at a meeting held at Newark, N. J., February 22, 1905. Candidates may make other selections from that list, provided they notify the registrar of the Sheffield Scientific School before February 1 of the calendar year in which the examination is to be held.

4. HISTORY OF ENGLAND.

The student should have some acquaintance with the leading facts of *English History* from the landing of Julius Cæsar (55 B. C.) down to the conclusion of Beaconsfield's ministry (1880). Special attention should be given to incidents from the Norman Conquest onward. It is recommended that, so far as possible, the attention of the student be directed to the importance not only of the development of English government, but of English industry, and English literature. Montgomery's Leading Facts of English History, or an equivalent.

[In view of the importance of a knowledge of the history of England as a preparation for the study of English in freshman year no equivalent is accepted for this requirement.]

5. HISTORY OF THE UNITED STATES OR ROMAN HISTORY OR GREEK HISTORY.

In *History of the United States*, a thorough acquaintance is expected with some one of the more recent text-books, such as Johnston's History of the United States, revised edition, Montgomery's Students' American History, Channing's Students' History of the United States, or McLaughlin's History of the American Nation.

In *Greek History* the examination will cover the period to the death of Alexander (323 B. C.). Myers's A History of Greece, or Botsford's History of Greece, or an equivalent.

In *Roman History* the student should be particularly familiar with the Roman Republic (509 B. C. to the death of Julius Cæsar), though he will be held responsible for some knowledge of the development of the Empire to the death of Augustus (14 A. D.). Myers's Rome: Its Rise and Fall, or Botsford's History of Rome, or an equivalent. In Greek and Roman history the importance of historical geography should not be overlooked.

The examinations in history will be framed to discourage hasty memorizing and to encourage careful preparation at the hands of teachers. Stress should be laid in preparation upon a knowledge of historical geography and upon a clear understanding of the more salient dates and facts.

6. LATIN GRAMMAR AND COMPOSITION.

The examination in Latin grammar will be based on connected passages taken from the first and second books of Cæsar's Gallic War. The exercises set for translation from English into Latin will involve the vocabulary and idioms of these two books.

7. CÆSAR OR NEPOS.

The first four books of Cæsar's Gallic War.

The first twelve of Nepos's Lives, as they appear in the Teubner edition, will be accepted as an equivalent for the third and fourth books of Cæsar. For the first and second books of Cæsar no equivalent is accepted.

8. VIRGIL OR CICERO.

The first three books of the Æneid. This requirement involves ability to scan Latin hexameters.

Cicero's orations against Catiline and for Archias may be offered in place of Virgil.

In order to allow preparatory schools still further freedom in arranging their courses of work, examination papers will be prepared on other equivalents of the texts mentioned above, provided application for a sufficient number of candidates be made to the registrar of the Sheffield Scientific School before February 1.

9. GERMAN OR FRENCH.

Candidates will be required to translate at sight simple prose selections from German or French authors, and to have such a knowledge of grammar as will enable them to read the selections intelligently. This implies familiarity with the declensions of nouns, adjectives, and pronouns, with the conjugation of verbs, and with the syntax of cases. The ability to translate simple sentences from English into German or French will also be requisite, as well as an intelligible pronunciation of the language offered.

10. ALGEBRA A, ELEMENTARY (THROUGH QUADRATICS).

The four fundamental operations for rational algebraic expressions; factoring, determination of the highest common factor and least common multiple by factoring; fractions, including complex fractions and ratio and proportion; linear equations both numerical and literal, containing one or more unknown quantities; problems depending on linear equations; radicals, including the extraction of the square root of polynominals and of numbers; exponents, including the fractional and negative. Quadratic equations, both numerical and literal; simple cases of equations with one or more unknown quantities that can be solved by the methods of linear and quadratic equations; problems depending on quadratic equations; binomial theorem for positive integral exponents; formulas for the *n*th term and the sum of *n* terms of arithmetical and geometrical progressions with applications.

11. ALGEBRA B, ADVANCED.

Permutations and combinations, limited to simple cases. Numerical equations of higher degree, and so much of the theory of equations with graphical methods as is necessary for their treatment, including Descartes' Rule of Signs and Horner's method, but not Sturm's functions or multiple roots.

A syllabus of the requirement in advanced algebra may be obtained from the treasurer of the Sheffield Scientific School, New Haven, Conn., on payment of 10 cents.

It is expected that candidates presenting themselves in algebra will have covered all the subjects above specified. The examination, however, is especially designed to test the *thoroughness* of the candidate's training and preparation. Those questions, therefore, whose solution involves only the fundamental operations must be worked out rapidly and accurately.

Much time should be devoted to the statement and solution of problems, and the student should be taught the importance of the interpretation and verification of his results.

The required topics in algebra are adequately treated in Advanced Algebra by H. E. Hawkes.

12. PLANE GEOMETRY.

Demonstration of the theorems and constructions contained in any standard text, and solution of original propositions and problems.

The examination in this subject will test not only the candidate's acquaintance with the theorems of any standard text, but also his ability to solve original exercises and problems. Two hours will be allowed for the examination.

and it is expected that aptitude will be shown in attacking questions of reasonable difficulty. As much time as possible should be devoted, in the student's preparation, to originals. The student should learn, therefore, that knowledge of geometry means not merely familiarity with propositions proven in the text, but rather the possession of keenness and readiness in space perception as well as the power to reason logically and deductively.

13. SOLID GEOMETRY.

The usual text demonstrations, including the relations of planes and lines in space, the properties and mensuration of prisms, pyramids, cylinders, and cones, the sphere and spherical triangle.

In selecting a text-book in geometry, it is especially important that one be chosen which encourages and develops independent thought and work on the part of the student, and which does not reduce the study of the science to an exercise in memorizing. Knowledge of propositions and constructions is not the only aim of geometric instruction, but training in logical thinking and deductive reasoning as well. The student should acquire power in applying the methods which he has been taught to the solution of original exercises and problems. The examination is intended to test the power of the candidate in this respect, and also his acquaintance with the text.

14. TRIGONOMETRY AND LOGARITHMS.

Fundamental definitions, properties, and analytical theory of the trigonometric functions, with the usual formulæ; applications to the solution of simple problems, and, in particular, to the formal solution of plane oblique triangles. Theory and principles of logarithms (without the introduction of work involving infinite series), solution of right and oblique plane triangles, and of numerical problems in algebra.

Preparation in trigonometry should include exercises in applying the formulæ to a variety of reductions and transformations, and the solution of trigonometrical equations involving either direct or inverse functions. Of fundamental importance is a thorough drill in the reduction of functions of any angle to functions of an acute angle. Accuracy in results and neatness in the arrangement of computations are insisted upon.

The student should be familiar with the tables furnished at the examination. These are entitled Four-Place Logarithmic Tables, and may be obtained from the publishers, Henry Holt & Co., New York City. The necessary formulæ for the solution of plane oblique triangles are given in these tables.

15. BOTANY OR CHEMISTRY OR PHYSICS.

In *Botany* the requirements include a knowledge of the structure and of the more important physiological processes of flowering plants, together with matters pertaining to pollination and the dissemination of seeds. Leavitt's Outlines of Botany or Bergen's Foundations of Botany is recommended as a suitable aid in preparing for the examination. It is desirable that the candidate should have had some experience in the analysis of common flowering plants.

In *Chemistry* the requirement will involve (*a*) a knowledge of hydrogen, oxygen, the halogens, sulphur, nitrogen, phosphorus, arsenic, carbon, silicon, sodium, potassium, ammonium, calcium, barium, magnesium, zinc, mercury, silver, copper, tin, lead, iron, and aluminum, together with their simple compounds. This will include ability to describe the occurrence in nature of such substances, their simple physical properties, the more important or typical

chemical changes in which they take part, the important methods of preparation, and a knowledge of the common names; also, ability to describe accurately the phenomena observed in experiments and to make deductions from those observations.

(*b*) Ability to sketch and describe simple pieces of apparatus used in the laboratory.

(*c*) Ability to write equations of simple reactions and to make calculations of the quantities involved, atomic weights being supplied; also, ability to calculate volumes of gases from their weights or the reverse and to calculate the quantity per unit volume of a substance in solution from the density and percentage composition of the solution.

(*d*) Familiarity with the fact that elements combine in fixed ratios or multiples thereof, and a knowledge of the atomic theory; also, ability to apply the laws of Boyle, Charles, and Avogadro, and to write equations representing the reactions by volume of the common gases and vapors.

It is strongly recommended that the preparation for this requirement should be by a course of class-room and laboratory work in which particular emphasis is laid upon the systematic study of the elements in natural groups or by the use of Mendelejeff's classification. Fundamental principles, such as reduction, oxidation, the reaction of acids, bases, etc., should be given special attention, and the more important test reactions should be made familiar.

No candidate will be accepted in this subject unless he has had a laboratory course. Every candidate must attach to his answer paper in chemistry a statement, signed by his instructor, of the work he has done in this subject.

In *Physics* the examination will be designed to test the candidate's familiarity with the general phenomena of mechanics, sound, light, heat, magnetism, and electricity, and his knowledge of the simpler laws governing these phenomena.

Division of Examination.

Preliminary examination.—Candidates are allowed to divide the examination between two *successive* years. For the first *preliminary examination* the candidate may present himself at any regular examination in either June or September and may offer any five or more of the above-mentioned subjects. At this examination each candidate must submit a recommendation from his principal instructor regarding the subjects which he is authorized to offer.[a] A *certificate of preliminary examination* will not be granted unless at least five of these subjects have been satisfactorily passed. A preliminary certificate given in June can not be completed until the following year; but a candidate who has received a preliminary certificate at the June examination may at the next September examination add to the list of subjects credited thereon, provided he present evidence of work done during the summer.

Final examination.—Final candidates, whether presenting themselves for the first time or for completing the credits not included in a certificate of preliminary examination, may take the examinations at any regular session. A final candidate who desires to postpone examination in any subject from June until September should submit with his request the authorization of his principal instructor.

A *final* candidate who has been rejected in June may try the whole examination again in September of the same year.

Deficiencies.—Students are admitted conditionally with certain deficiencies, if their record of examinations is such as to make it appear that they are fitted

[a] Blank forms for this purpose will be sent upon application to the registrar of the Sheffield Scientific School.

to pursue the course of the school successfully. The number of conditions which shall exclude a candidate from admission is not fixed. The record of each candidate is considered with a view to deciding whether his preparation is adequate and whether the deficiencies are of such a nature as to admit of their being made up within the time allotted. All deficiencies in subjects required for admission must be made up before the student is allowed to enter upon the work of the second (Junior) year.

Testimonials.—Candidates for final examinations must present satisfactory testimonials of character and scholarship covering the whole of the school year preceding the examination. Students from other colleges must present certificates of dismissal in good standing.[a]

Age.—No one is admitted to the Freshman class who is less than 16 years of age.

Time of Examination.

Two regular examination sessions are held each year—the first at the close of the college year in June; the second at the beginning of the college year in September.

Fee.—A fee of $5, payable at the opening of the session at the place of examination, is charged for admission to all examinations (whether complete or partial) held outside of New Haven.

Admission Through Examinations of the College Entrance Examination Board.

Candidates for admission to the Sheffield Scientific School may meet the entrance requirements by passing with satisfactory grades the equivalent subjects in the examinations set by the college entrance board and by presenting the board certificates for credit. The Sheffield Scientific School requirements are given below, and opposite are placed the subjects in the board examination which may be offered as substitutes.

Sheffield Scientific School.	*College Entrance Examination Board.*
English grammar.[b]	Reading and practice.
English lit. A (reading and practice).	Study and practice.
English lit. R (study and practice).	English history.
History of England.	American history, or mediæval and modern European history, or ancient history.
History of U. S., or Roman history, or Greek history.	
Latin grammar and composition.	Grammar.
	Elementary prose comp.
Cæsar.	Cæsar.
Virgil, or Cicero.	Virgil's Æneid, or Cicero.
German, or French.	Elementary German, or Elementary French.
Chemistry.	Chemistry.
Botany.	Botany.

[a] Blank forms for this purpose will be sent upon application to the registrar of the Sheffield Scientific School.

[b] In case the candidate passes the C. E. E. B. examinations in English, the Sheffield Scientific School examination in English grammar will be waived.

Sheffield Scientific School—Continued.	*College Entrance Examination Board*—Continued.
Physics.	Physics.
Algebra A.	Algebra I, II.
Algebra B.	Advanced algebra.
Plane geometry.	Plane geometry.
Solid geometry.	Solid geometry.
Trigonometry and logarithms.	Plane trigonometry.

Board certificates should be sent to the registrar of the Sheffield Scientific School, New Haven, Conn., so that the credits obtained may be recorded.

Requests for blank applications for admission to the board examinations should be sent to the secretary of the college entrance examination board, Substation 84, New York, N. Y.

REQUIREMENTS FOR ADVANCED STANDING.

All candidates for advanced standing are examined in the subjects required for admission as well as in the studies already pursued by the class which they wish to enter, except where satisfactory credits, covering the required subjects, are presented from some other university or college of good standing. No candidate for a degree is admitted later than the beginning of the senior year.[a]

---

(7) UNIVERSITY OF CALIFORNIA.

ADMISSION REQUIREMENTS.

Applicants for admission to regular undergraduate courses must be at least 16 years of age, must give satisfactory references concerning moral character, and must, by examination or by certificate, give evidence of proficiency in such of the subjects as are designated below as required for the course and status sought. Applicants must also appear before the university medical examiners and pass a satisfactory physical examination, to the end that the health of the university community may be safeguarded.

GENERAL LIST OF PREPARATORY SUBJECTS.

NOTE.—The normal amount of work represented both by preparatory or high-school subjects and by the university courses is specified quantitatively. In the university a unit signifies one hour per week of recitation or lecture, with preparation therefor, during one half year. A course of study taken in preparatory school for one year at five periods per week is valued at 3 units. Laboratory hours not requiring preparation are to be estimated at a lower rate than recitations and lectures.

[a] Blank forms of application for advanced standing will be sent upon request by the registrar of the Sheffield Scientific School.

	Units.
A[a]. Oral and written expression	
1. English, elementary	6
2. Plane geometry	3
3. Elementary algebra	3
†4a. Intermediate mathematics: Algebraic theory	1½
†4b. Intermediate mathematics: Solid geometry	1½
5. History and Government of the United States	3
6a. Cæsar	3
6b. Latin composition, elementary	3
†7a. Cicero	1½
†7b. Virgil	1½
†7c[1]. Latin composition, advanced	1½
†7c[2]. Latin composition, advanced	1½
†8a. Greek grammar and composition	3
†8b. Xenophon	3
†9a. Greek composition, advanced	1½
†9b. Homer's Iliad	1½
10. Ancient history and geography	3
11. Physics	3
†12a[1]. Synthetic projective geometry	1½
†12a[2]. Plane trigonometry	1½
†12a[3]. Plane analytic geometry	1½
12b. Chemistry	3
12c. Botany	3
12d. Zoology	3
12e. Physical geography	3
12f. Physiology	3
13a. Mediæval and modern history	3
13b. English history	3
14a. English, advanced	3
14b. English, advanced	3
†15a[2]. French, elementary	6
†15a[3]. French, intermediate	3
†15a[4]. French, advanced	3
†15b[2]. German, elementary	6
†15b[3]. German, intermediate	3
†15b[4]. German, advanced	3
†15c. Spanish	6
†16. Free-hand drawing	3
†17. Geometrical drawing	3

Subjects 6 and 8 are not credited unless both *a* and *b* be passed. Subdivisions of subjects are not permitted unless provided for in the above list.

Credit for elementary French, 3 units, or for elementary German, 3 units, may be given to applicants who matriculate with both Latin and Greek and who have studied French or German during the last year of their high-school course and have completed the work ordinarily completed by nonclassical pupils in two years.

Group I.

For matriculation in the colleges of letters, social sciences, natural sciences, commerce; the general course in the college of agriculture; and the five-year courses in the colleges of mechanics, mining, civil engineering, and chemistry: English, subject 1, 6 units; foreign language or languages, ancient or modern, selected from subjects 6, 7, 8, 9, 15—12 units; United States history and government, subject 5, 3 units; mathematics, subjects 2 and 3, 6 units; natural science, subject 11, 12*b*, 12*c*, 12*d*, or 12*f*, 3 units; elective, 15 units. Total, 45 units.

The candidate for admission must have chosen his preparatory subjects in such a way as to have a total of 12 units of subjects designated as "advanced,"

[a] Subject A will hereafter not be required for matriculation by a regular student, but will be required for the junior certificate in the colleges at Berkeley. An examination in this subject will be given some time after the beginning of each half year. Every intrant admitted to regular first-year or second-year standing is required to take an examination in subject A before the close of his first half year's work; failure to take the examination in subject A at the time required, or failure to pass, has the same effect upon the student's standing as a failure to pass in an ordinary course.

Special students, as heretofore, will be required to pass a test in oral and written expression before entering the university. This test will be conducted for each applicant by his adviser. A student who passed this test would still be required to pass subject A if he desired promotion to junior standing.

† The dagger indicates subjects for which equivalent courses are offered in the university. For further description of these courses reference should be made to the annual announcement of courses.

including United States history and government, and including one of the following sciences, if taken, with laboratory work, in the third or fourth year of the high school course: Physics, chemistry, botany, zoology, physiology. Subjects which may be offered as advanced subjects are as follows: 4, 5, 7, 9, 11, 12 (excluding sciences given in the first and second years of the high school), 13*b*, 14, 15*a*[3], 15*a*[4], 15*b*[3], 15*b*[4].

SPECIAL NOTE.—The work for matriculation is so closely related to the work of the freshman and sophomore years in the university that the matriculation electives can not be intelligently chosen without reference to the requirements for the junior certificate.

GROUP II.

(Before 1908–9, known as Group IV.)

For matriculation in the four-year courses in the colleges of mechanics, mining, civil engineering, and chemistry: Subjects 1, 2, 3, 4, 5, 11, 12*a*[3], 12*b*, 16, 17, and any two of the following subjects: 6, 8, 14, 15*a*[3], 15*b*[3], 15*c*. Total, 43½ units.

For the course in architecture, the student may matriculate either in letters, social sciences, or natural sciences.

For the *technical course* in agriculture, the applicant may offer Group I, except that additional work in science or mathematics may, if desired, be offered in lieu of 6 units of foreign languages.

For the premedical course, leading to the degree of A. B. or B. S. at the end of the fourth year and M. D. at the end of the seventh year, the student should matriculate in the college of letters or of natural sciences.

For matriculation in the medical department—the four years' course leading to M. D.—the student is required to obtain his junior certificate either in letters, social sciences, or natural sciences, and is required to have had at least a one year's laboratory course of college grade in each of the following subjects: Physics, chemistry, zoology; and is required to have a reading knowledge of both German and French.

For admission to the course in jurisprudence in the academic colleges, leading to the bachelor's degree (A. B. or B. L.) at the end of the first year and to the degree of juris doctor at the end of the third year, senior standing in the college of letters or social sciences is required.

The matriculation requirements for Hastings College of the Law are as follows: Subjects 1, 2, 3, 4*a*, 5, 6, 7, 13*a*. Total, 31½ units.

The question of admitting an applicant with matriculation deficiencies is decided in each case by the academic council upon the merits of the case. In general, applicants with less than 45 units of matriculation credit (or 43½ units for the colleges of engineering) will not be admitted.

STUDENTS AT LARGE.

The recommended graduates of accredited secondary schools are admitted to the university to the status of student at large on any 45 units of credit for subjects included in the university's preparatory list. Students entering in this way may take as much university work as is permitted to regular students without matriculation conditions. They will, like all other students in the university, be permitted to enroll only in courses of instruction for which they have the necessary scholastic preparation. By virtue of their status they are not candidates for a degree.

Students at large who do not offer all the subjects necessary to make up a complete matriculation group, according to present requirements for admission,

will be under the necessity of completing a group after entering the university, provided they wish to become candidates for a degree.

Applicants who have less than 45 units of matriculation credit will not be admitted as students at large.

SPECIAL AND LIMITED STUDENTS.

The university has no "special courses;" all courses are organized for regular students—that is, students who have had the equivalent of a good high-school education and have been fully matriculated. Special students are admitted to such parts of the regular work as they may be found capable of undertaking.

The applicant for admission as a special student is required to pass such formal or informal examinations as the officers in charge of the studies intended may deem requisite to establish his ability and fitness. Applicants for this status must be at least 21 years of age. Applicants will not usually be admitted directly from the secondary schools to the status of special student.

Special students intending to take courses in the department of English will be expected to pass the regular matriculation examinations in subjects 1 and 14 at the usual time and place. Reasonable substitutions for the particular masterpieces prescribed will be allowed, but these should be arranged in advance.

In general, admission to the university as a special student can be arranged only by personal conference with the members of the committee on special students and the instructors concerned; such admission usually can not be arranged by correspondence.

The administration of special students is in the hands of the committee on special students. Each applicant for admission to special status is assigned to a member of the committee, who will act as the applicant's adviser and will supervise his studies in case he is admitted to the university. On registration day, at the beginning of every half year, every special student must submit to his adviser his choice of studies for the half year ensuing.

A circular containing detailed information concerning the admission of special students may be obtained on application to the recorder of the faculties.

For a limited course. The requirements for admission to a limited course are the same as for admission to a regular course.

DESCRIPTION OF THE PREPARATORY SUBJECTS.

A. ORAL AND WRITTEN EXPRESSION.

Training in this subject enters into the proper treatment of all topics of study taken up in the school course, and extends to speaking and oral reading as well as to writing. Its aim is to secure to the student the ability to use his mother tongue correctly, clearly, and pertinently on all lines upon which his thought is exercised.[a]

An examination in this subject will hereafter be required of all candidates for junior standing in the university. The examination will not be required before entrance.

1. *English*[b] (2 units).—The examination will presuppose thorough acquaintance with the following works, together with the practical knowledge of gram-

[a] See English in the Secondary Schools, pp. 20–33 (University Press, Berkeley, 1906), for suggestions to teachers and pupils regarding the discipline involved.

[b] For the sequence, purpose, and method of these studies, the teacher is referred to the University of California pamphlet, English in the Secondary Schools (University Press, Berkeley, 1906), where a full discussion of the subject will be found, together with the necessary bibliography and additional lists of reading.

mar and the fundamental principles of poetry and prose implied in such acquaintance: (1) The Lady of the Lake; (2) Ivanhoe or the Alhambra; (3) the best ballads, heroic lays, and poems of nationality—in all about 1,500 lines; (4) classical and Teutonic mythology (as indicated in the next paragraph); (5) the following poems: The Deserted Village, The Cotter's Saturday Night, Tam O'Shanter, The Ancient Mariner, The Prisoner of Chillon (or selections from Childe Harold), Horatius, Snow-bound; (6) The Merchant of Venice, (7) Julius Cæsar; (8) essays and addresses: Emerson's The Fortune of the Republic, the American Scholar; Lowell's Democracy, Lincoln (two for study; one *for reading*).[a]

While the examination at the university will be upon the subjects as stated above, accredited schools may avail themselves of the following list of substitutions: for (1), The Lay of the Last Minstrel; for (2), any one of these: Scott's Quentin Durward, Kenilworth, Woodstock, Rob Roy, Tales of a Grandfather, Irving's Sketch-book, his Tales of a Traveler, Hawthorne's House of the Seven Gables, Tom Brown at Rugby, Gulliver's Travels, Don Quixote; for (3), an equivalent amount of purely literary selections from the Bible (e. g., Genesis, Exodus, Ruth, Esther), or The Pilgrim's Progress; for (4), (*a*) Classic Myths in English Literature (except Chapters I–III) or the equivalent in any standard text-book; or (*b*) Classic Myths (*one-half*), i. e., about 200 pages, covering approximately the material of sections 16–56, 65–67, 70–100, 104–107, 111–125, 132–164, 177–186, or an equivalent from any standard authority, and Epic Selections (*one-half*), viz, the Iliad in translation, Books I, VI, XXII, and XXIV, or the Odyssey in translation, the episode of Ulysses among the Phæacians, or any other four books; or (*c*) the whole of the Iliad or the Odyssey in translation, and a familiarity with the characteristics and stories of the more important gods and heroes of Greek and Teutonic (Norse and Old German) mythology;[b] for (5), short poems of similar scope and character; for (6), As You Like It, Midsummer Night's Dream, Twelfth Night, The Tempest; for (8), an equivalent amount in the best prose explanatory of American ideals of citizenship, such as: Washington's Inaugural of 1789; Jefferson's of 1801; Everett on Franklin, Washington, The Pilgrim Fathers; Choate on American Nationality; Daniel Webster; Sumner on The Scholar; Curtis on The Puritan Spirit, The Public Duty of Educated Men; Bryce on The Strength of American Democracy (American Commonwealth, Chapter XCIX).

2. *Plane geometry* (1 unit).—The usual theorems and constructions of elementary plane geometry, including the general properties of regular polygons, their construction, perimeters and areas, and the different methods for determining the ratio of the circumference to the diameter. The solution of original exercises, including problems in loci and applications to mensuration.

3. *Elementary algebra* (1 unit).—Algebraic practice through simple quadratic equations; namely, the fundamental laws of algebra (including the laws of exponents for positive and negative integers), the various methods of factoring with applications to highest common factor, to lowest common multiple, to the reduction of fractions, and to the solution of equations, practice in the use of the

[a] Items marked "for reading" are not for class recitation, but for perusal outside of school, with reports or discussions in class once a week or fortnight. The examination upon such items will not presuppose acquaintance with minute details. Whatever credit the pupil may acquire by his answers will be applied to offset deficiencies in other respects, or still further to improve his standing.

[b] Some familiarity may be acquired either from systematic study of a text-book in connection with the epic chosen, or from such study in connection with the interpretation of the masterpieces of literature prescribed for the rest of the course, English 1 and 14. For information regarding the purpose and method of this study, see the University of California pamphlet, English in the Secondary Schools, pp. 14, 15, 35–39.

remainder and the factor theorems, simultaneous equations of the first degree with problems involving their solution, simple quadratic equations, ratio and proportion.

4a. Intermediate mathematics: Algebraic theory (½ unit).—Mathematical induction, the remainder and the factor theorems proved, the binomial theorem for a positive integral exponent, square roots of polynomials, fractional and negative indices, theory of quadratic equations, examples in simultaneous quadratic equations, the progressions and other simple series. The ability to demonstrate principles is an important part of this requirement.

4b. Intermediate mathematics: Solid geometry (½ unit).—Supplementary studies in plane geometry and the fundamental propositions of solid and spherical geometry with problems in demonstration and in the mensuration of surfaces and solids. The ability to apply geometry to practical problems is important in this requirement.

5. History and Government of the United States (1 unit).—A knowledge of the outline of American history, and of the nature of federal, state, and local government. This requirement represents three things: The regular use by the pupil of a text-book in history, such as Channing's Students' History of the United States, McLaughlin's History of the American Nation, or Montgomery's Students' American History, and a text-book in government such as Hinsdale's American Government, or Bryce's American Commonwealth (1-volume edition);[a] systematic reading of assigned references; and a notebook containing maps, concise topical outlines or summaries of the most important movements or institutions, notes on some of the reference reading, and a few carefully prepared brief papers with bibliographical notes. The emphasis in the notebook should be on accuracy and thoughtfulness rather than on quantity.

6a. Elementary Latin, Cæsar (1 unit).—This subject represents four periods a week during two years. It includes the mastery of inflections and of the simpler principles of syntax, the acquisition of a working vocabulary of from one to two thousand words, and, above all, the power to understand in the original, from the printed page and at hearing, simple prose narrative, and to translate the same into idiomatic English. The basis of this work should equal in amount Cæsar's Gallic war, Books I–IV, but there may be substituted as a partial equivalent portions of the Lives of Cornelius Nepos, or the matter contained in the second-year books. There should be also some training in translation at sight from easy authors.

6b. Latin composition, elementary (1 unit).—This subject represents one period a week, or its equivalent, during two years, the work of the first year being taken from the first lesson book. It includes the writing in Latin of detached and connected English sentences, and it should constitute the chief means of teaching Latin forms and syntax.

7a, 7b. Advanced Latin, Cicero and Virgil (1 unit).—This subject represents four periods a week during two years. It includes the continuation of the requirements outlined under 6a, with the addition of the study of versification, and not omitting training in reading at sight; but the emphasis in these two years should be laid upon the development of the student's power to understand Latin prose and poetry in the original, and upon the thought of the authors read, rather than upon the syntax, except in so far as the syntax is suggested by the interpretation of the thought. The basis of this work should be six orations of Cicero (7a, ½ unit), and Virgil's Æneid, Books I–VI (7b, ½ unit), but it is hoped that the stronger schools may increase the amount by reading other books, or other authors.

[a] The mention of any book does not mean that the university or the department of history recommends it.

NOTE.—The examinations for admission given at the university are based upon the authors named above, but accredited schools are at liberty to select other authors that are fair equivalents. An arrangement whereby part of the Cicero is postponed to follow Virgil is approved by the department.

7c'. Latin composition, advanced (½ unit).—This subject represents one period a week, or its equivalent, for one year, presumably the third of the course. It includes the writing in Latin of connected English sentences. The emphasis should be laid upon the order of words, the simpler features of sentence structure, and the means of connecting sentences in paragraphs.

7c². Latin composition, advanced (½ unit).—This subject represents one period a week, or its equivalent, for one year, presumably the fourth of the course. It may well serve as a means of reviewing Latin forms and syntax, but the prose of Cæsar and Cicero should be the standard for reference.

8a. Greek grammar and composition (1 unit).—Greek grammar, including accents, the ordinary inflectional forms, the simpler rules of syntax, and the translation of easy English sentences into Attic Greek.

8b Xenophon (1 unit).—Xenophon's Anabasis, Books I–IV, with questions on the forms, syntax, and subject-matter. The translation into Attic Greek of simple passages of connected narrative based on the Anabasis. Parts I and II of Pearson's Greek Prose Composition represent the nature and amount of preparation required.

9a. Greek composition, advanced (½ unit).—Advanced Greek composition [Part III of Pearson's Greek Prose Composition]. Sight translation (50 pages from the last three books of the Anabasis, or other Attic Greek).

9b. Homer (½ unit).—Homer's Iliad, Books I–III, with questions on Homeric forms and prosody. Students should be trained not only to write a correct metrical scheme, but also to read Homeric hexameters at sight, with fluency and expression.

It is not possible for schools to gain accrediting in both 8 and 9 with less than three years' study of Greek, except under extraordinary circumstances. The adjustment of Greek work in the university to the different classes of students is as follows:

1. Students who enter the university with credit for matriculation subjects 8 and 9 will be admitted to Greek 1 or 2 in freshman year.

2. Students who offer only matriculation subject 8 will be admitted to Greek B, which will cover the work of matriculation subject 9 in one year at the rate of three exercises a week. This will prepare them to take up Greek 1 or 2 in sophomore year.

3. Students who bring no Greek to the university, but who wish to begin the study in the university, will be admitted to Greek A, which will cover the work of matriculation subject 8 in one year at the rate of five exercises a week. Such students can complete Greek B in sophomore year and still have time for two years of strictly university Greek before graduation. But the period of life covered by the high-school course is the time when the memory work involved in learning the elements of a highly inflected language, like Greek, is most easily and successfully accomplished, and students who intend to study Greek are advised to begin the subject in the high school whenever this is possible.

10. Ancient history and geography (1 unit).—The elements of ancient history, from the earliest times to 800 A. D. Chief stress should be laid upon Greek history from the fifth to the third century B. C., inclusive; upon Roman history, from the conquest of Italy to the end of the second century A. D., and upon the geography of the ancient world. The following text-books* will indicate the

*The mention of any book does not mean that the university or the department of history recommends it.

amount required from those who are admitted on certificate: Goodspeed's History of the Ancient World, Botsford's Ancient History, West's Ancient History, Wolfson's Ancient History, Myer's Ancient History (new edition). From pupils presenting themselves for examination a fuller knowledge of the subject is demanded. In connection with the text-book the pupils are expected to acquire facility in making concise, logical outlines, and to embody some of these, with a few maps, and simple evidences of collateral reading, in a notebook.

11. Physics (1 unit).—The requirement represents at least a daily exercise during one school year, which falls within the last two years of preparation for college. It is expected that the ground covered will include fair representation of primary empirical laws from each of the main subdivisions of physics.

The results called for demand vigorous and thorough instruction in the class room, based upon laboratory exercises by the pupils and other experimental illustrations; and it is urged that a strong effort be made to connect the principles of physics with familiar facts and processes. In addition to the test of a written examination, it will be required that each candidate submit a laboratory notebook, signed by his teacher, as evidence that the main principles of the subject as treated have been presented experimentally. The following form of certificate is suggested as a definite statement of what is vouched for by the teacher's signature:

I hereby certify that these notes represent actual laboratory results obtained by [*Insert name of pupil*]. This statement applies to experiments numbered [*Insert the numbers*], entered upon pages [*Insert the page numbers*] of this record.

Dated at _____, _____, 19__. Signed, [*Teacher's name.*]

It is requested that this certificate be entered upon the last page of the student's laboratory record.

12a¹. Synthetic projective geometry (½ unit).—Harmonic and anharmonic ratios, theory of poles and polars with respect to the circle, radical axes, centers of similitude, transversals in general, perspective and projective pencils, reciprocation, involution.

12a². Plane trigonometry (½ unit).—The development of the general formulæ of plane trigonometry, with applications to the solution of plane triangles and the measurement of heights and distances. Practice in computation with logarithmic tables.

12a³. Advanced algebra, Part I (½ unit).—Determinants, rational factors and higher equations, simultaneous equations of higher degree (graphical methods), solution of numerical equations by Horner's method, relations between roots and coefficients, symmetric functions of roots, complex quantities (graphical method), binomial equations, derived functions, maxima and minima, Taylor's theorem for algebraic functions, transformation of functions, reciprocal equations, criteria for real roots, Descartes's rule of signs.

12a⁴. Advanced algebra, Part II (½ unit).—Inequalities, limits, and indeterminate forms, exponentials and logarithms, natural logarithms, convergency and divergency of series, indeterminate coefficients with applications to integral functions, partial fractions, expansion of functions and summation of series, permutations and combinations, the binomial theorem for any index, exponential and logarithmic series, logarithmic computation.

12b. Chemistry (1 unit).—This requirement represents five exercises a week for one year. Laboratory practice is essential, and as much time as possible should be devoted to it. Much of the time should be spent in acquiring fundamental principles, omitting as much as possible the analytical work. A notebook should be kept and presented at the time of the examination in Berkeley.

12c. Botany (1 unit).—A knowledge of the morphology and simpler physiology of the higher plants is required. This should be based upon a full year of practical work in the laboratory, and, to some extent, also, in the field. Careful attention should be paid to the recording of observations, by notes and drawings, together with the drawing of correct inferences from the observations. It is desirable that the pupils become familiar with the easier orders of flowering plants represented in the local flora. Setchell's Laboratory Practice for Beginners, Jepson's Flora of Western Middle California, Bergen's Elements of Botany, and Osterhout's Experiments with Plants, indicate both the scope and the method of the work. A notebook should be kept and presented at the time of the examination in Berkeley.

12d. Zoology. (1 unit).—Preparation in this subject should aim at proficiency in solving problems rather than the mere acquisition of information. For this reason, the necessity of practical work in field and laboratory is strongly emphasized. Local conditions should determine in the main the character of the course, materials, relative proportions of field and laboratory work, etc. The text-books by Jordan and Kellogg, and Linville and Kelly, also Peabody's Laboratory Exercises, and Linville and Kelly's Guide for Laboratory and Field are suggestive of scope and method. No single text-book is recommended, however, and a stereotyped course is neither demanded nor desired. Consideration will be given especially to capacity to make accurate observations, state problems and apply facts to their solution, make thoughtful deductions and clear expositions.

The requirement represents a minimum of five hours a week. Four hours at least should be devoted regularly to practical work, preferably in two periods of two hours each. Drawing should be used as a means of testing the correctness of observations, not primarily as a means of record. Notebooks—not composition books—and drawings should be submitted with the examination paper.

12e. Physical geography (1 unit).—A course designed to cultivate habits of observation, comparison, and reflection; requiring a practical acquaintance with common natural phenomena and the processes which underlie them. It should embrace experimental and field investigation of as many topics as may be practicable in each of the commonly accepted divisions of the subject, namely, mathematical geography, the atmosphere, the ocean, and the land. The order of these divisions should be arranged to suit the individual school. Obviously some of mathematical geography should come early in the course—the uses and limitations of flat maps, for example. Observations of such a nature as those of the sun's noon altitude should continue during the entire year, with weekly records. Schools too far from the ocean to make field excursions to the shore may reduce somewhat the time for this division, although much valuable field work is possible with pictures and the monthly pilot charts. In the other divisions of the subject direct observation of phenomena is equally possible for all schools, the details of climate and land forms varying with the locality.

Notebooks should be kept and presented at the time of the examination in Berkeley.

12f. Physiology (1 unit).—The requirement represents five exercises a week throughout one year.

The work should embrace (1) a well-organized laboratory course and (2) class-room exercises based upon both laboratory and text-book study.

The emphasis should be placed upon physiology proper, viz., the mechanism of the phenomena of life and the functions of the various organs of the human body; but in connection with this the pupil should learn accurately with the aid of a manikin such anatomical facts as are fundamental for the understand-

ing of the functions of the organs. He should also receive definite and practical instruction in the more important principles of personal and public hygiene, e. g., the sources of infection for typhoid or diphtheria or other infectious diseases, and how to avoid these infections.

In the laboratory carefully written notes and drawings should be made, and these should be frequently criticised by the teacher. The laboratory work should occupy at least one-half of the time of the entire course.

The laboratory notebook, properly certified by the teacher, should be presented as a part of the entrance examination.

13*a*. *Mediæval and modern history* (1 unit).—The period to be covered is from 800 A. D. to the middle of the nineteenth century, and Myers's Mediæval and Modern History indicates approximately the amount required.[a]

13*b*. *English history* (1 unit).—From the earliest times to the middle of the nineteenth century. Larned's History of England indicates approximately the amount required.[a]

14. English.[b]—The examination both in 14*a* and 14*b* will presuppose a thorough acquaintance with the works covered as regards organization and development of thought, style, metrical structure, place in literary history, life of the author, and relation to the age.

14a (1 unit).—(1) Tennyson's Idylls of the King (for careful study, the Passing of Arthur; for *reading*,[a] with occasional reports in class, two of the following: The Holy Grail, Lancelot and Elaine, Guinevere, Enid, Gareth and Lynette); (2) Lowell's The Vision of Sir Launfal, and the Commemoration Ode; (3) Macaulay's Chatham (second essay) or Frederick the Great or Clive or Warren Hastings (for *reading*);[a] (4) Henry Esmond, or Silas Marner and the Vicar of Wakefield; (5) Milton's L'Allegro, Il Penseroso and Comus; (6) Sir Roger de Coverley.

While the regular examination will be confined to these items, accredited schools may make such substitutions as the following: For (1) similar selections from the poetry of chivalry, or The Princess; for (4) one of the following: The Newcomes, Adam Bede, The Mill on the Floss, Romola, Tale of Two Cities, David Copperfield, Nicholas Nickleby, Our Mutual Friend, Oliver Twist, The Cloister and the Hearth; for (5) Comus, Paradise Lost, Book 1, or 2, or 5, or 6; for (6) an equivalent amount from Addison's Select Essays, the Essays of Elia, the Autocrat of the Breakfast Table, Stevenson's Virginibus Puerisque, or Burrough's Essays, or Warner's Back-log Studies, or Curtis' Prue and I.

14b (1 unit).—(1) Arguments and Orations: Burke's Speech before the Electors at Bristol; Macaulay's First Speech on the Reform Bill; Webster's Reply to Hayne; (2) The Essay, literary or ethical; Carlyle's Essay on Burns, or Emerson's Compensation and Self-Reliance (for *reading*,[a] with occasional reports in class); (3) a general outline of English Literature, illustrated by the study, in chronological order, of Chaucer's Prologue to the Canterbury Tales; Shakespeare's Macbeth (reading and reports); Milton's Lycidas and Sonnets II, XVI, XIX, XXII; Gray's Elegy; Wordsworth's Tintern Abbey, Ode on the Intimations of Immortality and Ode to Duty; Keats' Eve of St. Agnes and the Nightingale; Shelley's The Cloud and The Skylark; Browning's A Transcript from Euripides (in Balaustion's Adventure), or shorter poems, Rabbi Ben Ezra, Andrea del Sarto, and others, five or six hundred lines in all; Arnold's Scholar-Gypsy (or The Forsaken Merman and Rugby Chapel); Tennyson's Oenone.

---

[a] The mention of any book does not mean that the university or the department of history recommends it.

[b] See notes under English 1.

Schools on the accredited list may make such substitutions as the following: For (1) any three oratorical masterpieces of argument (including one of Burke's); for (2), *literary*, one of the following: Carlyle or Macaulay on Boswell's Life of Johnson, an equivalent in Boswell's Life, Macaulay's Addison (½) and Milton (½), an equivalent from Lowell's Literary Essays, such as his Chaucer, or from Arnold's, such as his Prefatce to the Poems of Wordsworth (½) and his Emerson (½), Ruskin's Sesame, Harrison's Choice of Books; *ethical*, an equivalent from Bacon's Essays, or from Moulton's edition of the Proverbs, the Psalms, the Book of Job, or the writings attributed to St. John. It is also recommended that, so far as time may permit, standard English poems not included in this list, but illustrative of the history of literature, and the best short poems of our American authors, be read in class, though not necessarily for purposes of minute study.

15a[1]. *Elementary French* (1 unit).—Candidates who matriculate with both Latin and Greek, and who have studied French during the last year of their high-school course in a special class, may be credited for that work with one unit; provided that this work be approximately equivalent to the regular elementary French as defined below.

15a[2]. *Elementary French* (2 units).—French is a living language, and the object of the instruction should be to teach the student to read, write, and speak it as such. Therefore as much French as possible should be used in class from the beginning. Translation into English should be sparingly used. It is preferable to get at a student's understanding of a passage by simple questions in French based on the passage. The answers of the students should be always in French.

At the end of the elementary course the student should be able to pronounce French accurately; to read ordinary French prose; to understand, write, and speak French in simple sentences based on some text or on the ordinary affairs of life.

The work should comprise: (1) Careful attention to pronunciation. A good pronunciation is absolutely necessary. (2) The essentials of the grammar, especially the regular and most common irregular verbs, the forms and positions of pronouns, the uses of the prepositions and conjunctions. (3) The reading of some 200 duodecimo pages of modern prose. (4) Writing based on the texts read and on the affairs of every-day life. The class work should be as far as possible in French.

15a[3]. *Intermediate French* (1 unit).—At the end of the intermediate course the student should be able to read French of moderate difficulty; to write ordinary French in the narrative form; to carry on a simple conversation in French.

The work should comprise: (1) A review of the essentials of the grammar, especially the use of the auxiliary and modal verbs; the meaning of the moods and tenses; a rather full knowledge of irregular verbs; the essentials of syntax, the use of the pronoun, the verb-forms required in dependent clauses, special attention being given to the use of the subjunctive. The putting of connected English prose into French is a valuable exercise in practical grammar. It is a means toward free writing. (2). The reading of from 300 to 500 pages, from at least four standard authors. Some of this should be done outside of the class, and written reports made upon it in French. (3) The writing of many letters and short themes and oral and written reproduction of French texts. The course should be carried on entirely in French.

15a[4]. *Advanced French* (1 unit).—At the end of the advanced course the student should be able to read more difficult French of a literary character of not earlier date than the seventeenth century; to write in French a short essay on

some simple subject connected with the works read; to carry on a conversation in French.

The work should comprise from 400 to 600 pages of standard French; the writing of numerous short themes in French; explanation and discussion of the text in French. The course should be given entirely in French.

The reading of verse of suitable difficulty comes naturally into the work of all classes. Some comedy also should be read in each course.

15b[1]. *Elementary German* (1 unit).—Candidates who matriculate with both Latin and Greek, and who have studied German during the last year of their high-school course, in a special class, may be credited for that work with one unit. It is expected that a year's work, under these circumstances, will be approximately equivalent to the regular two years' course in elementary German as defined below (*15b*[2]) and will enable the student to continue the study of German in the same college course as those who were credited with *15b*[2].

15b[2]. *Elementary German* (2 units).—The ability to read at sight easy German prose, to translate correctly simple English sentences into German, and to understand and answer in German simple questions on passages in the reading; a knowledge of the elements of German grammar.

The reading in elementary German should amount to at least 150 pages of graded modern prose.

The requirement in grammar includes: The regular inflection of nouns, adjectives, articles, pronouns, and weak verbs; the inflection of the more usual strong verbs; the more common prepositions; the ordinary uses of the modal auxiliaries; the elements of syntax, especially the rules concerning word-order and the use of the subjunctive.

15b[3] *Intermediate German* (unit).—The ability to read at sight ordinary German prose or poetry, to translate correctly into German a passage of easy English, and to carry on a simple conversation in German; a knowledge of the essentials of German grammar.

The reading in intermediate German should amount, in addition to that done in the elementary course (*15b*[2]), to at least 350 pages of recent and classical prose and poetry.

The requirement in grammar includes the inflection of the less usual strong verbs, the rules concerning the use of articles, cases, auxiliaries of all kinds, tenses, and moods, and the elements of word-formation.

15b[4] *Advanced German* (1 unit).—The ability to read at sight any not exceptionally difficult piece of German prose or poetry from the literature of the last one hundred and fifty years, to translate into German a passage of ordinary English prose, to answer in German questions relating to the lives and works of great writers studied, and to write in German a short, independent theme upon some assigned subject.

The reading in advanced German should amount to at least 600 pages of good modern (including eighteenth-century) literature.

15c. Spanish (2 units).—An accurate knowledge of the essentials of the grammar, especially the verbs. (2) The ability to read ordinary Spanish prose, of which some 300 to 500 duodecimo pages should be read. (3) The ability to write ordinary Spanish. (4) The ability to carry on a simple conversation based on a text or on the ordinary affairs of life. [For more detailed suggestions, see Elementary French, subject 15a.[5]]

16. Free-hand drawing (1 unit).—Representing not less than two years' work of not less than four hours a week. The study of light and shade and perspective, by drawing and shading, with lead pencil, from geometric models (such as the cube, sphere, cylinder, etc., singly and in groups) and from simple objects related to these in form.

17. Geometrical drawing (1 unit).—This requirement represents one daily exercise during one school year, following the course in free-hand drawing. The requirement calls for continuous training in the use of drawing instruments in the solution, by graphic methods, of such geometric problems as shall emphasize the necessity of accuracy and neatness. The course should be a general one, affording preparation for technical drawing as taught in the colleges of engineering, as well as for the purpose of business life.

TIMES AND PLACES OF EXAMINATION.

Matriculation examinations are held in August and in January of each year; but the examinations in January are primarily for the purpose of enabling students in the university to remove deficiencies incurred in previous matriculation examinations. Applicants for admission who present certificates from their teachers that they are prepared in the subjects they offer will be admitted to the January examinations. Such certificates must be filed with the recorder of the faculties before the examinations.

No person save a registered student of the university will be allowed to take any matriculation examination without having first filed an application for admission.

In 1908 examinations will be held in Berkeley on August 6, 7, 8, 10, and 11. The university may conduct matriculation examinations at the same time in any city or at any school where the number of candidates and the distance from other places of examination may warrant it. Applications for this purpose should be sent to the recorder of the faculties by mail, not later than June 1.

A circular giving detailed information regarding the matriculation examinations may be obtained by addressing the recorder of the faculties.

Certificates of successful examination before the College Entrance Examination Board will be accepted in lieu of matriculation examinations conducted by the University of California in all of the preparatory subjects; but at present the board holds no examination covering the ground of English subject 14.

---

(8) THE UNIVERSITY OF CHICAGO.

THE JUNIOR AND SENIOR COLLEGES. ADMISSION.

§ 1. *TIME OF PREPARATION—ADMISSION UNITS.*

Preparation for admission to a junior college is expected to cover a period of four years in a secondary school (high school or academy) of high grade. Admission credits are reckoned in units. A unit is a course of study comprising not less than one hundred and fifty hours of prepared work. Two hours of laboratory work are regarded as the equivalent of one hour of prepared work.

§ 2. *SUBJECTS ACCEPTED FOR ADMISSION AND THEIR UNIT VALUES.*

The work accepted for admission is classified according to departments in the following list. Under each department the subjects for examination are numbered 1, 2, 3 etc. The numbers correspond in each case with those given under the several departments in the following table. The unit value of each subject is specified. For description of the ground covered by each of these units see § 7.

Civics, or political economy, ½ unit.

History 1, Greek, ½ unit; history 2, Roman, ½ unit; history 3*a*, European, mediæval, and history 3*b*, European, modern, together 1 unit; history 4*a*, United States, elementary, ½ unit; history 4*b*, United States, advanced, 1 unit; history 5*a*, English, elementary, ½ unit; history 5*b*, English, advanced, 1 unit.

Greek 1, elementary, 1 unit; Greek 2, Anabasis and prose composition, 1 unit; Greek 3, Homer, 1 unit.

Latin 1, Cæsar; Latin 2, elementary prose, 2 units; Latin 3, Virgil; Latin 4, Cicero; Latin 5, advanced prose composition, 2 units.

French, 1, 2, and 3, each 1 unit.

Spanish, 1 unit.

German, 1, 2, and 3, each 1 unit.

English, 3 units.

Biblical history and literature, ½ or 1 unit.

Mathematics 1*a*, algebra to quadratics, 1 unit; mathematics 1*b*, algebra through quadratics, ½ unit; mathematics 2, plane geometry, 1 unit; mathematics 3, solid geometry, ½ unit; mathematics 4, trigonometry, ½ unit.

Astronomy, ½ unit.

Physics, 1 unit.

Chemistry, 1 unit.

Geology, ½ unit.

Physiography, ½ or 1 unit.

Zoology, 1 unit } or ½ unit each.
Botany, 1 unit }

General biology, 1 unit.

Physiology, ½ unit.

Mechanical drawing, 1 unit.

Free-hand drawing, ½ or 1 unit.

Shop work, 1 unit.

§ 3. *AMOUNT OF WORK.*

A candidate is admitted on the presentation of 15 units from the list of approved subjects (§ 2).

§ 4. *SPECIFIC SUBJECTS.*

Of the 15 units presented for admission, 3 units must be English; 3 units, language other than English; and 2½ units, mathematics. One additional unit of language other than English will be required of a student who enters the college of literature.

§ 5. *LIMITATIONS.*

(1) Not more than 1 unit each of United States history and of English history will be accepted. (2) Not more than 4 units in science will be accepted. (3) College credit for work done in a high school or academy in excess of the 15 units will be granted only on the following terms: (*a*) On presentation of a certificate of an amount of work equivalent in quantity and kind to that required in the corresponding course in the junior college; (*b*) on completing one quarter's work in the university with creditable standing; and (*c*) on passing an examination at the university within six months after admission. (4) Not more than 2 units in all for both drawing and shop work will be credited for admission.

76049—No. 2—09——7

§ 6. ADVISED GROUPING OF PREPARATORY SUBJECTS.

(1) A student who wishes to enter the college of arts is advised to present, besides the required English and mathematics, 4 units of Latin and 3 units of Greek. (2) A student who wishes to enter the college of literature or the college of philosophy is advised to present, besides the required English and mathematics, 5 units of Latin, French, or German, and 2 units of history. (3) A student who wishes to enter the college of science is advised to present, besides the required English, 3 units of mathematics, 4 units of Latin, French, or German, and 2 units of science.

NOTES.—(a) While Latin is not required for admission to the colleges of literature, of philosophy, and of commerce and administration, or for graduation from them, all students entering these colleges are advised to take Latin; and students who expect to do advanced work or to teach in political economy, political science, history, sociology, French, German, or English, or who expect to enter the divinity school, or the law school, are advised to take at least 3 units of Latin. Latin is required for admission to the divinity school, and is a prerequisite for graduate work in any of the departments mentioned. (b) Students who intend to study medicine are advised to present for admission 2 units of Latin, 3 units of French or German, 1 unit each of physics and chemistry, 3 units of mathematics (including ½ unit of trigonometry). All of these subjects are included in the requirements for admission to the courses in medicine.

§ 7. DESCRIPTION OF SUBJECTS ACCEPTED FOR ADMISSION.

The scope of the subjects accepted for admission is indicated in the pages which follow. The numbers in each department correspond with those in the tables above.

POLITICAL ECONOMY.

Some standard text, such as Laughlin's Elements of Political Economy, should be used as the basis of work and of class room discussion. Students should have access also to selected economic treatises, and should be encouraged in connection with class work systematically to extend their research into local conditions of industry and agriculture. ½ unit.

POLITICAL SCIENCE.

Civil government.—Credit will be given for such knowledge of this subject as is indicated by any standard text—such as Hart, Hinsdale, or James and Sanford. The student should not be confined to one book, however, but should be accustomed to work by topics. ½ unit.

HISTORY.

(1) *The History of Greece* from earliest times to the fall of Corinth (146 B. C.), together with a preliminary survey of ancient Oriental history. ½ unit.

(2) *The History of Rome* from earliest times to the death of Constantine (337 A. D.), with especial emphasis upon the republic of the first century B. C., and the history of the empire. ½ unit.

Recommended texts: Goodspeed's History of the Ancient World; Botsford's History of Greece and History of Rome; or Botsford's Ancient History; West's Ancient History; Oman's History of Greece; Morey's History of Rome; Morey's History of Greece; Myer's Ancient History (revised edition, 1904); Abbott's Short History of Rome.

(3) *General European history.*—(a) The work in general European history is to begin with a study of the institutions of the Roman Empire under Diocletian and Constantine. (b) The following texts are recommended: For the

mediæval period, Thatcher and Schwill's The Middle Ages (new edition); for the modern period, Schwill's History of Modern Europe or Robinson's History of Europe, entire; Adams's General European History, Bourne's European History. 1 unit. No credit will be given for 3*a* or 3*b* separately.

(4) *The History of the United States, elementary.*—(*a*) More attention should be given to the period subsequent to the Declaration of Independence than to that preceding. So far as possible, the use of books other than the text-book should be encouraged. Fiske's, McMaster's, Thomas's, or Johnston's school texts are recommended. ½ unit.

(*b*) *The History of the United States, advanced.*—This requires more detailed study than the preceding. 4*a* is included in 4*b*, and separate credit will not be given for 4*a* if the student takes 4*b*. Recommended texts: Channing's Students' History of the United States, McLaughlin's History of the American Nation, and Epochs of American History (3 vols.), edited by A. B. Hart. 1 unit.

(5) *The History of England, elementary.*—(*a*) The student should know the main facts connected with the development of the English people. Recommended texts: Coman and Kendall's The Growth of the English Nation, Larned's History of England, Cheyney's History of England, or Tout and Sullivan's Elementary English History. ½ unit.

(*b*) *The History of England, advanced.*—This requires more detailed study than the preceding. 5*a* is included in 5*b*, and separate credit will not be given for 5*a* if the student takes 5*b*. Recommended texts: Terry's History of England, Gardiner's Student's History of England, or Ransome's History of England. 1 unit.

GREEK.

(1) Greek grammar, and the translation into Greek of sentences of average difficulty. Required of candidates for the college of arts.

(2) The translation of a passage from Xenophon's Anabasis, either at sight or from Books I to IV, with grammatical, literary, geographical, and historical questions. Required of candidates for the college of arts.

To satisfy the requirement of (1) and (2) four books of the Anabasis should be read, with frequent exercises in composition.

(3) The translation of an average passage from the Iliad of Homer, either at sight or from Books I to VI, with questions on Homeric grammar and prosody. (3) is recommended to candidates for the college of arts. The candidate is expected to have read at least six books of the Iliad. If only a half unit is offered, an extra major—one of the elective courses—will be required in college.

It is possible, however, for students who desire to be candidates for the degree of bachelor of arts who are admitted without Greek to take the preparatory courses in college; see Annual register, department of Greek.

LATIN.

(1) The translation at sight of narrative prose similar to that of Cæsar.

(2) The translation into Latin of sentences of average difficulty based upon Cæsar's Gallic War. (1) and (2) taken together constitute 2 units.

(3) The translation at sight of an average passage from Virgil or Ovid, with questions on poetical forms and constructions and on prosody. One unit.

(4) The translation at sight of a piece of prose equal in difficulty to an average passage of Cicero's speeches or letters, with grammatical, literary, and biographical questions.

(5) The translation into Ciceronian Latin of a connected passage of idiomatic English. (4) and (5) taken together constitute 1 unit.

NOTE.—While Latin is not required for admission to the colleges of literature and of commerce and administration, or graduation from them, all students entering these colleges are advised to take Latin; and students who expect to do advanced work or to teach in political economy, political science, history, sociology, French, German, or English, or who expect to enter the divinity school, or the law school, are advised to take at least 3 units in Latin. Latin is required for admission to the divinity school, as well as to the course in medicine, and is a prerequisite for graduate work in any of the departments mentioned.

FRENCH.

(1) The first unit of French should comprise: (*a*) The rudiments of grammar, including the inflection of the regular and the more common irregular verbs; the plural of nouns; the inflection of adjectives, participles, and pronouns; the use of personal pronouns, common adverbs, prepositions, and conjunctions; the order of words in the sentence, and the elementary rules of syntax. (*b*) The reading of not less than 200 duodecimo pages of graduated texts, with constant practice in translating into French easy variations of the sentences read (the teacher giving the English) and in reproducing from memory sentences previously read. (*c*) Careful drill in pronunciation; writing French from dictation; conversation.

(*a*), (*b*), and (*c*) taken together constitute 1 unit; recommended to all applicants for admission to the colleges of literature, of science, and of commerce and administration. Either this unit, or the first unit of German, is recommended to applicants for admission to the college of arts.

(2) The second unit of French should comprise: (*a*) Continued drill upon the rudiments of grammar, with constant application in the construction of sentences; mastery of the forms and use of pronouns, pronominal adjectives, of all irregular verb forms, and of the simple uses of the conditional and subjunctive. (*b*) The reading of not less than 400 pages of easy modern prose in the form of stories, plays, or historical or biographical sketches; constant practice in translating into French easy variations upon the texts read; frequent abstracts, sometimes oral and sometimes written, of the text. (*c*) Continued drill in pronunciation, conversation, and dictation.

Suitable texts for the second unit are: Colomba (Mérimée); Jeanne d'Arc (Lamartine); Le roi des montagnes (About); Le tour de la France (Bruno); Daudet's stories; Contes biographiques (Foa); Le petit Robinson de Paris (Foa); La poudre aux yeux (Labiche et Martin); Le voyage de M. Perrichon (Labiche et Martin); La cigale chez les fourmis (Legouvé et Labiche); Sans famille (Malot); La tâche du petit Pierre (Maigret); Le siège de Paris (Sarcey); La mare au diable (Sand); extracts from Michelet, stories of Erckmann-Chatrian, Verne, etc.

(*a*), (*b*), and (*c*) taken together constitute 1 unit. French (2) or a second unit of German is recommended to applicants for admission to the colleges of literature, of science, and of commerce and administration.

(3) The third unit of French calls for the ability to use the language effectively as a means of oral and written expression. The work should comprise: (*a*) The study of a grammar of moderate completeness. (*b*) The reading of not less than 600 pages of French of ordinary difficulty, a portion to be in the dramatic form. (*c*) Constant practice in giving French paraphrases, abstracts, or reproductions from memory of selected portions of the matter read; writing from dictation; conversation.

Suitable texts for the third unit are: About's stories; Augier and Sandeau's Le gendre de M. Poirier; Béranger's poems; Corneille's Le Cid and Horace;

Coppée's poems; La Brète's Mon oncle et mon curé; Madame de Sévigné's letters; Victor Hugo's Hernani and Ruy Blas; Labiche's plays, Loti's Pêcheur d'Islande; Molière's L'avare and Le bourgeois gentilhomme; Racine's Athalie, Andromaque, and Esther; Sandeau's Mademoiselle de la Seiglière; Scribe's plays; Thierry's Récits des temps Mérovingiens; Thiers' L'expédition de Bonaparte en Egypte; Vigny's La canne de jonc; Voltaire's historical writings, etc.

(*a*), (*b*), and (*c*) taken together constitute 1 unit and may be presented as the third unit of modern language recommended to candidates for the colleges of literature, of science, and of commerce and administration.

SPANISH.

This unit should comprise: (*a*) Drill in pronunciation, including accentuation. (*b*) The elements of grammar, including all the regular and the more common irregular verbs, the forms and order of the personal pronouns, the uses and meaning of the common prepositions, adverbs, and conjunctions, the use of the personal accusative, and other elementary rules of syntax. (*c*) Study of not less than 175 pages of graded prose texts.

(*a*), (*b*), and (*c*) together constitute 1 unit

GERMAN.

(1) The first unit should comprise: (*a*) Careful drill upon pronunciation. (*b*) The memorizing and frequent repetition of easy colloquial sentences. (*c*) Drill upon the rudiments of grammar—that is, upon the inflection of the articles, of such nouns as belong to the language of everyday life, of adjectives, pronouns, weak verbs, and the more usual strong verbs; also upon the use of the common prepositions, the simpler use of the modal auxiliaries, and the elementary rules of syntax and word order. (*d*) Abundant easy exercises designed not only to fix in mind the forms and principles of grammar, but also to cultivate readiness in the reproduction of natural forms of expression. (*e*) The reading of from 100 to 200 pages of graduated texts, chiefly prose, with constant practice in translating into German easy variations upon sentences selected from the reading lesson, and in the reproduction from memory of sentences previously read.

The work indicated constitutes 1 unit; recommended to all applicants for admission to the colleges of literature, of science, and of commerce and administration. Either this unit or the first unit of French is recommended to applicants for admission to the college of arts.

(2) The second unit calls for the reading of about 400 pages of moderately difficult prose and poetry, with constant practice in giving, sometimes orally and sometimes in writing, paraphrases, abstracts, or reproductions from memory of selected portions of the matter read; also grammatical drill upon the less usual strong verbs, the use of articles, cases, auxiliaries of all kinds, tenses and modes (with special reference to the infinitive and subjunctive), and likewise upon word order and word formation. Suitable reading matter (five books) must be selected from the following works: Andersen's Märchen, or Andersen's Bilderbuch ohne Bilder, or Leander's Träumereien—to the extent of about 40 pages; after that Hauff's Das kalte Herz, or Zschokke's Der zerbrochene Krug; then Hillern's Höher als die Kirche, or Storm's Immensee; next one of the three selections in Nichol's Karl der Grosse nebst zwei andern Bildern aus dem Mittelalter (Freytag), preferably Aus dem Klosterleben; or Schiller's Wilhelm Tell; lastly, Benedix's Der Process, or Wilhelmi's Einer muss heirathen!

The work indicated constitutes 1 unit. German (2) or a second unit of French is recommended to applicants for admission to the colleges of literature, of science, and of commerce and administration.

(3) The third unit calls for the ability to use the language effectively as a means of oral and written expression, tested by: (*a*) The translation of continuous English prose into idiomatic German, or (*b*) a brief essay in German upon one or two subjects selected from the following works:

1907–8: Conrad Ferdinand Meyer, Das Amulett (American Book Company); Theodore Storm, Pole Poppenspäler (D. C. Heath & Co.); Helnrich von Treitschke, Das deutsche Ordensland Preuszen (Maynard, Merrill & Co.); Hermann Sudermann, Teja (Henry Holt & Co.). 1908–9: Thiergen, Am deutschen Herde (Ginn & Co.); Grillparzer, Der arme Spielmann (D. C. Heath & Co.); Schrammen, Legends of German Heroes of the Middle Ages (Maynard, Merrill & Co.); Heyse, Kolberg (Maynard, Merrill & Co.). 1909–10: Helnrich Seidel, Aus goldenen Tagen (D. C. Heath & Co.); Gottfried Keller, Das Fähnlein der sieben Aufrechten (D. C. Heath & Co.); E. T. A. Hoffmann, Das Fräulein von Scudéri (Henry Holt & Co.); Manley and Allen, Four German Comedies (Ginn & Co.); Ernst von Wildenbruch, Harold (D. C. Heath & Co.).

(*a*) and (*b*) taken together constitute 1 unit, and may be presented as the third unit of modern language recommended to candidates for the colleges of literature, of science, and of commerce and administration.

Those who begin their study of German in the university will begin with course 1, *elementary German*. Those who receive credit for 1 unit of German on admission will begin with course 3, *intermediate German*; those who receive credit for 2 units will begin with course 5, *modern prose readings*; and those who receive credit for 3 units will, with the approval of the instructor in each case, elect work from the senior college courses.

ENGLISH.

Three units of entrance credit are given by the university, covering the following subjects:

(1) Elementary composition, including grammar, spelling, punctuation, etc., and the reading of English classics in what is known as the "general list" as follows:

Group I (two to be selected): Shakspeare's As You Like It, Henry V, Julius Cæsar, The Merchant of Venice, Twelfth Night.

Group II (one to be selected): Bacon's Essays; Bunyan's The Pilgrim's Progress, Part I; The Sir Roger de Coverley Papers in the Spectator; Franklin's Autobiography.

Group III (one to be selected): Chaucer's Prologue; Spenser's Faerie Queene (selections); Pope's The Rape of the Lock; Goldsmith's The Deserted Village; Palgrave's Golden Treasury (First Series), Books II and III, with especial attention to Dryden, Collins, Gray, Cowper, and Burns.

Group IV (two to be selected): Goldsmith's The Vicar of Wakefield; Scott's Ivanhoe; Scott's Quentin Durward; Hawthorne's The House of the Seven Gables; Thackeray's Henry Esmond; Mrs. Gaskell's Cranford; Dickens's A Tale of Two Cities; George Eliot's Silas Marner; Blackmore's Lorna Doone.

Group V (two to be selected): Irving's Sketch Book; Lamb's Essays of Elia; De Quincey's Joan of Arc and The English Mail Coach; Carlyle's Heroes and Hero Worship; Emerson's Essays (selected); Ruskin's Sesame and Lilies.

Group VI (two to be selected): Coleridge's The Ancient Mariner; Scott's The Lady of the Lake; Byron's Mazeppa and The Prisoner of Chillon; Palgrave's Golden Treasury (First Series), Book IV, with especial attention to Words-

worth, Keats, and Shelley; Macaulay's Lays of Ancient Rome; Poe's Poems; Lowell's The Vision of Sir Launfal; Arnold's Sohrab and Rustum; Longfellow's The Courtship of Miles Standish; Tennyson's Gareth and Lynette, Lancelot and Elaine, and The Passing of Arthur; Browning's Cavalier Tunes, The Lost Leader, How They Brought the Good News from Ghent to Aix, Evelyn Hope, Home Thoughts from Abroad, Home Thoughts from the Sea, Incident of the French Camp, The Boy and the Angel, One Word More, Hervé Riel, Pheidippides. 1 unit.

(2) Literature: Study of the English classics in what is known as the "list for intensive study;" and an outline of the history of the chief periods of English literature following the classics studied. 1 unit.

The books for study in 1909 and 1910 are: Shakspeare's Macbeth; Milton's Lycidas, Comus, L'Allegro, and Il Penseroso; Burke's Speech on Conciliation with America, or Washington's Farewell Address and Webster's First Bunker Hill Oration; Macaulay's Life of Johnson, or Carlyle's Essay on Burns.

(3) Composition and rhetoric, including the rhetorical treatment of the whole composition, the paragraph, and the sentence; the kinds of composition; diction; usage—such topics, namely, as are treated in the standard text-books of rhetoric. 1 unit.

It should be noted: (*a*) That the units described above represent approximately half work in English literature and half work in rhetoric and composition. (*b*) That the division of the units by topics does not imply a corresponding separation in the teaching. (*c*) That the three units are given as a whole; i. e., credit will not be given for one or two units. (*d*) That the university reserves the right to withdraw one or more units of credit from students whose work in English in the junior colleges is found to be seriously defective in spelling, punctuation, grammar, or division into paragraphs.

Advanced standing.—Attention is called to the fact that candidates whose credentials show work in English beyond the requirements specified above may apply for advanced standing, and may, on satisfactorily passing examinations, omit either or both of junior college courses 1 and 40. The examinations for advanced standing will be held at the university during the first week of the autumn quarter. Application should be made to the examiner for secondary schools.

BIBLICAL HISTORY AND LITERATURE.

(1) *The History of the Hebrews from the Establishment of the Kingdom to the Return from the Exile.*—The following texts are recommended as indicating the character of the work required: Price, Syllabus of Old Testament History, §§ 50-80; Kent, History of Hebrew People, Vol. I, §§ 73-169; Vol. II, §§ 1-212.

(2) *The Life of Jesus.*—The requirement will be met by the study of Burton and Mathews, Constructive Studies in the Life of Christ; chaps. 2, 3, 20-27, may, if necessary, be passed over lightly or omitted.

(3) *Old Testament Literature.*—Robertson, The Books of the Old Testament, will indicate the scope and character of the requirement.

(4) *New Testament Literature.*—The requirement will be met by the study of McClymont, The New Testament and its Writers, chaps. 1-18.

The unit consists of (1), (2), and either (3) or (4), at the option of the student. 1 or ½ unit.

MATHEMATICS.

(1a) *Algebra to quadratic equations*, with emphasis on the technique. Special attention should be given to factoring, the solution of equations, the algebraic formulation of problems, and the simpler processes of radicals and exponents. Required of all students. 1 unit.

(1b) *Algebra through quadratic equations*, with emphasis on the statement and the demonstration of principles. Special attention should be given to radicals and exponents, imaginaries, systems of equations, and the theory of quadratic equations. Required of all students, ½ unit.

NOTE.—It is desired that the preparatory schools give to the subject of algebra, besides the customary first-year course, a more advanced course, not earlier than the third year of their curriculum. The second course should include a review of the previous work and a thorough study of the topics emphasized in (1b). The student in his first course is not sufficiently mature to do full justice to these topics, and first-course work will not satisfy the requirement (1b).

(2) *Plane geometry*, with emphasis on the demonstration of original propositions and the solution of original problems. Required of all students. 1 unit.

(3) *Solid geometry*, with emphasis on the demonstration of original propositions and the solution of original problems. ½ unit.

NOTE.—Preparatory schools should give this course in the third or fourth year of their curriculum.

It is suggested that schools and teachers individually consider carefully what can be done to shape instruction in mathematics so that it: (*a*) Proceeds *from particular to general, from concrete to abstract;* (*b*) Treats arithmetic, geometry, algebra (elements of trigonometry) as phases of *one* subject—mathematics; (*c*) Correlates mathematics closely with physics and the other natural sciences; (*d*) Utilizes whatever is of value in the current discussions on the teaching of mathematics. In connection with this, reference is made to the reports of the committees of ten, of fifteen, and of thirteen of the National Education Association (Dr. Irwin Shepard, secretary, Winona, Minn.), and the articles and citations to be found in School Science and Mathematics (Smith & Turton, 440 Kenwood terrace, Chicago).

ASTRONOMY.

The requirements in astronomy call for proficiency in the fundamental facts and principles of astronomy, including the more recent developments in the direction of spectroscopy and photography. Thorough familiarity with Moulton's Introduction to Astronomy will afford adequate preparation in this subject. ½ unit.

PHYSICS.

In order to obtain entrance credit in physics the applicant must have completed a course in the elements of physics which is equivalent to not less than 150 hours of assigned work. Not less than one-third of the total assignment must have been devoted to laboratory work, two hours of laboratory work being counted as one hour of assignment.

A notebook containing the record of at least 35 laboratory experiments selected from, or essentially like, those found in the "University of Chicago Recommended List of 50 Laboratory Experiments in Physics for Secondary Schools" is a part of the requirement. 1 unit.

CHEMISTRY.

A course in elementary chemistry as taught in the better class of high and preparatory schools, covering thirty-five to forty weeks, four to five days per week, one-third to one-half of the total assignment being devoted to laboratory work, will afford the necessary preparation. Two hours of laboratory work are reckoned as equivalent to one hour of assignment.

Remsen's, Torrey's, Hessler and Smith's, Newell's, Young's, Linebarger's, and Storer and Lindsay's elementary chemistries are suitable text-books for preparation. Smith & Hall's Teaching of Chemistry and Physics (Longmans) discusses fully the material and methods approved by the department. The standard of attainment must be fit for admission to the special college course in general chemistry (2S) to which this unit is prerequisite. 1 unit.

GEOLOGY.

(1) *Elementary physiography.*—The requirement for credit in this course includes: (*a*) A knowledge of the simpler facts and principles involved in mathematical geography; (*b*) a knowledge of the general facts concerning atmospheric movements, precipitation, temperature, etc., together with the principles governing them; (*c*) an elementary knowledge of the sea, including the general facts concerning its movements and their causes; and (*d*) a general knowledge of the earth's features, and their mode of origin. ½ unit.

(2) *Advanced physiography.*—For this course more detailed knowledge will be required concerning the topics named above. In addition, the candidate should be familiar with the principles of climatology, the modern doctrines concerning the evolutions and natural history of geographic features, and the distribution of life and its relations to surface conditions. ½ unit.

A unit's credit will be given those who present both (1) and (2). Thorough courses based on such texts as those of Salisbury, Gilbert & Brigham, Dryer, or Davis meet the requirement for (1) and (2).

(3) *Geology.*—The requirement for admission embraces the elementary features of petrographical, structural, dynamical, and historical geology. Familiarity with the modes of action of geologic agents, and clear views of the progress and relations of geological events are essential. A thorough course, based on such a book as Brigham's Text-book of Geology, or Norton's The Elements of Geology, meets the requirement. ½ unit.

(1) and (2), or (1) and (3), may be offered as the second unit of science recommended to candidates for the college of science (§6).

GENERAL BIOLOGY.

The candidate applying for admission credit in general biology will be required: (*a*) To submit to the examiner a notebook consisting of drawings and descriptions of the animals and plants studied. (See statement concerning notebook under physics, above.) It is recommended that studies of at least fifteen principal forms be undertaken, that these studies be largely such as do not demand the use of a compound microscope, and that attention be given chiefly to those organisms that can be studied in a living condition. (*b*) To demonstrate in the college laboratory, under the supervision of college officers, that he possesses some power to observe accurately and intelligently. More stress will be laid on correct observation, and on the careful record thereof than upon technical terms. (*c*) To answer in writing a few general questions about familiar animals and plants, such as the perch, crayfish, grasshopper, moss, fern, some common type of flowering plant, etc. The candidates for 1908–9 will be expected to have some first-hand knowledge of the habits and reactions of the earthworm and the life history of the fern. 1 unit.

ZOOLOGY.

If admission credit in zoology is sought, the general character of the work required will be the same as that indicated under general biology; but in this

case the number of types of animals studied should be increased, so that the total amount of work offered is not less than that specified under general biology. 1 or ½ unit.

BOTANY.

If admission credit in botany is sought, the preparatory work should consist of the study of types from all the chief divisions of the plant kingdom, including a training in the fundamental principles of morphology, physiology, ecology, and classification. In every case laboratory notebooks (see statement concerning notebook under physics, above) must be submitted to the examiner, and a written examination passed. 1 or ½ unit.

NOTE.—Two units of credit may be obtained in zoology and botany; but a unit's credit will not be given for either of these subjects, if credit is received for general biology. Any one of these three subjects may be offered as the second unit of science recommended to candidates for the college of science (¶ 6).

PHYSIOLOGY.

The student is expected to be familiar with the facts given in Huxley's Text-Book of Physiology (revised) or Martin's Human Body (briefer course). ½ unit.

DRAWING.

Admission credit not to exceed two units will be given in drawing.* This unit must represent not less than 250 hours of work in freehand or mechanical drawing, or both. Admission in drawing is given upon examination only, but in addition to taking the examination, every candidate must present a full set of drawings, with the teacher's certificate that they are the candidate's work. The examination is temporarily under the direction of the department of physics.

Freehand drawing.—The applicant must possess ability to represent simple objects in outline and with shading. The examination will consist of drawing a group of geometrical solids, a simple piece of machinery, or an architectural ornament. ½ or 1 unit.

Mechanical drawing.—The applicant must be able to make projections in plan and elevation of geometrical figures, and to prepare working drawings of simple architectural and mechanical subjects. The examination will test the applicant's knowledge of principles and methods. 1 unit.

SHOP WORK.

Admission credit not to exceed 2 units will be given for shop work.* Each of these units must represent not less than 250 hours of work in the shop. This credit is given on examination only; but, in addition to the examination, every candidate must present a list of the exercises completed by him, with a certificate from his instructor stating that the list is correct. The examination is temporarily under the direction of the department of physics.

These two units consist of four half units, each representing not less than 125 hours of work, as follows: (1) Carpentry and wood turning; (2) pattern making, foundry work, and forging; (3) machine shop work; and (4) advanced machine shop work. 1 unit.

*Not more than 2 units in all for both drawing and shop work will be credited.

§8. EXAMINATIONS, ETC.

1. *General remark upon the requirements.*—The preparatory teacher should note that the university will insist, in all the above requirements, upon the power to ascertain and use facts in addition to a knowledge of facts.

2. *Times and places of examinations.*—Examinations for admission are held at the university in June and September. They are also given at the request of students or teachers at either of the regular dates at other places in which satisfactory arrangements can be made. Applications for such examinations should be made to the examiner for secondary schools at least thirty days in advance. Examinations for admission at other than the regular dates may be given only at the university, and that by special permission of the examiner, and upon the payment of a fee of not less than $10 nor more than $15 (the amount being dependent on the number of examinations taken).

Candidates for admission are not required to take all the examinations at one time.

3. *Examination or inspection fee.*—A fee of $5 is charged for examination for admission. This is paid when the first examination is taken. The same fee is paid by students entering upon certificate from cooperating schools, to cover cost of inspection.

4. *Students from the university high school and the affiliated and cooperating schools* are admitted to the university upon presentation of a *subject certificate* covering each of the subjects stated above as required for admission. (See No. 3 above.)

5. *Credit cards.*—Credit cards will be issued to candidates for the subjects in which examinations are passed or subject certificates accepted. A credit card is valid for *one year* from the date of issue, and its validity may be renewed by the passing of examinations in additional subjects not later than one year from that date. This may be done repeatedly, but in no case will a certificate remain valid more than *four years* from the original date.

6. *Advanced standing by examination.*—College credit is not ordinarily given for preparatory work in excess of the fifteen units required for admission; but candidates from cooperating schools who have carried their work beyond the requirements for admission to the first year of a junior college may apply for examination for advanced standing after one quarter's residence in the university. If a record for scholarly work has been established in this time, the student will be furnished by the examiner with an official statement of excess admission credit, authorizing the proper departmental examiner to test the student's claim by examination and designate the amount of credit to be assigned. Students from the university high school and affiliated schools receive advanced standing for excess admission credit without further examination, in the ratio of two majors for one unit. Such students must, however, first establish a record for scholarly work by one quarter's residence in the university.

§9. ADMISSION FROM HIGHER INSTITUTIONS.

Students are admitted with advance standing on probation (without examination) from reputable colleges, but the right is reserved to exact examinations if the subsequent work makes this seem necessary. The following conditions should be noted: (1) The student must have been in residence at least one year in the institution from which he comes. (2) The applicant must present a statement of his preparatory and college work upon a form supplied by the university, and file with this (a) a letter of honorable dismissal and (b) an

official transcript of his record in the college from which he comes. (3) Equal credit will be given only in case the preparatory course corresponds to the admission requirements of the university. (4) Except in the case of students from affiliated colleges, no more than twenty-seven majors of credit toward the bachelor's degree will be given for undergraduate work done in another institution, and with the same exception a bachelor's degree will not be conferred on a student before he has been at the university three quarters and received credit for nine majors of resident work. (5) Students who present claims for advanced standing must specify in their statements, at the outset, all the work for which they expect to receive credit. Credit will not be given at a later time for work not thus specified, unless the case is reopened by special vote of the faculty. (6) Credits provisionally granted on admission are not recorded until final approval in the third quarter of residence.

(9) MASSACHUSETTS INSTITUTE OF TECHNOLOGY.[a]

REQUIREMENTS FOR ADMISSION.

Applicants for admission to the Massachusetts Institute of Technology are, in general, required to pass the entrance examinations of the Institute or the equivalent examinations of the College Entrance Examination Board. Certificates of entrance examinations passed for admission to another college are usually accepted, provided they cover not fewer than three of the subjects required by the institute. Persons who are considerably past the usual age or who are engaged in teaching or technical pursuits, and applicants who for satisfactory reasons desire only special courses requiring no previous training may be admitted also, at the discretion of the faculty, without entrance examinations.

ADMISSION TO THE FIRST YEAR.

The student purposing to enter the institute should bear in mind that the broader his intellectual training in any direction and the more extensive his general acquirements, the greater will be the advantages he may expect to gain. The importance of thorough preparation in the subjects set for examination also is great; for the character and the amount of instruction given in the institute from the outset leave little opportunity for one imperfectly fitted to make up deficiencies, and render it impossible for him to derive the full benefit from his course, or perhaps even to maintain his standing. The training given in the best high schools, manual training high schools, and academies will, in general, afford suitable preparation.

The requirements of age and scholarship specified below are regarded as a minimum in all ordinary cases, and only exceptional circumstances will justify any relaxation. Parents and guardians are advised that it is generally for the ultimate advantage of the student not to enter under the age of 18 years, unless for a five-year course.

Entrance examinations in Boston.—Examinations for admission to the first-year class are held *in Boston only* on the first Wednesday, Thursday, and Friday after June 28, in the Rogers Building, 491 Boylston street. A second series of examinations for admission, and for applicants conditioned at the first examina-

[a] From the Bulletin of the Massachusetts Institute of Technology, June, 1908, pp. 50–69.

tions, is held at the same place, on the first Tuesday, Wednesday, and Thursday after. September 17.

Applicants for admission after the September examinations will be received only when some good cause, such as illness, has prevented attendance on the days prescribed.

Students are advised to attend the June entrance examinations, if practicable, in order that any deficiencies then existing may be made up before entrance.

Entrance examination fee.—In accordance with the practice now followed by the leading colleges and by the College Entrance Examination Board, a fee of $5 will be charged for admission to entrance examinations in Boston. This amount will, however, be credited towards the tuition fee for the first term of students who enter the institute. A candidate who is rejected will be required to pay a second fee if he repeats the examinations, and his original fee will not be credited to him if he is ultimately admitted. A candidate dividing his examinations will pay a fee only for his first examinations. Fees may be paid to the bursar at the time when the examinations are taken, or may be remitted in advance.

Examinations.—Examinations are now held by the institute in Boston only. Candidates desiring examination at other points in June are expected to take the examinations of the College Entrance Examination Board. The conditions of application are stated below. For detailed information candidates should address the "Secretary of the College Entrance Examination Board, Post-office Substation 84, New York, N. Y."

REGULATIONS OF THE COLLEGE ENTRANCE EXAMINATION BOARD.

All applications for examination must be addressed to the secretary of the College Entrance Examination Board, and must be made upon a blank form to be obtained from the secretary upon application.

The examination fee is $5 for all candidates examined at points in the United States and Canada, and $15 for all candidates examined at points outside of the United States and Canada. The fee (which must accompany but can not be accepted in advance of the application) should be remitted by postal order, express order, or draft on New York, to the order of the college entrance examination board.

Table of equivalents.—The following table shows for which subjects records of the College Entrance Examination Board are accepted as covering requirements for admission to the institute:

M. I. T. subjects.	*C. E. E. B. subjects.*
ALGEBRA A.	MATHEMATICS a, i (Algebra to Quadratics).
ALGEBRA B.	MATHEMATICS a, ii (Quadratics and beyond).
ENGLISH.	ENGLISH a and b.
FRENCH.	FRENCH a (Elementary).
GEOMETRY, PLANE.	MATHEMATICS c (Plane Geometry).
GEOMETRY, SOLID.	MATHEMATICS d (Solid Geometry).
GERMAN.	GERMAN a (Elementary).
HISTORY.	HISTORY a or d.
PHYSICS.	PHYSICS.
ELECTIVES.	HISTORY a or d; HISTORY b; HISTORY c; LATIN a, i and ii; LATIN b, c, or d; FRENCH b; FRENCH b, c; GERMAN b; GERMAN b, c; SPANISH; CHEMISTRY; BOTANY; DRAWING.

Records below 60 will not be accepted.

Certificates covering fewer than three of the institute requirements are accepted only for final candidates, but a certificate for two subjects may be accepted in connection with a satisfactory elective.

French b and German b will be accepted for advanced standing.

Trigonometry records of 70 or better will be accepted for advanced standing.

Certificates.—The institute accepts no certificates of preparatory schools in place of entrance examinations. The value of the opinion of previous teachers is, however, fully recognized, and great weight will be attached to statements from them. It is accordingly requested that every applicant present from the principal of the school last attended a statement of the duration and extent of his work there. For statements in regard to elective certificates see below. For the required certificates for preliminary applicants see also below.

Conditions.—A candidate failing in only one or two of the examination subjects may be admitted with "conditions." A candidate incurring conditions in June must repeat in September examinations in those subjects in which he has failed. Conditions incurred in September must be made up in January for continuance in dependent work.

DIVISION OF ENTRANCE EXAMINATIONS.

Candidates for admission are allowed at their option to divide their entrance examinations between two successive years, or between June and September of the same year. A candidate taking all his examinations at one time is termed "Complete;" a candidate taking certain examinations with a view to admission a year later, "Preliminary;" a candidate who has already passed preliminary examinations, "Final;" a candidate who is dividing examinations between June and September of the same year, "Partial."

A preliminary candidate may take examinations in June or in September, but is not entitled to repeat in September any examination in which he has failed in June. He must be at least 16 years of age, and will be allowed the choice of any of the following seven subjects, but he will not be entitled to a record for any unless he presents a certificate from his teacher stating that he is qualified in the subjects in which he is examined, and unless he passes at least three (of which one may be an elective): Algebra A, history, plane geometry, French I, English, physics, and German I.

Preliminary candidates are advised not to offer English or the second part of algebra (see page 111). Algebra B, if taken by a preliminary candidate, will be counted with algebra A as a single subject. Solid geometry may be taken by a preliminary applicant, provided he presents, before entrance, evidence that he has continued mathematical study during the intervening year. A preliminary candidate passing English will also be required to present a statement from his teacher that he has continued the study of English.

A partial candidate may make his own choice of subjects, but no credit will be given for less than three (of which one may be an elective). Algebra A and B count as one subject.

A complete or partial candidate having credit for three or more subjects may be credited with them for admission the following year, subject to presenting the teacher's certificate required of a preliminary candidate.

SUBJECTS FOR EXAMINATION.

To be admitted as a regular student in the first-year class, the applicant must have attained the age of 17 years, and must have passed satisfactory examinations in the following subjects: Algebra A, algebra B, plane geometry, solid geometry, physics, French I (elementary), German I (elementary), English, and history.

Applicants for admission in 1908 must also present satisfactory evidence of preparation in one of the following electives (see page 114): French or German (additional), Latin, English (additional), history (additional), chemistry, mechanical drawing and mechanic arts, biology.

Applicants for admission in 1909 and thereafter will be required to offer two electives. These may be selected from the above list, or a satisfactory examination in intermediate French or intermediate German will cover the entire elective requirement.

The detailed requirements in the various subjects are as follows:

DETAILED REQUIREMENTS.

ALGEBRA.

A. The four fundamental operations for rational algebraic expressions; factoring, determination of highest common factor and lowest common multiple by factoring; fractions, including complex fractions; ratio and proportion; linear equations, both numerical and literal, containing one or more unknown quantities; problems depending on linear equations; radicals, including the extraction of the square root of polynomials and numbers; exponents, including the fractional and negative.

B. Quadratic equations, both numerical and literal; simple cases of equations with one or more unknown quantities that can be solved by the methods of linear or quadratic equations; problems depending upon quadratic equations; the binomial theorem for positive integral exponents; the formulas for the nth term and the sum of the terms of arithmetic and geometric progressions, with applications. The examination in algebra B may also include questions of a less elementary character on topics in algebra A.

It is assumed that pupils will be required throughout the course to solve numerous problems which involve putting questions into equations. Some of these problems should be chosen from mensuration, from physics, and from commercial life. Facility in the analysis and the discussion of an algebraic expression or equation, and the use of graphical methods and illustrations in connection with the solution of equations, is also expected.

PLANE GEOMETRY.

The usual theorems and constructions of good text-books, including the general properties of plane rectilinear figures; the circle and the measurement of angles; similar polygons; areas; regular polygons and the measurement of the circle. The solution of numerous original exercises, including loci problems. Applications to the mensuration of lines and plane surfaces.

SOLID GEOMETRY.

The usual theorems and constructions of good text-books, including the relations of planes and lines in space; the properties and measurement of prisms, pyramids, cylinders, and cones; the sphere and the spherical triangle. The solution of numerous original exercises, including loci problems. Applications to the mensuration of surfaces and solids.

The above definitions are those reported by the committee of the American Mathematical Society, September, 1903.

Importance will be attached to accuracy in the numerical work of the papers in algebra and geometry. Familiarity with the metric system is required.

The attention of teachers and applicants is particularly called to the necessity of thorough preparation in mathematics, not merely as to the extent and amount of work done, but as to its quality. Candidates should be thoroughly grounded in fundamental principles, operations, and definitions, and should be carefully

guarded against the tendency to become mechanical in their algebraic work from giving disproportionate attention to mere dexterity in the solution of problems.

FRENCH I (ELEMENTARY).

The examination in French is given in two parts, which, however, may not be taken separately.

(*a*) Ability to translate simple prose at sight into clear and idiomatic English.

(*b*) Proficiency in elementary grammar, to be tested by the translation of easy English into French, or by direct questioning on the following topics, or by both: Inflection of nouns and adjectives for gender and number, excepting unusual cases; pronominal adjectives; the forms and positions of pronouns, especially the personals; the partitive constructions; the forms and use of numerals; the use of the subjunctive, except unusual cases; the conjugation of the regular and of the more common irregular verbs, such as *aller*, *dire*, *faire*, and of the classes represented by *ouvrir*, *sentir*, *venir*, *paraître*, *conduire*, and *craindre*. Special attention will be given to the verbs.

Provision will be made for students prepared to pass an examination for advanced standing. (See page 116.)

GERMAN I (ELEMENTARY).

The examination in German is given in two parts, which, however, may not be taken separately.

(*a*) Ability to translate simple prose at sight into clear and idiomatic English.

(*b*) Proficiency in elementary grammar, to be tested by the translation of easy English into German, or by direct questioning on the following topics, or by both: The conjugation of the weak and of the more usual strong verbs; declension of readily classified nouns, of adjectives, articles, pronouns; comparison of adjectives; use of the more common prepositions; the simpler uses of the modal auxiliaries; simple cases of indirect discourse, and the rules for the order of words.

Provision will be made for applicants prepared to pass an examination for advanced standing.

NOTE.—Attention should be given from the beginning to the correct pronunciation of the modern languages, and teachers in preparatory schools are advised to give this important subject all due consideration.

ENGLISH.

The examination in English will be as far as possible a test of the candidate's ability to express himself in writing in a manner at once clear and accurate, and of his power to distinguish in a broad sense literary values—the qualities which mark a work as being literature. The examination is not divided.

1. The candidate will be required to write upon subjects familiar to him. His composition should be correct in spelling, punctuation, grammar, idiom, and formation of paragraphs, and should be plain and natural in style. He will be judged by how well he writes rather than by how much he writes.

2. The candidate is required to have some acquaintance with good literature. The books adopted by the National Conference on Uniform Entrance Requirements are taught in most secondary schools, and the candidate may, if convenient, use these in his preparation. Any course of equivalent amount, if made up of standard works, will be received; and in any case it is expected that the aim of preparatory study will be to gain a clear perception of what qualities make a work literature. The examination will be intended as a test

rather of the candidate's power of intelligent appreciation than of his knowledge of specific books. Copies of recent entrance examination papers may be had of the secretary of the faculty, and will give an accurate idea of what is expected of the candidate.

NOTE.—It is expected that the paper in history and the translations from French and German be written in correct and expressive English; and these papers may at any time be examined as additional evidence in determining the student's proficiency in composition.

HISTORY.

Preparation in either United States history or ancient history may be offered. In the former subject a thorough acquaintance with the history of the thirteen colonies and the United States to the present time is required, together with an elementary knowledge of the government of the United States. In the latter subject the requirement covers the history of Greece and Rome to the fall of the Roman Empire in the west.

Each of the above subjects is intended to represent one year of historical work, wherein the study is given five times per week, or two years of historical work, wherein the study is given three times per week.

The examination in history will be so framed as to require comparison and the use of judgment on the pupil's part, rather than the mere use of memory. The examinations will presuppose the use of good text-books, collateral reading, and practice in written work. Geographical knowledge may also be tested.

Candidates expecting to take the course in architecture are advised, should it be equally convenient, to prepare in ancient history.

PHYSICS.

The candidate will be expected to be familiar with the fundamental principles of physics. It is especially desirable that he should have a good knowledge of general mechanics and of the mechanics of solids, liquids, and gases. A knowledge of physical hypotheses is comparatively unimportant. Text-book instruction should be supplemented by lecture-room experiments. A sufficiently extended treatment of the subject will be found in any of the principal text-books now in use in secondary schools. Ability to solve simple problems will be expected. It is furthermore expected that the student will receive training in laboratory work. For the present, however, no student will be rejected because of deficiency in laboratory work, if the school from which he comes is unable to furnish such instruction, a certificate to which effect from the principal of the school will be required.

The laboratory work presented for entrance should consist of at least twenty-five well-selected experiments, chosen with the view of illustrating and teaching fundamental laws and principles rather than methods of physical measurement. A satisfactory selection may be made from experiments 1 to 55 of the college entrance examination board.

The notebook should in every case contain the *original data as recorded by the student in the laboratory*, and each experiment should bear the instructor's indorsement. Great weight is attached at the institute to the ability of the student properly to record experimental data at the time they are taken, as well as subsequently to discuss and draw logical conclusions from them; and this training should begin in the preparatory school at the very outset of the work in quantitative measurement.

Laboratory notebooks should be presented at the registrar's office during the week preceding the examination if practicable.

76049—No. 2—00——8

ELECTIVE SUBJECTS.

The object of the elective requirements is to secure and to recognize greater breadth of preparatory training.

These requirements are to be met by the presentation of certificates made out on forms supplied by the institute, but an applicant passing an examination for advanced standing in intermediate French, or in intermediate German, need not present a certificate.

Excuse from the elective requirements, or the acceptance of equivalents may be allowed in the case of applicants considerably above the usual age, or those coming from foreign countries.

Examinations are in general required in the case of applicants desiring excuse from work in the institute on the ground of electives offered at entrance. The subjects in which excuse may be granted on examination are French, German, drawing, and mechanic arts. Applicants offering chemistry may take a course more advanced than otherwise during their first year, and all applicants who expect to enter the chemical or chemical engineering courses are advised to present chemistry as an elective subject if practicable.

ELECTIVE FRENCH OR GERMAN.

(*a*) French: translation from English into French; review of grammar, with special reference to the syntax of verbs (modes and tenses); additional and more varied reading.

(*b*) German: translation from English into German; review of grammar; additional and more varied reading.

The additional reading in French and German may be selected from the works read in the institute classes, but no requirement of particular text-books is intended. The elective requirement is intended to be equivalent in extent to the first half of intermediate French or intermediate German, but need not be of the same character.

Applicants passing advanced standing examinations in French or German may count these examinations for the elective.

ELECTIVE LATIN.

Satisfactory evidence should be presented that the applicant has acquired the elements of Latin grammar and that he has read four books of Cæsar or an equivalent.

The study of Latin is recommended to persons who purpose to enter the institute, since in addition to its disciplinary value it gives a better understanding of the various terms used in science, and facilitates the acquisition of the modern languages.

ELECTIVE ENGLISH OR HISTORY.

The work of secondary schools differs so much in these branches that no definite requirement is formulated at present. Any applicant who has carried work in English or history materially beyond the requirements stated on pages 112 and 113 may present for approval as his elective a statement of the amount and kind of work done. Such a course can be considered, however, only when the amount of work done in excess of the ordinary requirement has been in time equivalent to the requirement in Latin.

ELECTIVE CHEMISTRY.

Applicant must present evidence of familiarity with the rudiments of chemistry. More importance is attached to aptitude in manipulation and in critical observation, and to a practical knowledge of the composition, methods of preparation, and reactions of the common chemical substances, than to knowledge of theoretical conceptions, such as the determination of atomic and molecular weights, molecular structure, valence, etc.

The subject should be attempted only in schools having adequate equipment; and the laboratory work should be carried out with great care and attention to manipulation and note writing, special emphasis being laid upon exhaustive observation and correct inference.

The applicant should also present for examination his original, uncopied notes, with any annotations which may have been made by the instructor.

For applicants who have completed the requirements of the chemistry elective a course of instruction is provided which is sufficiently advanced to take advantage of the knowledge of chemical science which they already possess, and such applicants are, in general, expected to take this course, while those who satisfy the chemical department, by examination or otherwise, as to their proficiency in both inorganic chemistry and elementary qualitative analysis may substitute more advanced work for the entire chemistry of the first year.

ELECTIVE MECHANICAL DRAWING AND MECHANIC ARTS.

These subjects are to be offered in combination.

MECHANICAL DRAWING.

The applicant must be familiar with the projections of points, lines, planes, and simple solids. Special attention is called to the importance of neatness and accuracy, and to facility in lettering and dimensioning drawings. Plates should be presented, showing the ground covered by the applicant. Applicants are advised in general not to offer mechanical drawing and descriptive geometry with a view to omitting these courses at the institute.

MECHANIC ARTS.

The applicant should be thoroughly familiar with the different tools and materials, and know when and how to use them. He should be able to adjust and to sharpen all edge-tools, and capable of executing work from working drawings. The main object of preparatory exercises should be systematic instruction in the correct use of various tools and in the fundamental operations, rather than construction.

Carpentry.—The exercises should include systematic instruction in sawing, planing, chiseling, including chamfering, grooving, and plain molding work; framing, including tenoning, mortising, and fitting in braces; use of the ordinary molding planes and the making of simple moldings; the making and use of the miter box in fitting moldings; nailing, dovetailing, gluing, and the proper use of sandpaper.

At least seventy-five hours should be allowed, exclusive of any time that may be used in making working drawings.

Wood-turning.—The applicant should have had systematic instruction and experience in the use of the wood lathe; should understand the adjustment of speeds for the work in hand, and how to use properly the turning tools, such as

gouges, turning chisels, nosing tools, right and left side tools, parting tool, calipers, and dividers. The exercises should also include systematic instruction in center and chuck turning, particular attention being paid to the production of smooth work by the cutting action of the tools, and not by the excessive use of sandpaper.

At least forty-five hours should be allowed, exclusive of any time that may be used in making drawings.

Elective Biology.

Applicants may offer either (*a*) an extended course in botany, such as that recommended by the College Entrance Examination Board, or courses of similar extent in zoology or in physiology; or (*b*) briefer courses in any two of the same subjects. In the latter case evidence should be given of thorough elementary knowledge of general principles and of some laboratory and field work.

ADMISSION TO ADVANCED STANDING.

In the case of students passing examinations for advanced standing, in addition to obtaining a clear record in entrance requirements, the faculty endeavors to facilitate the substitution of alternative work. A candidate passing more than the required work in modern languages may arrange to complete any remainder during his first year. A candidate passing trigonometry or other subjects for advanced standing may, with the approval of the faculty, substitute second-year European history or mechanic arts, or take additional work in English composition or in the chemical laboratory. A candidate who has passed off descriptive geometry and mechanical drawing may take second-year descriptive geometry. Graduates of manual training schools may be excused in particular cases from the mechanic arts required in some of the engineering courses. It is in general preferred that English and mathematics be not anticipated.

To be admitted as a regular student in the second, third, or fourth year, the applicant must have attained the age of 18, 19, or 20 years, respectively, and must in general pass satisfactorily the examination for admission to the first-year class, and examinations on all subjects given in the earlier years of the course which he desires to enter. Applicants presenting satisfactory certificates for work done at other colleges may be excused provisionally from taking the corresponding examinations at the institute.

Graduates of colleges are admitted to the institute without the usual entrance examination, and will be permitted to enter any of the courses at such a point as their previous range of studies will allow. If prepared to enter upon most of the studies of a certain year, they may often be afforded opportunity to make up any studies of the earlier years in which they are deficient. They will, in general, be credited with all subjects in earlier or later years in which they can show, by examination or otherwise, a standing satisfactory to the faculty, and may be received provisionally as regular students, subject to making up deficiencies in work of previous years within a limited time.

It is highly desirable that students contemplating professional courses after graduation from college should arrange their college electives to cover the earlier subjects of the courses chosen, in order that the number of deficiencies to be made up may be as small as possible. In order to enter any of the engineering or allied courses in the second year, it is essential that applicants have preparation in analytic geometry and the elements of the calculus, and highly desirable that they be familiar with mechanical drawing and descriptive geometry. For admission to third-year engineering work, they must be pre-

pared in mathematics through the calculus, in mechanical drawing, in descriptive geometry and mechanics. Summer courses of appropriate scope are offered in most of these subjects, and applicants proposing to enter with advanced standing are advised to correspond with the secretary of the faculty in regard to their credits as early as June 1, in order to determine what studies, if any, should be pursued during the summer preceding entrance. Applicants desiring excuse from any portion of the physical laboratory work should present their original laboratory records. Those desiring excuse from mechanical or free-hand drawing should submit examples of their work besides presenting official records.

Graduates from other technical schools and colleges who have the equivalent of all the other engineering work of the course in naval architecture may take the strictly professional work of that course, together with marine engineering, in one year. A special circular in regard to the admission of applicants from other colleges and opportunities for college graduates will be mailed on application, and all persons desiring admission with advanced standing should correspond with the secretary of the faculty.

ADMISSION OF SPECIAL STUDENTS.

To be admitted to one or more selected subjects in any of the regular courses except that in architecture—that is, to a partial or special course—the applicant must have attained the age of 17 years, and must give satisfactory evidence, by examination or otherwise, that he is qualified to pursue with advantage the subjects chosen.

Applicants desiring admission as special students in architecture must be college graduates, or 21 years of age, with not less than two years' office experience. They will be required to pass, before entrance, either the regular entrance examinations in plane and solid geometry or a special examination in geometry, which will be of a somewhat practical character, emphasizing geometrical construction, and as far as possible be a test of fitness for the courses in mechanical drawing and descriptive geometry; and they must include in their work at the institute the regular first-year courses in free-hand drawing, descriptive geometry, and mechanical drawing, unless these subjects have been passed at the September examinations for advanced standing.

By means of the description of subjects of instruction the applicant may ascertain what the various subjects of study are, how, when, and by whom they are given, in what regular courses they are included, and the preparation required for each; but admission to and continuance in special courses is dependent in all cases upon the approval of the faculty. In general, no student will be allowed to take any subject until he has proved his satisfactory knowledge of all subjects required as preparation for it.

To teachers and to persons of mature age engaged in technical pursuits and wishing to devote some time to scientific study, the institute desires to offer the amplest opportunities in its lecture rooms and laboratories. Such persons may, in general, be admitted without formal examination on satisfying the faculty that they are qualified to undertake the work proposed. They will be expected after admission to attend the same exercises and examinations as other students.

The foregoing statements are offered to show the scope of preparatory work which is assumed to have been completed before a student matriculates. This preparatory work is usually covered in the public high schools and in private schools of the same grade. It is designed to occupy about four years of study and is taken by the average student between the ages of fourteen and eighteen.

Quite recently an attempt has been made, as noted above, to supersede the separate examinations given for each college by a general and uniform system of examinations which shall be recognized by all colleges alike. A board, known as the College Entrance Examination Board, now conducts examinations approximating the average standard required by colleges in general, and a certificate from this board is honored in full by some colleges and in part by others. A reference to the entrance requirements for Yale and Harvard will show to what extent certificates from the college entrance board may be substituted for the regular examinations conducted by each college separately.

When all the requirements of matriculation are satisfied a student enters college with what is termed "regular" standing. But in some cases students only fulfill partially the entrance requirements. If their general scholarship is proved to be sufficiently advanced a college will frequently admit them on the understanding that during their college course they will complete the matriculation subjects in which they are deficient. Such students are usually termed "conditioned" students.

Again, most colleges make special provision for students, usually those of mature age, who want to attend a few courses, but who have no immediate intention of qualifying for a degree. Such students are termed "partial" or "special" students. Generally speaking, any student of the average age required for matriculation and of the average scholarship may be admitted to college courses, and eventually qualify for a degree. Irregular cases of this kind, however, are always settled upon their individual merits, and each college applies rules and regulations of its own in this matter. Chinese students, and indeed all foreign students who do not care to meet the requirements for matriculation, have always the opportunity of applying for admission as partial or special students, though they would be unable to qualify for a degree until the entrance requirements, or their equivalent, had been satisfied. In the case of foreign students colleges tend to be liberal rather than strict in regard to admission, in fact, the general maxim holds that no one is refused admission to a college who shows any evidence of being able to profit by college instruction.

(B) SPECIAL PROVISION FOR CHINESE STUDENTS.

The requirements for matriculation outlined above are designed for American students. The subjects insisted upon, especially the languages, are all connected with the general system of liberal culture which tradition has sanctioned and experience justified. But it is readily conceded that between an American and a Chinese student

the differences in traditional culture make a readjustment of college entrance requirements not only desirable, but at the same time equitable. As will be seen below, most of the larger universities and colleges of the United States admit the principle of readjustment in favor of Chinese students. Each institution, however, applies rules of its own in carrying this readjustment into effect. Those which consent to modify entrance requirements in favor of Chinese students proceed usually upon the principle that a good working knowledge of English and facility in at least one modern language other than English are essential to all Chinese students, but that the study of the European classical languages, Greek and Latin, while very desirable, is not so essential. It is usually taken for granted that a good knowledge of the Chinese classics fulfills for Chinese students the purpose effected by the European classics for the English-speaking students. Consequently an equivalent amount of proficiency in the former may be offered and accepted as a substitute for the latter. But, as suggested more than once, each college applies rules of its own in this matter.

Although, in dealing with general entrance requirements in the preceding section, stress was laid upon examination as a test of fitness for college entrance, it should be pointed out very clearly that not all colleges insist upon examination for admission. On the contrary, many admit by certificate from a recognized preparatory school whose standard of work meets the requirements exacted by the colleges in question. This is particularly true of state universities, such as the University of California, and it is to some extent true of the large colleges of the East. Many Chinese students enter college directly from preparatory schools of this kind.

But it is now generally recognized, owing doubtless to the very excellent scholarship shown by Chinese students who have already been to the United States, that the preparatory work done in some of the schools in China sufficiently covers the ground of entrance requirements, and a certificate from such a school, accompanied by a specific statement of all the subjects studied, will gain admission without further formality.

The Bureau of Education, in gathering data for this bulletin, sent a circular letter to all the leading universities and colleges, asking among other things for some statement of policy with regard to the special ground of admission for Chinese students. The question asked was framed as follows:

"Would proof of equivalent attainments, including a preliminary knowledge of English, be accepted in the case of Chinese students in lieu of the usual admission requirements or examinations?"

A few of the answers are selected as follows:*

University of California.—In receiving and classifying students from the Orient, we accept certificates in lieu of admission examinations—just as we do for students in our own country—provided the applicant has completed at least the equivalent of a satisfactory secondary course, that is, the equivalent of a good high school course of four years according to our standards. We allow liberal substitutions of Oriental languages, literatures, and histories for our own electives in corresponding fields, though we do try to insist upon a fair working knowledge of the English language and literature.

Northwestern University.—An equivalent education and a fair knowledge of English will be accepted in lieu of the usual admission requirements or examinations. Students would need to bring proper certificates.

University of Chicago.—The university has been liberal in interpreting admission requirements for all foreign students. Since some of the admission requirements are prerequisite to further study, not all can be replaced by "equivalent" attainments in other lines. English, at least one European language, history (English and United States), and mathematics (algebra and geometry), should be considered as necessary.

Columbia University.—Apart from the regular collegiate examinations in English, the university has no formal examinations to test the knowledge of foreigners. No student, however, who understands enough English to profit by instruction need fear embarrassment on this score.

University of Pennsylvania.—The University of Pennsylvania will accept the credentials from accredited institutions in China and omit the usual written requirements and examinations in all subjects covered by these credentials.

Leland Stanford Junior University.—Candidates from China are admitted who show credentials covering the satisfactory completion of courses of study equivalent to those of approved American high schools. Before admission to the university such candidates must show ability to use and to understand readily both written and spoken English.

Brown University.—If they have English and mathematics, as our Chinese students usually have had, we can allow some substitution. The record of a good Chinese university would be proof of attainments.

Harvard University.—The faculty has adopted certain regulations to govern the treatment of Chinese applicants for admission to Harvard College. If they can show that they have graduated from a Japanese Government middle school or from a Chinese provincial high school or from private schools certified as of equal standing with respect to the amount and quality of instruction in oriental classics, they will be excused from examination in ancient languages (Greek and Latin), counting eight points. They may also be excused from presenting for admission an elementary modern language (French or German), but will be required to take, as part of their work for a degree, a course in French or German more advanced than the elementary course. In English, history, mathematics, and science they must satisfy the Harvard requirements in the usual way. Such men, therefore, are admitted partly on certificate, partly on Harvard examinations, with the further provision that a part of the work prescribed for them may be taken in college.

In case Chinese students have already begun work of a college standard in China, and can show a record of good scholarship, they may be admitted without examination. This was the case with the students from Tientsin, and their high average of scholarship, while at Harvard, fully justified their admission on these terms.

* For other answers, see pp. 197–216.

Massachusetts Institute of Technology.—An applicant from a foreign country is in general excused from our entrance examinations provided parents or teachers (or the applicant himself, when of age) are ready to take the responsibility as to his preparation for our work. Thorough preparation in mathematics and facility in the use of English are essential.

Yale University.—The only change that we make in entrance requirements in the case of Chinese students is that a knowledge of the Chinese language and literature is accepted in place of the Greek requirement or its alternatives in the academical department, and the substitution of Chinese for Latin in the scientific school. We make a special point of emphasizing the importance of a good knowledge of English before admission.

Degrees from representative Chinese institutions, such as St. John's College, Shanghai, and Tientsin University, are accepted for admission to the Graduate School as would be the degrees of American institutions of rank.

These instances are sufficient perhaps for a broad generalization. Taken together, they indicate very clearly the policy of American colleges to relax the strictness of entrance requirements in favor of Chinese students. The fact should be emphasized, however, that the standard expected of Chinese students is precisely the same as that insisted upon for American students, and that with the exception of the classical languages, the ground supposed to be covered is exactly the same.

(C) SPECIMEN ENTRANCE EXAMINATION PAPERS.

The following entrance examination papers, omitting those in the classical languages, are printed, to supplement the schedules of requirements outlined in Section A of this subject.

(1) MASSACHUSETTS INSTITUTE OF TECHNOLOGY.

PLANE GEOMETRY.

Time: One hour and three-quarters.

1. Prove: If two triangles have the three sides of the one equal, respectively, to the three sides of the other, the triangles are equal.

2. Prove: The square on the hypotenuse of a right triangle is equal to the sum of the squares on the other two sides.

3. Prove: The bisector of the vertical angle of a triangle divides the base into segments proportional to the adjacent sides.

4. Given a circle and a straight line. Show how to construct a circle which shall be tangent to the given circle at a given point and also tangent to the straight line. Prove the construction correct.

5. A regular hexagon is circumscribed about, and a square is inscribed in, a circle of radius 1. Find the difference between the perimeter of the circle and half the sum of the perimeters of the two polygons, accurate to thousandths.

6. A parallelogram *ABOD* has the vertex *A* fixed and the directions of the adjacent sides *AB* and *AD* also fixed. Find the locus of the vertex *O* if the sum of the two sides *AB* and *AD* is constant, and prove your answer correct.

SOLID GEOMETRY.

Time: Two hours.

1. Prove: Through a given point without a straight line, one and only one plane can be passed perpendicular to that line.

2. Prove: Two rectangular parallelopipeds having equal bases are to each other as their altitudes.

3. Prove: Every section of a sphere made by a plane is a circle whose center is the foot of the perpendicular from the center of the sphere on that plane.

4. Prove that in any triedral angle the three planes passed through the edges and the bisectors of the opposite face angles, respectively, intersect in the same straight line.

5. Derive an expression for the area of a zone.

6. A railroad oil tank has the shape of a right circular cylinder with its axis horizontal. The internal diameter of the tank is 6 feet and its length 25 feet. How many gallons will it contain if filled to a depth of 4[a] feet? (One gallon contains 231 cubic inches.)

ANCIENT HISTORY.

Time: One hour and a half.

Answer the first three questions.

1. Locate eight of the following places and tell briefly of some historical fact connected with each: Olynthus; Trasimene; Eleusis; Messana; Adrianople; Susa; Ægospotami; Ostia; Philippi.

2. Explain the constitution and functions, in the time of Pericles, of the Athenian (*a*) Council of Five Hundred; (*b*) Assembly; (*c*) Juries; (*d*) Archons; (*e*) Generals.

3. Tell what you can of the period and policy of any two: Vespasian; Aurelian; Constantine.

Answer any two of the following questions:

4. Give an outline of the history of Syracuse down to its incorporation into the Roman dominion.

5. Explain carefully the political condition, under the Roman Republic, of the inhabitants of (*a*) a Latin colony, (*b*) a Roman colony, (*c*) a Roman province.

6. Give an account of the disruption of Alexander's empire and of the principal kingdoms that resulted therefrom.

7. Tell what you can of the *fora* of imperial Rome and of the buildings connected with them.

UNITED STATES HISTORY.

Time: One hour and a half.

Answer any SIX questions, and answer them FULLY.

1. Mention the colonies founded by the Puritans, Separatists, Roman Catholics, and Quakers; and state the causes leading to such settlements.

2. What was the greatest extent of French colonial possessions in North America; and how and when did France lose these possessions?

3. What were the chief provisions and main objects of the navigation acts of the English Government?

4. Compare the views of Alexander Hamilton and Thomas Jefferson on the interpretation of the Constitution.

---

[a] This should have been printed 4½.

5. Enumerate the leading principles or doctrines of the following political parties, and indicate approximately when these parties existed: (1) Abolitionist, (2) Greenback, (3) Know Nothing.

6. Explain the method of impeachment, and give an account of one important impeachment case.

7. State the qualifications, term of office, and principal powers and duties of the President of the United States.

ENGLISH.

Time: One hour and three-quarters.

NOTE.—For the convenience of the candidate the following division of time is suggested as indicating the comparative length of the answers expected: Question one, forty-five minutes; question two, ten minutes; question three, twenty minutes; question four, twenty-five minutes.

Be careful in the choice of words, in the construction of sentences, and in the formation of paragraphs.

1. Write a theme of 300 to 400 words on the nature and effects of fire. (*This is meant largely as a test of the power of the candidate to arrange his material properly.*)

2. Distinguish briefly but as clearly as possible between throwing a ball and tossing a ball. (*This is intended to show the power of exact statement and careful use of words.*)

3. In the following selection explain the force of the italicized words:

Of all inorganic substances, *acting in their own proper nature, and without assistance or combination*, water is the most wonderful. If we think of it as the source of all the changefulness and beauty which we have seen in clouds; then as the instrument by which the earth we have contemplated was modeled into symmetry, and *its crags chiseled into grace;* then as, in the form of snow, it robes the mountains it has made with that transcendent light which we could not have conceived if we had not seen; then as it exists in the form of the torrent—*in the iris which spans it*, in the morning mist which rises from it, in the deep crystalline pools which mirror its hanging shore, in the broad lake and glancing river; finally, in that which is to all human minds the best emblem of unwearied, unconquerable power, the *wild, various, fantastic, tameless unity of the sea;* what shall we compare to this mighty, this universal element, for glory and for beauty? or how shall we follow its eternal changefulness of feeling? It is like trying to paint a soul.

4. In the above selection what (*a*) seems to you the main thought? What (*b*) are the chief merits in expression?

PHYSICS.

Time: Two hours.

The numerical work as well as the answer is required in the solution of problems.

1. If two equal forces of magnitude 5 act for three minutes on two masses, 20 and 200, respectively, calculate: (1) acceleration of each; (2) space traversed by each in that time.

2. Under what circumstances will a suspended body be in equilibrium? What determines its stability?

Explain when a pivoted body will be in equilibrium under the action of a system of parallel forces.

3. Define the terms *potential energy* and *kinetic energy*, and give some examples of each.

How many pounds of water can be pumped per minute from a mine 500 feet deep by an engine expending 20 horsepower?

4. A solid weighing 250 pounds has a specific gravity 5. Calculate its volume in cubic feet, assuming that 1 cubic foot of water weighs 62.5 pounds.

What force would be required to prevent this body from sinking if immersed in a liquid of specific gravity 1.5?

5. Explain the construction and uses of a mercurial barometer.

Why does a balloon filled with illuminating gas rise, and why does it not continue to ascend indefinitely? If a balloon, while descending, enters a cooler layer of air, how will its speed of descent be affected? Why?

6. What is meant by the transference of heat by conduction, convection, and radiation? Illustrate.

Can heat be transmitted through a vacuum? Give your reasons.

Which would be the more effective in cooling hot water, 100 pounds of ice at 32° F. or 100 pounds of water at this temperature? Why?

7. Construct the images of an object in two plane mirrors at right angles. State the rule used in this construction.

What sort of lens should be used and where should the object be placed to give a real, magnified image on a screen?

8. How many voltaic cells, each of electromotive force 1.5 volts and internal resistance of $\frac{1}{4}$ ohm, would be required in series to send a current of $\frac{1}{4}$ ampere through a resistance of 51 ohms?

9. Explain two methods for magnetizing a piece of steel.

What is a declination needle?

What is a dipping needle?

What is the effect of breaking a permanent magnet into small pieces?

ALGEBRA A.

Time: One hour and three-quarters.

1. Find the value of

$$\frac{a}{b} - \sqrt[3]{\frac{1+a}{1-9b^2}} + \sqrt[5]{\frac{5a^2}{2b^5}},$$

when $a = \frac{1}{2}$ and $b = \frac{1}{3}$.

2. Simplify $\dfrac{p^2+q^2}{p^2-q^2} - \dfrac{1}{\dfrac{2p}{2p-q} - \dfrac{2q}{2q-p}}$

3. Solve $\dfrac{2(5-3x)}{2-x} + \dfrac{9}{3x-1} = 6.$

4. If $ax + b$ is 40 when $x = 3$; and 159 when $x = 10$; what is its value when $x = 5$?

5. A quantity of water just sufficient to fill three jars of different sizes will just fill the smallest jar four times; the largest jar twice with four gallons to spare; and the second jar three times with two gallons to spare. What is the capacity of each jar?

6. Simplify

$$(\sqrt{6}-2)\left(\frac{1}{\sqrt{2}+\sqrt{3}-\sqrt{5}} + \frac{1}{\sqrt{2}+\sqrt{3}+\sqrt{5}}\right).$$

7. *A* starts at noon on his bicycle from Boston for Worcester and return. At the same time *B* leaves Worcester for Boston and return. They meet the first time at 2 p. m., and the second time 15 miles from Worcester. At what rate in miles per hour does each man travel, assuming the distance between the two cities to be 40 miles?

ALGEBRA B.

Time: one hour and three-quarters.

1. Expand and arrange in ascending powers

$$(1 + a^{\frac{1}{2}} - a^{-2})^3.$$

2. Factor $a^{\frac{n+1}{n}} + ab\left(a^{\frac{1-n}{n}} + b^{\frac{1-n}{n}}\right) + b^{\frac{n+1}{n}}$.

3. Find all pairs of values which satisfy simultaneously

$$y^2 = \frac{x^3}{2a - x};$$

$$x^2 + y^2 - 2ax = 0.$$

4. Solve

$$x^2 + y^2 = 169,$$

$$x + y = 17.$$

and draw the graphs, showing how the values of x and y are paired.

5. Find a value of x which satisfies

$$\sqrt{2a - x} + \sqrt{5a - x} = 3\sqrt{x}.$$

6. Two bodies move toward each other from A and B, and meet after 35 seconds. If it takes one 24 seconds longer than the other to move from A to B, how long does it take each one to traverse the distance?

7. Given a square whose side is $2a$. The middle points of its sides are joined by straight lines, forming a second square inscribed in the first. In the same manner a third square is formed in the second, a fourth in the third, and so on indefinitely. Find the sum of the perimeters of all the squares.

GERMAN I (ELEMENTARY).

Time: Two hours.

1. Translate into English:

Endlich kamen ſie aus dem Walde und dort ein paar Schritte vor ihnen ſtand auch ſchon der alte Weidenbaum. Der mächtige Stamm war ganz gehöhlt, und das Dunkel, das darin herrſchte, ſchien tief in den Abgrund der Erde zu führen. Andrees ſtieg zuerſt allein hinab, während Maren ſich auf die Höhlung des Baumes lehnte und ihm nachzublicken ſuchte. Aber bald ſah ſie nichts mehr von ihm, nur das Geräuſch des Hinabſteigens ſchlug noch an ihr Ohr. Ihr begann angſt zu werden, oben um ſie her war es ſo einſam und von unten hörte ſie endlich auch keinen Laut mehr. Sie ſteckte den Kopf tief in die Höhlung und rief: „Andrees!" Da nach einiger Zeit war es ihr, als höre ſie von unten wieder heraufkommen, und allmählich erkannte ſie auch die Stimme des jungen Mannes, die ihren Namen rief, und faßte ſeine Hand, die er ihr entgegenſtreckte. „Es führt eine Treppe hinab," ſagte er, „aber ſie iſt ſteil und ausgebröckelt, und wer weiß wie tief nach unten zu der Abgrund iſt!"

2. Translate into English:

Zwei Tage darauf ließ der Oberſt Georg und Tertſchka zu ſich rufen. Er betrachtete ſie lange und ſchweigend; dann fragte er nach dieſem und jenem und ſchloß damit, daß er ihnen den Rat erteilte, vorderhand in der Stadt zu bleiben. Für ihren Unterhalt durch angemeſſene Arbeit wolle er Sorge tragen, und ſie würden noch ſpäter von ihm hören. Nachdem die beiden das Zimmer verlaſſen hatten, ging der Oberſt mit leiſen Schritten auf und ab. Es waren ſeltſame Gedanken die ihn bewegten. Er hatte vor vielen Jahren ein ſchlankes, blondes Fräulein geliebt und war

sehr unglücklich gewesen. Nicht etwa, daß die Schöne seine Neigung zurückgewiesen hätte; er war in seinen reinsten Empfindungen betrogen worden, und das hatte ihn mit dauernder Bitterkeit erfüllt.

3. (1) Give the principal parts of ließ (line 1), rufen (line 1), schloß (line 2), zurückgewiesen (line 8), betrogen (line 9).

(2) Decline, in the singular and plural, seltsame Gedanken (line 6) and schlankes, blondes Fräulein (line 7).

(3) Give the reason for the use of the subjunctive wolle (line 4).

(4) Give the complete declension of the relative pronoun.

(5) Give in full the present tense, indicative, and imperfect subjunctive of ließ (line 1), tragen (line 4).

4. Translate into German:

(1) This good old man was sitting between me and my brother.

(2) He spoke as if he had known you many years ago.

(3) She did not know what happened in that old house last week.

(4) Last month he was said to have lost all his money, but I think he will have to pay his debts, although he does not appear rich.

(5) This ink does not seem black at first, but after you have written with it it becomes black.

(6) If he had sent me the book, I could have brought it to you this morning.

(7) If you see him to-morrow, tell me so at once.

(8) After the soldiers had waited for the enemy from half-past one until a quarter of four, they went home again.

GERMAN II (INTERMEDIATE).

Time: Two hours.

1. Translate into English:

Das schmiedbare Eisen unterscheidet sich von dem Roheisen chemisch hauptsächlich dadurch, daß es einen viel geringeren Kohlenstoffgehalt besitzt, aber auch dadurch, daß es nur ganz geringe Mengen von allen jenen fremden Elementen: Silizium, Mangan, Phosphor, Schwefel enthält. Es ist infolgedessen von viel größerer Festigkeit als das Roheisen, trägt mindestens etwa 28 kg auf 1 qmm Querschnitt. Mit solchem Eisen kann man daher Brücken und Häuser bauen, man kann es zu Eisenbahnschienen verwenden, man kann Achsen und Räder der Eisenbahnwagen daraus machen, kurz, die vielen Gegenstände, welche eine hohe Festigkeit haben müssen. Das schmiedbare Eisen kann sogar in einzelnen Arten die höchsten Festigkeitsziffern unter allen Stoffen, die man in der Technik braucht, aufweisen. Für die meisten technischen Verwendungen, ja für die gewöhnlichsten Sachen, für jeden Nagel, jede Schere, jeden Bohrer, kurz fast für jedes Werkzeug braucht man eine höhere Festigkeit, als sie uns das Roheisen, auch im umgeschmolzenen Zustande als Gußeisen, gewähren würde.

2. Translate into English:

Hans von Breitenstein zog Georg zu sich nieder, die anderen folgten seinem Beispiel; die Knechte trugen auf, und der edle Wein machte den Ritter von Lichtenstein und seinen Sohn vergessen, daß sie in mißlichen Verhältnissen, im feindlichen Lager seien, daß sie vielleicht einem ungewissen Geschick, und wenn sie die Reden Frondsberg recht deuteten, einer langen Gefangenschaft entgegen gehen. Gegen das Ende der Tafel wurde Frondsberg hinaus gerufen; bald kam er zurück und sprach mit ernster Miene: „So gerne ich noch länger Eure Gesellschaft genossen hätte, liebe Freunde, so tut es jetzt not, aufzubrechen. Der Wächter ist da, dem ich Euch übergeben muß, und Ihr müßt Euch sputen, wollet Ihr heute noch die Feste erreichen."

3. Translate into English:

Das Geheimnis Karls seltener Grösse liegt, soweit wir sein Wesen erkennen, in der wohlgewogenen Verbindung der drei höchsten Eigenschaften eines

Regenten: er sieht die Dinge richtig, wie sie sind, er besitzt die erfinderische Kraft, die an Stelle des Ungenügenden Besseres zu schaffen weiss, und erfreut sich einer unwiderstehlichen Gewalt in der Ausführung seiner Pläne. Er hat ein Gemüt, das klar und ruhig die Bilder der Aussenwelt aufnimmt, eine schöpferische Kraft, die sie zweckvoll zu verwenden weiss, und kurzen, eisenfesten Entschluss, der gerade auf das Ziel losgeht. Deshalb ist uns die Gestalt dieses Königs, welche mehr als tausend Jahre von uns liegt, weit durchsichtiger und verständlicher als die der meisten Herrscher, welche ihm folgten.

4. Translate into German:

The two brothers sat up in their beds and stared into the darkness. The room was full of water, and by the moonlight, which found itsfway through a hole in the shutter, they could see in the midst of it an immense foam globe bobbing up and down like a cork, on which, as on a most luxurious cushion, rested the little old gentleman, cap and all. There was plenty of room for it now, for the roof was off.

"Sorry to disturb you," said their visitor. "I'm afraid your beds are dampish: perhaps you had better go to your brother's room; I've left the ceiling on, there."

FRENCH I.

Time: Two hours.

I.

Translate into English:

1. Il est à peine jour sur les coteaux verts de la ferme, mais les coqs vigilants ont salué la petite pointe de l'aurore: à leur voix le poulailler (poultry house) s'éveille; une trentaine de poules, caquetant et chantant, vont chercher dans la rosée les petits vers qu'a fait sortir la fraîcheur de la nuit. Bientôt la ménagère matinale, la bonne dame Guillaume, elle aussi, sera debout. Regardez: sa fille aînée la suit. Adèle est une belle et laborieuse fille qui a déjà quinze ans et demi, et qui, active comme sa mère, court partout où sa présence est utile.

2. Un dimanche matin, Marie me demanda si je ne pensais pas à la retirer bientôt de son pensionnat (boarding school).

Père, dit-elle, toutes mes camarades sont libres maintenant et plusieurs sont mariées. Je ne suis plus une enfant et je commence à m'ennuyer dans ce pensionnat où j'ai déjà passé tant d'années.

C'est vrai, répondis-je tout absorbé. Tu es grande maintenant.

Père, dit-elle, en souriant, j'ai dix-huit ans.

3. Le plus grand ministre de Louis XIV est un des plus grands hommes qui aient gouverné la France; ce fut Colbert, le fils d'un simple marchand de laines de Reims. Colbert avait pris dans le commerce des habitudes d'ordre et de probité, qu'il apporta plus tard dans les affaires publiques.

II.

Translate into French:

1. My child brings me a flower every Sunday morning. He is over seven years old. My father governs his farm as Colbert governed France. I smiled when my daughter asked me at what age I began to think of marrying. What would you answer me if I should say to you that you will never bring habits of order into your business?

2. I am afraid that he will come. I am not afraid that he will come. We will go unless it rains. I wish that you would do that. We should do it if you

would promise not to look at us. In April, eighteen hundred and sixty-three, the civil war in America had lasted two years. If you received three thousand dollars a year, how much would you spend and how much would you save (*épargner*)? We should spend twenty-four hundred and save six hundred. We should receive three-fourths of what you receive and save a third of what you save. You have the best apples that I have ever known; have you seen my potatoes? They are not those that I bought last summer.

III.

Give the principal parts and the second person plural of the simple tenses of the verbs: *parler* and *recevoir*.

Give the principal parts and the third person plural of the compound tenses of the verbs: *venir* and *plaindre*.

How is the comparative and how is the superlative of a French adjective regularly formed? Give examples.

FRENCH II.

Time: Two hours.

Traduisez en anglais:

1. Le transformateur joue donc ici le rôle inverse de la bobine de Ruhmkorff ordinaire, car il *réduit* la tension au lieu de l'augmenter. Mais cela ne change rien au principe même, puisqu'il *suffit* de modifier le rapport du nombre de spires pour modifier dans un sens ou dans l'autre le coefficient de transformation. Le rendement des transformateurs à courants alternatifs est remarquablement élevé. Il atteint 97% à pleine charge dans les appareils les plus récents et reste très élevé, même pour de très faibles charges. Il ne semble pas possible d'améliorer ce rendement qui touche à la perfection; les progrès futurs auront principalement pour objet de réduire le prix de construction de ces utiles auxiliaires.

2. Les bonnes habitudes sont impérieuses comme les mauvaises. Chez un homme cultivé, elles ont cette supériorité de pouvoir en outre *se justifier* à chaque instant par le sentiment de la dignité personnelle, par celui du bien général, par la conception d'un idéal humain qui apparaît à la fois comme utile et comme beau. La vraie sanction, c'est l'approbation de la conscience; Rousseau *a dit* admirablement: la récompense de bien faire, c'est le plaisir d'avoir bien fait.

Traduisez en français:

3. I should like to see you once more before you go to Chicago. If I were you, I should not stay there longer than two weeks, and I should try to be back in New York by the twenty-fifth of August. Unless we meet this summer we shall probably not see each other again for five or six years. Do not forget me, and write to me every Saturday.

4. The dress which you have promised to give me is not the one which your mother had promised me. You must ask her to keep her promise. Here is the cane which your father left at my house. When you see him give it to him. Speak of it, too, to your mother. I should make her a visit myself if I could, but I am not well enough to travel seventy-five miles. She is the most interesting woman that I have ever known. Remember me kindly to her. This is the fourth letter that I have written you since I received one from you.

5. Écrivez les temps primitifs, et l'impératif, des verbes en italiques, dans les paragraphs 1 et 2 ci-dessus.

6. Ecrivez les temps primitifs, l'impératif (s'il y en a), et la deuxième personne du singulier, de tous les autres temps, des verbes suivants:

A la forme négative.	A la forme interrogative.	A la forme négat-interrog.
Se maudire.	Joindre.	Relire.

7. In translating the English *past conditional* into French, which two tenses of the French verb may be used? Illustrate by translating: *He would have spoken to us if he had known us.*

8. In translating the English *pluperfect indicative* into French, which two tenses of the French verb may be used? Illustrate by translating: *At eleven o'clock he had not arrived.*

9. In translating the English *imperfect indicative* into French, which two tenses of the French verb may be used? Illustrate by translating: *I saw your father three years ago.* Translate: *I used to see your father three years ago.*

---

(2) COLUMBIA UNIVERSITY.

ENTRANCE EXAMINATIONS—SEPTEMBER, 1908.

MATHEMATICS.

ELEMENTARY ALGEBRA.

NOTE.—Time: Three hours. The subject is divided into two parts as follows:
a. i. To quadratics.
a. ii. Quadratics and beyond.

Candidates offering at this examination:
One part only are to answer *all* the questions on that part.
Both parts are to answer *four* questions on *each* part, including questions 3, 4, and 8.

a. i.

1. Reduce to its simplest form

$$\frac{1-\frac{a+3}{a^2+9}}{\frac{1-\frac{a+3}{3-a^2+9}}{}}+\left(\frac{\frac{1+1}{a+4}}{\frac{1-\frac{4-a}{4-16+a^2}}{}}-1\right)$$

2. Factor

$(3a-b)^2-(a+3b)^2$, $\quad 10a^2+ab-2b^2$, $\quad 6ax-2by+3bx-4ay$

Hence find the H. C. F. and the L. C. M. of these three expressions.

3. Solve for x, y, and z the equations

$$x+\tfrac{1}{2}(y+z)=a$$
$$y+\tfrac{1}{2}(z+x)=b$$
$$z+\tfrac{1}{2}(x+y)=c$$

4. At a certain time the ratio of the numbers of employees of two companies was 7 to 4. After the first company had laid off 10 per cent of its men, and the second had laid off 130 men, the ratio was 12 to 7. Find the number of men employed by each company at first.

5. Find the square root of

$$\frac{4x^2}{y^2}+\frac{16}{3}+\frac{y^2}{9x^2}+\frac{8x}{y}+\frac{4y}{3x}$$

6. Express by means of fractional exponents

$$\sqrt[4]{x^3}+\sqrt[5]{\frac{1}{y^7}} \text{ and } \sqrt{x^{-1}}+\frac{3}{y^2}\sqrt{y}$$

and find the product of the resulting expressions.

a, ii.

7. (*a*) Solve the equation

$$\sqrt{5x-9}=\sqrt{x-1}+2$$

and verify your result.

(*b*) Prove that the roots of the equation

$$ax^2+bx+c=0$$

will be equal if

$$b^2-4ac=0$$

8. A and B entered a 5,000-mile race. A traveled the same distance every day and won the race by 1,100 miles in a certain number of days. For one-fifth of this time B went 110 miles a day, and after a delay of five days he traveled for the rest of the time at four-fifths of A's speed. Find the number of days.

9. Solve completely the simultaneous equations

$$3x^2-4y^2=48$$
$$y^2-3x+3=0$$

and indicate the value of x which is to be taken with each value found for y.

10. Draw the graphs of the two equations

$$9x^2+16y^2=144$$
$$x-y+5=0$$

Find the point, or points, of intersection of the graphs.

11. (*a*) Expand by the binominal theorem

$$\left(\frac{x^2}{3}-2a^{-1}\right)^5$$

(*b*) Find and simplify the ninth term in the expansion of

$$\left(a^2-\frac{2}{a}\right)^{12}$$

12. (*a*) Find the sum of ten terms of an arithmetical progression whose first term is a and whose second term is b.

(*b*) The second term of a geometrical progression is 3 and the fourth term is $\frac{1}{3}$. Find the ninth term.

PLANE AND SOLID GEOMETRY.

NOTE.—Time: Three hours. Candidates offering only plane geometry are to answer all the questions of group A and two from each of the groups B, C. Those offering only solid geometry are to answer all the questions of group D and two from each of the groups E, F. Those offering both subjects are to answer two questions from each of the groups B, C, E, F.

On the cover of his examination book each candidate will state what text-book or text-books he has used in preparation for this examination, and will

Indicate whether his examination is in plane geometry, solid geometry, or plane and solid geometry.

A.

1. Prove that two triangles are equal if two angles and the included side of one are equal respectively to the two angles and included side of the other.
2. Prove that if three or more parallel straight lines cut off equal segments on one transversal, they cut off equal segments on every transversal.
3. Show how to circumscribe a circle about a given triangle. Prove the correctness of your method.

B.

4. Prove that two parallel chords intercept equal arcs on the circumference of a circle.
5. In a right triangle, a perpendicular is drawn from the vertex of the right angle to the hypotenuse.
   (*a*) Prove that either leg is a mean proportional between the whole hypotenuse and the segment adjacent to that leg.
   (*b*) If the hypotenuse is 10, and the perpendicular from the vertex of the right angle is 4, into what segment does the perpendicular divide the hypotenuse?
6. Prove that the areas of any two similar triangles have the same ratio as the squares of their corresponding sides.

C.

7. Prove that an angle inscribed in a circle is measured by one-half the arc intercepted between its sides.
8. Find the locus of the vertex of a triangle which has a fixed base and a given area.
9. The area of a circle is 36π. Find the side, apothem, and area of the inscribed equilateral triangle.

D.

10. Prove that of all straight lines drawn from a given point to a given plane,
   (*a*) the perpendicular is the shortest line;
   (*b*) any two oblique lines which cut off unequal distances from the foot of the perpendicular are unequal, the one which cuts off the greater distance being the greater.
11. Prove that the sum of any two face angles of a triedral angle is greater than the third.
12. Prove that if a pyramid is cut by a plane parallel to the base, the edges and altitude are divided proportionally and the section is a polygon similar to the base.

E.

13. Prove that the locus of points in space which are equidistant from two given fixed points is the plane which bisects at right angles the straight line joining the given points.
14. Prove that the plane passed through two diagonally opposite edges of a parallelopiped divides the parallelopiped into two equivalent triangular prisms.

15. Prove that the area generated by the revolution of a straight line about an axis coplanar with it, but not parallel to it, is equal to the projection of the line on the axis multiplied by the circumference of the circle whose radius is the perpendicular erected at the mid point of the line, and terminated in the axis.

F.

16. A right circular cone whose altitude is 12 feet, and the radius of whose base is 9 feet, is cut by a plane 4 feet from and parallel to the base; find the lateral surface and the volume of the frustum thus formed.
17. A cylinder is circumscribed about a sphere of radius R; find the ratio of their surfaces and also the ratio of their volumes.
18. Prove that if one spherical triangle is the polar of a second spherical triangle, then the second is also the polar of the first.

PLANE TRIGONOMETRY.

NOTE.—Time: Two hours. Omit one question from each of the groups A, B, C.

A.

1. (*a*) Log$_a$ 64=3; find the value of a.
   (*b*) Prove that the logarithm of the product of two numbers is equal to the sum of the logarithms of the numbers.
2. Prove the identity
$$(\sin\theta+\cos\theta)\ (\tan\theta+\cot\theta)=\sec\theta+\operatorname{cosec}\theta$$
3. Show that
$$\sin(-300°)+\sin 840°\ .\ \cos 330°+\cos 135°\ .\ \cos 225°=\tfrac{1}{2}$$

B.

4. Find values of x less than 180° which satisfy the equation
$$2\cos^2 x+3\sin x=3$$
5. If x and y are positive angles whose sum is less than 90°, prove from a figure that
$$\cos(x+y)=\cos x\cos y-\sin x\sin y$$
and apply this formula to express cos $2x$ in terms of cos x.
6. (*a*) Assuming the formula for cos $2x$, derive the formula
$$\sin\tfrac{1}{2}x=\sqrt{\frac{1-\cos x}{2}}$$
   (*b*) Given $\sin A=\frac{1}{3}\sqrt{2}$, find $\sin\frac{1}{2}A$.

C.

7. Prove that in any plane triangle
$$a^2=b^2+c^2-2bc\cos A$$
8. At a point A, due north of a balloon, the angle of elevation of the balloon is 44° 56′; and from a point B, due south of the balloon, the angle of elevation is 36° 4′ 2″. If A and B are 700 feet apart, find the height of the balloon.
9. In a plane triangle,
$$a=154.08,\ b=182.12,\ B=51°\ 9'\ 6''$$
Determine the remaining parts. How many triangles are there having the given parts? Give reasons for your answer.

D.

10. In a spherical triangle ABC, C is a right angle. Prove that

$$\sin a = \sin c \sin A$$

11. In a spherical triangle, right-angled at C,

$$c = 105° 17' 20'', \ b = 38° 47' 11'';$$

find a and B.

CHEMISTRY.

NOTE.—Time: Two hours. Candidates are required to present their certified notebooks on forty experiments as a part of the examination.

A.

Answer all questions in this group.

1. A certain volume of gas measures 100 c.c. at 10° C. and 750 mm. pressure. What will it measure at 0° C. and 760 mm. pressure? (See data below.)
   What is the weight of 10 liters of sulphur dioxide measured at 0° C. and 760 mm. pressure?
   What weight of potassium chlorate must be heated to obtain 100 grams of oxygen?
   Data: Atomic weights: S=32, O=16, K=39, Cl=35.5. Use .09 gram as the weight of 1 liter of hydrogen at 0° C. and 760 mm. pressure.
2. Define and illustrate base, reversible reaction, electrolyte, nascent state, dibasic acid.
   Sixteen grams of oxygen combine with 2 grams of hydrogen, and 3 grams of magnesium combine with 2 grams of oxygen. Calculate the equivalent of magnesium.
3. Complete the following equations using formulas:
   Potassium nitrate and sulphuric acid (heated) = ?
   Carbon monoxide and copper oxide (heated) = ?
   Ferrous sulphide and dilute sulphuric acid = ?
   Calcium carbonate and dilute hydrochloric acid = ?

B.

Answer two questions from this group.

4. Describe, in full, the experiments you performed illustrating the methods of preparation and the physical and chemical properties of ammonia. Give the equations for all the chemical reactions.
5. Describe experiments showing that
   (*a*) calcium oxide is a basic anhydride,
   (*b*) water is an aid to some chemical reactions.
   (*c*) the air contains oxygen, carbon dioxide, and water vapor.
   Describe an experiment illustrating the law of definite proportions.
6. Describe laboratory methods for the preparation of chlorine, silver nitrate, hydrofluoric acid, nitrous oxide. Give equations.

C.

Answer two questions from this group.

7. What are the physical or chemical properties of each of the following that make them directly useful to mankind? Oxygen, chlorine, carbon (coal), tin, copper, iron, zinc.

8. What is the nature of the most important chemical change which occurs during the production of pig iron from its ores in the blast furnace? How does a steel differ chemically from a pig iron? Give the names of two processes for the production of steel from cast iron. Define the terms "ore" and "flux."

9. Give three methods for the preparation of salts, using sodium chloride as an example.

In what respects do chlorine, bromine, and iodine resemble each other and in what respects do they differ from each other?

PHYSICS.

NOTE.—Time: Two hours. Candidates are required to present their notebooks on the thirty-five experiments as a part of the examination. Answer ten of the following questions as briefly as is consistent with clearness and definiteness. Explain all symbols used.

1. A boy throws a ball vertically upward, and four seconds later it strikes the earth. What height did the ball attain and with what velocity did it leave the boy's hand?
2. A dog hitched to a cart can exert a pull of 10 kg. With what velocity must the dog move in order to do work at the rate of 20 kilogrammeters per second? Name and define the c. g. s. units of force, work, and power.
3. A 20-gram weight attached to one end of a uniform rod 100 cm. long causes it to balance about a point 20 cm. from that end. Find the weight of the rod.
4. A string has its two ends attached to points 100 cm. apart in a horizontal plane. At the middle point of the string is attached a weight of 5 kg., and the point is 20 cm. below the horizontal plane. Find, by graphical solution, the tension on the string. Suggestion—Let the distance between the lines of the examination book represent 10 cm. and 1 kg. respectively.
5. What is the atmospheric pressure in grams per square centimeter when the barometer stands at 76 cm.? Density of mercury equals 13.6 gr./cm.³
6. A rectangular block of stone, 20 x 30 x 40 cm., has a density of 2.0 gr./cm.³ What force will be required to lift this block under water?
7. What must be the length of an open organ pipe that will give a fundamental note of 200 vibrations per second, if the velocity of sound in air is 300 meters per second?
8. A piece of copper weighing 200 grams is taken from an oven and placed in 500 cubic centimeters of water. The temperature of the water is changed from 20° C. to 30° C. If the specific heat of the copper is 0.09, what was the temperature of the oven?
9. Draw optical diagrams showing the path of the rays in the formation of a real image by a double convex lens, and of a virtual image by a double concave lens.
10. Draw a diagram showing the path of the rays in the formation of a spectrum by a prism, and indicate the position of the colors.
11. Draw a diagram of the parts and connections of an electric doorbell.
12. Draw a diagram showing the principal parts and connections of a simple type of dynamo.

PHYSIOGRAPHY.

NOTE.—Time: Two hours. Candidates are required to present their certified notebooks on the forty exercises as a part of the examination, and also to answer the following questions as concisely as is consistent with clearness and definiteness. Use diagrams as freely as desired.

1. Mention as many ways as you can by which the true north may be determined. How would a true north and south line vary from the compass direction at New York and at San Francisco?

2. Explain the following terms: Equinox; block mountain; young valley; escarpment; high.
3. Compare the distribution of rainfall along the western coast of the United States with that along the eastern coast. Account for the variation between the summer and winter rainfall of the northern Mississippi Valley.
4. Show by a diagram the atmospheric conditions about a cyclone, including temperature, pressure, and rainfall.
5. Describe the shore features to be seen along a regular shore line. Account for the location of Portland, Me.; Norfolk, Va.; and Boston, Mass.
6. Compare the surface features in a glaciated with those in a nonglaciated region. Describe the occupations to be seen in a glaciated region like Maine and show how these occupations are related to the glacial features.
7. Mention four regions in this country where lakes abound and explain the origin of the lakes in each region.
8. What phenomena of the ocean are due to the earth's rotation? Explain the relation.

SHOPWORK.

NOTE.—Time: One hour and a half. Candidates may select *a* or *b* or *c*.

a. WOODWORK.

1. Name three common woods used in furniture making, and give some of their properties.
2. Make sketches and note the uses of three of the common woodworking tools.
3. Show by sketch the teeth of a rip and of a cross-cut saw, and describe the action of both.
4. Describe the method of planing a block of wood on all six sides true to given dimensions.
5. Make freehand drawings of a mortise and tenon joint.
6. Sketch a sectional view of one form of a plane, and describe its adjustments.
7. Explain the method of gluing and nailing a picture frame with mitered corners.
8. Make a sketch of the head stock of a wood-turning lathe, and name the parts.
9. Explain the method of turning a cylinder 1½" in diameter and 8" long.
10. Describe the method of making a chisel handle with a ferrule.

b. FORGING.

1. Show by sketch the tuyere iron of a forge. Describe its function, and explain how a fire for small work should be built.
2. Describe the process of (*a*) forming, (*b*) scarfing, and (*c*) welding of links to a chain.
3. Describe the process of forging a twisted gate hook.
4. A shaft 1" in diameter requires a collar 2" in diameter, ¼" thick, 2" from the end. Describe the method of forging.
5. Make sketches of the following tools: Flatter, set hammer, top and bottom fuller.
6. Describe the method of forging a square-headed bolt.
7. In drawing down a piece of iron to smaller size, what precautions should be taken against splitting?
8. Should wrought iron and tool steel be worked at the same temperature? If not, how should they be treated?

9. Compare the fractures of wrought iron and soft steel, and describe the differences in their qualities.
10. Describe the process of forging and tempering a cold chisel.

6. Machine Work.

1. Show by sketch the cutting angle of a lathe tool for wrought iron, for cast iron.
2. What is a surface gauge, and what are its uses?
3. Explain the method of setting a lathe to cut a taper.
4. Describe the process of centering a piece for the lathe.
5. Show by sketch how a diamond-pointed lathe tool should be adjusted to a piece of work.
6. Describe the operation of drilling a half-inch hole in the center of a round piece of cast iron in the lathe.
7. If the lead screw in a lathe has eight threads to the inch, what gears might be used on the lathe spindle and on the lead screws to cut a screw with 20 threads to the inch?
8. Make a sketch of the tool head on a planer, and show how it may be adjusted for angular cuts.
9. Describe the process of making a shrink fit for a 2" steel collar on a 1" steel shaft.
10. What is the advantage of a twist drill over a flat drill?

BOTANY.

Note.—Time: Two hours, ten minutes of which will be devoted to an oral examination. The certified notebook on the laboratory work must be submitted at the examination.

1. What structures of the leaf are of advantage in photosynthesis? Explain in what way each one is of service.
2. What is the cause and mechanism of the curvature of tendrils?
3. How is the root protected against injury? How does it absorb materials from the soil? What other functions does it perform?
4. Make a sketch of the important stages in the life of a fern, labeling the various parts.
5. In what respects does the seed of a monocotyledon usually differ from that of a dicotyledon?
6. Mention the agencies that promote the distribution of plants, with illustrations of the adaptive features. What factors control the association of plants upon the earth?
7. Give the characteristics of six families of seed plants that you have studied.

ZOOLOGY.

Note.—Time: Two hours, ten minutes of which will be devoted to a practical oral examination.

1. Explain what is meant by evolution—natural selection—inheritance of acquired characters.
2. Enumerate the chief distinguishing characters of fishes, amphibians, reptiles, birds, and mammals.
3. Discuss the process of digestion in man.
4. Compare the chief systems of organs in the earthworm and the frog, and illustrate by means of diagrams. (The crayfish may be substituted for the earthworm if preferred.)

5. Explain how respiration takes place in clam, crayfish, grasshopper, fish, and frog.
6. Give the general classification of the following—porpoise, paramecium, jelly-fish, spider, seal, turtle, earthworm, oyster, salamander, snail, lobster, roach.

ENGLISH.

NOTE.—Time: Two hours. Candidates should write with care and should read over their answers before handing them in.

READING AND PRACTICE.

Write four essays, of several paragraphs each, on subjects selected from the following group:

1. *The Merchant of Venice:* Shylock.
2. *The Sir Roger de Coverley Papers:* Sir Roger's life in the country.
3. *Ivanhoe:* The household of Cedric.
4. Irving's *Life of Goldsmith:* Goldsmith's acquaintance with Johnson.
5. *Lancelot and Elaine:* The death and burial of Elaine.
6. *Silas Marner:* The character of Godfrey Cass.
7. *Macbeth:* "The line of Banquo."
8. *The Lady of the Lake:* The fiery cross.

ENGLISH.

NOTE.—Time: Two hours. Candidates should write with care and should read over their answers before handing them in.

STUDY AND PRACTICE.

I. Write an essay of three or four paragraphs on Shakspere's treatment of the supernatural in "Julius Cæsar."

II. "Unmuffle, ye faint stars; and thou, fair moon,
That *wont'st* to love the traveller's *benison*,
Stoop thy pale visage through an amber cloud,
And *disinherit Chaos*, that reigns here
In double night of darkness and of shades;
Or, if your influence be quite dammed up
With black *usurping mists*, some gentle taper,
Though a rush candle from *the wicker hole*
Of some clay habitation, visit us
With thy *long levelled rule of streaming light*,
And thou shalt be our *star of Arcady*,
Or *Tyrian Cynosure*."

(1) From what poem are these lines quoted?
(2) Explain the situation of the speaker and the circumstances that led to it.
(3) Scan the first three lines and name the meter employed.
(4) Explain accurately the meaning of the italicised words.

III. "The Colonies complain *that they have not the characteristic mark and seal of British freedom.* They complain that they are taxed in a Parliament *in which they are not represented. If you mean to satisfy them at all*, you must satisfy them with regard to this complaint."

(1) What does Burke mean by "the characteristic mark and seal of British freedom?"
(2) What was Burke's plan for satisfying the above complaint of the colonists? How did he prove its feasibility?

(3) Point out, exactly, the grammatical function of the italicised subordinate clauses.

IV. (1) What does Macaulay say of Addison's knowledge of Greek and Roman authors?

(2) Describe Addison's travels on the continent and his preparation for public life.

(3) Write a brief account of Addison's connection with the periodical literature of his time.

FRENCH.

ELEMENTARY.

NOTE.—Time: Two hours. The use of good English is strictly required.

I.

Translate into English:

S'il y a dans l'histoire de France un personnage qui soit connu des Américains, c'est assurément le général La Fayette. Mais le rôle joué par lui après son retour en France est bien moins connu d'eux que la part prise par lui aux luttes de la guerre de l'Indépendance. La Fayette n'est mort qu'en mil huit cent trente quatre, plus d'un demi-siècle après la capitulation de Yorktown, et ce demi-siècle a été pour lui, chaque fois que les circonstances l'ont permis, une période d'activité politique.

En mil sept cent quatre-vingt neuf, quand commença la grande révolution qui devait mettre fin à l'ancien régime et créer la société moderne, La Fayette fut un des plus ardents parmi les défenseurs des idées nouvelles. Après la victoire du peuple au quatorze juillet il devint commandant en chef de la garde nationale. Plus tard il commanda une des armées opposées à l'Europe monarchique coalisée, par la France décidée à rester libre.

Il quitta le pays au moment où les chefs de la Révolution lui parurent devenir trop violents; mais saisi par les soldats de l'Autriche il fut jeté en prison et traité pendant des années avec la plus grande dureté. Il finit par devoir sa délivrance aux victoires répétées de la France républicaine.

Une nouvelle révolution, en mil huit cent trente, fut pour La Fayette une nouvelle occasion d'affirmer sa fidélité aux idées de sa jeunesse. La France s'était revoltée contre son ancienne dynastie, replacée sur le trône par les étrangers victorieux après la défaite de Napoléon. La Fayette fut pendant quelques jours le maître de son pays qui, victorieux, suivit les conseils de sagesse et de modération donnés alors avec une grande abnégation par le patriotique vieillard.

Sa gloire est une des gloires les plus pures de la France.

II.

1. Give the principal parts and the first person singular of the future of the following verbs: *aller, devoir, dire, faire, prendre.*

   Conjugate in the present indicative: *avoir, être, donner, finir, rompre.*

2. Give a complete statement as to the position of the personal pronoun when used as object of the verb. Illustrate with brief sentences where the verb has a single personal pronoun as object and others where there are two personal pronouns, one the direct and the other the indirect object.

3. Construct a list containing twelve masculine and twelve feminine French nouns with their English translation, placing them separately and designating the gender of each group.

III.

Translate into French:

1. I have books. I have no books. I have enough books. I have good books. I have French books.
2. Come in. Who are you? What do you wish? Sit down. Read me the letter. What is the name of this gentleman? Is he a Catholic?
3. Good day. How are you? What is the news? From where do you come? Where are you going? How long have you been here?
4. The professor to whom I gave my note-book and whom I wish to see said he would be here at ten minutes past eleven.
5. He knows what I wish and why I am here, for I told him yesterday.
6. Excuse me if I leave you alone. I am hungry and have a headache.
7. You are right. Go and eat your lunch. Besides, it is the fourteenth of July and you ought not to work too much.

IV.

1. Give rules for the pronunciation of the consonants c and g in French.
2. Under what conditions does a vowel have the nasal pronunciation? What are the nasal vowel sounds and how are they written?
3. What is the pronunciation and what is the usual significance of è?

INTERMEDIATE.

NOTE.—Time: Two hours. The use of good English is strictly required.

I.

Translate into English:

(*a*) Au commencement de ce siècle, la France était pour les nations un magnifique spectacle. Un homme le remplissait alors et la faisait si grande qu'elle remplissait l'Europe. Cet homme, sorti de l'ombre, fils d'un pauvre gentilhomme corse,[a] produit de deux républiques, par sa famille de la république de Florence, par lui-même de la république française, était arrivé en peu d'années à la plus haute royauté qui jamais peut-être ait étonné l'histoire. Il était prince par le génie, par la destinée et par ses actions. Tout en lui indiquait le possesseur légitime d'un pouvoir providentiel. Il avait eu pour lui les trois conditions suprêmes, l'événement, l'acclamation et la consécration. Une révolution l'avait enfanté, un peuple l'avait choisi, un pape l'avait couronné.—*Victor Hugo.*

(*b*) Tu grandis sans plaisir, tu tombas sans murmure.
Rien d'humain ne battait sous ton épaisse armure:
Sans haine et sans amour, tu vivais pour penser.
Comme l'aigle régnant dans un ciel solitaire,
Tu n'avais qu'un regard pour mesurer la terre,
Et des serres[b] pour l'embrasser. . . .
Être d'un siècle entier la pensée et la vie;
Émousser[c] le poignard, décourager l'envie,
Ébranler,[d] raffermir l'univers incertain;
Aux sinistres clartés de ta foudre qui gronde
Vingt fois contre les dieux jouer le sort du monde,
Quel rêve! et ce fut ton destin! . . .
Tu tombas cependant de ce sublime faîte:[e]

[a] Corsican, *Corse.*
[b] Serres, *claws.*
[c] Émousser, *to blunt.*
[d] Ébranler, *to shake off its base.*
[e] Faîte, *height.*

Sur un rocher désert jeté par la tempête,
Tu vis tes ennemis déchirer ton manteau;
Et le sort, ce seul dieu qu'adora ton audace,
Pour dernière faveur t'accorda cet espace
Entre le trône et le tombeau.—*Lamartine.*

II.

1. Translate into French:
   This is the best French book I have read.
   This is the best of the French books I have read.
2. Translate into French:
   I shall see you after you have finished your theme.
   I can not see you before you have finished your theme.
3. Explain the uses of the following conjunctive (or relative) pronouns. Illustrate by examples: Qui, que, lequel, duquel, dont.

III.

Translate into French:

Lamartine and Victor Hugo are two of the greatest French poets. They both lived in the nineteenth century and both wrote and spoke on Napoleon. The two passages set for translation from French into English both relate to Napoleon and describe the splendid part and the dramatic end of his astonishing career. The prose passage is an extract from the speech delivered by Victor Hugo on being received into the French Academy. The verse passage comes from the collection of poems which made Lamartine illustrious, the *Poetic and Religious Meditations*. It was written almost immediately after Napoleon's death, which occurred on May fifth, eighteen hundred and twenty-one.[a]

IV.

Write in French seventy-five to one hundred words on the coming presidential election. You may write this in the form of a letter addressed to a French friend who has asked for information on the subject.

You may substitute for the above the synopsis of a play seen or a book read by you within a year before this examination.

GERMAN.

ELEMENTARY.

NOTE.—Time: Two hours. Every candidate will write his name on outside page of cover, and state whether he is a candidate for admission to Columbia College, Barnard College, a school of applied science, a school of fine arts, or the College of Physicians and Surgeons.

I.

GERMAN INTO ENGLISH.

Translate into good English:

(a) In einer Sommernacht, da es auch allzuwarm geweſen, war Marietta früh erwacht, und konnte nicht wieder einſchlafen. Drum ſprang ſie freudig vom Lager, als das erſte Morgenrot über die Meereswellen gegen das Fenſter des Kämmerleins blitzte. Sie kleidete ſich und ging hinaus, Antlitz, Bruſt und Arme am kühlen Brunnen zu waſchen; den Hut nahm ſie mit, am Meere ein Stündchen zu luſtwandeln.[b] Sie kannte da eine heimliche Stelle zum Baden.

[a] The date must be written out in words.
[b] luſtwandeln = ſpazieren.

Um aber zu der heimlichen Stelle zu kommen, mußte man über die Felsen hinter dem Hause gehen, und von da wieder abwärts, neben Granatbüschen[a] vorbei und Palmen. Diesmal konnte Mariette nicht vorbei. Denn unter den jüngsten und schlanksten[b] der Palmen lag im süßen Schlaf ein junger, schlanker Mann—neben ihm ein Strauß der allerschönsten Blumen. Auch sah man wohl ein weißes Papier daran, auf welchem vermuthlich[c] wieder ein Seufzer redete.—Wie konnte Mariette da vorbei kommen?

(*b*) Da wurde die Tür stürmisch aufgerissen, Emma stürzte herein und warf sich an den Busen der Dichterin.

„Ach, Tante!" rief sie verzweiflungsvoll aus—„ach Tante, hätte ich auf dich gehört! O, der Falsche, der Schändliche!"

„Ha!" rief Thusnelda und faßte die Papierschere fester, „hat er die Maske endlich fallen lassen, der tückische Wälsche?[d] Sprich, mein Kind.—Du bist bei Thusnelda, deiner Tante, und Thusnelda wird dich zu schützen wissen."

Das Auge der Sprecherin flammte, ihre Gestalt wuchs um mehrere Zoll.

„O, ich kann's kaum sagen—der Verräter hat—"

„Was hat der Elende?"

„Eine zweite Geliebte!" stieß Emma hervor und weinte, daß es einen Stein in der Erde hätte erbarmen müssen.

„O, du Unglückliche!" rief Thusnelda aus und strich dem zitternden Mädchen liebreich über die blonden Haare.

II.

ENGLISH INTO GERMAN.

Translate into good German:

1. He lives in the new house on the other side of the street.
2. She has a son and a daughter who speak very good German.
3. He is a good friend of the little children.
4. Father is not in his room; he has just gone into the garden.
5. Who is that lady yonder who is looking over toward us?
6. I never saw such a man; I believe he reads all the new books.
7. She will be at home this evening; if you come early, you will find her.
8. Please give me a glass of water and something good to eat.
9. If you had not spoken of it, I might easily have forgotten it.
10. He told me that he would like to go to a good concert, but he has no money.

III.

GRAMMATICAL QUESTIONS.

1. Give with the definite article, the nominative and genitive singular and the nominative plural of the following nouns in passages I (*a*) and (*b*): Sommernacht, Fenster, Kämmerleins, Hut, Meere, Hause, Mann, Blumen, Dichterin, Auge.

2. Decline in full, singular and plural, the German for: *my poor heart, good, old friend, the greatest pleasure;* and from passage I (*b*) der Falsche.

3. Give the remaining forms, singular and plural, present indicative, of „ich bestrebe mich nur, mir selbst zu gefallen"—(I strive only to please myself).

4. Give the principal parts and the third person singular present indicative active of the following verbs in I (*b*): aufgerissen, warf, rief .... aus, fallen, sprich wissen, wuchs, kann, stieß .... hervor, strich.

---

[a] Granatbüschen=pomegranate bushes.
[b] schlank=slender.
[c] vermutlich=presumably.
[d] der Wälsche here=the Italian.

5. Conjugate treffen in the present and preterite (or imperfect) indicative; kommen in the perfect subjunctive; können in the future perfect indicative.

6. State the most important rules for the position of the inflected verb in independent (or principal) clauses and in dependent (or subordinate) clauses; account for the order „hätte erbarmen müssen" in I (*b*).

INTERMEDIATE.

I.

NOTE.—Time: Two hours. Every candidate will write his name on outside page of cover, and state whether he is a candidate for admission to Columbia College, Barnard College, a school of applied science, a school of fine arts, or the College of Physicians and Surgeons.

GERMAN INTO ENGLISH.

Translate into good English.

(*a*) Die Prinzessin freute sich, doch einmal Ausführliches[a] zu erfahren von jener verwunschenen[b] Burg, die sie immer von weitem sah, und niemals aus der Nähe betrachten durfte. Sie staunte über die vielen merkwürdigen Begebenheiten—eine kleine Weltgeschichte!—welche sich alle dort ereignet haben sollten, und über die zahllosen noch vorhandenen historischen Heiligtümer des alten Gemäuers.[c] Die französischen Bücher, womit sie von der Martigny täglich gequält[d] ward, führten nach Paris und Rom, nach Athen und Mexiko und anderen gleichgültigen[e] fremden Orten: es tat der Prinzessin so wohl, zum ersten Male auch über die nächste Heimat, über das Rätsel, welches vor ihrem Fenster lag, Gedrucktes zu lesen. Der Anfang des Buches wirkte beruhigend, sogar schlafbringend, die Mitte dagegen anregend, der Schluß aufregend. Der Autor wurde mitunter komisch, wenn er recht ernsthaft sein wollte, aber er meinte es immer gut und glühte für seinen Gegenstand. Die Prinzessin erwärmte sich für einen Schriftsteller, über den sie zum öfteren lachte, aber sie konnte ihn niemals auslachen. In der Vorrede[f] bot er sich jedem Besucher der Ruine zum Führer an, bei Regen und Sonnenschein, Tag und Nacht: als Isabelle das Buch ausgelesen, hätte sie sich für ihr Leben gern einmal von dem Schulmeister durch die Burg führen lassen, am liebsten im Mondschein. (Riehl—*Burg Neideck.*)

(*b*) Sprach sein Führer: Dieser ist der
Stille Mann, mein braver Gastfreund,
Den ich lange schon beherberg.[g]
War ein stolzes Menschenkind einst.
Fand ihn draußen in dem Tale,
Und ich wollt' den Weg ihm zeigen
Nach dem Dorfe zu den Menschen.
Doch er schüttelte das Haupt und
Höhnisch[h] schier[i] klang mir sein Lachen.
Seltsam große Worte sprach er,
Bald wie frommandächtig[j] Beten,
Wie ein Psalm, so wie wir selbst ihn
In der Erde Schoße[k] singen,
Bald als wie ein Fluch zum Himmel;

---

[a] Ausführliches = something in detail.
[b] verwunschen = haunted.
[c] Gemäuer = ruins.
[d] quälen = torment.
[e] gleichgültig = indifferent.
[f] Vorrede = preface.
[g] beherbergen = to shelter.
[h] höhnisch = scornful.
[i] schier = fast.
[j] andächtig = devout.
[k] Schoße = bosom, interior.

Viel auch konnt' ich nicht verſtehen,
Doch es klang mir wie Erinnrung
An uralte Schöpfungszeiten,
Als die grimmigen Titanen
Berg und Fels zu [a] unſern Häupten
Aus dem Boden riſſen, und wir
Scheu hinab zur Tiefe flohn.

(Scheffel—*Der Trompeter von Säkkingen.*)

II.

ENGLISH INTO GERMAN.

Translate into German:

I arrived in Leipzig yesterday morning at 10 o'clock. I should have been here day before yesterday if I had not interrupted the journey in order to visit my friend Busse in Magdeburg. It seemed as if the whole train had been full of students, for the platform (Bahnſteig, *m.*) was crowded with young men who all had an academic air (Ausſehen). Many of them were old students who had come to meet old friends or welcome new acquaintances. Everywhere the gay (bunt) caps of the fraternity students (Couleurſtudent) were to be seen. I left my baggage (Gepäck, *n.*) at the station and then went directly to the university. On the way I noticed that some of the older students observed me carefully from head to foot, and that they then exchanged glances as if they wished to say, "A new freshman (Fuchs)—what do you think of him?"

III.

GRAMMATICAL QUESTIONS.

1. Give the present indicative and the present and imperfect (or preterite) subjunctive of all the modal auxiliaries in I (*a*); by means of brief sentences show the use of the two forms of the past participle of a modal auxiliary; construct and translate two sentences to illustrate one idiomatic use of ſollen and one of wollen.

2. Write the first seven lines of I (*b*) in indirect discourse, supplying any needed forms and changing the word-order where necessary to that of ordinary prose.

3. To what verbs are the following forms related: andächtig, Erinnerung, Schöpfung; give the substantives corresponding to the infinitives ſprechen, lachen, beten, ſingen, indicating the gender by prefixing the definite article.

4. Give the principal parts of verſtehen, klang, riſſen, flohn, and the present indicative singular of ſchüttelte.

5. Translate into German: *they ask for money; it was many years ago; she went on writing; he gave all that he had; it is good to drink.*

HISTORY.

ANCIENT HISTORY.

ELEMENTARY.

NOTE.—Time: Two hours. Candidates may omit either 3 or 7. The principal dates are to be given in all cases.

1. Explain the following terms: Achaean League, city, State, dyarchy, exarch, ostracism.

2. Draw the boundary of the Confederacy of Delos and indicate three or four of its principal States. Draw the boundary of the Roman Empire as it was about (*a*) 220, (*b*) 200 B. C., and explain how it was thus enlarged.

[a] zu here = über.

3. Give an account of the Phoenicians with especial reference to (*a*) their country, (*b*) industries, (*c*) commerce and colonization, (*d*) conflicts with Europeans, (*e*) contributions to civilization.
4. Describe the government of Athens under Pericles with reference chiefly to (*a*) councils and assembly, (*b*) law courts, (*c*) magistrates, (*d*) general character.
5. How did Greece become a part of the Roman Empire? What benefits did the Romans derive from contact with the Greeks?
6. What are the distinctive features of the principate of Hadrian?
7. Sketch the history of the Franks from the conversion of Clovis to the coronation of Charlemagne.

MEDIÆVAL AND MODERN HISTORY.

NOTE.—Time: Two hours. Candidates will answer the first two questions and four others. The principal dates are to be given in all cases.

1. Locate the following places on the outline map, and associate each with some historical event: Aix-la-Chapelle, Granada, Sedan, Austerlitz, Constance.
2. Write brief historical notes on the following: Investiture, Hansa, Treaty of Utrecht, fief, concordat.
3. Describe the structure of the mediæval church.
4. Show the effect of the Holy Roman Empire upon the development of Germany and Italy.
5. Outline the history of the French Revolution until 1800.
6. Describe clearly the setting of the Italian Renaissance in the history of European culture.
7. Sketch the life work of Bismarck.
8. Outline the history of the year 1848 in Europe, stating in the case of each country whether its effects were permanent or temporary.

ENGLISH HISTORY.

NOTE.—Time: Two hours. Candidates will answer the first two questions and four others. The principal dates are to be given in all cases.

1. Describe and state clearly the historical significance of the following: Magna Charta, habeas corpus, chartism, test act, ship money.
2. What was the rôle in English history of: Sir Robert Walpole, Simon de Montfort, Benjamin Disraeli (Lord Beaconsfield), Wilberforce, Henry V?
3. Outline English church history under the Tudors.
4. Sketch the political and constitutional history of England under the Plantagenets.
5. Show clearly how Parliament governs: Sketch the history of the cabinet system.
6. Give an account of the progress of democracy in England in the nineteenth century.
7. Describe definitely the conditions in England which caused the civil war.

AMERICAN HISTORY.

NOTE.—Time: Two hours. Candidates will answer the first two questions and four others. The principal dates are to be given in all cases.

1. Explain the following terms: Kansas-Nebraska bill; Albany plan of union; specie circular; X Y Z mission; interstate commerce act.
2. Mark on the outline map the position of the following and associate each with an historical event: Providence; Mobile; Yorktown; the Oregon Country; Hartford.

3. Name three men who were prominently connected with the acquisition of territory by the United States after 1800, and point out their share in the transaction.
4. Give some idea of what was done after the civil war with the States that had attempted secession.
5. How was the colonization of the Carolinas and Georgia effected?
6. What are the chief duties of the President according to our system of government?
7. For what events is the history of the United States during the period 1829–1837 remarkable? Give a brief description of each.

(3) YALE UNIVERSITY: SHEFFIELD SCIENTIFIC SCHOOL.

ENGLISH GRAMMAR.

JUNE, 1907.

1. Parse the words of the following sentence:

The book is John's, but it is doubtful whether John will come to claim it.

2. (a) Distinguish carefully between the use of *shall* and *will*.

(b) Write sentences containing (1) a pronominal adjective, (2) an adverb clause, (3) an adjective clause. Underline the required word or phrase in each sentence.

SEPTEMBER, 1907.

1. Parse the words of the following sentences:

He was asked a question whose meaning seemed doubtful. Still, gathering courage, he made some attempt at reply.

2. (a) Write sentences illustrating the use of each one of the relative pronouns.

(b) Illustrate the use (1) of coördinate, and (2) of subordinate clauses.

ENGLISH LITERATURE.

JUNE, 1907.

A.

[The candidate is advised to be careful in paragraphing, spelling, punctuation, and form of expression.]

Write short compositions (containing about one hundred words each) on *four* subjects chosen from this list. One of these must be number 1; the others must be chosen from *three different* works. The Idylls of the King is to be regarded as one work.

1. Which work read in preparation for this examination interested you most? Answer this question in the form of a brief theme, setting forth clearly and specifically the reasons for your preference.
2. The Stag Hunt in *The Lady of the Lake*.
3. Shylock as a Father.
4. Malcolm after the Murder of Duncan.
5. The Arrival of Gareth at Camelot.
6. Lancelot after the Death of Elaine.
7. Scott's Use of Disguise in *Ivanhoe*.
8. Goldsmith and the Literary Club.
9. The New Year's Ball at the Red House.

ENGLISH LITERATURE.

SEPTEMBER, 1907.

A.

[The candidate is advised to be careful in paragraphing, spelling, punctuation, and form of expression.]

Write short compositions (containing about one hundred words each) on *four* subjects chosen from this list. Choose subjects from *four different* works. The Idylls of the King is to be regarded as one work.

1. The Rivals for the Hand of Ellen.
2. Hecate.
3. Portia as a Lawyer.
4. The Marriage of Eppie.
5. Irving's Estimate of the Character of Goldsmith.
6. Excalibur.
7. Sir Torre in *Lancelot and Elaine*.
8. The Comic Element in *The Merchant of Venice*.
9. Sir Roger de Coverley at Westminster Abbey.

JUNE, 1907.

B.

[Answer all questions fully and in order.]

1. (*a*) Discuss the relation of Addison's literary fame to his political preferment.

   (*b*) How did Johnson come to write The Lives of the Poets?

2. (*a*) What was the occasion and what the nature of Lycidas?

   Describe the part played by the Attendant Spirit, from first to last, in Comus.

3. Trace the successive steps by which Brutus was won to the conspiracy.

4. How did Burke's plan of conciliation with the colonies differ from other plans?

SEPTEMBER, 1907.

B.

[Answer all questions fully and in order.]

1. (*a*) Macaulay's interpretation of the Addison-Pope quarrel.

   (*b*) Macaulay's estimate of Johnson's Dictionary and of his Shakespeare.

2. What resemblances are there between L'Allegro and Il Penseroso? What differences?

3. (*a*) Contrast the motives and methods of Brutus and Antony in Shakespeare's Julius Cæsar.

   (*b*) Show how the conspiracy in Julius Cæsar was doomed from beginning to end.

4. Develop Burke's ideas regarding taxation of the American Colonists.

ENGLISH HISTORY.

JUNE, 1907.

1. Locate and indicate the historic importance of:—Naseby; Oxford; Canterbury; Evesham.

2. Explain briefly:—Divine right of kings; Revolution of 1688; Puritans; Trafalgar.

3. Name the important events in John's reign.
4. The causes of the civil war in England.
5. Why is Mary I called "bloody Mary"?
   Explain Mary's relation to the Roman Church.
6. England's conquest of Canada. Why did England attack Canada?
7. Write on *one* of the following topics:
   (I) Causes of the hundred years' war.
   (II) The divorce of Henry VIII.
   (III) The Elizabethan age.
   (IV) The reign of George III.

SEPTEMBER, 1907.

1. Locate and indicate the historic importance of:—Calais; Cambridge; Lewes; Marston Moor.
2. Explain briefly:—Norman Conquest; Roundheads; act of supremacy; rump Parliament.
3. Sketch the controversy between Henry II and Becket.
4. Give briefly the important events in Elizabeth's reign.
   What justification may be given for the execution of Mary, Queen of Scots?
5. What right had James I to the throne of England?
   Name James' three successors (kings).
6. Write on *one* of the following topics:
   (I) The revolution of 1688.
   (II) The character of Richard I.
   (III) The granting of Magna Carta.
   (IV) The marriage of Mary I to Philip II.

HISTORY OF THE UNITED STATES.

JUNE, 1907.

[NOTE.—The candidate may take the examination in Greek history, in Roman history, or in the history of the United States. Give dates whenever dates add to the clearness of answers.]

1. Locate and indicate the historic importance of—Saratoga; Gettysburg; Yorktown; Vicksburg.
2. Explain briefly: Kentucky and Virginia resolutions; treaty of Ghent; Articles of Confederation; Federalists.
3. State briefly what the Missouri Compromise was.
4. Give a short account of Roger Williams' settlement in Rhode Island. Why did he leave Massachusetts?
5. Name the most important events in Madison's administration.
6. What was meant by nullification? Where and when did it become an important question?
7. Write on *one* of the following topics:
   (I) Administration of Andrew Jackson.
   (II) The causes of the American Revolution.
   (III) The origin of the Monroe Doctrine.
   (IV) The Louisiana purchase.

SEPTEMBER, 1907.

[NOTE.—The candidate may take the examination in Greek history, in Roman history, or in the history of the United States. Give dates whenever they add to the clearness of the answers.]

1. Locate and indicate the historic importance of—Fort Sumter; Harper's Ferry; Valley Forge; Plymouth.
2. Explain briefly: Puritans; Hartford convention; reconstruction; Abolitionists.
3. What was the Louisiana purchase? Name definitely the individuals who took part in the negotiations.
4. The important events of Washington's administration.
5. Causes and principal events of the war of 1812.
6. Why did the South secede in 1860–61?
7. Write on *one* of the following topics:
   (i) Alexander Hamilton.
   (ii) Samuel Adams, the "Father of the American Revolution."
   (iii) Andrew Jackson.
   (iv) Reasons for the failure of the Articles of Confederation.

ROMAN HISTORY.

JUNE, 1907.

[NOTE.—The candidate may take the examination in Greek history, in Roman history, or in the history of the United States. Give dates whenever dates add to the clearness of answers.]

1. Locate and indicate the historic importance of: Philippi; Actium; Cannæ; Tiber.
2. Explain briefly: Senatus consultum; consuls; patricians; the Gallic war.
3. Give the causes and results of the first punic war.
4. What was the first triumvirate?
5. What was Cicero's attitude toward the first triumvirate? Explain his position.
6. Write on *one* of the following topics:
   (i) Career of Hannibal as the enemy of Rome.
   (ii) The Roman provinces.
   (iii) The struggle between the Gracchi and the Senate.
   (iv) The dictatorship of Sulla.

SEPTEMBER, 1907.

[NOTE.—The candidate may take the examination in Greek history, in Roman history, or in the history of the United States. Give dates whenever they add to the clearness of the answers.]

1. Locate and indicate the historic importance of—Zama; Pharsalus; Tarentum; Corinth.
2. Explain briefly: Plebs; decemvirate; pro-consuls; agrarian reform.
3. Outline briefly the preparations made by Carthage for the second punic war and her line of attack upon Rome.
4. The principal reforms of the Gracchi.
5. What is meant by the dictatorship of Sulla?
6. Write on *one* of the following:
   (i) The Roman senate.
   (ii) Cicero as champion of the Republic.
   (iii) Julius Cæsar.
   (iv) Pompey's struggle with Cæsar.

GREEK HISTORY.

JUNE, 1907.

[NOTE.—The candidate may take the examination in Greek history, in Roman history, or in the history of the United States. Give dates whenever dates add to the clearness of answers.]

1. Locate and indicate the historic importance of the following: Peiræus; Lacedæmon; Salamis; Delos; Thebes.

2. Explain briefly: Peloponnesian League; oracle of Apollo; ostracism.

3. What was the Delian confederacy? What part is played in it by Athens?

4. Give the important facts relating to the battle of Marathon that make it an important battle in Greek history.

5. Compare the relative strength of Sparta and Athens at the opening of the Peloponnesian war.

6. Write on *one* of the following:

(i) The reforms of Solon.
(ii) The services of Themistocles to Athens.
(iii) The Greeks in Sicily.
(iv) The court of Hieron.

SEPTEMBER, 1907.

[NOTE.—The candidate may take the examination in Greek history, in Roman history, or in the history of the United States. Give dates whenever they add to the clearness of the answers.]

1. Locate and indicate the historic importance of: Corinth; Syracuse; Cunaxa; Chæroneia.

Explain briefly: Delian confederacy; the Ten Thousand; tyrant; peace of Nicias.

3. Indicate briefly who Themistocles was and his services to Athens.

4. Name the important battles in the war with Persia (490–479 B. C.), indicating the importance of each.

5. Explain what the Sicilian expedition (415–413 B. C.) was, its leaders and results.

6. Write on *one* of the following topics:

(i) The Athenian Empire.
(ii) Contrast between Spartan and Athenian life.
(iii) The rise of Macedon.
(iv) Alcibiades.

GERMAN.

JUNE, 1907.

1. Translate:

Das Jahr 1848 brachte darin einen nicht allein plötzlichen, sondern auch gewaltigen Umschwung[a] hervor, denn Gold wurde in Californien entdeckt—Schätze, wie sie Pizarro und Cortez geträumt,—und nicht allein zu Schiff, über die Landenge von Panama und um Cap Horn herum, brachen die geldgierigen Miner auf, nein, in Schwärmen zogen sie jetzt auch über die öden, baumlosen Prairien, und damals soll—besonders im Jahre 1849—fast ein einziger endloser Zug von Ochsenwagen bestanden haben, der seine mühselige Bahn Monden lang, aber hartnäckig verfolgte.

Die Indianer sträubten[b] sich dagegen. Sie wollten den Wanderern die Bahn durch ihre Territorien verbieten und verwehren—doch umsonst. Sie überfielen einzelne Trupps und töteten Weiße, aber es half ihnen nichts. Wie bei einem Ameisen-schwarm[c] ersetzten sich augenblicklich die Herausgenommenen wieder, und als sie größere Angriffe versuchten, rotteten[d] sich auch die Weißen zu festen Colonnen zusammen und boten ihnen Trotz.

[a] change. [b] resist. [c] ant. [d] assemble.

II. 1. Give the genitive singular and dative plural of: einen gewaltigen Umſchwung (l. 1, 2), die Landenge (l. 3), die geldgierigen Miner (l. 4), die herausgenommenen (l. 12), ſie (l. 5), der (l. 7).

2. Give (1) the principal parts, (2) third person singular present indicative, (3) third person singular preterit (imperfect) subjunctive, second person singular imperative, of verbs represented by the forms: brachte hervor (l. 1, 2), brachen (l. 4), zogen (l. 5), wollten (l. 9), überfielen (l. 10), half (l. 11), boten (l. 14).

3. Indicate from the above passages by quoting the first and last words of the phrases, (1) the normal, (2) inverted, (3) transposed order of words.

III. Translate into German:

1. Many years ago Gerstäcker, who wrote this description (die Beſchreibung), traveled for several months in the United States (die Vereinigten Staaten).

2. By whom was gold discovered in California?

3. I can tell you when it was discovered.

4. When the travelers (der Reiſende) were attacked by the Indians, they often were obliged to fight because they could not flee.

SEPTEMBER 1907.

I. Translate:

„Nach einer Weile ſtand ich auf und ging in den Saal. Er ſchien mir noch düſterer faſt, als ich ihn mir gedacht hatte; die dicht vor dem Fenſter ſtehenden Bäume ſchienen ihre Zweige bis über das Dach zu breiten. Ich ſchlug mit meinem Stock auf den Tiſch, daß es an der hohen Decke wiederhallte; aber es kam Niemand. Zur Linken in einem Nebenzimmer, in das ich hinein blickte, ſtand ein einſames Billard.[a] Aber gegenüber an der andern Seite des Saals war noch eine Tür: ich öffnete ſie und kam in einen ſchmalen Gang und durch dieſen wiederum ins Freie. Neben einer Kegelbahn,[b] die dicht am Hauſe lag, fand ich einen ſchon ältlichen Menſchen, mit einer grünen Schürze angethan, auf dem Raſen eingeſchlafen. In der That, es ſchien auch derſelbe Kellner noch von damals!"

II. Give the genitive singular and nominative plural of: den Saal (l. 1), dem Fenſter (l. 2), das Dach (l. 3), der hohen Decke (l. 4), einem Nebenzimmer (l. 5), der andern Seite (l. 6), einen ſchmalen Gang (l. 7), am Hauſe (l. 8), derſelbe Kellner (l. 9); ihn (l. 2), es (l. 4), das (l. 5), die (l. 7).

III. Give principal parts, third person singular present indicative, and third person singular preterit subjunctive of: ſtand auf, ſchien (l. 1), gedacht (l. 2), blickte (l. 5), lag (l. 8), angethan (l. 9), eingeſchlafen (l. 9).

IV. Conjugate the present indicative active of: mögen, ſich erinnern, the present indicative passive of: kaufen, ſchlagen.

V. Write in German the cardinal numbers: 3, 6, 9, 12, 16, 22, 47, 100, with the corresponding ordinals.

VI. Compare the adjectives: arm, hoch, gut, munter.

VII. Translate:

1. Henry was the youngest brother of Frederick the Great.
2. I shall give him the book if I see him.
3. Is the book which you are reading his or yours? It is mine.
4. He said that his mother was not at home but that she would come soon.
5. The house is being (was, has been, will be) built by the merchant.
6. As soon as he comes back I shall go out. Do you want to go along?
7. In the winter the days are short and cold; in summer they are longest.

[a] Billard=Billardtafel. [b] bowling alley.

FRENCH.

JUNE, 1907.

[N. B.—State grammar used and authors read in preparation.]

I. Translate:-

Ceux qui volent et pillent en campagne méritent d'être fusillés, mais que voulez-vous! les villages qu'on rencontrait n'avaient pas le quart de vivres qu'il aurait fallu pour nourrir tant de monde. Les Anglais avaient déjà presque tout pris. Il nous restait bien encore un peu de riz, mais le riz sans viande ne soutient pas beaucoup. Les Anglais, eux, recevaient des bœufs et des moutons de Bruxelles; ils étaient bien nourris et tout luisants de bonne santé. Nous autres, nous étions venus trop vite, les convois de vivres étaient en retard; et le lendemain, qui devait être la terrible bataille de Waterloo, nous ne reçûmes que la ration d'eau-de-vie.

II. Translate into French:

1. Those who will not steal will pillage.
2. What a terrible battle! What battle?
3. The English receive nothing, but *we* take everything.
4. How much do you need? Not much.
5. Let us give this to those boys.
6. A little more meat will be too much.

III. 1. What is a reflexive verb, a disjunctive personal pronoun, a transitive verb, a partitive construction? Give an example of each.

2. Give the principal parts of *mourir, venir, finir, pouvoir, craindre.* Conjugate in the simple tenses *valoir* and *être.* Give a synopsis of the compound tenses of *aller* and *avoir.*

3. What different meanings have you noticed in the French preposition *de?*

4. Count in French from sixty to eighty-one.

IV. 1. Give from the extract at the beginning of this paper three examples of *liaison* or *linking.*

2. What is a nasal vowel? How many separate nasal vowel sounds in French? How many separate nasal vowel sounds in the following: *Pain, maintenant, dans, donnaient, femme, faim, enfin, longue, sang.*

3. Show by any method of phonetic spelling the pronunciation of *il est un peu plus grand que votre frère, mais il n'est pas si âgé que le nôtre.*

4. How do you pronounce *ch, th, ph,* and *h* in French?

SEPTEMBER, 1907.

[N. B.—State grammar used and authors read in preparation.]

I. Translate:

A huit heures, nous mangeâmes avec un appétit qu'on peut s'imaginer. Non, pas même le jour de mes noces je n'ai fait un meilleur repas; c'est encore une satisfaction aujourd'hui pour moi d'y penser. Quand l'âge arrive on n'a plus l'enthousiasme de la jeunesse pour de pareilles choses; mais ce sont toujours d'agréables souvenirs. Et ce bon repas nous a soutenus longtemps; les pauvres conscrits, avec reste de pain trempé comme de la pâte par l'averse, devaient en voir de dures le lendemain 18. Nous devions avoir une campagne bien courte et bien terrible. Enfin tout est passé maintenant; mais ce n'est pas sans attendrissement qu'on songe à ces grandes misères, et qu'on remercie Dieu d'en être réchappé.

II. Translate into French:

1. At half past 9 o'clock we had eaten.
2. At last everything will be past, but we shall think of this misery.
3. Shall you not thank God for it?
4. We no longer had the enthusiasm of our youth.
5. Who can tell us this now? I can myself.
6. Do not tell them what they wish to hear.

III. 1. Give several examples of the way negation is expressed in French. What meanings have you remarked in the word *en*?

2. What can you say of the adjective in French as to its position, its plural form, its feminine form, its comparison?

3. Conjugate the simple tenses of *avoir, dire* and *voir;* the compound tenses of *venir*. Give the principal parts of *aimer, faire, savoir, joindre*.

4. Give the French *possessive adjectives* and their corresponding *pronouns*.

IV. 1. What final consonants are usually pronounced in French?

2. Give examples of all the *accents* used in French. How do they affect the pronunciation of vowels?

3. What is *elision?* Give two examples.

4. Indicate the pronunciation of *donner, donnai, donnais, donnaient, donné, donnée, donne, donnent, donnant, oiseau, mon, en, dans, dent, fin, faim, chaude*.

ELEMENTARY ALGEBRA.

JUNE, 1907.

1. Simplify each of the following:

$$(a)\ \frac{a-1}{a+1}-\left(\frac{a+1}{1-a}+\frac{a^2+1}{a^2-1}\right);$$

$$(b)\ \frac{6x^2-xy-2y^2}{8x^2-2xy-3y^2}+\frac{6x^2-7xy+2y^2}{8x^2-10xy+3y^2};$$

$$(c)\ \sqrt{75}-\sqrt[3]{12}+3\sqrt{1\tfrac{1}{3}};$$

$$(d)\ \left[\frac{x^{m+n}}{x^n}\right]^{-m}+\left[\frac{x^{n-m}}{x^m}\right]^{m-n};$$

$$(e)\ \frac{\sqrt{1-x^2}+x^2(1-x^2)^{-\frac{1}{2}}}{x}$$

2. Determine without solving the nature of the roots of each of the following equations:

$$(a)\ 4x^2-4x+1=0;\quad (b)\ 3x^2-5x+3=0.$$

3. Two launches race to a buoy and return. The first has a start of 10 minutes, steams at the rate of 6 miles per hour to the buoy, and 8 miles per hour on the return. The second steams throughout 7½ miles per hour and is beaten by one minute. How long is the course?

4. Solve the equations

$$(a)\ \frac{x^2}{m+n}-\left(1+\frac{1}{mn}\right)x+\frac{1}{m}+\frac{1}{n}=0.$$

$$(b)\ x^2-3x-6\sqrt{x^2-3x-3}+2=0.$$

5. Given $a:b::c:d$. Prove that

$$a^2+b^2:\frac{a^2}{a+b}=c^2+d^2:\frac{c^2}{c+d}.$$

6. Solve the simultaneous equations

$$x^2-4y^2-3x=0; \quad 2x+5y-3=0.$$

Arrange your answers in corresponding pairs and verify.

7. Give the rule by which successive terms are formed in expanding by the Binomial Theorem.

8. Derive formulas for the nth term and sum of n terms of a geometrical progression, assuming given the first term, the ratio, and the number of terms.

SEPTEMBER, 1907.

1. Reduce each of the following:—

$$(a)\ \left(\frac{x^2+y^2}{y}-x\right)\left(\frac{x^2-y^2}{x^3+y^3}\right)+\left(\frac{1}{y}-\frac{1}{x}\right);$$

$$(b)\ (x^2+1)+(x^{\frac{3}{2}}+1); \qquad (c)\ \frac{3}{8}\sqrt{21}+\frac{9}{16}\sqrt{\frac{7}{20}};$$

$$(d)\ \frac{\sqrt[3]{(x^2+3a^2)^2}-3a^2(x^2+3a^2)^{-\frac{1}{3}}}{3x^2}.$$

2. Find five terms of the expansion for $(a+x)^n$ by the Binomial Theorem, n being any positive integer.

3. Solve the simultaneous equations

$$\frac{a}{x}+\frac{b}{y}+\frac{c}{z}=3, \quad \frac{a}{x}+\frac{b}{y}-\frac{c}{z}=1, \quad \frac{2a}{x}=\frac{b}{y}+\frac{c}{z}.$$

4. Two launches race over a course of 12 miles. The first steams 7½ miles per hour. The other has a start of 10 minutes, runs over the first half of the course with a certain speed, but increases its speed over the second half of the course by 2 miles per hour, winning the race by a minute. What is the speed of the second launch? Explain the meaning of the negative answer.

5. Solve the equations

$$(a)\ (4a^2-9b^2)(x^2+1)=2x(4a^2+9b^2);$$

$$(b)\ \frac{2}{\sqrt{x^2}}-\frac{1}{\sqrt{x}}=45.$$

6. Solve $Ax^2+Bx+C=0$. Prove the theorems concerning the sum and the product of the roots of this equation.

7. Explain what is meant by the "sum" of a decreasing geometrical progression of an infinite number of terms. Derive the formula for this sum.

ADVANCED ALGEBRA.

JUNE, 1907.

1. Draw the graphs of the equations

$$(a)\ x^2-6x-9=0; \ (b)\ x^3-x+1=0.$$

Find the roots of these equations and explain in what manner the figures indicate the nature of the roots.

2. Give rules for various transformations of equations which simplify their solution. What is the connection between the sequence of signs in an equation and the roots? How may the existence of imaginary roots be detected?

3. Prove the rules for the relations between the roots and the coefficients.

4. Transform and solve the equation

$$24x^4+14x^3-29x+6=0.$$

5. Show that the equation $x^3-4x^2-8x+7=0$ has an incommensurable root between 0 and 1. Calculate this root to two places of decimals.

6. Derive the formula for the number of permutations of n things taken r at a time.

SEPTEMBER, 1907.

1. Draw the graphs of the equations

(a) $3x^2-4x+1=0$; (b) $-x^2+4x-4=0$.

Explain the connection between the roots of these equations and the graphs.

2. Prove the theorem: If all the terms of an equation are transposed to the left-hand member, the numerical result obtained when a number h is substituted for the unknown x is equal to the remainder found by dividing the left-hand member by $x-h$.

3. State and prove the rule for writing down the equation whose roots are the reciprocals of the roots of a given equation.

4. Show that the equation $x^3+x-2=0$ has only one real root. Locate this root between two consecutive integers.

5. Prove that there is an incommensurable root of the equation $x^3-9x^2+2x-31=0$ between -1 and -2 and calculate it to two places of decimals.

6. In how many ways can four couples be selected from eight people?

PLANE GEOMETRY.

JUNE, 1907.

1. Construct a mean proportional between two given lines; a third proportional to two given lines. Prove your constructions.

2. In any triangle, the square of the side opposite an acute angle is equal to the sum of the squares of the other two sides, minus twice the product of one of these sides and the projection of the other side upon it.

3. The areas of two similar triangles are to each other as the squares of any two homologous sides.

4. The area of a regular polygon is equal to half the product of its apothem and perimeter. State the corresponding theorem on the area of a circle.

5. The difference of the squares of two sides of any triangle is equal to the difference of the squares of the projections of these sides on the third side.

6. When is a circle said to be the *locus* of all points satisfying a given condition? One side of a triangle is fixed in length and position and the opposite angle is given. The other two sides being variable, find the locus of the movable vertex.

7. The area of a right triangle is 25 square inches and one leg is 10 inches. What is the length of the hypotenuse of a similar right triangle whose area is 50 square inches?

8. A square is inscribed in a given circle. A circle is inscribed in the square. Compare the areas of the two circles.

SEPTEMBER, 1907.

1. If two sides of a triangle are unequal, the opposite angles are unequal, and the greater angle is opposite the greater side. If two angles are unequal, the opposite sides are also unequal, and the greater side is opposite the greater angle.

2. In a right triangle a perpendicular is drawn from the vertex of the right angle to the hypotenuse. State and prove three theorems true of the figure thus formed.

3. The bisector of an angle (interior or exterior) of a triangle divides the opposite side into segments which are proportional to the other two sides.

4. Show how to construct a square (a) equivalent to a given parallelogram; (b) equivalent to a given polygon. Prove your constructions.

5. The perpendiculars from any two vertices of a triangle on the opposite sides are inversely proportional to those sides.

6. When is a straight line said to be the *locus* of all points satisfying a given condition? Construct a number of points the ratio of whose perpendicular distances from two given fixed perpendicular lines is 2. Show that the locus of these points is a straight line.

7. Find the area and circumference of the circumscribed circle of an equilateral triangle whose side is 3 inches.

The hypotenuse of an isosceles right triangle is 10 inches. What is the length of the side of the square whose area is double that of the triangle?

SOLID GEOMETRY.

JUNE, 1907.

1. What is meant by the *projection* of a line on a given plane? Show that the acute angle which a straight line makes with its own projection upon a plane is the least angle which it makes with any line in that plane.

2. State and prove the theorem concerning the lateral area of a regular pyramid. What is the corresponding theorem for cones?

3. A sphere can be inscribed in any tetrahedron, and but one sphere.

4. Through a given point in space to pass a plane which shall be parallel to each of two given nonintersecting lines.

5. The radius of the base of a cone of revolution is 5 inches, its altitude is 10 inches. A cylinder of revolution is inscribed in the cone, its base lying in the base of the cone. The altitude of the cylinder is 4 inches. Compare the volumes and lateral surfaces of cone and cylinder.

6. Find the volume and surface of a sphere circumscribed to a cube whose edge is 3 inches.

SEPTEMBER, 1907.

1. If two intersecting straight lines are perpendicular to a third at the same point, their plane is perpendicular to that straight line.

2. A pyramid is cut by planes parallel to its base. Show (a) that the edges and altitude are divided proportionally, (b) that the sections made are similar polygons and proportional to the squares of their distances from the vertex.

3. State and prove the theorem on the area of a spherical triangle.

4. To determine a point in a given plane which shall be equidistant from three given points in space.

5. A projectile has the shape of a cylinder of revolution surmounted by a conical cap. Its total length is 24 inches and the cylindrical part is three times as long as the conical end. The greatest diameter is 10 inches. Find the volume and total surface of the projectile.

6. A plane is passed through a sphere bisecting at right angles one of the radii. Compare the area of the two portions into which the spherical surface is divided.

TRIGONOMETRY.

JUNE, 1907.

[NOTE.—No tables are to be used in this examination.]

1. Derive values of all trigonometric functions of 135° and 330°.

2. Express each function of an angle in terms of the tangent.

3. Solve the following equations:

(*a*) $\sin x+2\cos x=2$;

(*b*) $x=\sin^{-1}\frac{1}{2}+\tan^{-1}1$;

(*c*) $\tan(\frac{1}{4}\pi+x)+\tan(\frac{1}{4}\pi-x)=4$.

4. Derive the formulas:

(*a*) $\cos A-\cos B=-2\sin\frac{1}{2}(A+B)\sin\frac{1}{2}(A-B)$;

(*b*) $\sin\frac{1}{2}x=\pm\sqrt{\frac{1}{2}(1-\cos x)}$.

5. Prove the identities:

(*a*) $\tan x+\cot x=2\csc 2x$;

(*b*) $\tan x+\tan y=\dfrac{\sin(x+y)}{\cos x\cos y}$.

6. One angle of a rhombus is 60° and the opposite diagonal is 5 inches. Find the sides of the rhombus and its area.

7. What is the circular measure of a right angle? Of an angle of 15°?

8. Explain the solution of an oblique triangle when two angles and one side are given, and derive the necessary formulas.

SEPTEMBER, 1907.

[NOTE.—No tables are to be used in this examination.]

1. Derive values of all trigonometric functions of 225° and 120°.

2. Prove that the area of a parallelogram is equal to the product of two sides and the sine of the included angle.

3. Simplify:

(*a*) $\tan\left(\frac{3}{4}\pi+x\right)+\tan\left(\frac{7}{4}\pi-x\right)$;

(*b*) $1+\tan x\tan 2x$;

(*c*) $\sin^{-1}\left(\frac{1}{2}\right)+2\tan^{-1}(-1)$.

4. Derive the formulas—

(*a*) $\sin A+\sin B=2\sin\frac{1}{2}(A+B)\cos\frac{1}{2}(A-B)$;

(*b*) $\cos 2x=2\cos^2 x-1$.

5. Solve the following equations—

(*a*) $\cos 2x+\cos x=0$;

(*b*) $\tan x\tan 2x=1$.

6. In an oblique triangle ABC, the angles at B and C are 30° and 45°, respectively, and the altitude let fall upon BC is 5 inches. Find the projections of AB and AC upon BC and solve the triangle.

7. An angle whose vertex is O is 1¼ units in circular measure. A circle is described with O as a center, and the angle intercepts an arc of 5 feet. What is the radius of the circle?

8. If a, b, c are the sides of any triangle and C the angle opposite c, prove the relation

$$c^2=a^2+b^2-2ab\cos C.$$

9. Explain the solution of an oblique triangle when three sides are given.

THEORY AND USE OF LOGARITHMS.

JUNE, 1907.

[NOTE.—Angles must be expressed in degrees and decimal parts of a degree.]

1. What tables have you used in preparing for this examination?

2. Define *logarithm*. Prove the rule for the *characteristic* in the common system. Simplify

(*a*) $\log_{10}\frac{1}{10}-\log_8 32$. (*b*) $\log_{10}\sqrt{.1}$.

3. Find the value of $\left(1+\frac{1}{x}\right)^x$ when $x=10$.

4. The diagonals of a rhombus are 42.28 and 30.58. Find the sides and angles.

5. Solve the oblique triangle ABC when $AB=226.3$ and the angles at A and B are 28°.25 and 59°.37, respectively.

SEPTEMBER, 1907.

[NOTE.—Angles must be expressed in degrees and decimal parts of a degree.]

1. What tables have you used in preparing for this examination?

2. Define *logarithm*. What is meant by the *modulus* of a system of logarithms? Find the values of

$$(a)\ \log_3 \frac{1}{9} - \log_2 \sqrt[3]{4}; \qquad (b)\ \log_e 10.$$

3. Compute the value of $\dfrac{89.23 \times \sqrt{.3612}}{\sin 29° 25}$.

4. Solve the right triangle whose sides are 21.85 and 36.82.

5. Solve the oblique triangle whose sides are 101.65, 282.5, 202.5. Find the area.

BOTANY.

JUNE, 1907.

[The candidate may take the examination in botany, physics, or chemistry.]

1. What is an herbaceous plant? What is the difference between annual and biennial herbs? Give an example of each and describe, in the case of the biennial, the structures in which food is stored.

2. What is a compound leaf? Define, with characteristic examples, the two principal types of compound leaves. How may a compound leaf be distinguished from a flat branch with two longitudinal ranks of simple leaves?

3. Describe the general features of the root with special reference to its work of absorption. Show how osmosis plays an important part in this process.

4. Describe the appearance and structure of the bark in an old tree. What functions does it perform? Why does a tree die when a complete ring of bark is removed?

5. What are parasitic plants? How does a green parasite differ in its nutritive processes from one which lacks chlorophyll? Give an example of each kind.

6. Describe two ways in which plants may prevent self-pollination and secure cross-pollination. Illustrate by examples.

SEPTEMBER, 1907.

[The candidate may take the examination in botany, physics, or chemistry.]

1. What is a seed, and of what parts is it composed? Name and describe an example of a seed with endosperm.

2. Describe the process of photosynthesis. In what parts of a plant and under what conditions is it performed? How may the presence of starch in leaves be detected?

3. What are the general features of stems, and what are their most important functions? Describe the differences between monocotyledonous and dicotyledonous stems, giving an example of each. Which type of stem do all of our northern trees develop?

4. Give an example of a plant which climbs by means of tendrils, describing the appearance and behavior of the latter organs. Give also an example of a plant which climbs by twining about a support. What advantages are gained by the climbing habit?

5. What is the distinction between simple and compound pistils? Give an example of each, and describe its structure.

6. Describe two different types of seeds (or fruits) which are scattered through the agency of animals. In what ways may a plant scatter its own seeds?

CHEMISTRY.

JUNE, 1907.

[The candidate may take the examination in botany, physics, or chemistry.]

N. B.—*No candidate will be accepted in this subject unless he has had a laboratory course. Every candidate must attach to his answer paper in chemistry a statement signed by his instructor of the work that he has done in this subject.*

1. Define atom. Give the laws of definite and multiple proportion.

2. Describe the ordinary method for making hydrochloric acid and sketch the apparatus used.

3. Write the equations for the reactions (if any) when dilute sulphuric acid acts upon the following bodies: (1) aluminum hydroxide, (2) magnesium oxide, (3) zinc, (4) ferrous sulphide, (5) potassium carbonate.

4. Describe the visible changes when a solution of copper sulphate is mixed with solutions of each of the following: Hydrogen sulphide, cold sodium hydroxide, boiling sodium hydroxide, barium chloride. Write equations.

5. How many grams of zinc are required to make 50 liters of hydrogen by reacting with hydrochloric acid?

6. State whether each of the following changes is an oxidation or a reduction, with reasons: (1) chlorine to hydrochloric acid, (2) silver to silver bromide, (3) mercuric chloride to mercurous chloride, (4) phosphorus to phosphoric acid.

Atomic weights Zn = 65, Cl = 35.6, H = 1.

One liter of hydrogen under normal conditions weighs 0.09 gram.

SEPTEMBER, 1907.

[The candidate may take the examination in botany, physics, or chemistry.]

N. B.—*No candidate will be accepted in this subject unless he has had a laboratory course. Every candidate must attach to his answer paper in chemistry a statement signed by his instructor of the work that he has done in this subject.*

1. How could you liberate iodine from potassium iodide (three methods) and recognize it when free?

2. Write equations showing the reactions when metallic zinc is attacked by hydrochloric, sulphuric, nitric acids.

3. Describe ammonia, giving its principal physical and chemical properties and a method for preparing it.

4. How many grams and how many liters of hydrochloric acid gas can be made from 50 grams of sodium chloride?

5. Describe an economical method for the preparation of sodium hydroxide.

6. How could you make lead chloride, lead sulphate, lead sulphide? Write equations.

7. Give Avogadro's law. What volume of oxygen is required, in burning carbon, to make 20 liters of carbon dioxide?

Atomic weights: Na=23, Cl=35.5, H=1, C=12, O=16.

One liter of hydrogen under normal conditions weighs 0.09 grams.

PHYSICS.

JUNE, 1907.

[The candidate may take the examination in botany, physics, or chemistry.]

1. Find the length of a lead rod having a mass of 1.52 kilograms, a diameter of 1.25 centimeters, and a density of 11.3 grams per cubic centimeter.

2. A 15-gram bullet moving with a velocity of 600 meters per second penetrates 32 centimeters of wood. What is the average resistance (force) to penetration?

3. What is a barometer? Describe one or more of the familiar forms and their uses.

4. What is Boyle's law? What simple method may be employed for investigation of this law?

5. Describe the magnetic field due to a helix conveying a current. Show how to find the north pole of the solenoid.

6. What is meant by the fundamental and what by the overtones of a musical string? What influence do the overtones have upon the sound?

7. Describe and explain the colors of thin plates, or of Newton's rings.

SEPTEMBER, 1907.

[The candidate may take the examination in botany, physics, or chemistry.]

1. A train moving 60 miles an hour is brought to rest by a uniformly applied brake in a distance of 1,000 feet. Calculate the retardation (negative acceleration).

2. A boat crossing a river which flows 5 miles an hour heads 30 degrees upstream and reaches a point directly opposite the starting place. At what speed did the boat run?

3. In what particulars is the behavior of a vapor different from that of a gas?

4. Describe the action of the induction or spark coil as completely as possible.

5. Describe several different kinds of waves and the phenomena to which they may give rise.

6. If an object at the bottom of a vessel be viewed directly from above, explain what change will be observed on filling the vessel with water.

EXPENSES.

On the question of the expense of four or more years' residence at an American college, it is impossible to write with any degree of definiteness. No two colleges are exactly alike in their cost of tuition, living, and incidentals. A student coming to the United States from abroad would most probably find that even his necessary expenses exceeded the amount which had been represented to him as ample. This is said merely by way of caution, with the added suggestion that each student's budget should allow a generous margin for contingencies.

At the same time it should be borne in mind that the democratic tone of American colleges is such that the widest divergence is possi-

ble in the expenses of students at the same institution, ranging from a lavish and quite unnecessary display of wealth on the one hand to the bare means for the necessaries of life on the other. To ambitious students of slender means almost all colleges offer some opportunity for self-help; in fact, instances are numerous in which students through one form of employment or another have earned all necessary expenses while actually in residence at college. Nor are Chinese students an exception to this rule, though it would appear that the self-supporting students among the Chinese have usually been those born and brought up in the United States. The typical American student, however, is the one of moderate means, and it is this type which colleges have in view when publishing tables of expenses.

In all the larger colleges, especially those near the great cities, the cost of living for the person of moderate means tends to approximate a uniform standard. The difference of a few dollars a month as between Boston, New York, Chicago, and San Francisco does not invalidate this statement.

Admitting more or less uniformity in the cost of living, the difference in expense between one college and another would arise from one or two items which are here explained. In the first place, colleges vary widely in their charge for tuition. Some have practically no tuition fees at all, or at least place their fees at a nominal figure. Others require amounts varying from $50 to $250 a year and even more, particularly where courses are offered involving the use of expensive material, apparatus, and equipment. State universities charge usually a nominal fee; in some cases no fee at all. Here, then, is quite a large item for consideration.

In the second place, to a student coming from China, the expense for transportation is ordinarily quite heavy. A student remaining on the Pacific coast is saved the railroad fare from the Pacific coast to the East. The cost of traveling first class between San Francisco and New York or Boston amounts approximately to $125. Yet it may be suggested that no student does full justice to a four years' residence in America who does not spend some time in travel, and the transcontinental journey is not without its educational value.

There are printed below statements from the calendars of four of the larger universities showing estimates of student expenses. The figures show, it will be observed, three or four grades of expenditure, and their average would form a very fair estimate of the annual college expenditure of the student of moderate means. For expenses at other institutions, see replies to Question 5, pp. 198–216.

COLUMBIA UNIVERSITY.

FEES.

The regulations of the corporation of Columbia College in the city of New York in regard to fees are as follows. The president is under instructions to withdraw the privileges of any student delinquent in payment after the second Wednesday of each half year. All regulations as to fees are subject to change by the trustees at their discretion.

For matriculation or registration: Required of all students before entrance, payable but once	$5
For late registration	5
For tuition, payable at the beginning of each half year; if the entire fee be less than $100 the whole must be paid upon registration.	
For matriculated students:	
In the College, per point	5
To be paid for the total number of points for which the student is permitted to register, with extra charges for certain allowed professional courses, not to exceed $100 in any year.	
In the School of Law, per annum	150
In the College of Physicians and Surgeons, do	250
In the Schools of Mines, Engineering, and Chemistry (exclusive of certain summer course fees, see p. 162), per annum	250
In the Schools of Fine Arts, do	150-200
In architecture the fees are at the rate of $15 per annum for each hour of attendance a week on lectures, with special fees for drawing and design up to a total maximum of $200.	
Candidates for the degrees of master of arts and doctor of philosophy, exclusive of laboratory fees (see p. 162), per annum	150
With a maximum fee—for courses actually needed to fulfill the requirements of the degree in question—of $150 and $300,[a] respectively, when the course does not exceed for the master's degree three and for the doctor's degree five years.	
For nonmatriculated students (and matriculated students taking part time), at the rate of $15 per annum for each hour of attendance a week on lectures or recitations, with a maximum fee of $150, except that in Columbia College the charge is the same as for matriculated students, and in the Schools of Pure Science and Fine Arts the maximum fee is $200, and that in the Schools of Medicine, Mines, Engineering, and Chemistry the rate is $25 per annum for each hour, with a maximum fee of $250. For other fees see page 162.	
For all students, matriculated or nonmatriculated, in the Summer Session	30
For examinations, payable in each case before examination is held:	
For entrance	5
For any examination or single series of examinations taken at any other time than at the conclusion of a course actually attended	5
For the collegiate degree of bachelor of arts or bachelor of science	15
For any professional or technical degree	25
For the degree of master of arts	25
For the degree of doctor of philosophy	35

[a] Tuition fees paid by a candidate for A. M. will be credited toward the maximum fee for Ph. D., provided there be no change in the choice of major and minor subjects.

For use of the gymnasium:

Required of all students (men and women) except those of the College of Physicians and Surgeons and the College of Pharmacy, per annum	$7
Gymnasium fee, summer session, optional	5

Laboratory Fees.

The statutes provide that students registered in any department of the university who are not candidates for a degree, as well as all candidates for the higher degrees, shall be charged, in addition to the prescribed tuition fee, a fee for certain laboratory courses and for the use of laboratories, up to a maximum fee of $250, including tuition. The schedule of such fees, which is now under revision, may be obtained from the registrar.

Medicine.

The charges for noncandidates for a degree pursuing courses under the faculty of medicine may be obtained from the registrar or the assistant registrar.

Architecture.

Students not matriculated in architecture taking not less than four hours per week of lectures are permitted to register and pay for periods of two months at the rate of $5 per hour weekly of lectures taken. They are charged a fee of $25 for the use of the drafting rooms for the academic year, or $10 for a single period of two months, but in no case are the total fees to exceed $50 for the two months.

Summer Courses in Surveying.

Laboratory fees, payable on or before the last Saturday in May, are required as follows: Civil engineering course No. 15, $25, or $7 per survey; No. 25 and No. 27, $15, or $5 per survey; No. 26, $5; No. 28 and No. 71, $10.

Noncandidates, candidates for admission to and students having entered with advanced standing, who may be required to attend these courses, and students required to repeat them through delinquency, are charged, in addition, tuition fees as follows: No. 15, $35; No. 25, No. 27, No. 28, and No. 71, $25; No. 26, $10. In the case of a student registered in Columbia College who has paid an additional fee under the operation of this rule, an equitable credit will be made should he later complete the requirements for a professional degree.

For further details as to the administration of these fees, see the special announcement of the schools of mines, engineering, and chemistry.

Summer Courses in Mining and in Geodesy.

Candidates for admission to advanced standing who attend the summer course in practical mining are required to pay therefor a fee of $50. All students attending the summer course in geodesy must pay a fee of $20 for the course to the bursar at the university. These fees are payable on or before the last Saturday in May.

Deposits for Apparatus, Supplies, and for Keys to Desks and Lockers.

A deposit for the use of lockers, keys, apparatus, material, and the like, ranging from $2 to $40, is required of students in mines, engineering, chemistry,

those articles which he returns in good order, and the value of those he has injured or broken will be deducted from his deposit. Details may be obtained from the bursar.

Comparative statement of students' probable expenses for the academic year, October to June.

[Based on Students' Statements.]

	Low.	Average.	Liberal.
Matriculation fee (first year)	$5	$5	$5
Tuition fee[a]	150	150	150
Gymnasium fee	7	7	7
Books	18	30	[b] 40
Incidentals	7	15	[b] 53
Residence hall (39 weeks)	100	128	[b] 180
Commons (39 weeks)	150	191	[b] 236
Clothes and washing	46	80	[b] 125
All other expenses	24	57	[b] 109
Total	507	663	[b] 876

[a] For medicine and applied science add $100, and for architecture add $50. Students in applied science should also make provision for deposits for apparatus ranging from $10 to $40 and for summer courses.

[b] And up.

HARTLEY HALL AND LIVINGSTON HALL.

The two university residence halls, Hartley and Livingston, for registered students and officers, are situated on South Field.

The halls are built of stone and overburned brick. The floors and partitions are of the reinforced concrete type, and the construction is considered thoroughly fire resistant throughout.

Each hall contains 300 rooms, with outside light and exposure. The plans provide for 480 beds, but the arrangement permits of flexibility in renting the rooms in suites. The average size of the bedrooms is about 8 by 14.6 feet. The studies average 10 by 14.6. There are a number of double rooms. All ceilings are 9 feet high. Each bedroom has a clothes closet and basin with hot and cold running water. The rooms are provided with heavy oak furniture of the Mission type. There are four shower baths on each floor. All the water used in the halls is filtered.

The halls are lighted throughout by electricity and heated by steam, and have four electric passenger elevators.

The entrance for students to each hall is from the campus and leads directly into a large assembly room 60 feet square. This room runs up through two stories and has a large open fireplace opposite the entrance. It is furnished in heavy leather-covered oak. At one side of the main entrance is the office of the hall and on the other a reception room. Trunks and supplies will be taken in at the street side of the connecting building. In the basement is space for trunk storage.

The following furniture is provided for the various rooms:

Single rooms: One side chair, 1 table, 1 bookshelf, 1 chiffonier, 1 mirror, 1 wardrobe, 1 rug, 1 couch bed, 1 mattress, 1 pillow, blankets, bed linen, 1 couch cover, 1 portable lamp (in rooms where there is but one light).

Double rooms: One side chair, 1 armchair, 1 rocker, 1 bookcase, 2 chiffoniers, 1 mirror, 2 wardrobes, 2 beds, 2 mattresses, 2 pillows, blankets, bed linen, 2 couch covers, 2 large rugs, 1 large table.

Suite bedrooms: One side chair, 1 chiffonier, 1 mirror, 1 wardrobe, 1 rug,

Studies: One armchair, 1 large table, 1 rocking chair, 1 bookcase, 1 large rug.

The situation of the halls, within two minutes' walk of the Columbia University station of the subway, brings the residents within fifteen minutes of the Grand Central Depot and about twenty minutes of City Hall Park.

There are on South Field a practice field for baseball, lacrosse, and football, a running track, nine tennis courts, and eight outdoor handball courts. The university gymnasium and boathouse are within a few minutes' walk.

ADMISSION.

The university reserves all rights in connection with the assignment or reassignment of rooms or the termination of their occupancy.

Rooms will be ready for occupancy on the Monday preceding the opening of the academic year which falls on Wednesday, September 25, 1907. Rooms may be occupied until the Saturday following the final examinations. In 1908 the date will be Saturday, June 13.

Definite applications for rooms in hall must be received by the superintendent of buildings and grounds on or before May 15. These applications are to be made on the blank, page 9. Later applications will be received in case rooms remain vacant. Assignments will be made on or before June 1, and not later than ten days thereafter an assignment must be accepted in writing by the student to whom it is made. If not so accepted, the room may be reassigned by the superintendent.

Suites of rooms will be separately classified and allotted. Every application for a suite must give the names of the students who intend to occupy the rooms together and who undertake to be jointly responsible for the charge for the same.

Whenever, for any reason, one of the occupants of a double room or suite is permitted or obliged to cancel his room assignment, the remaining occupant must vacate the room or suite at the end of the current quarter, unless he agrees to pay the whole rent or to provide a roommate who shall join him in accepting a new assignment for the remainder of the academic year.

RATES.

The following rates have been fixed for the academic year September 25 to June 13, 1907–8, the average charge being $3.27 per week, or $127.50 for a residence of thirty-nine weeks for each furnished room.

These rates include heat, service, and furnishing and washing bed linen and towels, but are exclusive of lights. Electric light will be charged for by meter at the rate of 20 cents per 1,000 watt hours. The average cost for light under this system and rate has been about $5 per man for the academic year.

Double rooms:

$200.....Nos. 1004, 1010.
$210.....Nos. 807, 829.
$220.....Nos. 407, 429.
$230.....Nos. 507, 529.
$240.....Nos. 607, 629.
$250.....Nos. 707, 729.
$260.....Nos. 807, 829.
$270.....Nos. 907, 929.

Two-room suites:

$175.....Nos. *(111, 113), *(113, 115), (214, 215), *(219, 220).
$200.....Nos. *(308, 309), (314, 316), ([illegible]), (321,

Two-room suites—Continued.

$210.....Nos. *(301, 302), *(334, 335), *(408, 409), (414, 416), (415, 417), (421, 423), *(508, 509), (514, 516), (515, 517), (521, 523), *(608, 609), (614, 616), (615, 617), (621, 623).

$240.....Nos. *(401, 402), *(434, 435), *(708, 709), (714, 716), (715, 717), (721, 723).

$250.....Nos. *(501, 502), *(534, 535), *(808, 809), (814, 816), (815, 817), (821, 823).

$260.....Nos. *(601, 602), *(634, 635), *(908, 909), (914, 916), (915, 917), (921, 923).

$280.....Nos. *(701, 702), *(734, 735), *(801, 802), *(834, 835), *(901, 902), *(934, 935).

Three-room suites:

$260.....Nos. (102, 103, 104), (124, 125, 126), (202, 203, 204), (225, 226, 227).

$320.....Nos. *(210, 211, 212), *(304, 305, 306), †(326, 327, 328), *(330, 331, 332).

$340.....Nos. *(404, 405, 406), (418, 420, 422), †(426, 427, 428), *(430, 431, 432), (518, 520, 522), †(526, 527, 528).

$350.....Nos. *(504, 505, 506), *(530, 531, 532), (618, 620, 622), †(626, 627, 628).

$360.....Nos. *(604, 605, 606), *(630, 631, 632), (718, 720, 722), †(726, 727, 728).

$370.....Nos. *(704, 705, 706), *(730, 731, 732), (818, 820, 822), †(826, 827, 828).

$380.....Nos. *(804, 805, 806), *(830, 831, 832), (918, 920, 922), †(926, 927, 928).

$390.....Nos. *(904, 905, 906), *(930, 931, 932).

Special rates.—The rates for special periods of occupancy are as follows: Summer session, one-fifth of the amount for the academic year. Entire calendar year, one and one-fourth times the amount for the academic year. Summer only, one-half the amount for the academic year.

Payments.—Residents in hall will be required to pay the annual and other charges, in four equal installments in advance as follows: On or before taking possession, and on December 1, February 1, and April 1. They will be required to pay the cost of damage to their rooms, fittings, or furniture, however caused, and as security a deposit of $10 must be made by each occupant when assignment of room is made. This deposit may be retained in whole or in part to cover any other indebtedness.

Payments should be made by New York check, drawn to the order of Columbia University, and sent by mail or left at the office of the bursar, room No. 108, Library Building. The regulations governing the residence hall fees are the same as those which apply to tuition and other fees.

ADMINISTRATION.

Hall council.—A hall council is constituted to have general supervision of the residence halls of the university. The hall council consists of the consulting engineer, of two university officers, who shall be appointed by the president, and who shall, when practicable, be residents in hall, and of a representative of each hall elected by the appropriate hall committee. The hall council shall have power to terminate the assignment of any resident who violates the rules established by the hall committee, or who, for any reason, shall be deemed

undesirable as a resident. When the facts of the case seem to call for academic discipline, it is the duty of the hall council to report the facts to the dean of the appropriate faculty. The hall council shall have general supervision and control of the residence halls, subject to the reserve powers of the president of the university.

Hall committees.—A hall committee is constituted for each hall. Each hall committee consists of 10 residents in the hall and the superintendent of buildings and grounds, ex officio. The residents to serve on each hall committee shall be elected as soon as practicable after the opening of the academic year in September and to fill vacancies as they may occur. One resident shall be chosen from each floor by vote of the men having rooms on that floor.

Each hall committee shall represent the interests of the residents of the hall, and endeavor to promote the comfort and convenience of such residents and shall have power to make to the hall council such recommendations as they deem desirable in the interest of the hall and its residents.

In case of violation of the hall rules, or of any conduct or action on the part of a resident causing annoyance or discomfort to other residents, or damage to the property of the university, or which is otherwise objectionable, the hall committee shall report the facts with their recommendations to the hall council.

Each hall committee may, with the approval of the hall council, make such house rules as it deems proper and consistent with the following limitations:

(*a*) No wine, beer, or liquor shall be allowed in hall.

(*b*) No betting, gambling, or game of chance shall be allowed in hall.

(*c*) No dogs or other animals shall be kept in hall.

(*d*) Ladies may be admitted to the reception rooms between the hours of 3 and 5 p. m., but to no other part of the hall without the written permission of a member of the hall committee, nor at any other time without the written permission of the chairman of the hall committee.

Duties of servants.—Servants are required to make the beds and care for the rooms. For this service they are paid by the university, and are forbidden to ask or receive fees from occupants therefor. They are not paid to do any personal service, such as blacking boots, brushing clothes, or doing errands. If such service is desired, special arrangements may be made for it. Inefficiency on the part of the servants should be reported at the hall office at once.

No private servants are allowed in the halls, and no meals will be permitted in rooms except in case of sickness.

No change or alteration of any kind will be permitted in a room except upon the written order of the superintendent and by workmen employed by him. Residents are requested to notify the hall office of any such work which may be needed.

Surrender of rooms.—Residents leaving for vacations or upon surrendering their rooms shall return their keys to the hall office before leaving. All personal effects must be removed from rooms surrendered before June 20; no furniture, however, may be removed on commencement day. Arrangements may be made by which students may occupy the same room or rooms throughout the term of their residence at the university. If such rooms are not paid for during the summer, however, the superintendent may require that they be vacated and all personal effects stored elsewhere in hall, without expense to the student, but at his own risk. Anyone who wishes to enter a room in vacation must bring a written permit, signed by the resident, which must be presented at the hall office. No student will be allowed to occupy his room during any part of the summer vacation unless he shows a written permit from the superintendent.

ILLNESS.

In case of illness or accident to any resident, it shall be the duty of that member of the hall committee who resides on the same floor to report the case at the hall office, and word will be sent immediately to the medical visitor of the university, and proper care and attendance secured. The proximity of St. Luke's Hospital, within a block of the halls, makes it possible to secure doctors, nurses, and medical supplies promptly at any hour.

BOARD.

There is a university commons for the accommodation of men living in hall.

After a careful investigation of the methods at other universities, a combination system of table d'hôte and à la carte has been adopted. A weekly ticket, good for 21 meals, costs $3. This entitles a man to cereal, vegetables, bread, rolls, butter, tea, milk, coffee, soup, and dessert. For meat, fish, and eggs an extra charge is made, but this is kept as low as possible. Thus far the average total cost per man has been about $4.65 weekly. The commons is open from 7.30 a. m. to 7 p. m.

Board may also be secured at numerous dining rooms in the vicinity of the university.

UNIVERSITY OF CHICAGO.

FEES FOR MATRICULATION, TUITION, ETC.

1. Examination or school-inspection fee.—A fee of $5 is payable by students entering the junior colleges either by examination or from cooperating schools.

2. Matriculation fee.—The matriculation fee is $5, and is required of every student on entrance to the university.

3. Tuition fee.—(*a*) The tuition fee is $40 per quarter (including the library and incidental fee, $5) for regular work (three majors or their equivalent); there is no reduction to those taking only two majors. (*b*) A reduction is made in case of students taking only one major (or equivalent), one-half the full tuition fee being charged. (*c*) *All tuition and laboratory fees are due on or before the first day of each quarter, and payable without extra fee up to the end of the fifth day of the quarter. All fees are payable to the registrar,* Press Building, Room 1.

4. Fines, etc.—For registering with the dean after the second day of the quarter a fine of $2 is charged. For failure to pay tuition fees within the first five days of the quarter a fee of $5 is added to the bill.

5. Laboratory fee.—Students in chemistry pay a laboratory fee of $5 for a major course, and $2.50 for a minor course. Students in biology pay $2.50 for a major course and $1.25 for a minor course, except for courses in gross anatomy, in which the fee is $5 for a major course. Ten dollars is the maximum charge for laboratory work in any one department. (M and DMj courses will be charged in proportion.) In addition to the regular laboratory fee, students in chemistry procure a coupon ticket, entitling them to $5 worth of laboratory material. Students in biology will procure a conpon ticket, entitling them to $2.50 worth of laboratory material. Unused portions will be redeemed.

6. Gymnasium locker fee.—For the use of a locker in the dressing room of the gymnasium a fee of $1 per quarter ($2 for three successive quarters) is charged. It is paid at the office of the gymnasium.

7. *Graduation fee.*—The general graduation fee, including diploma, is $10. In the case of students taking the certificate of a two-years course, the charge is $5.

ROOMS, BOARD, AND GENERAL EXPENSES.

Nine dormitories have thus far been erected in the quadrangles. Two of these are reserved for the students of the divinity school, and four are for women. A university house is organized in each dormitory; each house has a head, appointed by the president of the university, and a house committee, elected by the members; also a house counselor, selected from the faculties of the university by the members of the house. The membership of the house is determined by election, and each house is self-governing under the general control of the university council.

The cost of rooms in the dormitories is from $20 to $74 per quarter of twelve weeks. This includes heat, light, and care. Each hall for women has separate dining hall and parlors. The cost of table board in these halls is $4.50 per week.

All applications for rooms, or for information concerning rooms and board within or without the quadrangles, should be made to the registrar. For further details, see special circulars as to rooms and board, which will be sent on application.

The following table will furnish an estimate of the annual expenses for thirty-six weeks of a student in the university, residing within the quadrangles.

	Lowest.	Average.	Liberal.
University bill, tuition	$120.00	$120.00	$120.00
Rent and care of room	60.00	105.00	225.00
Board	185.00	162.80	225.00
Laundry	15.00	25.00	35.00
Textbooks and stationery	10.00	20.00	50.00
Total	340.00	432.00	655.00

It is believed that students who find it necessary to reduce expenses below the lowest of these estimates can do so. Rooms outside the quadrangles, furnished, with heat, light, and care, may be obtained at from $1.25 a week upward, the $1.25 rate being easily secured where two students room together. Many places offer room and board from $4.50 upward. The men's commons, Hutchinson Hall, offers to students meals à la carte. Lexington Commons, for women, offers meals à la carte during the autumn, winter, and spring quarters. During the summer quarter the men's commons will be open to both men and women. A list of approved boarding places outside the quadrangles is kept on file at the information office, Cobb Lecture Hall, and information regarding them may there be obtained.

UNIVERSITY OF PENNSYLVANIA.

FEES AND DEPOSITS.

The amounts noted in the appended schedule are for *regular and special students*, and are for the full academic year. Tuition fees are payable in two equal parts, on October 1 and February 1, respectively. Remittances should be [illegible]

the exact amount due, made payable to the University of Pennsylvania, and sent to William O. Miller, bursar, room 102 College Hall. An addition is made to fees not paid within thirty-one days.

Arts and science[a]	see statement below	$150.00
Finance and commerce	see statement below	150.00
Biology	see statement below	150.00
Biology (two-year course)[a]		150.00
Architecture		200.00
Mechanical or electrical engineering		200.00
Civil engineering		200.00
Chemical engineering		200.00
Chemistry		200.00
Music		60.00

TUITION FEES FOR THE COURSES IN ARTS AND SCIENCE, FINANCE AND COMMERCE, AND BIOLOGY.

The tuition fees for the courses in arts and science, finance and commerce, and biology are $600 for the period of instruction leading to the degree, $150 being paid by a regular student in each of the four years of his course. Students taking five years to finish the course may not be required to pay more than $600. Students who finish the course in less than four years will, nevertheless, pay a total of $600 tuition before the degree is granted. Students in the course in arts and science who take the composite course in medicine and those in the special course in biology who register in the department of medicine the second year will pay $200 tuition for the year. Special arrangements as to fees will be made upon application in cases of students admitted to advanced standing on credits from other institutions.

TUITION FEES FOR THE COLLEGE COURSES FOR TEACHERS.

The fees for the college courses for teachers are charged at the rate of $10 per unit of instruction. A unit is one hour a week for one year. Two laboratory hours count as one hour of lecture or recitation.

FEE FOR GYMNASIUM AND HOUSTON CLUB.

A fee of $10 is added to the tuition fee of every male student in the college, for the privileges of the gymnasium and the Houston Club. This fee is payable in two equal parts on October 1 and February 1. Students in the (special) music and teachers' courses are not required to pay this fee.

FEES OF PARTIAL STUDENTS.

The tuition fees of a partial student in any course of the college are $10 a term for each hour a week, or, in the case of laboratory or drawing-room work, $10 a term for each two hours a week. The maximum fee required of a partial student shall, however, in no case exceed in amount the regular tuition fees of the department in which the student is registered.

[a] The fee for students in the composite year in medicine, or in the two-year course in biology who are registered at the same time in the department of medicine, is $200.

FEE FOR REEXAMINATION.

A fee of $5 is charged for every reexamination, after the first, that the student is permitted to take.

DEPOSITS.

Each student on entering college is required to make a money deposit to cover loss of books, keys, etc., breakage in the laboratories, or damage to university property. Any balance is returned upon graduation or withdrawal from college. Students in teachers' courses, unless they take work in laboratories, are not required to make a deposit. The deposit for each course is given in the appended table:

Arts	$10.00
Architecture	10.00
Biology	10.00
Chemistry	25.00
Engineering, all courses	25.00
Finance and commerce	10.00
Music	5.00

Special and partial students in chemistry and engineering deposit $20.

GRADUATION AND CERTIFICATE FEES.

A graduation fee of $20 is charged to each candidate for a baccalaureate degree, and of $10 to each candidate for the degree of master of science in architecture. A like fee of $10 is charged to each candidate for the technical degree of civil engineer, mechanical engineer, chemical engineer, or electrical engineer. The fee for certificates of proficiency in special courses is $10. *No student will be recommended for a degree or certificate until all fees due the university have been paid.*

BOARD AND LODGING.

Accommodation for students is provided in the dormitories. Plans, prices, and all other information relating to the dormitories may be had upon application to the bursar. In order to make sure of rooms, students are advised to apply as early as April 1, if possible.

Table board may be had in the immediate vicinity of the university at prices ranging from $3.50 per week upward. A printed list of approved boarding places, with or without lodging, may be obtained at the dean's office. The average price paid by students in such quarters for board and lodging is $5.50 per week.

The figures given herewith are based upon the cost of living, either in the dormitories or in a boarding house.

	Minimum.	Maximum.
Board and lodging (37 weeks)	$185.00	$350.00
Tuition and other fees (according to the character and year of the course)	160.00	210.00
Text-books (estimated)	10.00	25.00
Graduation or certificate fee	10.00	20.00
	365.00	605.00

HARVARD UNIVERSITY.

TUITION FEES.

FOR A STUDENT IN REGULAR STANDING.

The annual tuition fee for every student in regular standing in Harvard College, for every student in the Lawrence Scientific School who joined the school in 1906–7 or earlier (see below for the fees of students entering after 1906–7), and for every resident student in the Graduate School of Arts and Sciences or in the Graduate School of Applied Science doing full work, is *one hundred and fifty dollars;* but if the student takes work in excess of the amount required of members of his class, school, or programme, or if a freshman takes work in addition to the amount prescribed in his individual case, or if a resident student in the Graduate School of Applied Science takes work outside his plan of study for the year as approved by the committee of the school, he is charged a supplementary fee of twenty dollars per course for each additional course so taken.

The regular annual tuition fee of *one hundred and fifty dollars* is charged to every special student in Harvard College who is doing full work, as well as to every resident student in the Graduate School of Arts and Sciences or in the Graduate School of Applied Science who is doing full work, or who wishes to have the year counted as a complete year of study for any degree, or who holds a fellowship (except an Austin teaching fellowship) or scholarship. The supplementary fee of twenty dollars per course for each additional course is also charged to special students.

In his first year of residence, however, a special student in Harvard College or a resident student in the Graduate School of Arts and Sciences may take five courses for one hundred and fifty dollars.

The annual tuition fee for every student joining the Scientific School for the first time in 1907–8 or thereafter is *one hundred and seventy-five dollars.* A student taking work in excess of the amount required by his programme (or a first-year student taking more work than is prescribed in his individual case) is charged for each additional course taken.

Every student is held to have definitely chosen the courses standing in his list at the end of the third complete calendar week of the academic year, and to have assumed liability for the tuition fees chargeable in respect of the same, whether he pursue all of them to completion or not, and any new course brought into a student's list by change of elective or otherwise after that date is regarded as an additional course subject to supplementary charge—but this does not apply during the first three weeks of the second half-year to changes in half-courses beginning in that half-year.

Laboratory fees must be paid in addition to the tuition fees by students who take laboratory courses.

A student paying fees under the above rules is entitled to all the general privileges of membership in the university. He has the right to take any courses for which he is qualified, given under the authority of the faculty of arts and sciences. He has also the right of admission, provided he is properly qualified, to any of the instruction and the examinations given in any department of the university; except exercises carried on in special laboratories.

To obtain admission to instruction given in a department not under the charge of the faculty of arts and sciences, a college student should apply to the recorder for a certificate to be presented to the dean of the department in which the desired instruction is given. A scientific student or a graduate student should apply, in like manner, to the dean or secretary of his school.

A student who enters the university between December 31 and the end of the first half-year is allowed a *deduction* of forty dollars *from the regular tuition fee of one hundred and fifty dollars;* one who inters between the beginning of the second half-year and April 1 is allowed a deduction of sixty dollars; and one who enters after March 31 is allowed a deduction of one hundred dollars. A student who leaves before January 1 is allowed a deduction of one hundred dollars *from the annual tuition fee of one hundred and fifty dollars*, if he gives written notice of his withdrawal before that date to the dean of the department of which he is a member; one who leaves between December 31 and the end of the first half-year is allowed a deduction of sixty dollars, if he gives written notice to the dean before the end of the first half-year; and one who leaves between the end of the first half-year and April 1 is allowed a deduction of forty dollars, if he gives written notice to the dean before April 1; but if he fails to give the required notice of withdrawal no deduction is allowed.

The first half-year ends on the Saturday before the second Sunday in February. The first third of the academic year begins with the academic year and ends *December 31*. The second third begins *January 1* and ends *March 31*. The last third begins *April 1* and ends at *Commencement*.

Deduction from the full tuition fee of one hundred and fifty dollars a year is made for properly notified absence, as follows: for absence for three consecutive months, *thirty dollars;* for absence during the whole year, not including the mid-year and final examinations, or either of them, *one hundred dollars*. A student who claims a deduction, on the ground of absence, must present at the bursar's office a certificate from the recorder or secretary as to the fact and duration of his absence; and, in order to obtain such a certificate, he must have given previous notice of his intended absence to the recorder or secretary.

Deduction is made from the fees for additional courses, under the conditions named in the foregoing rules, in the same ratio as from the regular tuition fee.

Every nonresident student in the Graduate School of Arts and Sciences not holding a fellowship is required to pay at least *thirty dollars* to the university. Nonresident holders of fellowships are charged no fees.

A fee of *three dollars* is charged for each examination for advanced standing taken after a candidate for admission has secured a certificate of admission; for each examination for the removal of a condition; and for each make-up examination.

Special students in Harvard College are charged five dollars for each set of admission examinations taken by them until they are admitted to regular standing.

The fee for the examination for the degree of Ph. D. or S. D. is *thirty dollars*, but this fee is not charged to any candidate who has paid the full tuition fee of one hundred and fifty dollars for at least one year as a student in a graduate department of the university.

FEES FOR SINGLE COURSES.

Special students and students in the Graduate School of Arts and Sciences and in the Graduate School of Applied Science not doing full work may pay fees for the courses which they take instead of paying the full tuition fee of a

student in regular standing. But a student paying less than one hundred and fifty dollars is not allowed to be the holder of a fellowship (except an Austin teaching fellowship) or scholarship, or to count the year as a full year of study for a degree, or to claim admission to instruction or examination in another department of the university.

No deduction for absence or withdrawal is made from the fees for single courses. A student who attends a course of instruction for only a part of the year must pay the whole fee for such course. But a student who is liable for the full tuition fee of *one hundred and fifty dollars* a year is entitled to the same remission as a student in regular standing.

The fees for single courses are as follows:

For any course of instruction, not a laboratory course or course of research, and for any laboratory course designed "primarily for undergraduates," *forty-five dollars* for a full course, *twenty-five dollars* for a half-course.

For a laboratory course designed "primarily for graduates" or "for undergraduates and graduates," or for a course of research, a sum computed at the rate of forty-five dollars for a full course and twenty-five dollars for a half-course for as many courses or half-courses as represent the amount of time devoted to the subject by the student. In estimating this time it shall be assumed that all of the student's working time not devoted to other specified and accepted courses or occupations is given to this course.

In all other cases the fee is computed at the rate of *fifteen dollars for an hour a week* of instruction during the academic year, up to one hundred and fifty dollars.

In no case shall the tuition fee for the year be less than *thirty dollars.*

INFIRMARY FEE.

A fee of four dollars a year is charged to every student in Harvard College, to every student in the scientific school, and to every resident student registered in the Graduate School of Arts and Sciences or in the Graduate School of Applied Science, for the maintenance of the Stillman Infirmary; and, on the order of a physician, every such student is given, in case of sickness, in return for this fee, a bed in a ward, board, and ordinary nursing for a period not exceeding two weeks in any one academic year.

FEE FOR LATE REGISTRATION.

Every student in the college and the scientific school who, at the end of the Christmas or spring recess, fails to register at the time set for that purpose, is required to pay to the bursar a fee of *five dollars* before being permitted to register; but the dean may remit the fee whenever he considers the failure to have been unavoidable.

GRADUATION FEE.

A graduation fee of twenty dollars is charged to every candidate taking a degree in the Graduate School of Arts and Sciences or in the Graduate School of Applied Science; and to every candidate taking a bachelor's degree in Harvard College or in the Lawrence Scientific School who has incurred fewer than four years' full annual tuition fees in candidacy for that degree. A candidate for a degree at commencement chargeable with a graduation fee is held absolutely liable for payment thereof unless his candidacy was abandoned either by notice in writing given to the dean of his department before June 10, or through failure in examination. A candidate in the middle of the year is held absolutely

liable for payment unless in like manner his candidacy was abandoned on or before the first day of the second half-year. A candidate taking more than one bachelor's degree is not allowed to count the same time for both degrees in determining liability for the graduation fee.

LABORATORY FEES.

Every student who takes a laboratory course must pay, in addition to his tuition fee, the special fees pertaining to such course. The fees for the various laboratory courses are as follows:

Philosophy 14, $2.50; 20, $5 per course counted for a degree.

Astronomy 1 and 2, $5 each; 3, $10; 5, $20.

Physics B and 1, $10 each; *C*, $12; 2, 3, 4, and 20, $15 each.

Chemistry 1, $12; 3, 4, 5*a*, and 6, $18 each; 9, 10, 12, and 13, $9 each; 20, $36, which is the maximum fee for more than one course in chemistry taken in one academic year by one person. Students who take laboratory courses in chemistry are also subject, in addition to the above fees, to charges for use of materials, breakage, and fines for violation of laboratory regulations.

Engineering 3*a*, $2; 3*b*, 3*d*, 5*b*, 5*d*, and 5*c*, $1 each; 13*a*, 13*b*, 16*a*, 16*c*, 16*e*, 16*f*, 16*g*, 4*c*, 4*d*, and 6*d*, $5 each; 4*a*, $10; 10*a*, 10*b*, 10*c*, and 10*e*, $7.50 each for students in the scientific school registered in the programme of mechanical engineering or electrical engineering, and $15 each for other members of the university; 20, $10 for each course of research whenever the course requires laboratory work. A student taking both 16*c* and 16*g* in the same academic year is charged but one fee of $5.

Botany 1, 2, 3*a*, 3*b*, 4, 6, 8, and 9, $5 each; 5 and 7, $10 each; 20, $5 per course counted for a degree.

Zoölogy 1, 2, 4, 5, 6, 8, 9*a*, 9*b*, 10*a*, 10*b*, 11*a*, 11*b*, 13, 14, 15, and 16, $5 each; 3, $10; 20, to graduate students, $5 per course counted for a degree; 20, to undergraduate and special students, $10 per course counted for a degree.

Geology A, *B*, *C*, 4, 5, 7, 10, 14, and 17, $5 each; 6, 11, 12, and 15, $10 each; 20*c*, $5 to $20, according to time spent in the laboratory and the amount of materials used; 20*d*, $5 if taken as a half course, and $10 if taken as a whole course. The maximum fee for 20*d*, when counted for more than one course, is $20.

Mineralogy 2, $10; 7, 8, 9, and 14, $2.50 each; 12, $5; 20, $5 to $30.

Mining and metallurgy 1, $3; 2, $15; 3, $10; 4, $30; 6, $20; 7, $30; 8, $15; 9, $10; 10, $25; 14, $15; 17 and 28, $5 each; 20 and 22, each a minimum fee of $30.

Physiology 1, $10.

BONDS.

Every student in Harvard College or in the Lawrence Scientific School in regular standing must file with the bursar a bond in the sum of *four hundred dollars*, signed by two bondsmen, one of whom must be a citizen of the United States, or by a surety company duly qualified to do business in Massachusetts, as security for the payment of college bills; or he may deposit with the bursar four hundred dollars in United States bonds for the same purpose; or he may deposit *fifty dollars* as security and pay in advance all sums for which he becomes liable to the university. Money deposited as security is returnable after the issue of the second term bill, one week before commencement.

The same rule applies to every special student in Harvard College and every resident student in the graduate schools, except that *two hundred dollars* is the amount of the bond required of a student of one of these classes, unless he occupies a college room or boards at Memorial Hall or Randall Hall.

Every student in any department of the university who occupies a college room or boards at Memorial Hall or Randall Hall must file a bond for *four hundred dollars*, or must in advance, and in addition to his tuition fees, pay the full year's rent of his room, and make a deposit as security for the payment of his board at the rate of *five dollars a week*.

No officer or student of the university is accepted as a bondsman.

PAYMENT OF THE TUITION FEE—TERM BILLS.

Each student liable for full tuition is required to pay three-fifths of the tuition fee to the bursar punctually at the beginning of the academic year without the presentation of a bill. The sum thus required from a student joining the scientific school for the first time in 1907–8 or thereafter is *one hundred and five dollars;* from other students it is *ninety dollars*. The remainder of the annual tuition fee is entered upon the first term bill, issued January 20, and is to be paid on or before February 10.

In like manner students who are liable for less than the full tuition fee of one hundred and fifty dollars are required to pay at the beginning of the academic year ninety dollars, or the whole fee if it does not exceed ninety dollars; and the remainder of the fee, if any, on or before February 10. The fee for a half course alone is thirty dollars; for a whole course the fee is forty-five dollars; for two half courses the fee is fifty dollars; for a whole course and a half course the fee is seventy dollars, and so on up to one hundred and fifty dollars. But the fee for a laboratory course designed primarily for graduates, or for undergraduates and graduates, or the fee for a course of research, is computed according to the rule printed on a preceding page under the title fees for single courses. A student who is doing less than full work is required to present at the bursar's office, at the beginning of the academic year, a certificate from the dean, the recorder, or the secretary of his school, stating the courses that he is taking, and he is not permitted to attend courses that are not included in the certificate.

The first term bill is issued January 20, and must be paid on or before February 10. This bill includes, in addition to the second instalment of the tuition fee, such charges as the following: Two-thirds of the year's charges for the use of a college room; fees for laboratory courses which begin in the first half year; Stillman Infirmary fee; locker fees; such incidental charges as can then be determined; charges for gas, and for board at the Harvard Dining Association and the Randall Hall Association, made up to as late a date as practicable.

The second term bill is issued one week before commencement, and contains the tuition fees for additional courses, if any, and other charges not included in the first bill. The second term bill must be paid by all candidates for degrees at least one day before commencement, and by all other students on or before July 20.

Students who are candidates for degrees in the middle of the academic year must pay all dues to the university at least one day before the day upon which the degrees are to be voted.

The term bills are sent to the student at his catalogue address unless the bursar is requested in writing to send them elsewhere.

When a student's connection with the university is severed, all charges against him must be paid at once.

Each student whose dues to the university remain unpaid on the day fixed for their payment is required at once to cease attending lectures or recitations, using the libraries, laboratories, gymnasium, athletic grounds or buildings, boarding at the Harvard Dining Association or at the Randall Hall Association.

and making use of any other privileges as a student, until his financial relations with the university have been arranged satisfactorily to the bursar. Every student who neither pays his dues nor makes arrangement with the bursar for their postponement within three days after the date fixed for their payment, and who thereby loses his privileges but is shortly readmitted thereto, is required to pay a fee of ten dollars before resuming his standing in the university.

EXPENSES.

The following table exhibits four scales of annual expenditure:

	Low.	Moderate.	Liberal.	Very liberal.
Tuition	$150	$150	$150	$150
Room (one-half)	30	50	100	200
Furniture (annual average)	10	15	25	50
Board (39 weeks)	117	160	160	390
Fuel and light	11	15	30	15
Stillman Infirmary fee	4	4	4	4
Sundries	40	60	100	200
Total	362	454	569	1,039

The above estimates do not include laboratory charges, books and stationery, clothing, washing, membership of societies, subscriptions, service, and the expenses of the long vacation; some of which are luxuries, and all of which vary with the means and habits of the individual student. The exceptionally strong and capable student can, without injury to himself, reduce his necessary expenses below the lowest estimate presented in the above table, which may be regarded as a fair one for a student of ordinary constitution and power of self-command. Information regarding rooms in college buildings may be obtained after March 6, upon application to the bursar. During the course of the summer a list of available rooms outside the college buildings may be obtained from the secretary of the faculty or at the publication office.

A committee of officers and students have charge of nearly a hundred sets of chamber and study furniture which are rented at low rates.

DINING ASSOCIATIONS.

The student associations which use Memorial and Randall halls secure for their members board at cost.

At Memorial Hall the system adopted by vote of the members of the Harvard Dining Association in 1903 is a modification of the American plan. Various cereals, tea and coffee, milk, bread, rolls and butter, vegetables, and soups at luncheon and dinner, are offered on the American plan. These make up less than one-fourth of the cost of provisions, and are used by all about equally. Accordingly their cost is divided equally amongst all. Also the cost of service and the other running expenses which go on for all alike are, and ought to be, shared equally by all. Each member's share in this total cost of "general board" amounts to about $3 a week. Members regularly absent from luncheon are allowed a reduction of one-third in the amount charged them as their share of the expense of general board. Meats, desserts, and a variety of other articles are paid for when ordered. Most men spend in this way from $1.50 to $2.50 a week. Some choose to spend more, and many spend less. These articles are paid for by coupons issued to members in books, or by signed order slips, which are charged to their accounts. The objects are to offer greater variety than is possible on the American plan, to prevent the waste inseparable from that plan, and to avoid making any member pay for much that he does not order.

In the summer of 1905 a new serving room was added to the hall on the north side, with a new kitchen beneath, and new equipment throughout the rest of the basement. This change secures freedom from noise and odor in the dining room, with better service and increased seating capacity.

Application for admission may be made by any member of the university, and by anyone intending to enter the university. Friends may secure seats together by forming a "club table." Application for membership should be made on or before September 15 to secure a chance in the first allotment of seats for the following college year. The hall opens a little before the beginning of college. Application blanks, date of opening, and further information may be obtained from the auditor, Harvard Dining Association, Memorial Hall.

Randall Hall was built in 1898–99, partly with the gift for that purpose from the John W. and Belinda L. Randall Charities Corporation.

Membership in the Randall Hall Association is open to any member of the university. Meals are served à la carte, making it possible to board for $3.50 a week. The annual membership fee of the association is low. Application for admission should be made early to the secretary of the Randall Hall Association.

The Harvard Cooperative Society is another organization for reducing expenses. At the store of the society, clothing, books, stationery, wood, coal, etc., can be purchased at reduced prices.

Lest the estimates quoted above should be in anyway misleading, it is necessary to explain that they are intended to cover only those expenses actually incident to connection with a college. Personal and contingent expenses can not be discussed here, because they vary so much from personal taste and from the different opportunities offered for pastime and recreation in different localities. It may be said, however, that having in view the student accustomed to moderation, a generous margin over and above necessary expenses is almost essential.

THE ORGANIZATION OF CHINESE STUDENTS IN THE UNITED STATES.

The Chinese student who goes to the United States, even though he attend a college where no other Chinese students are present, will nevertheless have abundant opportunity of coming into touch with his fellow countrymen. This he will be able to do through the excellent system of organization which has been introduced amongst the Chinese students scattered all over the United States.

The idea of organization seems to have originated in the year 1901 with some of the students attending the University of California. They gave their association the name of the Chinese Students' Alliance of America. The association included originally students from all parts of the United States. But within the last few years the great increase in their numbers, particularly in the Eastern States, has made it possible to have two organizations, an eastern and a western. The eastern branch, known as the Chinese Students' Alliance of the Eastern States, is now the larger, counting in all

about 200 members. The western branch, known as the Pacific Coast Chinese Students' Association, numbers about 100 members. So far these two associations have not been constituted a part of the World's Chinese Students' Federation, the great national organization of China with its headquarters in Shanghai.

The activity of the alliance in the Eastern States is best seen in the conference, held yearly at some convenient point, and in two publications, one, the Chinese Students' Monthly, a magazine in English, devoted to the objects of the alliance, and the other, the Chinese Students' Annual, in Chinese. Prospective students would do well to obtain copies of the latter. The exact objects of the alliance it might be difficult to state in so many words. The constitution of the alliance, printed below, conveys, perhaps, the best suggestion. These objects may be summed up in the promotion of good fellowship among Chinese students in the Eastern States—a fellowship which seeks to unite all on the broad, general ground of patriotism. A casual glance through the literature which the alliance publishes, the contributions to the Monthly, and the reported speeches at the conferences, will reveal at once the strong note of earnest patriotic endeavor which animates the alliance members.

Local activity is confined to the local clubs of the different colleges where Chinese students are in attendance. There are clubs or associations in New Haven, Amherst, Illinois, Chicago, Wisconsin, Pennsylvania, Columbia, Cornell, Michigan, and a general club for Massachusetts.

The publications of the two associations throw, perhaps, the best light upon the conditions of student life in America. The following article, taken from the Dragon Student, an annual, issued in 1905, is a good résumé of the Chinese student movement for the year in which it appeared.*

CHINESE STUDENTS IN AMERICA.

By SAMUEL S. YOUNG.

[Mr. Young is a native of San Francisco. He prepared for college in Trinity School, where he received a gold medal for proficiency in Latin. While an undergraduate in the University of California he was the holder of a state scholarship during the academic year of 1903–4. He did such good work in the military department of the university that on graduation he was given a captaincy. He graduated in 1904, and is now a graduate student in Teachers College, Columbia University, to which institution he was awarded a regular graduate scholarship for the academic year 1904–5. Mr. Young is a candidate for the degrees of master of arts and doctor of philosophy, his major subject being educational administration.]

On account of the limited space to which I must confine myself, I shall attempt in this article nothing more than a mere summary of facts regarding Chinese students in the United States. It is almost impossible to obtain accurate information on account of the wide distribution of Chinese students throughout this country.

* This article appeared originally (without the introductory note) in the American Missionary for March, 1905.

Realizing the importance of uniting all Chinese students into an organic whole, of emphasizing the unity of purpose, and of infusing the spirit of patriotism into them, the Chinese students of the University of California, in 1901, organized a Chinese Students' Alliance, whose object is to promote interest among Chinese students in matters pertaining to China. From its very beginning the Chinese Students' Alliance has witnessed a very rapid growth. The membership has increased from 18 in October, 1901, to about 100 at the present time, and includes primary, elementary, and secondary pupils, as well as university students, in every part of the United States. Among its work the alliance has, during the past year, been able to gather valuable statistics concerning all Chinese students it could reach.

I shall dwell more fully upon the advanced students and the nature of their work, for it is about them that our immediate interests are centered. Furthermore, it has been impossible to obtain as full information concerning elementary students as has been desired, whereas very complete data have been compiled of students in the universities and technical and professional colleges.

University students may be divided into two classes—government students and self-supporting students. Among the latter are students who have enough ambition to work their way through the entire course. Space will not allow me to cite instances in which Chinese students have deprived themselves of many a pleasure and have spent all their spare time and even their vacation in earning whatever they could to enable them to remain in college. Such instances are even more common among less advanced students who struggle to reach the highest round of the educational ladder.

As a testimony of the awakening of China to western civilization, groups of students have, from time to time within the last three or four years, been sent to the United States by the Chinese Government to pursue advanced and professional courses in subjects of which the China of to-day is in greatest need. The students are so equally represented in every department of instruction in the universities that one can not say that one department has a greater attraction for Chinese students than another. Education can not be too varied or too broad for the needs of China of to-day. It must not be thought for a moment that the time of the Chinese student is devoted entirely to the intellectual and strictly academic side of life. Debating, college journalism, college societies, and athletics have their representatives in Chinese students. Even such a strenuous sport as American football has its charms for the Chinese boy.

An encouraging aspect in the education of Chinese in the United States is the increasing number of students in the secondary schools, which are to them preparatory schools in a stricter sense than they are to American students. The education of the Chinese student very seldom stops upon the completion of the secondary course; it ends more frequently with the elementary course, if it ends at all. For it is an easier step from the secondary school to the university than it is from the elementary to the secondary school. The barrier in the way of the Chinese student seems to be the four years in the secondary school. Having once entered it, his mind is settled as to the course which he intends to pursue in college.

The aims of the elementary pupils are very varied, and these pupils are so widely scattered that it is impossible to ascertain very much concerning them. Suffice it to say that there has been a very happy and general increase in their number throughout the country. Parents have begun to realize the value of an education in western ideals and civilization. * * *.

As a summary let me cite some statistics which have been gathered by the Chinese Students' Alliance. The total number of Chinese students in the United States universities is 46, of which 28 are government students and [illegible] are self-

supporting; 9 are gradnate students. [Later statistics show that the total number of Chinese students in the universities of this country is 51, and that there are 19 graduate students.—Editor.] The distribution of these students is as follows: In the University of California, 17; in Columbia University, 6; in Cornell University, 5; in the Massachusetts Institute of Technology, 5; in Yale University, 4; in Oberlin College, 2; in Princeton University, 1; and in New York University, 1. A large number of Chinese students are attending technical and professional colleges, but full data concerning them could not be obtained. Secondary school students number about 60, and the number of girls in the intermediate and secondary schools is 19.

Of course, the above statistics are very unsatisfactory, but they mark a beginning in the right direction. Before long the Chinese Students' Alliance hopes to be able to communicate with every Chinese student in this country, and also to create an interest in the unity of the purpose which should be foremost in the mind of every Chinese student. * * *

Table showing the number of Chinese students in 1905 and the time of their graduation.

Courses.	Graduate students.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	Total.
Political science	2					2			4
Law	2					2	3	1	8
Military science			1						1
Navy								1	1
Economics	1	1			1	1			4
Commerce	1		3		1		1		6
Banking				1	1				2
Railway engineering	2	1	1		5	3	4	2	18
Military engineering		1	1						2
Sanitary engineering					1				1
Agriculture	1		1	4		2			8
Mining	2	1		1	1	4			9
Mining engineering			2	1					3
Mechanical engineering	1		1	2			3	2	9
Electrical engineering	1			1	1		1		4
Physics	1	1	1			1			4
Chemistry				1	2		1		4
Textile manufacture			1						1
Teaching	3	1		2			1		7
Medical science	1	2	1	1					5
Dentistry	1								1
Total	19								105

The following article appeared in a publication of the year 1906:

CHINESE STUDENTS IN AMERICAN UNIVERSITIES.

By T. Y. Chang, 1907, California.

Through Chinese students studying in America the influence of American universities on new China can not be overestimated. As China has been rapidly wakening since the Boxer war and is trying to introduce western sciences and institutions, she is now in great need of those students who have received higher education from western countries. For such an education America furnishes the Chinese youths the best chance. According to a recent Chinese statistical publication, the number of Chinese students in American universities is greater than in any other western country. These students, owing to the fact that the demand for their services is so great, while their number is so small, are much more valuable to China than American students to America. The tendency of the Chinese public opinion to-day, as well as the recent policy

of the Peking Government, shows that the influence of students educated in western countries, especially in America, will, in the near future, be strongly felt throughout the celestial empire; and this influence is practically that of American universities.

China to-day needs men of higher modern education. She needs engineers to build her railroads and to open up her mines; she needs mechanics and chemists to supervise her factories; and she needs lawyers and economists to make her new laws and to direct her financial policies. With these needs urging her from all sides, China has realized the importance of having her youths educated in western countries. The youths have realized, too, the imminent necessity of their country, and have been thus impelled to seek their education in western universities.

Now, American universities, especially the University of California, attract Chinese students much more than European universities, perhaps with the exception of those of England. The reason is twofold: First, the English language is comparatively familiar to Chinese youths; second, they can find friends of their own nationality in America much more easily than in Europe. In fact, the total number of Chinese students in American universities and colleges at present has reached 56, of which California has 18.

As to the work of Chinese students in this country, a number of them have shown remarkable ability to master higher studies. A few instances will prove this to be true. Dr. C. H. Wang, a young man of only 24, who graduated from Yale last June with the degree of D. C. L., has been elected a member of Phi Delta Phi. Again, Dr. C. Y. Yun, also a young man of 27, was awarded a university fellowship for his excellent work in political science, and was honored last June with the degree of Ph. D. Moreover, there are a number of Chinese graduate students in eastern universities who are candidates for higher degrees. These facts show that the mental power of Chinese youths, speaking generally, is no weaker than that of any American youths; and this insures their future success.

The real great success of these students, however, rests upon their ability to apply their academic knowledge; to convey American ideas to their people; and to influence them with what the students themselves have been influenced by American universities. To prove that it is a success or a failure in regard to this point, time and experience have not been long enough, although a few of the successful Chinese students have been recently summoned home and placed in influential positions. Their future, anyhow, is very bright. Their influence on their countrymen will surely be enormous and irresistible. They will be a huge bridge across the Pacific Ocean between America and China, over which American civilization travels. They will be a marvelous means of transportation that transports American ideas to and distributes them throughout the vast middle kingdom. They will be able to modify the public opinion of their country that more than half a century of ordinary contact with the Occident can not modify. They will be able to insure a peace and trade in the Far East that treaties and military forces can not insure. In one word, these students will be the most natural medium and most effective instruments through and with which American civilization, or rather American university education, can exert its wonderful influence on the new China.

In the same publication appeared an article which deserves consideration. It enters a protest against the idea that education in American colleges appeals to Chinese students on its technical side only. The article in question was read before the annual conference of the Eastern Alliance held in Amherst.

IMPORTANCE OF ACADEMIC EDUCATION.

By S. C. Sun.

Fellow-students and fellow-countrymen: I hardly think it is necessary for me to repeat to you the object of this conference. I take it for granted that every one of us who is attending this conference knows what he is here for. It is a rare opportunity that we, scattered in a foreign land so vast as America, are able to gather here in Amherst to make acquaintance with each other and to exchange our ideas and the knowledge which we have gained and appropriated in the different schools during the past academic year. I even consider it a great privilege that we are able to meet here. It is only through the hospitality of the people of Amherst at large and the efforts of a few members of our alliance and some other favorable circumstances that this conference is made possible. Probably many of our members who have been longing for a whole year to come to this conference are now, for one reason or another, not able to be present. We are the fortunate and privileged ones. Having such an opportunity and having such a privilege, it is now up to us to make this conference a most profitable and a most successful one. Let every one of us who is attending this conference carry something away with him socially as well as intellectually. I do not know any subject that I can speak on this morning that will be more beneficial and useful to us than the subject "Importance of academic education."

Recently I read over the last report published by our students in the Western States of America, and found that out of 105 students in American colleges and universities, not more than 9 or 10 are devoting themselves to academic education. Almost 90 per cent of our men in this country are taking courses purely professional.

When Pei-Yang students came to this country a few weeks ago, my attention was again aroused. I do not know how accurate the account given in the newspapers is, but it shows that not one of the 39 newcomers is to study along the line of academic education. It seems strange that the offspring of a people who have studied nothing but philosophy and literature for the past two thousand years should desert literature and philosophy altogether as soon as they come in contact with modern science. It may be that the law of action and reaction which applies in the physical world applies equally in human tastes and habits. Is it because our habits have inclined too much in the past toward philosophy and our tastes have been too exclusively cultivated in the line of literature that we are so thirsty for professional studies to-day; or is it because materialism, which characterizes modern civilization so strongly, has already rooted itself in mind of our young students and entirely swept away their inherited habits and tastes? Whatever the cause of this rush for professions may be, we can say with confidence that unless we are aware of the weakness of such a rush and guard ourselves against it, China will suffer from its results in the near future.

I realize the fact that our country is in need of a great many engineers and professional men at present and even more in the future. China's railroads are yet to be built. Her mineral resources are yet to be developed. She has at present hardly any industry and commerce, which in the next fifty years will have to grow to accommodate the growth of the nation. Such men as lawyers, financiers, engineers, chemists, and agriculturists will have abundant chances to show their talents and abilities. They will have more work to do than they can do. And, fellow-students, China needs her own sons and daughters to help her. She can not and she is not to depend upon foreign nations to supply her

with helpers and workers of any kind. Therefore, I want to make myself understood that my idea is not to discourage any among us from taking professional courses, but rather to show the importance of academic education and to caution those who are pursuing professional studies not to neglect their academic education.

Let us consider a moment the bearing of academic education upon our country as a whole. The civilization of a nation advances with the education of her people. The progress of China toward modern civilization will be measured by the intellectual condition of her people. At present, although they are not without well-educated men and women in China, yet, take the nation as a whole, we can not deny that the greater part of the mass is ignorant. To educate the mass of our people is one of the most essential steps toward elevating the civilization of our country. When the time comes, we, the students of to-day, can not escape the responsibility of leading the educational movements in our fatherland. In order to become able and successful educational leaders, a thorough general education is absolutely necessary.

Take the question of text-books, which is one of the hardest problems for our educators to solve to-day. Our schools at present have hardly any efficient text-books. Many schools, in consequence, have to educate their students through English text-books. We must have text-books in our own language. Unless we have them, it is almost an impossibility to educate the great mass who never have studied any other language than their own. The students of to-day will have to be the text-book writers for the coming generation. Is it reasonable, then, that we should prepare ourselves for that kind of work by having a good, thorough, academic education?

Our educated class has always been trusted and even worshiped in the past; they are even more so to-day; and undoubtedly such a prestige will continue in the future. A well-educated person will have far greater influence upon the people than those who are not so educated. Let those who contemplate to be successful leaders consider this deeply and seriously.

Again, a broad academic education gives a certain kind of culture which is necessary for the advancement of our society. A man may be a successful engineer, yet he may not be a man of culture. He may do a great deal of good work along his profession, yet he may not benefit society as a whole. At present our society is undergoing a great reformation under the influence of western civilization. Men and women of sound education, strong character, and fine culture are specially needed for guiding the course of our society.

And then, looking from a personal point of view, a thorough academic education gives a person a great deal of pleasure and makes life more interesting and more enjoyable. Professional studies afford us means of living, but give us no enjoyments. Liberal education, however, is otherwise. It broadens our mind as well as enriches our life. More than that, it exerts much influence upon the inner life of a person, which to a great extent, determines the mode of life of a man or woman.

I do not intend to persuade all to take a degree of A. B. before commencing their professional studies. That is an impossibility. Circumstances do not allow everyone to have such an opportunity. Some of us may have financial difficulties; and some of us probably are obliged to return home within a certain limit of time. Gentlemen, a degree does not necessarily mean education. Education may be obtained without having a degree. Of course, for those who are fortunate enough to be able to take an academic course previous to their professional education, it is wise to do so. But even for those who are not so fortunate, a general education can be likewise obtained through wide reading

and constant attendance at useful lectures which are often given in the universities for the benefit of the professional students.

In conclusion, I may mention another thing in connection with this subject which may be considered as a part of our academic education, and even of greater importance to us. I mean our own language and literature. No matter where we are and what we are studying, let us not forget that a thorough understanding of our own language and literature is absolutely necessary for our work in China. I do not care how well-educated a person may be, if he is not well up in his own language and literature, he will render very little service to his country. At least, a person, not knowing how to read and write his own language, will be placed at a great disadvantage in serving his own people. Many of the students who were sent abroad to study twenty years ago have already experienced such disadvantages. May none of us who are here to-day suffer from a handicap again. It is better to let all other learnings go than to have our own language neglected on their account. Therefore, fellow-students, when you leave this conference, bear in mind the importance of academic education, and make the study of Chinese language and literature a part of your college work.

The work of the conferences of the students in the Eastern States is thus reviewed in the last "conference" number of the Monthly:

A REVIEW OF OUR CONFERENCES.

In reviewing the history of our past conferences, we see that its development has been most encouraging. In the first meeting, held at Amherst, there were only about thirty Chinese students. In the following year the number was increased threefold, and in our last conference, at Andover, the number was still greater. Moreover, the new features introduced and the more hearty support of the attendants made that gathering in Andover such a memorable and delightful one that those who were present have been constantly heard repeating the remark: "I am so delighted by the progress of our conference. I enjoyed so much that I must attend our conference next year." With such anticipations as this we can say with certainty that not only the attendance at this year's conference at Ashburnham will break all the records of previous years, but the success, and hence the enjoyments will also surpass that of former conferences. There will be more acquaintances, better friendship, more fun, and more good time this year than ever before! What a bright outlook we have before us! What a glorious anticipation!

But there must be a reason for the wonderful progress which each consecutive conference has attained. In the first place success depends upon the spirit and interest with which we enter into our undertakings. The greater success we attained is a synonym of the deeper interest each one of us has taken. We all realize the importance of this yearly gathering in which we may become acquainted with one another and undestand each other better so that we may be able to work harmoniously after our return to China. We, young people of common interest, come together from different parts of China and various institutions of the United States, and find in each other characteristics that make for stronger and more permanent friendship. The enlarging of one's circles of acquaintance alone makes the seven days of great value in the developing of a richer and more enjoyable life. Many persons testify that the conference has been the principal opportunity by which they get acquainted with so many of their fellow students. What an invaluable chance! How gratifying it is that we can thus meet and encourage each other in our lines of preparations for our future work and enjoy each other's fellowship!

The influence which each year's conference has upon the student body is, indeed, powerful. It instills into the mind of each individual the spirit of unity, and it helps to raise the standard of our moral character. These are the very traits which all of us must strive for, and certainly everyone who had attended the past conferences had gained something from them. Students bring with them various customs and traditions of the different institutions. Those from one institution impart something new to those from another. Surely we can not help learning something useful and inspiring from so many valuable sources.

In order to make the conference still more enjoyable, some changes in the old programme have been made. Hitherto fore, there have been too many business meetings which could have been eliminated. Experience, however, has taught us to modify our plans. In place of such business meetings, there will be social gatherings in which everyone will have ample opportunity to become acquainted with each other and to enjoy various entertainments more heartily. We all recollect the pleasant gathering in the Archæology Hall of Andover Academy. The ringing of merriment and the sound of laughter of that evening are still audible. The huge bonfire is still within the view of our memory, and the beautiful, cheerful, smiling faces of the ladies who attended our open-air entertainment bring us back to the pleasant memories of our past times. With the experience of former years and with the thorough preparations of the various committees, many members of which have been in Ashburnham throughout the summer to perfect the arrangements, and who have in view the enjoyment of the delegates, we can safely look forward to a gathering that can not be surpassed in its success.

For each conference we have secured several men of high intellectual ability to speak to us. Do we not remember the valuable and instructive talks of Mr. Stearns, Hon. Chow Tzchi, and other prominent men? We ought to be thankful that we have been favored by the presence of such thinkers who have sacrificed time and energy in order to fulfill our expectations. This year we shall have men equally well qualified to speak to us, and the messages which they shall convey to us will be welcomed with deep appreciation. * * *

The work of the Alliance for the past year (1907–8) is given in the following report, which appears in the last (November) issue of the Monthly.

THE YEAR'S WORK.

[English secretary's report read at the 1908 conference, Ashburnham, Mass.]

The President and Members of the Chinese Students' Alliance of the Eastern States, United States of America:

On behalf of the Chinese Students' Alliance of the Eastern States, United States of America, I beg to submit the following report on the general progress and work of the Alliance for the year 1907–8, ending August 20, 1908.

One of the chief features of last year's work was the revision of the constitution and by-laws by which the board of executives, the board of representatives and the board of editors were established. Since that change the work of the Alliance has been much improved and this improvement has been seen and felt by all.

The work of the board of executives for the past twelve months was faithfully and dutifully done. Much of its success was due to the hearty cooperation of the other two boards and also the assistance of the members in general.

After the organization of the board of representatives the work of the executive board has been greatly facilitated. Though the enactments of the board

of representatives have not been carried out as promptly as might otherwise be expected, yet it must not be overlooked that its members are too far separated from one another. Separated though they are, still it is hoped that they will devise means to transact their business in a better and prompter way in the future.

The Chinese Students' Monthly has achieved wonderful progress in the record of its work and activity. The English section of the Monthly has developed into a good-sized magazine with an ever-increasing demand and popularity. Its expenses last year were entirely defrayed by the receipts from subscriptions and advertisements and the publication is now self-supporting. One point, however, is not to be passed unmentioned, that is, its irregularity in issuing. This must be remedied and improved in the coming year. The Chinese section of the Monthly is not very promising. On account of the difficulty on the part of the management to secure proper Chinese printing, the publication has not as yet been issued. It is strongly urged that steps be taken in this conference toward the improvement or better organization of the entire management.

Another sign of progress which the Alliance made last year was the increase of its membership roll. The Alliance has now 195 members, including 4 honorary members, of whom 78 per cent are students in the universities, colleges, and technical institutions in the East and the rest are studying in high schools and academies. It is gratifying to note that two of our members have been elected to the Honor Society of Sigma Xi and one to the student board of representatives of one of the large universities.

One of the notable things which deserves special mention here is the interest taken in us by the members of the Chinese legation at Washington. For the purpose of promoting the different phases of athletics, a sum of $70 was presented to the conference for prizes to be awarded to the most successful contestants. Another sign of public interest was the presentation of two prizes by the Ithaca and Pennsylvania clubs—the former a gold medal to the best orator and the latter a handsome banner to the winning debating team. Other clubs, however, also are not slow in showing their interest in the conference events.

With all the progress we have made during the past year there is one great difficulty which, it seems to me, has been a hindrance to the work of the Alliance and which we must overcome if we hope to have a continued success. As the Alliance is rapidly growing in size, its business demands more than ever, better cooperation between the different boards and the members. The indifferent attitude on the part of many of our members is indeed a great detriment to the welfare of the Alliance. Unless we are contented to remain where we are, we must strive to secure thorough cooperation, which is the secret of success. Let us one and all bear in mind that the Alliance exists for the welfare and benefit of all of us. If every member takes an active interest in the administration, better cooperation will be attained and the progress of the Alliance of the coming year will be even greater than that of the past.

Respectfully submitted.

K. L. CARLOS SUN,
English Secretary.

It has been thought worth while to print in full the constitutions of the two branches. They show the admirable field for training in parliamentary organization and procedure which the Alliance offers.

CONSTITUTION OF THE CHINESE STUDENTS' ALLIANCE, EASTERN STATES, UNITED STATES OF AMERICA.

ARTICLE I.—NAME.

The organization shall be known as the Chinese Students' Alliance of Eastern States, United States of America.

ARTICLE II.—DEFINITION.

1. By "Chinese students" are meant those Chinese or persons regarded as Chinese by right of paternal descent or of marriage who at the time of applying for membership are students of recognized universities, colleges, or other educational institutions in Eastern States, United States of America.

2. By "Eastern States" are meant the States of Maine, Vermont, New Hampshire, Massachusetts, Connecticut, Rhode Island, New York, Pennsylvania, New Jersey, Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Michigan, Ohio, Indiana, Kentucky, Tennessee, Mississippi, Alabama, Louisiana, Arkansas, Missouri, Illinois, Iowa, Wisconsin, Minnesota, and District of Columbia.

ARTICLE III.—OBJECTS.

1. To labor for the general welfare of China, both at home and abroad.
2. To keep Chinese students in America in close touch with one another.
3. To promote their common interests.

ARTICLE IV.—OFFICERS.

The Alliance shall have a president, a vice-president, a Chinese secretary, an English secretary, a treasurer, a board of representatives, and a board of editors.

ARTICLE V.—THE BOARD OF EXECUTIVES.

1. *Nature.*—The board of executives shall consist of the president, the vice-president, the Chinese secretary, the English secretary, and the treasurer of the Alliance.

2. *Duties.*—(*a*) The president shall preside at all meetings of the board or of the Alliance, administer all laws of the Alliance, and recommend to the board of representatives for action such suggestions as are consistent with the objects of the Alliance.

(*b*) The vice-president shall assume and discharge all the duties of the president in the event of the latter's absence.

(*c*) The Chinese secretary shall take charge of all the correspondence of the Alliance and keep a record of its work in Chinese.

(*d*) The English secretary shall take charge of all the correspondence of the Alliance and keep a record of its work in English.

(*e*) The treasurer shall collect, receive, and have custody of all funds due or belonging to the Alliance, pay all bills not exceeding $25 in value and others only when approved by the auditor of the board of representatives, and make a report at the end of each month of the receipts and expenditures of the Alliance, and a final report of the same at the expiration of his term of office, to the said auditor. The treasurer shall also keep a list of the members of the Alliance, both in Chinese and in English.

3. *Powers.*—(*a*) The president shall have power to call special meetings, veto enactments of the board of representatives, fill vacant offices on the executive board, and appoint committees, with the consent of the board of representatives.

(*b*) The treasurer shall have power to appoint committees, to collect membership fees and special contributions.

ARTICLE VI.—THE BOARD OF REPRESENTATIVES.

1. *Nature.*—The board of representatives shall be constituted by delegates from any group of members of the Alliance, and shall have a chairman, a secretary, and an auditor, chosen from and by the delegates.

Each group shall consist of at least five members of the Alliance and shall send one delegate to the board of representatives. If the group consists of more than five members, then for each additional five one more delegate shall be sent. No members shall be represented by two delegates at the same time.

2. *Duties.*—The board shall look after the best interests of the members and enact such laws as are conducive to the general welfare of the Alliance.

(*a*) The chairman of the board shall preside over all meetings of the board.

(*b*) The secretary shall take charge of the correspondence of the board.

(*c*) The auditor shall audit all bills of the Alliance, exceeding $25 in value, before payment by the treasurer, and shall reject such as proven wasteful or unnecessary.

3. *Powers.*—The board shall have power to make all appropriations, borrow money, raise contributions at the recommendation of the treasurer, and make all laws with the approval of the president, or, if they apply to the board of editors only, with the approval of the editors in chief and business managers concerned. If in the case of the former the president disapproves an act presented to him by the board, or in the case of the latter the editors in chief and business managers disapprove an act similarly presented, the same act can be repassed by the board by two-thirds majority.

ARTICLE VII.—THE BOARD OF EDITORS.

1. *Nature.*—The board of editors shall have an English department and a Chinese department; each department shall have an editorial staff consisting of one editor in chief and four associate editors and a business staff consisting of one business manager and two assistant business managers.

2. *Duties.*—(*a*) The English department shall publish in English the Chinese Students' Monthly monthly throughout the college year, and the Chinese department shall publish in Chinese the Chinese Students' Annual once a year.

(*b*) The business staff shall take charge of subscriptions and advertisements, printing, and circulation of their respective publications.

(*c*) The business manager of the English department shall make a bimonthly report, and the business manager of the Chinese department shall make an annual report to the treasurer of their respective financial standing.

3. *Powers.*—The board shall have entire control of the said publications, subject only to the enactments of the board of representatives.

Within three weeks after the annual election the editor in chief of each department shall appoint four associate editors and business manager, two assistant managers of their respective publications with the consent of the board of representatives.

ARTICLE VIII.—CLASSIFICATION OF MEMBERSHIP.

1. Active members who are Chinese students as defined under Article II.

2. Nonactive members who, once active members, have left America or entered business or profession in America.

3. Honorary members, irrespective of race or nationality, who may have achieved distinguished services to China or to the Alliance.

ARTICLE IX.—RIGHTS AND PRIVILEGES OF MEMBERSHIP.

1. Active members shall have the right to vote and to hold offices.

2. Nonactive and honorary members are entitled to enjoy all the rights and privileges of active members except the power to vote and election to office.

3. On the payment of the regular programme fee any active member who is unable to attend the annual conference may appoint a delegate to represent him at the conference, provided that the delegate himself is an active member of the Alliance, and that he is duly authorized with a written credential, signed by the absentee in the presence of another active member. Upon the presentation of such authorized written credentials to the English secretary, and after having been duly authorized by him, the delegate is thereby empowered to cast vote for the absent member. No delegate, however, shall represent more than two absent members at the same conference.

ARTICLE X.—APPLICATION FOR MEMBERSHIP.

Any Chinese student, as defined in Article II, shall be eligible to membership, provided that he or she files an application with the English or Chinese secretary and is reported favorably after a careful investigation by a special committee of three appointed by the president at his discretion.

ARTICLE XI.—RESIGNATION.

1. Resignation of membership or from office shall be sent to the president in a written form, which, after being approved, shall be published in the Monthly.

2. No resignation of membership shall be accepted until all dues are paid.

ARTICLE XII.—NOMINATIONS AND ELECTIONS.

1. All officers of the Alliance (except those stated in section 3, Article VII) shall be elected by popular and direct vote.

2. The board of executives, the editors in chief, and the business managers of the two publications shall be elected annually at the Chinese students' conference.

3. The board of representatives shall be elected once a year, on or before the second Monday of November.

4. Qualified applicants for membership may be elected to the Alliance by two-thirds majority at any time by the board of representatives.

5. Honorary members shall be elected only at the annual conference.

6. The term of all office bearers on the board of executives and on the board of editors expires at the end of the first annual conference after their election, while the term of delegates on the board of representatives closes at the beginning of the annual conference, but the board must act temporarily until the new board is formed.

7. Officeholders on the board of executives and on the board of editors are not eligible for delegates on the board of representatives.

ARTICLE XIII.—AMENDMENTS.

The constitution and by-laws may be amended at the annual conference, the former by a vote of two-thirds majority and the latter by a vote of a majority of the members present. Notices of proposed amendments shall be published in the Monthly at least two months before the annual conference at which the proposed amendments shall be discussed.

By-Laws.

ARTICLE I.—SUBSCRIPTION AND CONTRIBUTION.

1. All active members shall be required to pay a membership fee of $2 gold every year.
2. All active members shall each be required to pay, according to their respective ability, contributions whenever deemed necessary, in the form of a resolution passed by the board of representatives at the recommendation of the treasurer.
3. All nonactive members are required to pay a fee of at least $5 gold upon becoming such.
4. All honorary members shall be exempted from all dues, but they are given opportunity to show their interest when the Alliance raises a standing fund or in time of financial need.

ARTICLE II.—PUBLICITY.

All the work and reports of the Alliance shall be published in the Monthly, subject to the discretion of the board of editors.

ARTICLE III.—DISQUALIFICATION OF MEMBERSHIP.

1. Any member who fails to pay his membership dues at the end of the first half year after receipt of notification shall be deprived of all rights and privileges of a member until such payment is made.
2. Any member who violates the constitution and by-laws, or commits any act of misconduct, shall be subject to expulsion from the Alliance after investigation and conviction by the board of representatives.

THE CONSTITUTION OF THE PACIFIC COAST CHINESE STUDENTS' ASSOCIATION.

ARTICLE I.—NAME.

The association, being the nucleus of the Chinese students on the Pacific coast, shall be called "The Pacific Coast Chinese Students' Association."

ARTICLE II.—OBJECT.

The object of the association shall be to unite the Chinese students in the United States for common benefit.

ARTICLE III.—MEETING PLACE.

The reception room in the Chinese Students' Club House, Berkeley, shall temporarily be taken as meeting place of the association.

ARTICLE IV.—ORGANIZATION.

The organization shall consist of: (*a*) Three executive officers, (*b*) a secretary in Chinese, (*c*) a secretary in English, and (*d*) a treasurer.

ARTICLE V.—DUTIES OF OFFICERS.

(*a*) Duty of the executive officers:

The executive officers shall execute what is decided upon by the members. In case it is incapable of being executed or there is any important business, they may at any time call the members together to hold a meeeting for the purpose.

(*b*) Duty of the secretary in Chinese:

The secretary in Chinese shall have the charge of the correspondence (in Chinese) of the association, shall keep record of the proceedings of each meeting, and shall read the minutes of the last meeting. (A member may ask the secretary for the minute-book to read before or after the meeting in case there is anything that he happens not to understand.)

(*c*) Duty of the secretary in English:

The secretary in English shall have the charge of the correspondence (in English) of the association, and shall send previous notice to the members in case a meeting is to take place.

(*d*) Duty of the treasurer:

The treasurer shall collect from members both the regular and special contributions. He shall have the power to demand from the members the paymen of whatever is overdue. He shall not pay any sum exceeding $5 to defray such expenses as have not been decided and approved by the members.

ARTICLE VI.—TERM OF OFFICE.

The term of the office shall be half a year. An officer shall not hold office consecutively for three times.

ARTICLE VII.—MEMBERSHIP.

(*a*) Classification of members:

(1) Active members who have the power to vote.

(2) Associate members who have not the power to vote.

(3) Honorary members who have not the power to vote.

(*b*) Qualification of members.

(1) All the Chinese students in the United States regardless of sex who are 16 years of age are eligible for active members of the association.

(2) Those who are under 16 years of age are eligible for associate members.

(3) All Chinese officials, gentry, scholars, and merchants who make contributions to the association will be invited to be honorary members.

(c) Rule of admission:

All the Chinese students in the United States regardless of sex who wish to be admitted to the association shall prepare a list of their names, ages, birthplaces, and residences, and shall be introduced by one of the members.

(d) Right of members:

All the active members shall have the right to discuss and decide the business of the association.

ARTICLE VIII.—CONTRIBUTION.

(a) Regular contribution:

The regular contribution of an active member shall be $1 (United States currency) a year, to be paid in two instalments—one at the general meeting in January and the other at the general meeting in July.

(b) Special contribution:

(1) In case the regular contribution is not sufficient to cover the general expenses of the association, each member shall have to pay his share assessed.

(2) In case of expenses needed for some important purpose, the executive officers may at any time call a meeting, and the members may contribute any amount they please.

ARTICLE IX.—TIME OF MEETING.

(a) General meeting:

There shall be every year two general meetings to be held before the opening of the school. The executive officers shall appoint the time of the general meeting, when the election of new officers will take place.

(b) Monthly meeting:

The monthly meeting shall be held on the first Saturday of every month at 1 o'clock p. m., to discuss and decide what is to be done during the month.

(c) Special meeting:

(1) In case of important business the executive officers may at any time call a meeting.

(2) In case of important business, and when three or more members request the executive officers to appoint a day to call a meeting, the latter shall have to comply with such a request.

ARTICLE X.—AMENDMENT OF CONSTITUTION.

In case any five members at the time of general meeting propose to amend the constitution with the approval of the majority of the members, a special committee shall be elected by vote to undertake the work of amendment. The said committee shall make report of the amendment at the first monthly meeting after the general meeting, or at the special meeting appointed by the executive officers. Such amendment shall be enforced if it meets the approval of the two-thirds of the members.

ARTICLE XI.—SUPPLEMENT TO CONSTITUTION.

In case any one member at any time proposes supplements or additions to the constitution, such supplements or additions shall be therein inserted, if they are not contrary to the existing constitution and meet the approval of the majority of the members.

Supplementary Articles.

(Approved July 16, 1905.)

ARTICLE I.

The three executive officers shall by turn preside the meeting every month.

ARTICLE II.

One who has already been elected to be an officer shall not hold any other office designated in the constitution.

ARTICLE III.

An officer may temporarily have the management of a special business.

ARTICLE IV.

The Article XI in the constitution (in case any one member at any time proposes supplements or additions, etc.) means that one makes a motion and another seconds it.

ARTICLE V.

There shall be a reception committee, consisting of two members, whose duty is to act as a guide and give information to the Chinese students coming to the United States.

ARTICLE VI.

There shall be an assistant secretary in Chinese.

SUGGESTIONS AND ADVICE.

[The editor of the Bulletin takes a personal responsibility for points of suggestion and advice offered in this section.]

I. *Preparatory work.*—For the student expecting to pursue a course in an American college the question inevitably arises, Is it best to go to a preparatory school in the United States, or to finish preparatory work before starting, or to combine the two plans by commencing preparatory work in a school in China and completing it in an American school? As between these three plans some difference of opinion will be found to exist. It needs must be said that study in an American college is likely to offer fewer difficulties to the student who has already had experience in an American preparatory school. The acquaintance with spoken colloquial English acquired in preparatory study smooths the way for the easier comprehension of instruction in university subjects. It relieves the student of a serious handicap at the beginning of his college studies. Against this advantage may be urged the objection that attendance at both a preparatory school and

a college lengthens the time of residence in the United States and keeps the student to that extent out of touch with his own country.

Without wishing to support one view or the other, the editor ventures to suggest that the secondary work now offered in China itself amply covers the ground required for college entrance. This subject has already been discussed, however, under a different heading, in dealing with the special provisions for the entrance of Chinese students now adopted by the admission boards of different colleges. If the student will exert himself to acquire readiness in written and spoken English, a thing which is gradually becoming more possible in China, he will find himself quite able, with the preparatory work from a Chinese school, to enter upon a college course in America with profit. Moreover, as a future Chinese gentleman of affairs he will undoubtedly find it to his advantage to have as mature a knowledge as possible of his own classics before his hold on them is perhaps superseded by the assimilation of a foreign culture.

Attention may be called to the fact that the age limit for entrance required by most colleges tends to advance rather than to recede. A greater degree of maturity is now assumed at matriculation than formerly. Although 16 years is the normal age, before which a student is not expected to matriculate, the majority of American students seldom complete their preparatory work before the age of 18 or 19. The same degree of maturity is naturally expected from Chinese students.

II. *Choice of a college.*—On this subject it is obviously impossible to go beyond the extent of offering very general advice. With more than one hundred institutions to choose from, selection becomes very difficult. Yet a little reflection will show that for each individual student the range of choice is, after all, more or less limited. If a student knows (1) the means at his disposal, and (2) the locality in which he wishes to reside, the problem of selection becomes easier.

Geographically the colleges of the United States may be arranged according to the following groups: Pacific coast, Western, Middle Western, Southern, and Eastern. Each section has relative advantages and disadvantages. In each the tone of society and public feeling is distinctive. While in each Chinese students are welcomed; experience goes to show that some sections have proved more congenial and attractive than others.

Judging from statistics at hand, based upon records of the Alliance of the Eastern States and the Pacific Coast Association, Chinese students seem to gravitate toward the larger universities; and it must be confessed that the broad cosmopolitan spirit which reigns in these institutions is perhaps peculiarly agreeable to them. The proximity of these larger institutions to one or another of the big cities of the United States has advantages; it enables the student to see at first

hand the more varied phases of American social life, the organization of industries, the working out of economic problems, the procedure of modern municipal government, the value of public hygiene, and the general system of public philanthropy and public works. Against this tendency to congregate in the larger universities a protest has recently been raised, and the point calls for very serious consideration. It is urged that a group or club of Chinese students, with their close ties and associations, tends to defeat one of the chief purposes of residence at an American college, that is, the broadening influence of contact with American students. To this end the agreeableness of associating exclusively with one's countrymen ought, perhaps, to be sacrificed. This, at least, is the suggestion offered in some quarters; and there is every good reason why Chinese students should spread themselves among various institutions in all parts of the country, rather than concentrate at a few. Such general considerations as these it is hardly necessary to discuss further.

Students having in view a particular profession, or a particular branch of academic work, may need to exercise greater care of selection than students looking merely for a general course. Professional studies, especially those in the applied sciences, call often for the use of a very expensive and elaborate equipment, while particular academic branches, such as economics, politics, and history, require the use of well-equipped libraries. In either of these cases a student, provided he have the means for so doing, makes a great mistake in attaching himself to a college whose equipment is not adequate to the fullest demands which the pursuit of his subject imposes. Some institutions specialize in their equipment for certain definite lines of work or research; the student should ascertain which these are before committing himself to attendance. For advanced or graduate work information about equipment is essential. For undergraduate work, especially in arts, the choice of one college or another is possibly of less consequence.

To the student contemplating both an undergraduate and a graduate course, it is an open question whether the two courses should be pursued at the same or at two or more different institutions. On the whole the editor is inclined to think that undergraduate and graduate work are best taken in separate universities, the change from one body of instructors to another having in many cases a distinct educational advantage. This form of migration from one university to another is perhaps to be commended especially if the student be of mature age and engaged upon a definite and systematic plan of study or research. But aimless wandering and changing from one place to another, particularly during the undergraduate period, is certainly to be condemned.

III. *Planning a course.*—Practically all the larger universities offer undergraduate courses in arts, natural science, and the applied sciences. Smaller colleges seldom go beyond a course in arts, supplemented by the natural sciences. Institutes of technology and schools of applied science confine themselves primarily to branches which belong exclusively to their own field.

Each college has rules and regulations of its own in regard to the work required of undergraduates who are candidates for a degree. Some have definitely prescribed courses of study extending over the term of undergraduate residence, and from which the student is not expected to vary. This is particularly true in schools or colleges of applied science. Others, going to the opposite extreme, allow the student to make his own grouping of subjects, a sufficient number satisfactorily completed qualifying for a degree. The majority prescribe certain subjects, but give the student freedom to choose the remainder. Whatever system is followed, an attempt is usually made to arrange courses so that a student may ultimately proceed into some definite field of study, and become proficient in it. It may be offered as general advice that no Chinese student ought to plan a course on his own responsibility. At each college instructors are always ready to advise and assist in the choice and arrangement of courses and the student can not do better than to consult freely with them and never hesitate to ask for advice.

IV. *The journey.*—The question of funds and expenses has already been discussed under a separate heading. Here it is only necessary to state that, from the experience of those who have already made the journey, it is not advisable for the student to leave China without having in hand an amount sufficient to cover all expenses for the first three months after getting settled. It is equally essential that parents and guardians, or agents, be prompt and regular in forwarding remittances. Five weeks may elapse between the mailing of a draft from Shanghai and its receipt at one of the eastern college towns. Frequently students have been seriously embarrassed by the indifference of families or agents in this respect, and the point is one that requires more than usual insistence.

The immigration laws of the United States insist upon the observance of certain formalities by every person entering or returning to the country. What these formalities are will be explained at any consulate of the United States. In the case of students from China passports are necessary, and of these also any consulate of the United States will furnish information. The exact observance of all the technicalities required for the passport will facilitate the difficulty of landing and avoid inconvenience with the immigration inspectors at the ports of entry.

Nearly all American colleges have sessions lasting nine months of the year, usually from the third or fourth week in September to the third or fourth week in June. Some colleges have "summer schools" during the long summer vacation. These begin in July and last through part of August. The University of Chicago follows a system of its own, dividing the year into four terms of nearly three months each. A student may begin his studies at the commencement of any quarter. The University of California has a nine months session lasting from the middle of August to the middle of May; the summer school begins the second or third week in June and continues for six weeks. Students should plan their time of arrival to meet these dates.

V. *Securing information.*—Each college and university is always ready and willing to furnish information about its special requirements for entrance, its courses of study, laboratory and library equipment, and conditions of residence. Such information is usually compiled into an annual calendar or register, and is distributed free of charge. A letter addressed to the secretary or the registrar of any university or college will secure the forwarding of a copy of the calendar. Should further information be desired upon specific points the secretary or registrar will see that it is furnished.

Two other sources of information are open to Chinese students. The secretary of the Chinese Students' Alliance of the Eastern States, or the secretary of the Pacific Coast Chinese Students' Association, will be glad to correspond with students who expect to come to the United States, and the first-hand knowledge which they have of the colleges within their sections of the country will render their suggestions invaluable. In addition, the Bureau of Education in Washington will answer inquiries upon this subject addressed to that office by interested persons. A letter to the Commissioner of Education, Washington, D. C., is sufficient.

UNIVERSITIES AND COLLEGES SHOWING PROVISION FOR CHINESE STUDENTS.

The Bureau of Education, in order to ascertain what provision has been made for Chinese students in the various colleges and universities of the United States, sent a circular letter to about one hundred institutions asking for answers to the following questions:

1. Have students from China at any time attended the institution under your direction?

2. Would proof of equivalent attainments, including a preliminary knowledge of English, be accepted in the case of such students, in lieu of the usual admission requirements or examinations?

3. What special inducements does your institution offer in the way of scholarships available for Chinese students, or fraternities or societies open to them?

4. What facilities in the way of summer sessions or special courses of study for such students are possible under your plan of organization?

5. What would be approximately the annual expense to each student—for tuition; for living expenses?

6. What residence accommodations could be secured by Chinese students during the terms and during vacation?

7. What special care would be exercised over the welfare of such students?

8. Other information that may occur to you as bearing upon the subject, including the title of any handbook issued by your institution giving fuller details of interest to Chinese students.

A selection from the answers is offered below, tabulated according to the alphabetical order of States.

CALIFORNIA.

University of California, Berkeley:

1. Yes; a large number. For the year 1907–8 there were 9 enrolled. For the summer session of 1908, 19 registered.
2. See page 120.
4. Summer session, June and July.
5. a, $20; b, about $400.
6. In private families. Some of the Chinese students live at a clubhouse of their own.
7. The department of oriental languages is charged with the special care and guidance of Chinese students.

Leland Stanford Junior University, Palo Alto:

1. Yes; several from time to time. Three during 1907–8.
2. See page 120.
4. Summer courses in biology.
5. a, $20 for registration; b, from $300 to $400.
6. Dormitories and private families.

University of Southern California, Los Angeles:

1. Yes.
2. Yes; but the knowledge of English should be sufficient to enable the student to take notes at lectures.
3. Free tuition to students preparing for missionary work.
4. Summer school of six weeks.
5. a, $67; b, $150.

Occidental College, Los Angeles:

1. Yes.
2. Yes.
3. One-half tuition would be remitted.
5. a, $50; b, $18 per month.

Pomona College, Claremont:

1. Yes; two at present.
2. We are disposed to be very lenient in this respect.
5. a, $90; b, $200 to $250.

Throop Polytechnic Institute, Pasadena:

1. One.
2. Yes.
5. a, $85 to $100; b, $275.
6. Dormitories and private houses.

COLORADO.

University of Colorado, Boulder:

1. Yes.
2. Yes.
4. Summer school.
5. a, arts $12, engineering $12, medicine $52, law $42; b, lowest estimate $4.50 per week.

CONNECTICUT.

Yale University, New Haven:

(1) We have had a large number of students from China at Yale. During this past year (1907–1908) there has been an enrollment of about 25. Among the men of distinction who have graduated in the past years have been Jeme Tein Yow, of Peking, and Yu Chuan Chang, who passed first in the great examinations in Peking two years ago. A list of the Yale men in China was published some few years ago.

(2) The only change that we make in entrance requirements in the case of Chinese students is that a knowledge of the Chinese language and literature is accepted in place of the Greek requirement or its alternatives in the academical department, and the substitution of Chinese for Latin in the scientific school. We make a special point of emphasizing the importance of a good knowledge of English before admission. Degrees from representative Chinese institutions, such as St. John's College, Shanghai, and Tientsin University, are accepted for admission to the graduate school, as would be the degrees of American institutions of rank.

(3) We have at present two Williams scholarships at $100 a year. In addition, special scholarships have been awarded from time to time. For instance, a few years ago one graduate of the university stated that he would be responsible for meeting the tuition charges of ten Chinese students.

There is a special organization of Chinese students. There is also a Cosmopolitan Club which has members from all the different na-

tionalities represented at the university. Occasionally Chinese students are elected to the regular undergraduate fraternities. This is true, for instance, in the case of Ponson B. Chu, of next year's senior class in the college.

(4) We have no special summer session that would be of use to Chinese students.

We have several professors in the university who are specially interested in the Chinese. F. Wells Williams, who was born in China, is a son of Wells Williams, the author of the Middle Kingdom. Prof. Harlan P. Beach was for many years a missionary in North China. These both give instruction on various problems of the Far East.

(5) The cost of tuition in the various departments is from $155 down. A large number of scholarships and fellowships are available to students of character and capacity. Good board can be secured at the university for about $4 a week. Rooms vary in price; I presume that most of the Chinese students pay about $2 per week for a room.

(6) Chinese students would be admitted to university dormitories on the same conditions as all other students.

(7) There is a distinct esprit de corps among the Chinese students at the university, and probably a rather unusual interest in China and the Chinese. This is partly due to the fact that Yale graduates have founded a collegiate school which they hope to develop later into a university, at Changsha, the capital of the province of Hunan.

Following is a copy of a letter with reference to entrance requirements in the academic department, written a year ago (January, 1907) by the dean of the college to the president of St. John's College, Shanghai.

Our committee on admission has examined the catalogue of St. John's College in order to decide on what terms graduates of that college may be received into the academical department of Yale University. I am directed to say to you that students who have taken the full four years' course (not the mixed course) in the western department of the school of arts and sciences and have received the degree of bachelor of arts may enter our junior class on the presentation of their diplomas, without examination, with the understanding that they devote themselves during junior and senior years mainly to history and language. I understand this to mean that more than one-half of their work here should be in these two groups of study, and the languages intended are French, German, English, and Latin. This would leave a fair amount of time for other subjects.

DISTRICT OF COLUMBIA.

George Washington University, Washington:

1. Yes.
2. Faculty action is taken upon each application for admission.
5. a, $150; b, $25 to $30 per month.
6. Dormitories for women only. Men in private houses.

IDAHO.

University of Idaho, Moscow:

1. One.
2. The student would be permitted to enter any class in any subject for which his previous education might be regarded as sufficient preparation.
5. a. Free; b, $250.
6. Private houses.

ILLINOIS.

University of Chicago, Chicago:

I. So far as appears from our records of attendance, Chinese students have been in residence at the university as follows:

Year.	Students.	Year.	Students.
1892-1899	0	1904-5	3
1899-1900	1	1905-6	5
1900-1903	0	1906-7	8
1903-4	2	1907-8	8

II. In reply to the second question, the examiner for the colleges makes this statement:

> The university has been liberal in interpreting admission requirements for all foreign students. Since some of the admission requirements are prerequisite to further study, not all can be replaced by "equivalent" attainments in other lines. English, at least one European language, history (English and United States), and mathematics (algebra and geometry) should be considered as necessary.

III. The Reynolds Club, an organization like the Houston Club of Pennsylvania and the Harvard Union, is open to Chinese students as to all other members of the university. Phi Beta Kappa, to which admission is strictly on the basis of scholarship, has included in its membership Mr. John Yiubong Lee. Departmental clubs, such as the Philosophy Club and the English Club, are, of course, open to Chinese as to all other members of the university. Recently a favorite in the chorus of the comic opera produced by the Blackfriars was a young Japanese student. The faculty of the physics department includes a young Chinese student who took his preparatory work at a university secondary school, Morgan Park Academy, and his college work here at the university. Mr. Y. T. Wang is a docent in Chinese, offering certain elementary courses in that language. All of the Chinese students in the university seem to belong to the Chinese Students' Alliance of the Middle West.

IV. The summer quarter is a regular part of the academic year in our institution. No special provision has been necessary for the large number of Filipinos and Japanese who attend during the summer; neither has any special provision been necessary for the Chinese

students. When these students have not been prepared in studies prerequisite to college work, they have been able to make up this work in the University High School.

V. Tuition amounts to $40 per quarter; in the law school the tuition is $50 per quarter, and in the medical school it is $60. The estimate of living expenses as given in the various college catalogues seems to be too low. Many difficulties have arisen from students not being able to keep within bounds of the estimates of these catalogues; this has happened very often, not only here, but at other institutions as well. Parents can not understand why the university allowance when labeled "liberal" is not liberal at all, and very often the student is placed in a very embarrassing situation. This would be particularly true of all foreign students. On the basis of reports to me from some of our Chinese students, I suggest that $500 be allowed for living expenses for the year. A man living carefully can keep within this sum. The circular entitled "Assistance to students" explains certain ways in which our Chinese students, like others, have earned their way through the university.

VI. The dormitories of the university are open to Chinese students. At the present time Middle Divinity House and Charles Hitchcock House have Chinese residents. Some five or six Chinese students attempted to live together in a flat. Because each was too busy, however, to keep house the venture failed. There is no reason why such a scheme can not be practicable.

VII. The Chinese students have generally taken care of themselves. Of course, like all other members of the university, they are assigned to a dean who has oversight of them. The presence of Mr. Lee and Mr. Wang, both above mentioned, will insure proper care of Chinese students in the University of Chicago.

Northwestern University, Chicago and Evanston:

1. Several, from time to time.
2. See page 120.
3. The university offers a large number of scholarships that will be available to Chinese as to other students.
4. A summer school in Evanston.
5. a, $100; b, $200.
6. Dormitories and private houses.

University of Illinois, Urbana:

1. About twenty in attendance.
2. Yes.
4. Summer session of nine weeks.
5. a, $25; b, $500 is not too much.
6. Private families.
7. The dean will undertake the special supervision of students when requested.

INDIANA.

Indiana University, Bloomington:

1. One at present.
2. Yes.
4. The summer session equals a term's work.
5. a, None but laboratory fees, about $40; b, $300.
6. Private houses.

Purdue University, Lafayette:

1. Yes; two at present.
2. Yes; if we were satisfied that the candidates had the strength and equipment to undertake the work successfully.
5. a, $60; b, $300.
6. Private houses.
7. If desired, a member of the faculty could be assigned to such duty. Regular faculty advisers are assigned to all new students.
8. Purdue University is a scientific and technological institution. The faculty would welcome in limited numbers students from China.

De Pauw University, Greencastle:

1. Yes; two last year.
2. Yes.
4. Summer school.
5. a, Free for Chinese students; b, $250 the lowest.
7. Yes.
8. Chinese students are heartily welcomed to the university. Those we have had hitherto have been happy in their association and work.

Rose Polytechnic Institute, Terre Haute:

1. No.
2. Yes.
5. a, $75; b, $300–$450.
6. Private houses.

IOWA.

State University of Iowa, Iowa City:

1. None in recent years.
2. Yes.
4. Summer session of six weeks.
5. a, Free; b, $225–$300.
6. Private houses.
7. Faculty advisers for every group of 10 or 15 students.
8. There are a number of foreign students here. We would be glad to receive a limited number of Chinese.

Iowa Wesleyan University, Mount Pleasant:

1. One student last year.
2. Yes.
5. a, Free; b, $150.
6. Private houses.

Iowa College of Agriculture and Mechanic Arts:

1. One at present.
2. Student must present the equivalent of 30 secondary school credits. The following are required: Algebra, 3; plane geometry, 2; English, 6; history, 2; foreign language, 4. The latter may be waived under certain conditions. In all cases foreign students, as well as others, should submit all credits before entrance.
3. We have a number of scholarships in agricultural science courses, open to all on scholarship competition or assignment of faculty on basis of scholarship.
4. No summer sessions as yet.
5. a, $50; b, about $300 to $400.
6. Same as other students, in rooming or boarding houses or in private families.
7. We have not found it necessary to extend any special care to foreign students. They do quite as well as native Americans.

KANSAS.

University of Kansas, Lawrence:

1. No.
2. Yes.
4. Summer session of six weeks.
5. a, $30 to $45; b, $200.
6. Private houses.

MARYLAND.

Johns Hopkins University, Baltimore:

1. One, who is still in residence.
5. a, $150; b, $5 a week moderate.

MAINE.

University of Maine, Orono:

1. Yes.
2. Yes.
3. Summer session of six weeks.
5. a, $80; b, about $200.
6. Dormitories.

MASSACHUSETTS.

Harvard University, Cambridge:

1. Few until 1906. Twenty-three students in all.
2. See page 120.

Harvard University, Cambridge—Continued.

3. The students now here are having their tuition and traveling expenses defrayed in part by a subscription of $10,000 raised in Boston and offered to the Chinese Government in 1905–6.
4. If the need exists we can offer, and have offered, special language courses for Chinese students. Hereafter there will be a special "foreign" section in freshman English.
5. a, $150 to $175; b, $350 and upward. (See p. 176.)
6. In term time, dormitories and private houses: in vacation, private houses.
7. Each would be assigned to some instructor, who would give advice and interest himself in the student personally.

Massachusetts Institute of Technology, Boston:

1. Yes. Several students from China are attending the institute at the present time.
2. See page 120.
4. All courses in our summer school are open to students who are prepared to take the work.
5. a, $250; b, $400 to $600.
6. The dean has an extensive list of desirable residences and boarding places and is glad to assist students in securing suitable accommodations.
8. We shall be glad to send any of our publications to those who may be interested in them.

Amherst College, Amherst:

1. Yes.
2. Probably.
5. a, $110; b, $450 to $600.
6. Dormitories and private houses, the latter exclusively during vacation.
7. None.

Boston University, Boston:

1. Yes.
2. Chinese is recognized as a study of collegiate grade and credits awarded accordingly.
5. a, $130; b, from $5 per week up.
6. Private houses in Boston and the suburbs.
8. The school of theology has enrolled many foreign students and has always been generous to them.

MICHIGAN.

University of Michigan, Ann Arbor:

1. Yes; we have several here now.
2. We require the same preparation for them as for others.

University of Michigan, Ann Arbor—Continued.

4. Summer sessions, in which some deficiencies in preparation can be made up.
5. a, $25 for matriculation, $40 to $65 for tuition; b, $400.
6. Private houses.

MINNESOTA.

University of Minnesota, Minneapolis:

1. No.
2. Yes.
4. Summer session of six weeks.
5. a, $50; b, $350.

MISSOURI.

University of Missouri, Columbia:

1. One.
2. Yes.
5. a, free; b, from $3.50 to $5 per week.
6. Dormitories and private houses.

NEBRASKA.

University of Nebraska, Lincoln:

1. Yes.
2. Yes.
4. A summer term.
5. a, $20 the first year; b, $300, but many students spend three or four times that amount.
6. Private houses.
7. They would, if desired, be placed under the special charge of their advisers.
8. We have many foreign students here who seem to enjoy the university.

NEW JERSEY.

Princeton University, Princeton:

1. Yes.
2. No.
5. a, $150 to $160; b, board $198, room $108 to $180, other fees $14.

NEW YORK.

Columbia University, New York City:

(1) A great many Chinese students have attended Columbia University since 1902–3. There were nine in residence in 1906–7.

(2) Apart from the regular collegiate examinations in English, the university has no formal examinations to test the knowledge of foreigners. No student, however, who understands enough English to profit by instruction need fear embarrassment on this score.

Columbia University, New York City—Continued.

(3) In the award of the four university scholarships (i. e., for post-graduate work) preference is given to Chinese students nominated by the Chinese minister at Washington. At least one Chinese student at Columbia University is a member of a secret society, and, so far as the university knows, there is no restriction against them in any of the student organizations.

(4) At Columbia University students can take advantage of the summer session, at which there were registered 1,510 students in 1908. The university has also a well-organized department of extension teaching. Of particular interest to Chinese students is the existence at Columbia University of an endowed department of Chinese, the head of which is thoroughly familiar with the needs of Chinese students.

(5) See page 161.

(6) The university residence halls for men are open both during the academic year and the summer session. At least two Chinese students live in the dormitories.

(7) All the machinery of student supervision and assistance is at the service of all students alike. The head of the department of Chinese is always glad to give personal attention to the needs of Chinese students.

(8) The large Chinese population in New York City, the number of Chinese objects of art in our museums and galleries, the fact that the chief offices of most of the foreign missionary organizations are in New York, and in particular the existence of a special department of Chinese at Columbia, should all be of interest to Chinese students. Any of our academic documents will be gladly sent to inquirers, and we have under consideration the preparation of a special pamphlet for the information of Chinese students.

New York University, New York City:

1. Yes; many during the last 20 years.
2. Yes. We admit on a certificate to be furnished by the school last attended by the applicant, showing the branches completed, or equivalent for the same.
4. A large summer school of some 600 students.
5. a, $100; b, $400 to $600.
6. College residence halls.
7. We appoint a professor to be special adviser to each student.

Colgate University, Hamilton:

1. Yes.
2. Yes, if they were of such a character as to form a reasonable preparation for such courses as we have to offer.

Colgate University, Hamilton—Continued.

5. a, $60; b, about $300.
6. Dormitories and private houses.

Cornell University, Ithaca:

1. Yes.
2. Yes.
4. Summer session.
5. Expenses as follows:

PAYMENTS TO THE UNIVERSITY.

Annual Tuition.	*Regular.*	*Special.*
Graduate Department (General)	$100	----
Graduate Department (Architecture)	125	----
Graduate Department (Engineering)	150	----
College of Arts and Sciences	100	$125
Medical College	150	150
Veterinary College	100	125
College of Agriculture	100	125
College of Architecture	125	125
College of Civil Engineering	150	150
Sibley College	150	150

The $100 tuition is payable $55 at beginning of first term and $45 at beginning of second term; the $125, $70 and $55; the $150, $85 and $65; in the Medical College in New York City, the entire fee is paid at the beginning of the year.

These fees must be paid at the office of the treasurer within twenty days after the registration day of the term announced in calendar.

Tuition is free to students with state scholarships, to New York State students in the State Veterinary College; to students pursuing the prescribed course in agriculture and intending to complete that course; and to special and graduate students in agriculture taking at least two-thirds of their entire work in subjects in the State College of Agriculture.

Any student who has received free tuition under the above regulations and who desires to change to a course for which tuition is charged, must first pay to the treasurer of the university the tuition fees for the full time spent in the free tuition course. For further fees see University Register.

A *matriculation* fee of $5 is charged to all students on entering the university, except for summer session.

The graduation fee for the first degree is $10, second degree $20.

OTHER EXPENSES.

The expense of text-books, instruments, etc., varies from $25 to $75 per annum.

The cost of living in Ithaca, including board, room, fuel and lights, varies from $4 to 10 per week. By the formation of clubs, students are sometimes able to reduce their expenses to $3.50 per week for room and board, and occasionally to even less than that amount.

Cornell University, Ithaca—Continued.

A fair estimate of the yearly expenses is from $300 to $500, but much depends on the student's personal tastes.

Rent of furnished rooms, fuel and lights, in Sage College and Sage Cottage, which are *exclusively for women*, varies from $25 to $300 per year. The cost of board is $4.25 per week. Both buildings are warmed by steam, lighted by electricity, and in most cases, the sleeping apartment is separated from the study. Letters of inquiry in regard to board and rooms at Sage College and the Cottage should be addressed to Mr. G. F. Foote, Business Manager of Sage College, Ithaca, N. Y.

6. Private houses.

Syracuse University, Syracuse:

1. Yes.
2. Probably no great change would be allowed by our faculty.
3. In our College of Liberal Arts we would give scholarships paying $60 a year, leaving $48 to be paid.
4. Summer session of six weeks.
5. a, $48 (see 3); b, from $300 to $450.
6. Private houses.
7. Special arrangements would be made if necessary.

Rensselaer Polytechnic Institute, Troy:

1. Yes, we had three last year and more entered in September.
2. Yes.
4. Special courses in shop work and surveying.
5. a, $200; b, $5 to $9 per week.
6. Dormitories and private houses.

NORTH DAKOTA.

University of North Dakota, Grand Forks:

1. No.
2. Yes, if their attainments were such as would enable them to pursue our courses with profit.
4. Summer session of six weeks.
5. a, Free; b, $200.
6. Dormitory and private houses.

OHIO.

Western Reserve University, Cleveland:

1. Yes, two in the Medical College.
2. It is probable that a liberal interpretation would be given of requirements for admission.
5. a, $100; b, $300.
6. Private houses.
7. The students would be put under the special charge of an individual officer.

University of Cincinnati, Cincinnati:

1. No.
2. Yes.
5. a, $90 to $100; b, $160 to $250.
6. Private houses.
7. Some fair and rational special oversight would be instituted.

Ohio Wesleyan University, Delaware:

1. Yes.
2. Yes, for purposes of assigning rank. But deficient studies would have to be made up before graduation.
4. Summer session of six weeks.
5. a, $60; b, $150.
6. Private houses; board in student clubs.

Case School of Applied Science, Cleveland:

1. No.
2. As far as possible. We should require them to have training sufficient to take up engineering studies.
4. Summer school from July 1st to August 15th.
5. a, $120; b, $200 to $250.
6. Private houses.
7. Each student has an adviser who looks after his work.

OREGON.

University of Oregon, Eugene:

1. No.
2. Yes.
5. a, Free; b, $350.
6. Private families.
8. The University of Oregon would be glad to welcome Chinese students.

Oregon Agricultural College, Corvallis:

1. No.
2. Yes.
5. a, $5; b, $250.

Willamette University, Salem:

1. Not in recent years.
2. Yes; proof of equivalent attainment would be accepted.
3. Special arrangements for scholarships might be made if necessary.
5. a, $50; b, $150.

PENNSYLVANIA.

University of Pennsylvania, Philadelphia:

1. Twenty-three at present (January, 1909).
2. The University of Pennsylvania will accept the credentials from accredited institutions in China and omit the usual

University of Pennsylvania, Philadelphia—Continued.

written requirements and examinations in all subjects covered by these credentials, when so decided by the entrance committee.

3. Chinese students are eligible to the scholarships open to all students. The fraternities and societies and the many student activities of the university are open to them.
4. In addition to the regular academic year, which begins upon the last Friday in September and ends upon the third Wednesday in June, we have a six weeks' summer school beginning early in July of each year. The circular of information containing the subjects offered at our summer school will always be mailed to any address upon request.
6. Accommodations excellent the year through. Several Chinese students now live in the dormitories; others in approved boarding and lodging houses; and these are open both during term time and during vacation.
7. Whenever requested, a member of the teaching body will cheerfully assume the care of watching over the welfare of any Chinese students who may come to us.
8. We are about to issue a circular in Chinese, prepared by our own students from China.

Haverford College, Haverford:

1. One.
2. We have not given a degree of recent years to anyone who entered our freshman class without examination. No decision has been reached to change this.
5. a, $150; b, $300.
6. College dormitories not open during vacation.
8. The Canton Christian College writes that it will send its students to Haverford. If the result is favorable we shall try to formulate definite plans for Chinese students in the future.

Lehigh University, South Bethlehem:

1. Yes; four.
2. Yes.
3. The university is now extending financial aid from funds at its disposal to Chinese students.
4. Summer sessions.
5. a, $60, arts and sciences; $100, chemistry; $150, engineering. b, college commons, $15 per month; college dormitory, $65 for single room, or $81 for half use of suite consisting of two bedrooms and a study room. This includes heat, light, care taking, and essential furniture. Board in the town can be had from $3 to $4 per week; rooms from $5 to $8 and $10 per month.

Lehigh University, South Bethlehem—Continued.

6. As outlined in 5 above.
7. Personal individual interest is exercised in the case of all students requiring help if sick, or advice if deficient in educational work.

RHODE ISLAND.

Brown University, Providence:

1. Several in the last few years.
2. See page 120.
3. Four scholarships were awarded to Chinese students last year.
4. Evening courses throughout the year, though primarily for teachers.
5. a, $150; b, $300 at least.
6. Dormitories in term time, otherwise private houses.
7. The president would depute some member of the faculty to have special oversight, if requested.

SOUTH CAROLINA.

University of South Carolina, Columbia:

1. No.
2. Yes.
5. a, $58; b, board from $12 to $15 per month. Unfurnished rooms in the dormitories are offered free, subject to a fee of $8 per year for care.
6. If students occupy rooms in the dormitories, they would be permitted to retain them in the holidays. There would be no difficulty in securing board in private families.
7. The authorities would do all in their power to promote the welfare of such students.
8. Columbia is the center of an extensive cotton-growing and cotton-manufacturing region. Chinese students would no doubt find it a convenient place to familiarize themselves with these industries.

TENNESSEE.

Vanderbilt University, Nashville:

1. Yes. Several have received degrees and now hold prominent positions in China.
2. Yes; equivalents will be accepted.
5. a, $100, not including laboratory fees; b, dormitory rooms, $30 to $45 per year; board, $13 per month, and in private families $20 per month.
6. See under 5.

TEXAS.

Baylor University, Waco:

1. No.
2. Yes.
3. Two scholarships for Chinese students, covering the amount of tuition.
4. Summer session of two months.
5. a, $60; b, about $15 per month at least.
7. Special help when needed would be given.

WEST VIRGINIA.

West Virginia University, Morgantown:

1. Occasionally.
2. To a limited and reasonable extent. Examinations for entrance are not required in cases where other adequate evidence is offered.
3. A few free scholarships are offered in cases of exceptional merit.
4. Summer session; special courses may be taken at any time during the year.
5. a, $25 to $50; b, $200.
6. Private houses.

VIRGINIA.

Washington and Lee University, Lexington:

1. Very rarely.
2. Yes.
3. We shall be willing to offer six tuition scholarships.
5. a, $85; b, $200.

University of Virginia, Charlottesville:

1. Yes.
2. Yes.
3. One scholarship is at the disposal of the China local chapter of the University of Virginia Alumni Association. Dr. E. L. Woodward, Nankin, China, is at present secretary and treasurer of this local chapter. The scholarship is available for the academic departments only.
4. The summer session may be used to make good any lack of preparation for entrance requirements.
5. a, $75 for academic departments; b, $165 at least.
6. Private houses.

Randolph-Macon College, Ashland:

1. No.
2. Yes.

Randolph-Macon College, Ashland—Continued.

3. Scholarships to the value of $75 would be offered in case of need.
5. a, $100; b, $350.
6. Rooms on the college grounds.

VERMONT.

University of Vermont, Burlington:

1. None.
2. Yes; if competent to take up studies with regular classes.
3. Five scholarships of $50 each would be offered for each class.
5. a, $80; b, $150 to $200.
7. Chinese students would be placed under care of special advisers.

WASHINGTON.

University of Washington, Seattle:

1. Two at present.
2. Yes.
5. a, Free; b, $200 to $300 a year.
6. Private houses.

Whitman College, Walla Walla:

1. Yes.
2. Yes.
5. a, $50; b, $166.
6. Dormitories.

WISCONSIN.

University of Wisconsin, Madison:

1. Yes.
2. Attainments equivalent to the admission requirements would be accepted in lieu of full examinations, provided preparation seemed adequate.
4. Summer session of six weeks.
5. a, $50; College of Engineering, $70; b, $4 to $6 per week.

SPECIAL COLLEGES FOR WOMEN.

(All the state universities are coeducational; that is, they admit women on the same terms as men. Many colleges other than state universities admit women on the same principle, as, for example, the University of Chicago and Leland Stanford Junior University. Among the colleges for women exclusively, the following sent replies to the questions of the Bureau of Education.)

Mills College, Alameda County, Cal.:

1. Yes, chiefly young girls.
2. Yes, such proof has been accepted.

Mills College, Alameda County, Cal.—Continued.

3. There are inducements in the way of scholarships and a large deduction of expense if necessary.
5. For tuition and living expenses, $500 a year.
6. All students are residents at the school.
7. Special and particular care would be taken of such students.

Mount Holyoke College, South Hadley, Mass.:

1. No.
2. Yes, to a certain extent.
3. Three scholarships of $125 each; after 1908–9, $150.
5. a, $150; b, $200 on the campus. Private families, $30 or more per month.
6. The college houses are closed for the summer, but lodging may be had in private families.
7. A particular effort would be made to oversee the work of Chinese students.
8. Several officers of the college remain in South Hadley during the summer, so that girls would not be left during the summer months without supervision. Chinese students would be gladly received.

Wellesley College, Wellesley, Mass.:

1. One is now in college.
2. Yes, special consideration is made in such a case.
3. Three such scholarships were established by the college at the time of the visit of the Chinese commissioners in 1906.
5. a, $175; b, $275.
6. Every care would be taken to secure suitable places of residence in Wellesley.
7. Some member of the faculty would act as adviser in each case.

Radcliffe College, Cambridge, Mass.:

1. None.
2. The same substitutions would be allowed as for the Harvard College entrance requirements, which see.
4. The summer school of Harvard is open to men and women alike.
5. a, $200; b, from $270 to $540 a year.
6. College dormitories or in private houses.
7. The officers of the college would extend all the help and assistance necessary for such students.

Simmons College, Boston, Mass.:

1. No.
2. Yes.
3. Scholarships equivalent to tuition would probably be open to a limited number.

Simmons College, Boston, Mass.—Continued.

5. a, $100; b, $300 for college year, $400 for whole year.
6. Dormitories during term and approved lodgings in vacation.
7. Under special supervision of the dean.
8. This institution is for young women only, and offers technical instruction in household economics, library science, secretarial studies, general science, and philanthropic work, together with the general academic studies needed as a basis.

Woman's College of Baltimore, Baltimore, Md.:

1. Yes, and one is in attendance at present.
2. Yes. We accept English as a "foreign" language, and regard work done in Chinese as similar to work done in our own fitting schools. Admission is acceptable by "certificate."
5. a, $150; b, $275.
6. There are four residence halls as dormitories, and some students spend the vacation in residence.
8. "It would please us to have Chinese girls in the college."

Vassar College, Poughkeepsie, N. Y.:

1. No.
2. The special cases would have to be referred to our faculty.
5. a, $150; b, $500.
6. There is no provision for students during the summer vacation.

Barnard College, New York City, N. Y.:

1. Yes.
2. Some exception would probably be made in favor of properly equipped students.
5. a, $150; b, $400.
6. Two dormitories open during term time and in the summer session. Otherwise private families.
7. Special care is exercised over students in the dormitories.

Randolph-Macon Woman's College, Lynchburg, Va.:

1. One at present.
2. Yes, provided the student were prepared in mathematics and able to study a modern language other than English in class.
3. Free tuition to those preparing for mission work.
5. a, $90; b, $500.
6. Students reside at the college.

REFERENCES TO CHINESE STUDENTS IN THE UNITED STATES.

American education for the Chinese. Outlook, 82: 387–88, February 24, 1906.

Baldwin, S. L. [Education of the Chinese in the United States] *In* National education association. Journal of proceedings and addresses, 1886. Salem, Observer book and job print, 1887. p. 216–21.

Chentung Liang-Chang, *Sir*. Early Chinese graduates. Yale alumni weekly, 15: 871–72, July 1906.

"Over fifty years ago first Chinese student graduated from Yale"; that graduate, Yung Wing, class 1854, succeeded in inducing the Chinese government to send 120 boys to the United States to be educated, "in the early seventies."

Gray, Mary Richards. Visit to a Chinese kindergarten. Elementary school teacher, 7: 214–19, December 1906. Illus.

Miner, Luella. Chinese students and the exclusion laws. Independent, 54: 974–79, April 24, 1902.

——— Exclusion of Chinese students from the United States. Outlook, 72: 984–88, December 27, 1902.

United States. President. Remission of a portion of the Chinese indemnity. Message . . . transmitting copy of an executive order signed . . . 28th day of December, 1908 . . . 11 p. 8° (60th Congress, 2d session. House of Representatives. Document no. 1275)

Walker, C. S. Army of Chinese students abroad. World's work, 13: 8471–74, January 1907.

Young, Charles S. Co-education of the races. *In* National education association. Department of superintendence. Proceedings, 1886. Washington, Government printing office, 1886 p. 96–103. (United States. Bureau of Education. Circular of information, 1886, no. 2)

CHINESE STUDENT PUBLICATIONS.

Chinese students' alliance, Pacific coast. Annual bulletin, August 1908. P. M. Jee, editor-in-chief, 21 Brenham Place, San Francisco, Cal. Bi-lingual, English and Chinese.

——— Report, 1905–6. P. H. Linn, acting English secretary. English and Chinese edition.

The Chinese students' monthly. volumes 1–3. 1905–8. (Published by the Chinese students' alliance of Eastern states, U. S. A. V. R. Wellington Koo, editor-in-chief, Columbia University, New York) 1905–08. 3 v.

The Dragon student. volume 1, 1904. (Published by the Chinese students' alliance of America. P. M. Jee, manager, 21 Brenham Place, San Francisco, Cal.) 1904. 1v.

Official organ of the C. S. A. Bi-lingual annual, English and Chinese. Illustrated.

The World's Chinese students' journal. volumes 1–2. (Published by the World's Chinese students' federation. E. 562, Burkhill Road. Shanghai, 1907–8. 2v. A bi-lingual bi-monthly, English and Chinese.

INDEX.