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Yours very cordially,
Edward P. Smith
The ceaseless stream of time flows on. To-morrow becomes to-day and before we realize it, has passed to yesterday. For twenty years young men have gathered here to profit from the teachings of those who are giving their life-work to the instruction of youth; have paused a moment and then have gone forth to fight with skill the brief battle of life. With many the conflict has been all too short, and some even, ere three years were passed at the Institute, have graduated from their earthly course out into a greater world beyond. So Death has come, taking now an alumnus, now a student cut down in his promising manhood, but never before in this score of years has his skeleton hand touched a member of the Faculty.

Conducting his recitations as usual, attending to his duties as an officer of the Institute, present at a meeting of the students to show his interest—these are the last scenes in the life of Dr. Smith which come before us. So sudden and unexpected the blow came that now after the lapse of a week it can hardly be believed, and many weeks will pass before its full seriousness will be felt.

Criticisms, many of them severe, have been made upon him, by those who have come under his instruction. Some of these were from students whose opinions have little value—those who have not cared to make the most of their opportunities and to whom his ideas of constant application and unceasing work were obnoxious. The rest were almost entirely criticisms not upon him as a teacher, but on the stress which he laid upon his own studies and the importance given to his course in the curriculum.

Queer as it may seem, this but shows his character, for the very fact that the prominence of his department was the cause of remark and even alarm from graduates in engineering, is a monument to the untiring energy and zeal which ever seems to have marked his labors in the Institute, and which has raised his department from almost nothing to the position which it now holds. He was placed in charge of a certain branch of work and he felt it his duty to make that as important and valuable as possible, and if his success was too great in the opinion of some, it was the result of a good fault. In his devotion to his special studies he leaves a worthy example even to his colleagues. He was accused of overcrowding the students under his charge. Idleness and carelessness, to be sure, he could not tolerate, but few of the men who were desirous of nothing but Mechanics, and have lamented the time spent on Political Economy, would be able to estimate
the full value of the mental training which his thoroughness must have produced. If the verdict of graduates long absent from the school may be considered, his principles could well be expressed by the words of that other Worcester teacher who used to say, "I would teach you so as to merit your good opinion ten years hence, rather than your favor to-day." In the students he had the most active and kindly interest, always striving to show them the opportunities for increased knowledge which were theirs. For many individuals he arranged special lines of outside reading and study and it was through his effort that several of the student societies were established. His fearlessness and faithfulness to what he considered the path of duty, commanded the absolute respect of all. He knew no hesitancy or equivocation. He struck his line and followed it true to his convictions, and from these elements in his character we all may profit.

He has passed out and closed the door of room 18 never to return, and there is gone from the Faculty one of its strongest members, from the Institute one of its staunchest and most loyal supporters and from the students themselves one of their ablest instructors and truest friends.

Next Saturday the annual field-sports of the Institute occur, and from interest thus far shown, give promise of being the most successful in years. Few colleges in the country have the use of such excellent grounds and track; the number of entries has been large and all that now is needed is a general attendance of enthusiastic students. Everyone should go. From the winners that afternoon will be selected the team which is to represent us at Springfield the 25th. Just where Worcester will come out that day is very hard to judge. The Athletic Directors although supplied with funds, have shown their usual enterprise in establishing a training-table, and we have the encouraging sight of athletes still dieting on roast pork. But in spite of all the difficulties under which our men labor, we ought to make a creditable showing as it is. The return of Dadmun means the half-mile for us and Fish is good for one of the jumps. We ought to enter a tug-of-war team this year for we have splendid material from which to select; a dozen or fifteen men now in training and two weeks more time. It is a very easy matter to enter one and it would give us a good chance for another first. Unless some dark horses are brought out, the prizes will be more evenly divided among the several colleges this year than last, which of course will be an advantage to us.

GRADUATE STUDY IN THE JOHNS HOPKINS UNIVERSITY.

"Is this the Johns Hopkins University that the newspapers have been a-blowin' about? Why, Trinity College, Dublin, would turn this into an academy!" Such, in tell-tale brogue, was the comment of a stranger who chanced to ask me to show him the University buildings, at the very moment when I was looking upon them for the first time myself.

No one, in whose mind an university has been associated with "scholarly repose," with spacious grounds, and with stately and venerable halls, can visit the Johns Hopkins without some feeling of disappointment. He finds nothing of the cloister here. Planted in the heart of a great city, its plain, business-like buildings are crowded into blocks bounded by narrow, ill-paved streets; stables, retail stores, a High School, an engine-house and a theatre are its immediate neighbors; a few yards of turf, and a brick-paved tennis-court, its campus.

The trustees of the Hopkins, in its first beginnings, looked out for men, rather than buildings. As heads of the various departments, eminent specialists were chosen, who have planned their laboratories to meet growing needs. Two old dwelling-houses, of the prosy Baltimore type, served as the cradle of the infant University. A small back-kitchen, now used as the students' post-office, was the first home of the department of physics, and here some of Prof.
Roland's most famous work was done. To-day—fifteen years later,—the new physical laboratory, by far the largest and best of the buildings, is badly crowded, and a separate laboratory for the study of electricity is one of the most imperative needs of the University. Such is an example, paralleled in several other instances, of departmental growth.

For some time the location of the University was considered simply temporary until plans could be prepared for building at Clifton, the beautiful country-seat of the founder, where he doubtless expected the University would arise. But experience soon brought the conviction that, whatever may be true for the college, the city is the place for the modern university.

The professional student of to-day, if he is to work with the greatest efficiency, must be where he can put his hands on his needed books and materials with the least possible loss of time. In meeting this requirement the location of the Johns Hopkins University is admirable. So accessible are all parts of the city that hardly any need can arise, however unexpected, which the student cannot readily satisfy. Splendid libraries are also at hand; the scientists' supplies are easily obtained, while within a few minutes' walk each student may find the room, the boarding-club, and the church of his choice. Nor should I neglect to say that the University is gradually elevating its environment. Within a year the most unsightly of the adjacent buildings will be torn down, to give place to a worthy central hall, to be devoted to "the fair humanities." The lack of a campus, also, is partly compensated by the athletic grounds at Clifton, and by the accessibility of the beautiful Druid Hill Park.

Until recently the Johns Hopkins was unique among American universities in that from the beginning, not incidentally, but primarily, it has been an institution for graduate students. From its first year, undergraduates have been in a decided minority, and to-day, three-fifths of the students connected with the University are "bachelors" in good and regular standing from college or scientific school, while of the remaining number many are special students, pursuing advanced courses in their chosen lines.

In this predominance of graduates are found some of the greatest advantages of student life at the Hopkins. In the first place the professors are enabled to devote their best energies to work with their advanced students instead of giving them what scraps of time and force are left over from teaching large elementary classes.

Again, the large body of graduate students forms a most stimulating environment for work. Among the undergraduates one finds students of much the same grade as in his own college. But the graduate students are an older and more mature company of men. Many of them have taught a year or two; long enough to have lost something of the Seniors' omniscience, and to have found out what they need most to study. So when they come to the University, it is with a definite purpose in their work. Many have not a "practical," bread-and-butter end in view, in their study, but whatever the goal, all recognize that it is to be reached through work. This student atmosphere is most inspiring.

Another very attractive feature of graduate student life in Baltimore is the diversity of one's associates. There surely is no such representative body of university students elsewhere in the United States. For example, in our class of forty-nine graduate members, which I have no reason to believe is exceptional in respect to its membership, there are, besides one Japanese student, men from twenty-three States and Territories. Of this number, only seven are from Maryland, nor do many of the others come from the adjoining States; on the contrary, those represented by more than one member are Illinois by four, Massachusetts and California by three each; Maine, Wisconsin, South Dakota and Missouri, by two each. A year's study in such a student world, where in class and in club men from so many sections are brought into intimate association, cannot fail to give a man broader views of American citizenship. It widens his horizon wonderfully. Natural science is cosmopolitan; generally speaking, its successful study is independent of the place where it is pursued, so that the chemist or physicist finds only an indirect and personal gain in being associated with colleagues from different sections. But it is men and institutions that form the materials with which the historical and social sciences deal, and for the student in these lines it is of direct and incalculable benefit to have his observatory so placed that all parts of his field are brought, in miniature, within his view. It goes without saying that a discussion of certain points in history and economics becomes of great interest where the opinions of the North, the South, and the West are presented in animated succession. Nor is such a discussion without interest as a study in the shades of American dialect.

Another advantage of study in Baltimore arises from the fact that the University is within an hour's ride of Washington. Accordingly it is enabled to keep in close touch with the scientific work carried on by the government. Frequent courses of lectures are obtained from eminent specialists. The student of politics can pursue his study at first hand. The Congressional Library, the riches of the National Mu-
The system of the Smithsonian Institute, and of the various departmental experiment stations and commissions are within easy reach. The student is also able to attend the great conventions of scientists, which more and more tend to meet at the national capital.

The Hopkins, itself, is rich in library facilities. Its own carefully selected library already numbers some 40,000 volumes, admirably distributed among the various departments, so that each student may find his library materials at hand. Within ten minutes' walk, too, are the immense collections of the Enoch Pratt Free Library and of the Peabody Institute, which has few superiors in this country as a working library for students. The privileges of these libraries are freely open, and access to two other important collections may be easily obtained.

Though many graduate students attend the Hopkins for a year or two to acquire a more general culture as a supplement to their college course, by far the greater number plan to derive from their study not merely a polish, but a broader preparation for their life-work. To give greater definiteness to their study, a course is usually planned leading to the degree of Doctor of Philosophy, which may be obtained after from three to five years of distinctively graduate study. Such a degree course is made up of a principal, and two subordinate subjects; for example, a man who wishes to make chemistry his "major," frequently combines with it, as "minors," mineralogy and geology.

A graduate student, who finds himself somewhat uncertain in the foundations of his chosen study, feels not the slightest hesitancy in reviewing it in the regular matriculate courses, in many of which the number of graduate students nearly equals that of undergraduates. In this way the student is enabled in his University study, to make his courses cover the whole range, from the elements of his science up to its most recent developments, while at the same time pursuing his own original research.

Many, perhaps most, of the graduate students have taught before coming to Baltimore, while of the two hundred and fifteen who have followed systematic courses and received the doctor's degree, eighty-seven per cent. have become teachers. In the fifteen years since the Hopkins was founded its specialists have become scattered over the whole land. At the recent Commemoration Day exercises, telegrams were read from three associations of young Hopkins "doctors;" one in Madison, Wis., consisting of nine members, Dr. Wm. H. Hobbs, '83, being one of the number; and a second, on the Pacific slope; most of its nine members being located in the University of California, or in the Leland Stanford, Jr. University.

Journalism claims not a few of the graduates, while quite a number have been attracted by governmental positions, as specialists in the employ of the various United States commissions.

As the graduate department of the Johns Hopkins University is a training school for specialists, it follows naturally that one's range of acquaintances outside of his own field of work is very narrow. Except as brought together in the boarding club or gymnasium, or at occasional social gatherings, there is little mingling of the students from different departments.

In the relations between professors and students there is more of directness and personal contact than is often possible in college. For each undergraduate student the President designates one of his principal instructors to act as his "adviser," who takes a special interest in the work of the students assigned to his charge, and gives them his cordial guidance. Each of the professors has his regular "consultation hours" in which any of his students may come to him freely for direction in their work, while at other hours the professors give generously of their time and experience.

In the various publications connected with the University, original work of merit readily finds its way before the public.

In method of instruction, the lecture and the laboratory, or "seminary," play a prominent part in all departments. Not the least interesting of the class gatherings is the weekly or bi-weekly seminary or journal meeting. Here, some special line of investigation is pursued by cooperative study, or advanced work is reported upon, while a sharp look-out is kept for any new books and magazine articles of special interest to the department in question.

Men who wish to supplement their Tech studies by advanced work, as a preparation either for the teaching or the practice of their favorite science, will find attractive opportunities in Baltimore. At present the courses most largely attended are those in chemistry and in history and political science, which number about fifty each. Physics and electricity, biology, geology and mineralogy attract many, while the languages, with mathematics and the new courses in meteorology offer strong inducements.

Grades of the W. P. I. find so many opportunities opening to them upon leaving Worcester, that thus far comparatively few have been willing to devote several years to further study, before entering upon their life-work. And yet, for many, graduate study would surely be, not only a delight, but also a paying investment, yielding large returns, if not in hard
money, at any rate in a firmer grasp of their own powers and in increased efficiency and enjoyment in their life-work.

Twenty years ago, it would have seemed strange, indeed, that New England colleges should send their graduates south of Mason and Dixon’s Line to pursue advanced studies. And yet, of the three hundred and twenty-five graduate students in the Hopkins to-day, one-tenth are from New England alma maters, and most of them are New Englanders by birth, as well as in education.

As one comes to know the University, its charm consists not simply in the eminence of its instructors, and the progressiveness of its methods, but also in the eager spirit of research which characterizes the whole institution.

In this community of workers, gathered from every part of the land, and reflecting the manifold phases of American citizenship, is found an environment well calculated to stimulate the student to the highest development of his powers.

GEORGE H. HAYNES.

EDWARD PAYSON SMITH, Ph.D.

Dies suddenly of Heart Disease.
Sketch of his life.

Edward P. Smith, Ph.D., professor of modern languages and political science for twenty years at the Institute, died very suddenly at his home Monday, May 2nd, of heart disease. For several weeks Prof. Smith had not been in the best of health but attended to all his duties to the very last and even on Monday evening was present at the meeting of the W. M. E. society where he was first seized with the trouble which in about three hours caused his death.

Dr. Smith came of an old New England family, one which was noted for its education and interest in educational matters. His father, Samuel Smith, of Middlefield, was an excellent scholar and a successful teacher and gave a liberal education to all his children. Dr. Smith was the youngest of ten children and was born in Middlefield, January 20th, 1840. He pursued his academic studies at home under his brothers and sisters, in Lewiston Academy, Penn., and with his brother Dr. Judson Smith, now Foreign Secretary of the American Board but then a professor at Oberlin College, who fitted him for Amherst. This college he entered in 1861. His work there was entered upon heartily and performed with the same thoroughness and accuracy that marked his whole life. He considered it his duty to apply himself earnestly and faithfully to his books and he made for himself an enviable record obtained only by hard work. His scholarship was of the highest order as may be seen by the prizes which he won. While a Sophomore he took first prize in Mathematics, in his Senior year the first prize in both Latin and in Essay and became a member of the Phi Beta Kappa, a distinguished honor. He also divided the first prize in Greek with Prof. Tyler of Smith College and was one of four who attained to the rank of valedictorian and drew lots for the honor. Failing to draw the valedictory he delivered the Commencement oration for his class. He was at one time Monitor and in the Junior year an editor of the Amherst Olio.

He was an honored and esteemed member of the Psi Upsilon Fraternity and in it made the acquaintance of G. Henry Whitecomb, Esq., now trustee of the Institute, which was pleasantly continued during his residence in Worcester.

Dr. Kimball, ’66, and Dr. Eaton, ’68, were also in Amherst with Dr. Smith and Rev. D. O. Mears, D.D. was a classmate.

At that time there were no athletics at college but in the gymnasium where all students were required to practice Dr. Smith proved himself much more than an average athlete for the same reason that he excelled in his studies.

After leaving college he immediately accepted the position of principal of the Hinsdale High School which he held for one year, giving it up in order to study theology which he pursued during the year 1866–67 in Oberlin, and during 1867–68 at Andover Theological Seminary. In the fall of 1868 he married Miss Julia Mack Church, who with four children, a daughter preparing for college and three young, sons now survives him.

The next two years 1868–70 he passed as teacher of Latin and Greek at Williston Academy, Easthampton, Mass. In 1870 he went abroad for travel and study. Most of his time for a year was now spent at the University at Halle, Germany. On returning to America he was licensed to preach in Boston, but was soon again in Europe for four months of further study in France. On again returning to America he entered upon the duties of the Professorship at the Worcester Polytechnic Institute which he held to the day of his death. During the year 1887–88 he was granted leave of absence and pursued a course of study at Johns Hopkins.

By the laws of the University, however, his degree could not be conferred upon him then as his residence in Baltimore had not been sufficiently long, and he secured his degree of Ph.D. by passing examinations at Syracuse University at Syracuse, New York.

Such in brief is the outline of Dr. Smith’s life. Although his earlier education was designed to
fit him for the ministry he gave that up on coming to Worcester, but at various times however, ably and acceptably supplied pulpits of Worcester and vicinity. His whole life work was thrown into his office as professor.

Dr. Smith's mental ability and intellectual worth was early recognized by Dr. Sweetser of Worcester, a man known through New England for his wisdom and knowledge, who was then a trustee of the Institute. It was owing to his recommendation that Dr. Smith came to Worcester. The Institute was then in its infancy and the department of which Professor Smith was the head is practically of his own production. During the Junior and Middle years French was studied and in the Senior year students were given option of continuing French or of taking up German. Changes have gradually been made so that now French is necessary for admission to the Institute and all the time is devoted to a thorough and excellent drill in German.

But it is in the Department of English Literature and Political Science that the hand of Dr. Smith has most been felt. He found a fragmentary and incomplete course in literature taught by Prof. Thompson in addition to his numerous other duties, and from this he built up under considerable opposition the present course. This was his creation and remains as his monument, and the student who enjoyed his instruction came nearer to receiving a liberal education than possible at most scientific schools. The New Course was established mainly through his instrumentality and thus the scope of the Institute broadened to a marked degree in that it is now possible to obtain here a general scientific education without devoting so much time to a specialty.

A large proportion of those who attend the Institute come to receive an education which shall be distinctly practical and technical, and seem to desire and imagine that their time should be almost exclusively devoted to mechanics, mathematics, chemistry and those studies which aim to fit and educate the student for some particular profession or scientific work. Anything which is not of this nature is to them of little use and of little practical value. They forget that the true purpose of all education is to produce a completely trained man, not only in respect to the hand and eye but to the mind, a man who shall have all his God-given talents thoroughly developed and capable of use, a man who, if he enters upon scientific or engineering work shall not only have the power of originating ideas in his chosen line but shall be capable of imparting those ideas in a comprehensible and intelligent form to his fellows that they too may have the advantage of his ability. Dr. Smith never forgot this fact.

He strove continually to develop in the minds of the young men under his charge that appreciation of all that is noble and inspiring in literature and history, that recognition of the reason and right for fame and honor of such men as Goethe, Schiller and Shakespere, that longing for a more highly developed and quickened intellect, that understanding of the customs, laws and rights of men and nations, and all that which is necessary for an educated man. To develop in young men character, and to cherish and nourish its growth, was his pleasure, and he took delight in noting the change in their mental condition as they passed through his class-room and under his instruction. His hand and heart were always ready to aid the student who came to him with the earnest desire to learn, even though he was dull, stupid, and slow to perceive. His active mind was ever ready to afford information to the interested seeker for knowledge, and many an hour has he spent outside of his school work in helping and instructing his pupils in their own private research. This is shown by the interest he took in many organizations of the students. The Y. M. C. A. owes a debt of gratitude to him for his support and help. The Camera Club which has taken such high rank among similar clubs, and has been the occasion of an infinite amount of pleasure and profit to its members, was his conception. The Historical Society which he also originated and founded, and which for the past two years has been the means of awakening a great deal of interest among many of the students in English Literature, can never forget the name and influence of the man who spent time and study in raising it to a high standard, and in making its work valuable to the members.

His great aim was accuracy and thoroughness in everything and he had little patience with the slothful and indolent, and superficiality was his detestation. The man who could learn and would not, found little pleasure with him, but to those who were animated by a desire for learning, who recognized and appreciated the rare powers and gifts of mind and intellect of Dr. Smith, his death will come as a severe blow. Many of the Alumni, especially those who have studied at higher institutions, will feel the loss of a conscientious and sympathetic teacher.

From boyhood up he had been in the habit of making up his mind to what he considered right and best and then with all the strength of his body and will, carrying to completion his ideas. Sometimes this dauntless pursuit of what he desired produced enemies and called down upon his head indignant and cutting
words, but he did not yield and pursued his purpose generally to a triumphant end.

His conscientious attachment to his Institute work gave him little time for outside literary employment. Many of his friends had hoped to see published the fruit of his pen, but aside from several addresses, noticeably one delivered at the centennial of his native town and an essay on the Constitutional History of the U. S. in the Formative Period, he gave little to the press.

He took an active interest in the affairs of Union Church of which he was a member and deacon for six years.

If it were possible to sum into three words the characteristics of his life those words would naturally be conscientiousness, accuracy and thoroughness.

To his little family who have always looked up to him and found in him strength and care must the sympathies of many friends go forth in this hour of sorrow and sudden bereavement. To mortal eyes it seems a mysterious Providence that he should be stricken down in the prime of life and usefulness, and we can only believe and trust that God in his infinite mercy has done what is wise and best.

The News at the School. The Funeral.

As soon as President Fuller learned of the death of Dr. Smith, a notice was posted asking the attendance of all students at the usual chapel exercises. The silence which pervaded the room and the sober faces of Faculty and students, betokened the surprise and sorrow felt at the sad news. The exercises took the form of a brief memorial service, Dr. Fuller reading appropriate passages of scripture and offering a feeling prayer, after which the students were dismissed for the day and the Institute closed out of respect to the memory of Dr. Smith. At a meeting of the Faculty held at nine o’clock, a committee of three, consisting of President Fuller and Profs. J. E. Sinclair and A. S. Kimball, were appointed to draw up resolutions. On recommendation of this committee the Faculty have adopted the following minute with respect to the late Dr. Edward P. Smith:

We the members of the Faculty desire hereby to record our recognition—of his eminent services to the Institute, of his breadth of view in the consideration of plans for its general work, of his ambition for its prosperity, of his unremitting industry, of the stimulus of his intellectual energy, of the vigor and thoroughness of his instruction, of his high standard of character for himself and others,—and to express our deep sense of personal loss in this sudden bereavement and our profound sorrow because of it.

We would also express our appreciation of the worth of our late associate as a neighbor and friend, and our sincerest sympathy with his family in their affliction.

The Seniors met and appointed Messrs. E. L. Mundin, C. O. Smith, G. F. Freed, M. J. Lyden and F. B. Knight, a committee to draw up resolutions for the class, and Messrs. Collier and Hammond a committee to select a suitable floral design for the funeral.

The resolutions submitted were adopted by the class and are as follows:

WHEREAS, God in His divine wisdom has seen fit to remove from our midst, our faithful instructor and friend, Dr. Edward P. Smith.

Be it resolved, That the Senior Class has lost not only an efficient instructor, one who labored constantly to inculcate that high ideal of culture which he himself possessed, but a most faithful friend.

That as the years pass by, we shall realize more and more the great benefit of his instruction and better appreciate that example of faithfulness and fidelity which his life gave to us.

That from the Worcester Polytechnic Institute has been taken one of her most honored and respected instructors, and one whose distinguished attainments in his profession have increased the influence and usefulness of the Institute beyond our estimation.

That we extend to the family of Dr. Smith, our heartfelt sympathy in this sad hour of bereavement.

That a copy of these resolutions be sent to the family, and they be published in the W P I and the daily papers.

The Middle class also held a meeting and voted to send a floral tribute accompanied by a letter of sympathy to the bereaved family. As it was the wish of the family to have the funeral at the residence on Boynton St., it was impossible for the students all to attend and hence Messrs. Kent, Coombs, Baker, Bucklin, Bingham, Andrews, Wright and Heard were selected to represent the class.

The funeral took place Thursday afternoon at 3:30. The students who desired were granted an opportunity of viewing the remains just previous to the exercises and a number availed themselves of the privilege of beholding for the last time the features which had been so familiar to them in their every day work.

At the appointed hour the rooms were filled with immediate relatives and personal friends of the deceased and prominent citizens of Worcester. The exercises were very simple and appropriate. A quartet sang, after which Scripture selections were read by Rev. W. V. W. Davis, D.D., of Union Church. The hymn, "I'm but a stranger here-Heaven is my Home," was rendered by the quartet. The remarks of Rev. Dr. Davis were brief and directed to the consolation and encouragement of the relatives and friends. They emphasized the influence of Dr. Smith as a father, instructor and Christian man. President Fuller read a very appropriate eulogy, after which Rev. Dr. Davis read, and the quartet sang a favorite hymn of Dr. Smith’s commencing, "For all the saints who from their
W. M. E. SOCIETY.

A Start under Favorable Auspices.

The first regular meeting of this society was held in the model room at the Salisbury Labs., May 2. Members of the Faculty present were Drs. Fuller, and Smith, Profs. Alden, Sinclair, Gladwin, and Supt. Higgins. From the alumni came Instructors Phelon, Smith and Rice, Messrs. Tolman, '71, Chase, '77, Slater, '81, Wyman, '82, Edwards, '83, Bird, '87, Rockwood, '88, and Davis, '91. Members of '92 and '93 raised the number present to something over 40.

Pres. Fish called for order, after which Sec. Alden read the records of the two meetings for organization; also a list of charter members. He then, upon a vote of the house, cast a ballot electing 24 new members.

Prest. Fish then gave a short address. It seems to be the idea he said that each newly elected president shall give his views as to what this society ought to do. Oratorical generalizations are not looked for; we need practical instruction from alumni of experience. Another thing, we ought to make excursions. We are in a region famed for its manufactures. The students ought to see what others have done. If some one would only conduct the excursions they would soon become a valuable feature; why not this society? Lectures by outsiders are good, but one at Commencement, and one other beside should suffice. "Home talent" ought to be employed. Advice from the alumni as to electricity vs. mechanical engineering, would be particularly valuable to the Middlers. There is something about this Institute which has a good influence on the alumni.

Mr. W. W. Bird, of Cambridge, then read a paper on "Internal Stresses in Cast Iron due to Shrinking." As an illustration, he spoke of a cast pulley. The rim cools first being thinner. The hub tends to pull away from the arms, the arms from the rim.

This is a subject of great importance, and has received too little attention. There are three evil effects consequent upon these stresses: warping or twisting, breaking, and weakening, rendering a break likely. Fly wheels often burst when there are no outward signs of weakness. This is due to internal stress.

The mixture and melting of cast iron need not be touched upon. A fact of importance is that cast iron expands at the instant of solidification. The force of this expansion is five or six tons. The mould is of necessity cooler than the molten iron. As the iron begins to set, it tends to form layers of octohedral crystals perpendicular to the cooling surface, hence if there be sharp corners, distinct lines of breakage will be seen when the direction of these crystal planes vary.

There are three rules for use in designing patterns. First, make the distribution of heat as nearly even as possible, maximum surface, minimum volume in the thick parts, and vice versa. Second, avoid square corners. Third, design what you want, and then cut it down to a factor of safety of 4 or 5.

Rule 1 is for closed figures, rule 2 for plane surfaces, bearing ribs, flanges, mouldings or bosses, and rule 3 explains itself.

Ingenious artifices are used by the founder to counteract these stresses, as laying weights on the flasks over parts liable to spring, etc., but a little care on the part of the designer would prevent all this. The foundryman "would if he could," the designer "could if he would."

A long discussion followed Mr. Bird’s paper. Among other statements of interest, Mr. Rockwood remarked the fact that within the past year or two, several large wheels having their arms and rims "built up" to avoid shrinkage strains had burst when accidentally run slightly above their normal speeds, while he had in mind an instance where a well proportioned wheel of large diameter, cast in halves and cored clear through the hub at the division, had withstood a rim velocity of nearly 8000 feet per minute. In his opinion, built up wheels were less desirable than those cast in halves.

Mr. Higgins said that the subject of founding had possessed great interest to him for years, and he regarded it as one of great importance. He spoke of the rigid tests to which work for
the government is subjected. The Builders' Iron Foundry, Providence, where J. G. Aldrich, '85, is Supt., is building 13 in. mortars for the Government. They are cast iron hooped with wrought iron, shrunk on; rings are cut from the inside and tested under official supervision.

He also spoke of the method of venting cores in use at the Deane Steam Pump Co.'s Foundry. Waxed threads are introduced into the green core, and when this is baked the wax being melted, the thread may be pulled out.

Mr. Tolman said that weights on the flask might do to make an article to sell, but when it was machine it sprung all kinds of ways. In response to a question, he said that the thing to do before the finishing chip, was to loosen all the fastenings and let the thing twist as it would.

In regard to "inspection" of castings and tricks of the trade, Messrs. Bird, Rockwood, and Edwards, were rather severe on a certain class of foundrymen who made castings "to sell."

Pres. Fish here reminded the company that it was waxing late, and that unless some one else wished to speak further, he would call on Mr. Rockwood for his paper on "Two Cylinder vs. Multi-cylinder Compound Engines."

This paper gives an account of some tests made by Messrs. Rockwood and Green, '85, on an engine at the Merrick Thread Co.'s Works at Holyoke, in order to prove whether there was a gain in having one or more intermediate cylinders. As Mr. Rockwood's paper is to be read at the meeting of the American Society of Mechanical Engineers, and he is also under contract to publish a paper in Power, he requests us to withhold all statements concerning his work until next month. We feel pretty certain that an interesting discussion will take place at San Francisco.

Mr. Edwards remarked that Mr. Rockwood's paper would undoubtedly cause much criticism "kind and other kind," according as it met or disagreed with its hearers' views. Messrs. Rice and Rockwood got into a bit of a tilt in regard to work done in the cylinders of a compound engine, but the discussion was not long.

Mr. E. F. Miner, '87, then gave an account of some tests made on different ways of fastening bolts into stone. The results of these tests are given below. The meeting adjourned at 9.45. Quite a length of time was occupied by the alumni in discussion of various topics suggested by the papers. We think all will agree that the evening was spent in an interesting and a profitable way.

It is hoped to have a lecture given by some distinguished mechanic at Commencement time. Prof. Alden will endeavor to make ar-

rangements with some gentleman on his San Francisco trip.

**ANCHORING BOLTS IN STONE.**

Extracts From a Paper Read by E. F. Miner, '87, before the W. N. E.

The following are the results of some tests which were made on the Fairbanks' testing machine at the Mechanical Laboratory, for the purpose of determining the relative strength of materials for anchoring bolts in stone. The tests were made in connection with certain work where the journal plate was to be fastened to a stone column. The materials tested were babbitt-metal, lead and sulphur. Cement was suggested, but could not be used in the projected work and therefore was not tested.

It was necessary that the bolts should not enter the stone over 6/16, and that they should be capable of easy removal without injuring the stone. For the purpose of the test a tap-bolt was prepared, 14/16 in diameter, 9/16 long, with a thread 64/64 long. The thread was V shape 1/4 pitch, cut nearly sharp on top, and about 1/16 wide at the root, thus leaving a wide space between threads to allow the setting to fill easily around the screw. In all the tests, with one exception, the bolt was set in the stone 6/16—in the test with lead-pipe 64/64.

The stones were prepared in 10" cubes, faced on three adjacent sides, and were of dark-red Brandford granite from Stony Creek, Conn. The holes in the stones were as nearly as possible 2" in diameter, 64/64 deep, and in three of the tests were tapered, so that at the bottom the diameter was 22/32. The loads were applied slowly and measurements for extension made at each 500 pounds increment. At every additional 5000 pounds the setting was allowed to remain five minutes with the load applied. Measurements for extension were taken by calipering the distance between the iron clamp-straps.

**Test No. 1.**

Babbit-metal setting—an inferior grade of metal, quite hard and brittle. Up to 10,000 pounds there was an extension of 13/16", due to the babbit-metal and stone coming to a firm bearing. After remaining five minutes under the load of 10,000 pounds no change was apparent. Between 10,000 and 15,000 pounds there was no extension; but after the five minute period at 15,000 pounds the bolt had drawn out 11/32". At 16,000 pounds the stone split. It had previously been used with a lead setting and had no doubt been weakened thereby.

**Test No. 2.**

Lead setting—lead melted and poured in about the bolt. Hole in the stone tapered. Up to 2500 pounds there was an extension of 32/32". From 2500 to 5000 pounds there was no change; but after standing five minutes under 5000 pounds the bolt had drawn out 11/32". Above 6000 pounds and up to 13,000 pounds, at each additional load of 1000 pounds there was an extension of 13/16", after which measurements were not taken. At 13,000 pounds, power from the engine was applied and an attempt made to pull out the bolt, the tension ran up to 33,000 pounds when the lead gave way rapidly and the load fell off.

**Test No. 3.**

Lead-pipe setting, in a straight hole. The internal diameter of the pipe was 14/16", and the external 2". The pipe was made to fit nicely in the stone, the
last inch in length being driven. The bolt was then screwed into the pipe and made to cut its own way, thus forming a thread in the pipe 1/8 deep and forcing the lead out into all the irregularities in the sides of the hole. Up to 4000 pounds there was an extension of $\frac{1}{8}''$, but between that and 10,500 pounds there was no change. Between 10,500 and 13,000 pounds there was an extension of $\frac{1}{32}''$. Above this latter point each additional load produced its proportional amount of extension. In applying the power from the engine the tension rose to 25,000 pounds, and then fell rapidly from that point.

Test No. 4.

 Sulphur setting, in tapered hole. Up to 10,000 pounds there was no perceptible change in the bolt or setting. Above this point the extension became a measurable quantity, but at a load of 29,000 pounds it had become only $\frac{1}{8}''$. Beyond this no measurements were taken. At a load of 31,125 pounds the stone split. It was thought that at this point the sulphur setting showed signs of a movement, though it is difficult to say anything definite. The fragments of sulphur from the broken stone showed no signs of crushing.

Test No. 5.

 Sulphur setting in a straight hole. Up to 20,000 pounds there was no measurable movement in either bolt or setting, at the end of the five-minute period at 20,000 pounds there was an accumulated extension of $\frac{1}{32}''$ but beyond this there was no further extension through the remainder of the experiment. At 29,000 pounds the pressure of one of the iron clamps cracked off a corner of the stone and the load dropped 1000 pounds; otherwise nothing was affected. At a load of 31,515 pounds one of the iron straps holding the stone broke and ended the experiment.

The tests with the sulphur were the most satisfactory in every way, and that was the material selected for use. In the experiments with lead and babbit-metal there was a very perceptible movement under a slight load, or until the metal and stone came to a firm bearing. This would seem to be due to the contraction of the metal on cooling. In both experiments with lead, the failure was between the lead and the stone.

EDW. F. MINER.

INTERCOLLEGIATE SPORTS.

Before the appearance of the next number of the W P I the annual Field-sports of the N. E. I. A. A. will have taken place. They occur at Hampden Park, Springfield, on the afternoon of Wednesday, May 25th. The Springfield Bicycle Club which has charge of the arrangements, is actively pushing things, and if the weather is favorable a most successful meet may be expected. The runs will be on the half-mile track which is now being put in condition. The city for that day and the day previous will be given over to the students. Last year the public schools were closed and a holiday taken generally. This year the same order will probably hold. The Springfield Bicycle Club has a finely equipped club-house on Worthington St., directly facing a small park. It will be thrown open as a headquarters for the athletes and officers, and on Tuesday evening a band concert will be given in the square opposite. Those who went last year can easily picture the thronged and gay streets. This year interest will probably run still higher. According to the Boston Advertiser Amherst alone will send a team numbering 41. On Wednesday evening the Amherst Glee Club will give a concert in the Opera House.

If possible, arrangements will be made by which special rates can be obtained from this city for Tech and Brown men. All students who possibly can, should go for it will be an affair of no small importance and interest.

THE OUTLOOK FOR FIELD-DAY,

At present the prospect is good for a very interesting Field-day next Saturday.

The track is of the best and the offer of a banner to the class scoring the most points will cause a great deal of enthusiasm. The results of the contests can probably be told a little more accurately after Saturday than now, but we will mention some of the most promising candidates for places. Let it be distinctly understood that we are not responsible for bets on what follows.

In the hurdles E. L. Smith, '92, Fish, '92, Andrews, '93, and Gallagher, '94, are all good men, but there may be some dark horses who will equal them.

Ninety-five looks to Stone for the 100 and 220 yard dashes with Denny, '95, second. The entries for these events will probably be large and ninety-five may be disappointed.

Whipple, '94, and Harris, '94, want first and second in the half-mile but if Smith, '92, runs he will count. Starbuck, '93, and O'Connor, '95, are also good men.

Derby, '93, and Leland, '95, are expected to take first and second in pole vault. Fish, '92, and Whipple, '94, probably will discuss third place. Morgan, '94, will undoubtedly take first in running high-jump. Fish, '92, Derby, '93, and Strong, '93, are all looking for places.

The mile walk, Morgan, '94, will take, with Butterfield, '93, and L. Killam, '94, as other contestants.

Brigham, '95, will probably throw the hammer farthest. Morse, '92, and Fish, '92, next.

In the quarter-mile run some good men are entered and it will be a lively race. Stone, '95, Derby, '93, Dyer, '93, Strong, '93, and Denny, '95, are all going to try hard.

Derby, '93, Strong, '93, and Fish, '92, are good in the standing high.

Smith, '92, Gallagher, '94, and Baker, '93, will probably take places in the mile run.
Mr. Kendrick graduated in the class of '73.

The engagement is announced of Charles H. Stearns, Asst. Engineer at the Silver Spring Bleaching and Dyeing Co., Providence, R. I., to Miss Lizzie Wadsworth of Barre, Mass.
SUGGESTION.

EDITOR W P I :

In less than two weeks our athletic team will go to Springfield, and at least a hundred more of us to support it.

There we shall meet our friends of other colleges, see our own pet athletes put in their best work, and feel the enthusiasm for different alma maters at its highest point. Last year some of us may remember that "P I" was the only yell given, and that not always just when needed.

The objections to "P I" is that Andover has "P A," a yell very similar to our "P I," and that it is somewhat too long. If anywhere it is at the Intercollegiate that individuality should be shown in the matter of yells, especially when different colleges congratulate each other with their own yells, followed by the name of the college congratulated. So this year let us have a good leader and yell "Polly Wolly," and revive that rousing good yell which used to resound in the 80's: "Rah! Rah! Rah! T! E! C! H! Rah! Rah! Rah! Worcester!"

One who is going.

NOTICES.

        17. Tuesday evening, Piedmont Church Y. P. S. C. E. social.
        18. Wednesday, 5 P. M. Ball Game, Worcester Oval, W. P. I. vs. W. A. C.
        21. Saturday, P. M. Ball Game at Providence, W. P. I. vs. Brown Freshmen.
        24. Tuesday, 7.30 P. M. Concert at Salisbury Hall for benefit of Associated Charities.

TECHNICALITIES.

The semi-annual business meeting of the Historical club occurred Friday evening, April 29th, President Andrews in the chair. A committee for the nomination of officers for the ensuing six months, which was appointed at the previous meeting, presented the following list of officers:—President, Charles Baker, Jr., '93; Vice-President, George W. Bishop, '94; Secretary and Treasurer, Robert B. Farwell, '93; Executive Committee, the officers ex-officio. Prof. E. P. Smith and W. J. Baldwin, '94. The report was accepted and the officers elected by a unanimous vote.

The literary exercises were then taken up and the following papers read:—"Watt Tyler and the Social Insurrection," by A. D. Butterfield, '93; "The Lancastrian Revolution," by A. F. Newton, '93.

All papers which have been read before the society are to be kept on file in the hands of the secretary, and hence form a source of reference which will continually grow more valuable. It is also intended to start a library for the benefit and use of the members.

The annual business meeting and election of officers of the Y. M. C. A. was held Wednesday noon, May 4th. The reports of the various officers and committees were presented and showed a very prosperous state of affairs in the Association. During the past year the membership has increased by twenty-three which, after deducting the number who have graduated, makes a total membership of one hundred and six.

During the year some progressive changes have taken place in the matters of receptions, increase of membership fees and conduct of the meetings, and the Association enters upon the new year under very favorable conditions, and with a balance of about sixty dollars in the treasury.

After the reports, the following officers were unanimously elected upon nomination of a committee:—President, A. D. Butterfield, '93; Vice-President, Frank J. Bryant, '95; Corresponding Secretary, Warren A. Scott, '94; Recording Secretary, H. Joseph Knight, '94; Treasurer, Charles E. Goodrich, '93.

During the past two weeks we have been sending out subscription bills for the ensuing year. Some of our subscribers may be surprised to see them thus early, but we wish they would stop to consider a few things before making comments. The expenses commence with the first number and are more than 50 per cent. larger than formerly. The Board, of course, has no fixed capital to back it, and we cannot collect our advertisements for nearly a year yet. Our bills are due at the first of each month. We are sure that this is taken into consideration subscribers will respond at their earliest opportunity.

Members of the Tennis Club may, by presenting their membership tickets, obtain the following discounts at E. B. Clapp's Athletic House: Wright and Ditson's racquets, 20%; Clapp's own make, 25%; nets, 33 1/3%; W. & D. Championship (50 cent) balls, three for $1.00.

Morse, '92, has resigned as Manager of the Intercollegiate team and Bartlett, '92, has been appointed in his place.

Dadmun has returned to school to make up Calculus and shop practice. He will enter the half-mile and perhaps the quarter and mile in the Intercollegiate.
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Fig. 1

Fig. 2

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