THE GEAR
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THETA TAU

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A PROFESSIONAL ENGINEERING FRATERNITY

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Founded at the University of Minnesota,
October 15, 1904

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Foreword

This number closes the administration of the present editor. The year has been spent in trying to arouse the various chapters from the lethargy into which they had fallen during the time when the Gear was not published. Nothing constructive has been accomplished. Indeed, it can hardly be said that the chapters have any better attitude towards their national duties than they had when the Gear was discontinued.

Let us hope, though, that next year, under the guidance of a more able man, the Gear may be built up to take its rightful place as a means of coordinating the efforts and ideals of the various chapters, the actives, and the alumni.

The Spirit of Engineering

By Ernest A. Hersam, Epsilon
Prof. of Metallurgy, University of California

It is an easy matter for men of certain temperament to rise in emotional response to acts of human good, renouncing the interests of the self. Rational minds, however, find less of motive in these unreasoned calls. There are certain calls that seem to impose claims upon the practice of engineering. It is not unworthy of our interest and our time as engineers to examine analytically some of these supposedly higher calls in order that we may know, through rational appeal, whether or not they are of the substance of dreams or the arguments of reality. It will be helpful to possess whatever uplifting force may be within the motives of engineering.

Men who have been leaders in all times past have been the men of combined vision and intellect. In naming these, opinion would not be in entire agreement as to individuals, but as to types of individuals it would be in harmony. Culture alone never has been sufficient, in itself, as a stimulus to great service. Though a determining influence upon the civilized world, culture as we know it today has been always subordinate to wisdom, to mental force, and to conscious purpose. Culture, skill, refinement, and sympathy have been concurrent with human progress. They seem to have led the way, but wherever we have found lasting results there has been vision through knowledge and power through understanding.

In modern times we are witnessing the rapid development of a calling to which we are giving the name engineering. Engineering as an art is not new. As a science however it has made, as yet, but a crude beginning. The world always has had at its service the impulse of the engineering mind irrespective of the wisdom it has commanded. Construction, management, and operation, are as old as the human mind. Yet, engineering embodying standardized essentials is new to modern practice. Even in our own time, engineers are perceiving new requirements of common practice, finding their place in the system of activities, organizing

a status out of complex efforts, and defining the necessary specialties through personal limitation. This natural development of engineering will continue throughout the lives of all men now living. We shall see engineering more and more held responsible for human welfare.

There have been many men without degrees, sometimes without fame, throughout all history whom we recognize as engineers. They were chance men of genius. Their power, energy, and understanding are seen through large results in material construction and through their direction of human progress. The engineering of Egypt and Rome are brought conspicuously before us by the perfect preservation of large records, but in all ages, through India, Babylon, Persia, China, and Greece, as well as through the early civilizations of America and other continents, no peoples have been known without their powerful men of action, possessed of constructive and directing skill, and imbued with the motive of improvement in the larger activities of human life. In Engineering as we know it today, however, there is discipline more distinct in definition. As a defined profession, engineering is new. The chance leader in material activities of the human affairs of ancient times has given way in modern engineering to the trained, standardized, and scientific man, of large calibre, operating upon the larger possessions of the human race. We know the engineer as the man entrusted with the ponderous possessions of the race, intricate, as a whole, and greatly valued. His materials are of the substance of all the earth. His forces are the great physical forces of nature. His agencies are human agencies, in the direction of which he has become highly skilled.

Men in our modern days who enter the engineering profession as a life career are not drawn by the higher appeals of social or moral welfare. They are not forced by moral conscience into service as is the clergyman or the missionary. They are not attracted by the insatiable desire to know as is the scientist. They are not led by eagerness to discover, explore, or experiment, as is the traveler or the investigator. They are but little moved by the inner impulses toward beauty, for the sake of beauty, as is the artist, nor are they peculiarly led to strife for the creation of the aesthetically perfect. They are not moved to their work, for the most part, by any broad purpose to do a great common good for common people, as would be the philanthropist. Engineers in practice, and engineers in training, are looking to self betterment Their expectations are centered upon commercial gain. They are

highly concerned in individual acquirement. The taste for the beautiful, which steals into the profession, finds it only as a permissible embellishment. The taste for truth, for accuracy, for justice, and for right, which exists in large measure in the profession, seems to be present more as a necessity of existence than as inherent longing of the constructive soul. The taste for inquiry and for discovery leads only cautiously to trial and then remains confined within the bounds of practical application.

Why should we strive to cultivate in engineering any of the foreign attributes that seem to belong to the humanitarian and the philanthropist. We do not condemn the average business man or the banker for mercenary practice, because the interest seems to be of a selfish nature depending upon paying investment and safe profit. Business as a whole is conducted for the profit there is in it to the business man himself. When the profits discontinue the business has to stop.

There is a phase of business wherein commercial practice takes on the characters of a profession. We have in engineering a merging of the scientific with the commercially practicable. Wherever the professional phase of commercial activity appears there develops a new responsibility which becomes great with the increasing utility of the profession.

Industry, commerce, and society alike seem to be a complex of individual and private interests. The actuating force in all these is primarily the self. The good which accrues from it comes largely as a resultant of the whole. It is not revealed, for the most part, by the ultimate analysis, giving attention solely to the units of which the whole is formed.

Engineering practice may at first appear to be subject to the same privileges that other divisions of human interest possess and to be comparable, particularly, with commerce and industry. The attributing of obligation to the engineer, to call for self sacrifice beyond the exactions of the new law or the dictations of custom and expediency, startles, as an infraction upon volition and as resistance to the force and spontaneity of engineering. The elementary units of commerce and of industry are privately operated enterprises, or individuals. The element of engineering practice contains, no less, the right of individual freedom, in the commercial phase. Each element, as a unit, is, in purpose, complete within itself. Each seeks for itself, gathers to itself, and bears heavily upon the resisting interests of other units. We do not see in this, necessarily, as such, either public spirit nor moral in-

tent. The laws of expediency may embody the highest aspiration. The acquirement of profit is universal, as is the force of gravitation. Profit in business, in the terms of business, is the measure of success. Commerce, industry, and society, running riot upon this principle to the limits of possibility encounter only the law. Bearing hard upon social opinion, no barrier exists more resistant than the general feeling against sharp practice or disrepute of monopolistic enterprise. Transgressing the law in the eagerness for gain, it is only the extreme of greed that encounters the definite action of society.

Engineering, as we know it, lies somewhere upon a graded scale between a generous, outward-giving and an inward acquiring interest. What recruits would be gathered in a profession under a solitary standard of self sacrifice? Yet where is the dignity in a profession that is based solely upon private gain? Such is the profession of the pickpocket and the highwayman. Of what nature is the limit to the propriety of private interest? Wherein is the call toward generous giving or ulterior human ends?

To see moral grounds, through reason, we are forced to see in our profession, as a whole, an embodiment of nature which is different from that of the separate individual elements. We see emerge from a chaos of private interests a form, composed of the substance from which it has emerged, but fashioned higher and purer than the form attainable in the human individual. The form is one of larger human welfare in symmetry and in goodness. The refinement comes through the multiple cancellation of the self purpose of the composing units.

Most of us would be glad to feel that engineering might take a high place in all its various aspects. Some of us habitually see the higher motive in collective purpose. It is through the consciousness of higher purpose that cultivation is worth while. It is through broader understanding and enlarged sympathy that the higher direction of human interests must come. No high motive is to be expected in engineering other than that which comes in the form of humanistic movement in its larger terms.

There are interests and individuals whose energies are consumed within the self element and never work beyond. They sense direction in terms no higher than expediency and power. Some there are who have the vision of larger welfare, but the vision, like the vision of dreams, lacks reality to justify decisive action. Breadth of outlook is needed by those entrusted with the powerful agencies of engineering, to encompass not only the private interest,

but that broader human purpose in which public welfare is a living factor. In this alone can engineering retain a place in the higher callings. Just as humanity would strangle itself without its own made law, just as civilization would decline without ethical public opinion, so engineering, without the motive of broad human welfare, would decline from the level of a service, to a menace in the world. Our respect is due to a higher type of engineering than such would be.

Specialization in technical practice does not alone lead to the higher vision of society. We find the engineer an instrument for any service, not an assured agency for good. It is, however, in the capacity for comprehending and acting upon the precepts of a larger and higher order that good develops, and it is through this good that there arises the need of engineers in our world system. It is only by the combination of engineering practice with the purposes of human society as a whole, that engineering rises above the commonplace and deserves support as a profession. It is only through cooperation by the members of the profession that the individual succeeds in actual service. It is only by the maintenance of a high ideal, held high in public expectation, that engineering, as we know it, can hold its place of power in the world.

Recent attempts that have been made by engineers, themselves, to define the characteristics of the profession have been astonishing in revealing how indefinite our ideas are about the essentials of the calling. It has been difficult to define the word engineer without including the farmer, or the blacksmith, and men of many callings that we commonly do not rate as engineers. A narrow definition excludes men recognized by all as true engineers. College education and a degree appear to be the safest and the easiest approach to the profession, but there are many others. Inborn capacity, through education, energy, and abundant experience, are commonly accepted essentials of the engineer. To these we must add another, which is higher, and which contains the higher moral responsiveness without which our profession becomes a trade.

In the exacting position in which the engineer is placed we find him thus required to respond to two dissimilar and sometimes apparently conflicting motives. The one motive is that of acquisition, for himself, or his employing interest. The other is the higher motive which is required of him by society, in which his endeavor is directed to public good. Why is this larger outlook required of the engineer over and above that required of any

citizen as a man? Why is the engineer to be weighed down with the impediment of public obligation? It is well to see. While we would not detract from the response that is due from all men of all callings, to the state, to society, and to the institutions that protect them, we must hold against the engineer a peculiar responsibility consisting of entrusted power, imparted understanding and developed capacity. The call of the higher motive holds the engineer responsible as an originating agent. The responsibility clings to him by his profession on all sides. The obligation appears threefold.

First, among the obligations of the engineer, is the recognition of the source of the capacity he has acquired. Secondly, there is an obligation of milder but appealing form, of the nature of expediency. A third obligation is a necessity in his practice which takes the form of character. The rightful practice of the engineer, which assumes to shape the course to private ends, does not escape these obligations. They fall to him not particularly as a citizen, nor as a man, but as an engineer.

In the first of these obligations, the engineer will recognize that his training has been made possible by the generous intentions of many who have gone before him and many who now surround him in his attempt at practice. The great fund of knowledge that is made publicly available represents the devoted sacrifice and service of thousands and hundreds of thousands of other minds. They represent the accumulated understanding of human society and scientific knowledge. The simplest problem in mathematics, in science, or constructive art, would baffle all accomplishment, in time for action, had the engineer not available the vast fund of knowledge that has been handed to him by those who have gone before. Names that are revered in scientific history, names that are symbols of discovery in modern practice, names that are linked with opportunity in modern life, express the existence of a society of other human beings. They are the world into which the engineer is admitted upon condition. The condition is that he preserve, perpetuate, maintain, adapt, and contribute. There should be a feeling of deep gratitude for the power to think, the right to speak, the ability to see, and the capacity to know, that have been accepted from the bounty of the practicing world. For the engineer, these acquisitions are the heritage of a profession that has received abundantly, of which he is a member, and in which he must bear a part. The engineer sees himself trained in the secrets and powers of control

of the very essentials of human life. Through his books, his schools, his associates, he is accorded opportunity. In his indicated rights there are implicated the evidences of superior trust and the requirements of response. There is an impulse to share that must exist in him as an inherent trait of manhood. What is given through human society, is given with expectation. The reaction felt by any healthy human mind is that of gratitude and of return. The response is effort directed toward human welfare.

The second obligation, which lies coincident with expediency in engineering, no less insistently proclaims a higher motive. The profession does not advance as a horde of separately moving individuals. There is a collective society in engineering. Fraternity and professional understanding move as a larger body and define the prevailing thought. There is a general engineering opinion against which the individual cannot operate with success. The larger current of practice is exacting and always is the loftier one. It is freed from the self seeking of the individual. It is too closely bonded with the interests of the world to sink utterly into the narrowed interest of the fraternity of engineers. It trends upward and runs higher than the individual alone can rise.

One of the strange phenomena in human life is that in which the average of human purpose lifts itself above the average level of itself. Collective human action soars higher than human understanding. Such is not a doctrine of pure pragmatism. It is an axiom of plain experience. The profession of engineering directs itself crudely but positively toward human welfare. It takes direction most positively when action is open, and collective. Expediency argues for concurrence in the tendencies of the profession. Traits and practices obstructive to collective action fall, by necessity, into disrepute. Secrecy, arrogance, and avarice, give place to public spirit and human interest, and by pure expediency, if for no other reason, are called for in the profession.

A third form of the obligation in engineering, which calls to the higher human purpose, unlike gratitude or expediency, is the maintenance of character, which is necessary to the existence of engineering. As time goes on, standard practice becomes more and more exacting. We have not developed, as yet, all of the demands that the future of the profession will require. Character is enforced by the profession within itself and upon itself. The contempt for dishonesty, for ignorance, error, waste, and delay, debar these qualities from the individual. Justice and the fair deal become requisite for standing in the profession. Such demands are made upon all engineers who would claim the title.

The world at large often is not informed of the professional exactions that are made, but it may know that the exactions are severe and in conformity with the highest ideals known to man. The demands of the profession which have become a necessity in its practice are upward tending. High character in humane motives in the profession is on the ascendent. Attainments uncommon for their rigor in ordinary walks of life are demanded as a matter of course in engineering. Unfailing dependability is an elementary requisite. No reputable engineer fails in his appointments, defaults in payments, neglects to deliver as specified, misrepresents facts in his possession, or fails in his obligations. Unflinching truth, ungarnished fact, and unquestionable reliability are simple conventional demands within the profession, but are always enforced. These qualities go along with scientific knowledge and human insight, in the profession. Their sum makes up the professional personality of the engineer. It is a personality that is held by the individual in common with other engineers. It is a society of high standards and high repute. Such quality is necessary for the intercourse among engineers. It is the common language of agreement and association. It is the specification of the engineer's guaranteed capacity. We find it culminating in the love of truth, of justice, and of right, and we find it extending to all the broader human applications, wherever broader issues appear.

Beyond these three forms of obligation, which, separately, through conscience, desirability, or requirement, lead to humanitarian service, we have in engineering the motive of progress and of research. Acting each in harmony with the profession and with the world, sustaining, uplifting, ennobling, unrequired by scientific law or material form, but dedicated to human welfare, the higher motives are the source of ultimate satisfaction to the individual, and of joy in the performance of his duties. They may be regarded as the spirit of engineering.

Progress is a feature of the engineering profession. It is the background against which we are able to see engineering practice as a human need. So uniformly expected is progress, so unquestionably necessary is it, the mention of its existence seems commonplace, yet, as progress implies advance, so also it implies relative position. The necessity of a relative location arises, and the supposition of a goal. While we believe that we are fully agreed as to the nature of progress, we are startled somewhat when we define the end. We cannot but see that progress signifies gain in

human achievement. It therefore deals in terms of human welfare. It thus takes a direction identical with that of good will, of which, in engineering, it is the active counterpart. Like all the highest human motives it leads toward general welfare.

It is pleasing to engineering to do great things with little effort. In money units, this is active production at low cost. It is pleasing to engineering to improve quality, to supply convenience. Profits are obtained, but the conscience and the feeling are broad in direction, and progress is recognized for common good. The common characteristic of the profession, collectively, is effort toward the highest efficiency, the sanest exploitation, the broadest application, and the wisest use for human welfare.

Research is necessary to engineering. For the engineer all life is the life of large research. Designing, planning, constructing, and operating are but working of experiments when practice is contemplated as a whole. Like all true research, engineering consists of origination in reason, with proof in experience. Unlike pure science, which traces the thread of inquiry wherever it may lead, engineering starts with a purpose. It excludes all that is not applicable. It draws upon the items of material science, economics, and sociology. Research in engineering is involved in the art of application. Because of the seriousness and the costs of application, there is required in the adaptation of research to engineering not only a superior precision in the reasoning, but economy in conformation, combined and cooperative endeavor, and publicity. Only by combining and comparing experience and results in economic practice does true engineering research exist. Only through the availability of results in all practice can the economy of research in engineering be satisfactory to the world.

As time goes on there will come about, through the discriminating opinion of the profession, through extensive understanding, and through enhanced commercial confidence, all of which are developing under the higher standards of the practice, a wiser and fuller appreciation of openness in industrial practice. There will be a time when the private restrictions upon engineering knowledge will be held less urgently necessary and will be less easily maintained. There have been commendable advances made in the public spirit of larger enterprise in recent years. Some interests there are, which, remaining sullen and secretive, return little to the general development of the country that harbors them. Most industries, through a pure motive of public welfare, contribute greatly to human knowledge. The great service of this knowledge should

be understood. Generally there is little gain by the secretive policy in modern industry, and always there is much that is lost. The engineer whose entire personality, along with his service, is absorbed in private interests, is becoming less common, and is feeling a forced withdrawal from his kind.

The larger social outlook, as we have seen, characterizes the calibre of the engineer, and of the man. The satisfaction in successful practice is through human service. The higher human motive is the spirit of the profession, without which engineering is a cold and lifeless form. Without such spirit there can be no profession of engineering. Endowed with such spirit through motive and service, no calling is more needed, no interest more honorable.

The Installation of Omicron

By LeRoy Grettum, Alpha '23

On February 23, in the chapter house of what was up to that time Theta Sigma Delta, a local engineering fraternity, Omicron of Theta Tau was installed with due ceremony by Grand Regent George D. Louderback. Assisting him were Bros. E. H. Comstock, Honorary Alpha, Paul Laurence, Alpha, Frank Hoenigman, Epsilon, and Brother L. A. Grettum, Alpha.

Bros. Grettum, Laurence, and Comstock arrived in Iowa City shortly before noon Saturday morning, and were met by a reception committee which escorted them at once to the Theta Sigma Delta house. Here we met Bro. Louderback, and were introduced to the members of the chapter about to be installed. The writer at first thought that all of Iowa's letter men must be living there, for almost every other man wore an emblem. Theta Tau assimilated an athletic bunch there, for sure.

The ceremony took place at 5:00 o'clock in the afternoon, and immediately after it was over the brothers adjourned to the Hotel Jefferson, where one of the most bang-up dinners was served that ever an engineer attacked. Brother Holbrook of the new chapter presided, and Brother Louderback made the chief speech of the evening with his usual forcefulness and grace. Every person present was called on for a short talk during the course of the evening, and we all went away with the fraternal spirit of H and T deep in our hearts, proud to belong to such an organization.

The following active members of Theta Sigma Delta were initiated as charter members of Omicron chapter: Anderson, Ashton, Crawford, Freese, Fry, Hains, Hastings, Hess, Herrick, Holbrook, Moran, Muth, Phillips, Sloan, Von Hoene, and Weir.

Alpha's House on Paper

By Leslie L. Halladay, Alpha '21

The Theta Tau Association of Minnesota, Inc., is a glorified Theta Tau Building Association, which was organized in 1912. This older organization served its purpose as far as its authority allowed. Then, in 1917, the Allies needed assistance, at the time the Building Association was just getting on its feet, so naturally fraternity interests were subordinated to affairs of state. So it has only been within the last four years that the Hammer and Tongs spirit has been revived. As a result of these conditions, it was necessary to have an organization with a better business and legal basis.

Therefore, in 1922, just 10 years later, the Theta Tau Association was organized, largely through the efforts of Brother Schrader. The Association was incorporated for $25,000.00. Under the laws of Minnesota, a board of directors was chosen, consisting of: 1. P. G. Lawrence, 2. F. Rockwood, 3. W. H. Wheeler, 4. Jos. Colvin, 5. E. I. Kopper, 6. J. F. Noble, 7. W. H. Webster, 8. C. Rounds, 9. L. L. Halladay; and officers were elected.

The financial condition of the Association, April 1st, 1923, is as follows:

	Assets:	
1.	Cash (Notes Paid)	$ 610
2.	Notes Not Due	2,090
3.	Notes Due	2,090
	Total Assets	$4,790
	No Liabilities.	

The above figures mean little, but upon analysis they reveal a good deal.

Cash $610 is composed of $200 paid within the last 6 months. In other words, ⅓ of the cash has been collected through the efforts of the Association. Notes Not Due, $2,090, shows another interesting thing. These notes start falling due a year after graduation and continue for 5 years. So this $2,090 is composed of notes signed since the spring of 1918. That year, the chapter consisted of only seven members, so the year 1918 may be neglected. Then, in the

4 years from 1919 to 1923, the Building Association has received notes at the rate of over $500 a year. In other words, 10 men signed notes for $50 for each year of the four year period. 10 members usually graduate a year, so the period shows 100% of the active men signing the notes.

Notes Due, $2,090. This last item is cause for sober reflection. Theta Tau was organized on October 15th, 1904, and, in April, 1918, Alpha had about 150 members. Assuming that everyone had signed a $50 note, this figure of Notes Due instead of being $2,090 would have been $7,500. This fact that only 30% of the older members signed notes is not so disconcerting were it not for a worse feature. Over 90% of this 30% who did sign notes neglected to pay them. A slide rule is unnecessary in comparing items 1 and 2.

The immediate and pressing problem is to buy a lot for a chapter house. We have $600.00 to start with, it is true. But, "Where do we go from here"? Is it to be only a start? The Association feels that they should not risk this $600.00 as a first payment, until the alumni begin to realize their obligations. That means every Alpha man who is in arrears pay up, and keep paid up. If this is done, we will have $2,090.00 for a regular start, and approximately $500.00 a year to pay for the lot and the chapter house. With a $15,000.00 investment, even this will take a long time, but then Theta Tau will outlive many chapter houses.

The future of the Theta Tau Association has not caused anyone a great deal of worry, as the house proposition is quite enough. Perhaps after we have the chapter house, we shall find a sphere of usefulness in aiding needy students. That, however, is too far in the future.

The Industrial Development of Artesian Water

By Wm. Murray Lewis, Alpha '06

The development of a water supply from deep wells for industrial and municipal use presents a relatively new and extremely interesting field for the engineer. An artesian well is popularly understood to be a flowing well. However, the average deep well must be pumped, and a flowing well is the exception. The term "ground water" is therefore more consistent for the underground supply that is available in almost all sections of the country.

The fact that ground water ranges from 50 to 55 degrees Fahrenheit in temperature the year around makes it of added value to industries requiring a large supply for condensing and cooling purposes. Surface water from rivers and small streams runs up to 70 degrees Fahrenheit during the summer season, often necessitating expensive refrigeration systems, cooling towers, and a substantial increase in consumption due to high temperature and loss by evaporation. Almost every industrial concern requires at least 50,000 gallons of water daily for some purpose, which may be for boilers, condensing, washing, chilling, or for some special process of manufacture. Such industries as Dairies, Ice Plants, Ice Cream Manufacturers, Oil Refineries, Tanneries, Paper Mills, and Chemical Manufacturers are some of the big users of water. Their requirements frequently amount to a million gallons or more daily. Hotels, apartment houses, golf clubs, estates, stock farms and state institutions comprise another class vitally interesed in an independent water supply, particularly when it can be produced at a much lower cost than the usual suburban supply, which in outlying districts may run from twenty to thirty cents per 1,000 gallons. Municipalities, small towns and even large cities are securing their supply from ground waters in increasing numbers. The uncertainty of surface waters, due to extended periods of drought, pollution, expensive treatment required for domestic use, and the danger of water famine and fire hazard has awakened them to the realization that the logical source is a few hundred feet below rather than miles away on the surface.

In large centers, where city water is supposed to be relatively cheap, the rates are seldom less than six or seven cents per 1,000 gallons, in addition to which there is a fixed service charge. The development of highly efficient pumping systems, utilizing the cheap electric power that is generally available, makes it possible to produce an independent supply of ground water from deep wells at average cost of two or three cents per thousand gallons. If the lift from the water level in the well is abnormal and the elevation to delivery point in plant is excessive, the cost will of course increase in proportion to the power required for pumping. A total lift from well of 100 feet and an elevation of 100 feet above ground level, will cover the average condition, and the cost of water should not exceed one cent per 1,000 gallons based on cost of power at one cent per K. W. H.

Some industries are fortunate in producing their own power at very low cost, from ¾ of a cent to one cent per K. W. H., and their pumping cost, therefore, need not exceed one cent per thousand gallons. Others that buy their power and use sufficient to derive the benefit of a minimum rate frequently average 2½ cents per K. W. H., and can produce their own water at this figure per 1,000 gallons.

This tremendous saving in water costs is not theoretical, but has been demonstrated in actual practice by hundreds of concerns, and is attracting the attention of every wide-awake plant executive. Cost of water has been considered a dead load and a fixed overhead charge by many not appreciating the possibilities afforded by present day methods of well construction and efficient pumping systems. Such matters have been left to the Plant Engineer, who is generally satisfied as long as he has enough water, and has no personal interest in its cost.

Aside from actual low cost of production, a ground water supply may effect economy worthy of serious consideration in surface and plant construction. The close proximity of the well to the plant eliminates the necessity of extended discharge and delivery pipe lines, with incidental friction loss and power waste. The delivering of water from well direct to mains, standpipe, overhead tank or to condensers cuts out rehandling by booster pumps and greatly reduces power consumption. A series of wells for a large industrial plant or a municipality may be located so as to deliver water direct to consuming units or into city mains, reducing cost of distribution to a minimum.

The drilling of wells has been a haphazard and uncertain business for years. The average local driller has no knowledge of

geology, no records of any value of wells drilled, and is principally interested in the depth of the hole at so much per foot. In some districts sufficient drilling has been done to establish water bearing strata and reduce the gamble in drilling new wells to a minimum.

The U. S. G. S. Folios and various state publications give a limited amount of information, much of which is too old to be of great value. However, a careful study of the geological maps for any section under investigation is certainly warranted and may establish the ground work of the investigation. This must be supplemented by a check up of all possible wells in the locality, and a study of their logs, if available, also any general information from local well drillers or well owners.

In a rock country, that is if bed rock outcrops at or near the surface, the problem is complicated and the result bound to be uncertain. Limestone and sandstone frequently give good supplies due to fractures, seams and greater porosity that permit ground water to flow and accumulate storage. The close grained igneous rocks, however, seldom give sufficient water to warrant drilling. A number of "dry holes" could have been avoided by numerous large concerns in this territory, at a saving of thousands of dollars, by a simple study of the fundamental rock structure. Some wells were drilled to depths of 800 feet and over in barren igneous rock, based on the fallacy that they were bound to strike water if they went deep enough. As a result there are some fine bargains in second hand wells, which they cheerfully offer to the unsuspecting sales engineer who approaches them on the pump question.

In a sand country, so called, such as the coastal plain along the eastern seaboard, the water bearing sand and gravel strata are found at relatively shallow depths, and give an abundance of good water, seldom requiring treatment even for domestic use. Here the problem consists in drilling a well, with proper screen area for capacity, proper screen construction to eliminate inflow of sand, and a rate of flow at a conservative speed that will not pull the sand. This should not be overlooked in selecting a suitable pump. The pump manufacturer should be consulted in reference to diameter of the well, down to probable water level under pumping, so that he can offer a standard installation that can be run at a conservative speed to give desired capacity.

For capacities up to 500 gallons per minute the nonpulsating type of double acting plunger pump, such as the Luitwieler, is undoubtedly the most efficient and dependable. This type of pump

is 75 per cent efficient, and delivers a continuous discharge, without back lash and water hammer with consequent rod troubles. The relatively slow piston speed makes a slow and steady draw on the well. For pumps of this type and range of duty, the following table gives diameters of wells and capacities:

Diam. of Well	Max. Yield	Max. Drop Pipe	Max. Pump Cyl.
6 in.	50 GPM	4½ in.	4¼ in.
8 in.	100 GPM	6 in.	5¾ in.
10 in.	200 GPM	8 in.	7¾ in.
12 in.	300 GPM	10 in.	9¾ in.
20 in.	500 GPM	16 in.	14 in.

In deciding on the diameter of well, where an abundance of water is practically assured, it is important to have sufficient clearance around the couplings of the drop pipe from pump which carries the working barrel, to permit plumbing of pump rods and drop pipe, as a well is usually not exactly vertical. This makes for better operation, gives the water free access to working barrel, and permits the installation of a water level indicator that will keep the operator informed of the actual amount of submergence of the working barrel when pump is running. Almost invariably pump troubles arise from lack of water and consequent pulling of air, due to ignorance of actual level of water under pumping.

A simple and effective device has been put on the market recently, that may be installed with the pump, or inserted in the well at any time, if there is a minimum clearance of ½ inch between drop pipe couplings and casing or wall of well. A flexible copper tube, ¼ inch in diameter, and tested for air tightness, but with bottom open to admit water, is lowered in well to known depth of working barrel. By means of a portable air pump and gauge, which may be attached to upper end of tube at the pump, readings are taken of required pressure to displace the water that rises in the tube seeking the water level in well, while pump is operating. This registers on a pressure gauge and in equivalent feet on an altitude gauge, and gives a positive measure of the depth of water above the cylinder. It eliminates the possibility of unnecessary rod load, demonstrates the effect of drought or adjacent wells on the water level, and enables the operator to get the most out of his well under favorable operating conditions.

Air lift systems have played an important part for years, and the high cost of pumping by this system was justified as long as there were available no other types of deep well pumps except

the so called crank pumps. This type has its weakness in varying load on the plungers, with consequent rod troubles, low efficiency and high cost of repairs. The air lift system is well known as a "power eater," requiring from two to four times the power to do the same work as the non-pulsating plunger pump described heretofore. Water costs from 10 to 16 cents per 1,000 gallons, and must then be rehandled by booster pumps to the distributing system. It usually requires an additional depth of well to give proper submergence, and is seldom over 25 per cent efficient.

For the development of millions of gallons of water daily by cities, or large industries requiring a range of pump duty beyond that of the non-pulsating type, the submerged multi-stage centrifugal deep well pump is by far the most economical and practicable. Layne and Bowler of Memphis, Tenn., have developed an engineering organization that have produced some wonderful results with this type of pump. They have made a study of well construction in sand and gravel country for years, and have educated and trained their drillers under the guidance of their experienced hydraulic engineers. They have perfected a gravel wall well up to 38 inches in diameter, that will shut out the inflow of sand and delivers water in immense quantities. Insertion of about a foot of coarse gravel around the well screen acts as a natural filter and shuts out the sand. This company will even guarantee a well's capacity for a year, and put up a bond to show their good faith. Their motto is: "No water, no pay." One of their notable installations is for the City of Camden, N. J., where they are pumping five million gallons daily from four wells, all equipped with centrifugal pumps of their own manufacture, direct connected and motor driven. This company holds a unique position, as they are pioneers in their field and the first to make a scientific study of ground water supply the foundation on which to build an engineering and manufacturing organization.

*Delta Chapter Reorganized**

It will be of interest to Case men to learn that Case is to have a real-for-sure, honest-to-Gosh, chapter of Theta Tau, the leading professional engineering fraternity of the country. At least that is the intention of the members of the new organization, as it has been very recently propelled.

As many know for some years Theta Tau has had a chapter on the Case campus. But unfortunately very few persons in or about the school have known that Theta Tau is a national professional engineering fraternity and that here at Case she has been violating the national policy of the organization. The facts are that Delta chapter of Theta Tau here at Case has been operated in competition with the social fraternities on the Case campus and has not heretofore allowed the membership of Theta Tau and that of any of the other social chapters to be identical.

Realizing that Theta Tau at Case has been missing her opportunity for an existence in harmony with her national chapter, both the local membership, active and alumni, and the national executive council of Theta Tau have worked to bring about the new organization as it now is.

In order to accomplish this reorganization it was thought best that a large part of the active membership of Delta chapter be made inactive. This was accomplished by the suspension of thirteen of the active members. These men may apply for reinstatement with alumni membership at the time of their graduation. This action was taken at the suggestion of the chapter, the benefit being that the student body would be assured that the new organization was not to be "run" by any group of men. This leaves but five of the old members now active.

Through the efforts of these men and Dr. George D. Louderback, Grand Regent of Theta Tau, a very typical or representative group of men have been selected and initiated into the Case chapter of Theta Tau.

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* The Case Alumnus.

It will be the purpose of Delta chapter at Case to foster the spirit of fellowship and brotherhood among its members and to promote the feeling among Case men that engineering is a profession, and as such, demand the co-operation of every Theta Tau man and every Case man, active and alumnus, in establishing engineering, as a profession, among the other recognized professions. Its membership will be limited to men of the junior and senior classes and to students taking graduate work.

The present membership of the chapter is composed of the five men who have been carried over from the old organization, of ten seniors and one junior, of which number most are men having social fraternity affiliations. "Count" Van Horn has been initiated an honorary member.

The Grand Scribe Visits Epsilon

By Erich J. Schrader, Alpha '04

I was fortunate enough to get to the Pacific Coast twice during the present college year and thus able to attend a number of meetings of Epsilon Chapter.

I arrived in San Francisco on October 26, and late that afternoon went over to Berkeley and had supper with the active chapter. The regular fall election took place during the meeting that followed supper, and out of a large number of men proposed the chapter finally elected eleven, the largest number ever pledged at one time at Epsilon, and we adjourned at two A. M. All the men were pledged the next day and it is noteworthy that Epsilon chapter in twelve years existence has never had a bid refused. That speaks for itself.

The chapter had an initiation on November 4, when I passed through Berkeley on my return from Los Angeles. This was followed by a banquet at the States Restaurant in San Francisco. In addition to the faculty and Epsilon alumni who attended, Brothers E. M. Marshall, Epsilon '11, Durand A. Hall, Beta '14, and A. E. Elfstrum, Alpha '11, attended the initiation and banquet. All responded to toasts at the banquet.

I later attended a chapter meeting in Berkeley, renewing my acquaintance with numbers of Epsilon alumni, but I was sorry to have missed Brother B. O. Pickard, Beta '07, who is in charge of the Berkeley station of the Bureau of Mines, and who did such

wonderful work at the Argonaut mine fire, where a number of his rescue crew were actives from Epsilon Chapter.

On March 23 I attended an initiation and banquet with Epsilon and was glad to see the type of new men taken in during the spring term. I had a short visit with Brother Pickard this time and also met Brother Probert, Dean of the School of Mines, who has been seriously ill during the past year. The Grand Regent gave a very interesting talk of his trip east during which he installed two new chapters and inspected the chapters at Columbia, Carnegie, Case, Illinois, Colorado School of Mines and Utah.

I can advise all members who have the opportunity to visit the Pacific Coast to visit Epsilon Chapter! I feel amply repaid for the time thus spent. It has been my good fortune to meet a large number of Epsilon men at various times and I can assure all the brothers that it is a pleasure to see them at any time. The chapter has been consistently conservative and it has a high standing. Its affairs are in excellent shape and it is the type of organization of which all men can be justly proud to be connected with.

E. J. Schrader.

Editorial

THE GEAR

The Gear has struggled along under the guidance of one man and Erich Schrader long enough. Next year it will either get the support of the whole fraternity or go out of existence. Theta Tau is becoming too large an organization to get along without coordination of the various chapters.

Each chapter must appoint a reporter, who must cover his assignments, not only active chapter news, but alumni as well, thoroughly and have his copy in on time.

Each reporter must be on the job all of the time and must feel it his duty to send in news voluntarily. The older men in the chapters should feel free to make suggestions for the good of the Gear. Alumni must be prevailed upon to "kick in" when asked for help, or to show good reason why they should not.

Theta Tau is able to and should support a quarterly Gear. The financial side of it will be comparatively easy, but the other side rests with the chapters. What is your opinion on it?

THE CHAPTER LETTER

The consensus of opinion among fraternity editors seems to be that the chapter letter offers no excuse for its existence. That may be true of the usual cut-and-dried recital of chess captains, year book office-boys, and Tau Bet's, which is drawn up in fifteen minutes after the third or fourth request from the editor is received. Such a letter serves only to demonstrate the fact that that particular chapter is pretty neglectful of its duties towards the national organization, is not returning service and cooperation for the benefits it receives from the national affiliation.

The real chapter letter, however, has a very definite function, namely to show the rest of the fraternity how it is living up to and furthering the ideals of the organization, and to indicate to the other chapters how it is solving the problems which are continually confronting it.

Supposedly the customary recital referred to is a method of indicating the calibre of the men in the chapter, but the other

function of the letter is far more important. Most of the chapters are called upon to meet the same problems: selection of members, competition, maintaining interest in meetings, the old problem peculiar to Theta Tau of steering between the honorary fraternity and the social. We meet them continually and solve them fairly successfully, but each chapter in its own way. A little information on the methods used by the chapters would save delay and prevent inefficiency in combating those same problems elsewhere.

If letters of the type mentioned are forthcoming, chapter letters become the most important part of the fraternity periodical. Otherwise that part of the paper might far better be devoted to cracks from Whiz Bang.

ANOTHER CHAPTER

Word has lately reached us that the petition of the Epsilon Society of the University of Virginia has been approved by a vote of four-fifths of the chapters. The date of installation has not as yet been set, but we hope it will be soon.

This is our second chapter in the south, and should prove an able running mate to Alabama. Indications seem favorable for the passing of the petition of Sigma Gamma Epsilon of North Carolina A. and M. College. The three will well represent Theta Tau in the south.

UNDERGRADUATE FAULTS

Any one who is forced to come into contact with the modern college man quickly realizes that his faults may be classified under two heads, procrastination and ingratitude.

The first is the result of our college system, the requirement of a certain amount of work before a specified time. College men soon get the habit of putting off assignments until the last minute and finally rushing them through in a haphazard, half-hearted manner, doing the absolute minimum amount of work. It requires great effort to break away from carrying that tendency into after life.

Ingratitude is a direct result of private endowment or state support of institutions, alumni direction of fraternities, and parental support of the individual, in other words, dependence. The student considers all this a part of the permanent order of

things and only grudgingly consents to do his part to further them.

It is in fraternity affairs that the tendency to carry these faults into outside fields is particularly noticeable. Lack of promptness and thoroughness in carrying out the requests of those directing the affairs of the fraternity is evidence of both faults. The fraternity undergraduate must be made to realize that he is reaping the benefits of affiliation with an organization held together by the efforts of a few alumni, and that he can only do his part in helping to increase the strength and unity of the fraternity by the prompt discharge of his duties.

LABOR AND THE COLLEGE GRADUATE

Ambition and the will to work alone insure success, in the opinion of Thomas A. Edison, according to an interview recently published in the daily press. He discredits the efforts of the colleges and belittles the value of a college education. The former, he says, fail in their purpose. The students and graduates object to work, particularly dirty work, and are disappointing.

This is a sweeping generalization; but pungent comment on important matters is the only type that invites adequate attention. We are particularly interested in what Mr. Edison says, because his impression coincides with that of a prominent mining engineer in the West, whose career has been used, on many occasions, as an object lesson to those who aspire to emulate the successful, and who has gone out of his way to provide employment in the mines under his control for college men seeking practical experience underground. The results, he admits frankly, have been uniformly disappointing. The students object to work, particularly dirty work. They expect, as Mr. Edison has discovered, to be promoted in a few weeks. We suspect that the movies have something to do with this, for the successful engineer of the silver screen is invariably portrayed as a youthful individual who achieves the pinnacle of his ambition by doing something dramatically clever at the right moment. College graduates should bear in mind the fact that opportunities that are manufactured by the scenario writer have no counterpart in real life.

We have only one preliminary suggestion to make to college authorities: The inculcation of a sense of intellectual humility among those of immature experience—an appreciation of the fact that the real education of the graduate begins when he leaves college.—*Engineering & Mining Journal Press.*

Recent Publications by Theta Taus

RECENT ADVANCES IN METALLOGRAPHY

By Zay Jeffries, Hon. Delta

Director of Research Aluminum Co. of America, Cleveland, O.
Published by A. I. M. & Met. E.

CHANNEL COAL & CARBONACEOUS SHALE DEPOSITS OF PENNSYLVANIA

By Chas. R. Fettke, Pittsburgh, Pa., Charter Member of Nu
Published by A. I. M. & Met. E.

BUL. 721 U. S. G. S. GEOLOGY & PETROLEUM RESOURCES OF NORTHWESTERN KERN COUNTY, CALIFORNIA

By W. A. English, Epsilon '10

PROFESSIONAL PAPER NO. 116—U. S. G. S. THE SUNSET MIDWAY OIL FIELD, CALIFORNIA

By R. W. Pack, Epsilon '10

To our Brothers who have been transferred to the Eternal Chapter

"Every golden beam of light
Leaves a shadow to the sight;
Every dewdrop on the rose
To the ocean's bosom goes.
Every star that ever shone
Somewhere has a gladness thrown.
All that lives goes on forever,
Forever and forever.

Every link in friendship's chain
Forged another link again;
Every throb that love has cost
Made a heaven and was not lost.
Every look and every tone
Has a seed in memory sown.
All that lives goes on forever,
Forever and forever.

Never yet a spoken word
But in echo it was heard;
Never was a living thought
But some magic it has wrought.
And no deed was ever done
That has died from under sun.
All that lives goes on forever,
Forever and forever.

So, O Soul, there's no farewell
Where souls once together dwell;
Have no fears, O beating heart,
There is no such word as part.
Hands that meet and closely clasp
Shall forever feel the grasp.
All that lives goes on forever,
Forever and forever."

ANNETTE ROHN.

Robert Baxter Elder

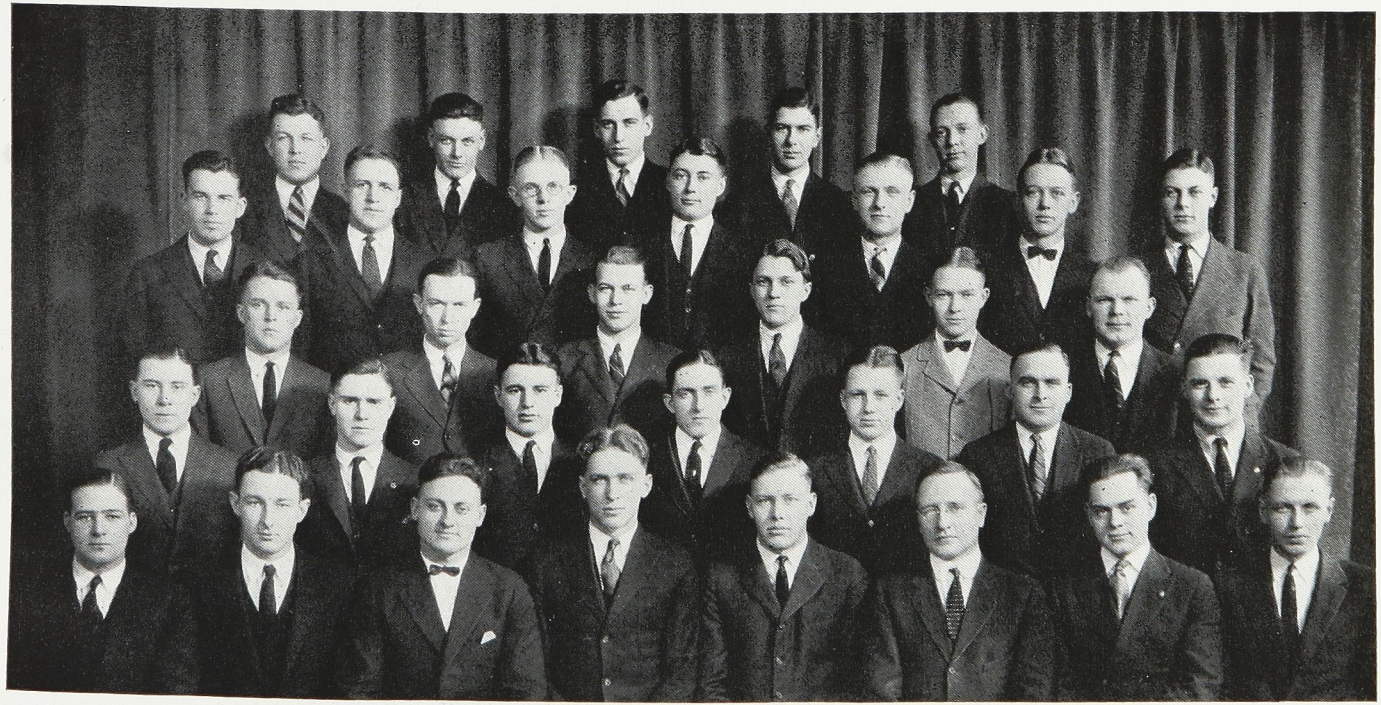
Gamma '08

Robert Baxter Elder, Gamma '08, instructor in metallurgy at the School of Mines, University of Idaho, and assistant metallurgist of the Idaho Bureau of Mines and Geology, died at Denver, Colo., on March 11. Mr. Elder was graduated from the Colorado School of Mines in 1908. He was a very active member of Theta Tau and of Kappa Sigma.

Following an experience with the Coast and Geodetic Survey, he entered the service of the Chicksan Mining Co., in Korea. In 1919 he returned to the United States, and accepted a fellowship in metallurgy at the University of Idaho. Here he speedily demonstrated marked research ability and distinguished himself in the fundamentals of flotation. At the conclusion of his fellowship, he was tendered a teaching and research appointment which he accepted. His paper "Interfacial Tension Measurements and Some Applications to Flotation," published by the Idaho Bureau of Mines and Geology, attracted wide attention, and a later publication, "Notes on the Measurement of Surface Tensions," issued by the *Journal of Physical Chemistry,* showed evidence of an unusual grasp of the physical basis of flotation phenomena. Shortly before his last illness he had been engaged in an investigation of classification as applied to concentration in Coeur d'Alenes.

Brother Elder had been suffering from an ailment of long standing. He was operated on shortly before his death and all his friends were expecting an early and rapid recovery.

News of his death comes as a keen blow to the members of the Theta Tau who saw in him a man who was fast being recognized as one of our most prominent alumni.



ALPHA CHAPTER

Fifth Row—Jones, Sims, Bumgardner, Larson, Knutson
Fourth Row—Skarolid, Young, Larpenteur, Morse, Kearney, Nelson, Wilson
Third Row—Kean, Spencer, Mooney, Lewis, Hennen, Olson
Second Row—Sturts, Calhoun, Hartman, Marshman, Haley, Willson, Brunner
First Row—Marshall, De Vaney, La Tendresse, Grettum, Bodin, Prof. Parker, Gow, Middleton

Chapter Letters

ALPHA CHAPTER

Total Initiates	236
Active Members	34
Pledges	8

At this time of the year, the chapter is thinking more of the future than of the present. Plans for the summer and fall are the main topics of discussion.

Although our present house is comfortably large, its distance from the engineering campus is undesirable. Shortening the noon hour, and thereby handicapping us during rushing seasons, is one of the objectionable features. We are consequently conducting a search for a better building with a view to occupying it next fall.

Loss of sixteen men by graduation this spring will rob the chapter of some of its most familiar faces, since these include those who have continued their university work after leaving several years ago to enter the service. With this in mind, there is a possibility that we shall have a social gathering before the end of the year. One of the suggestions is that we hold a house party at Lake Minnetonka, one of the nearest of our ten thousand.

Anticipating the reduction of the chapter roll at the end of the year, we are following a progressive schedule of pledging, and according to present plans we shall have twenty-three actives at the opening of the fall quarter, equaling the membership with which we started this year.

Since the last number of the Gear, St. Patrick's day has been the most interesting event on the campus. The celebration has always been held on March 17, but weather conditions and final examinations for the winter quarter necessitated a change of venue this year for our Patron Saint's court, and April 13 was chosen. The customary parade, open house in the shops, green tea and dansant, and grand ball in the evening entertained the visitors. Theta Taus took an active part in the celebration, including the duties of general chairman.

BETA CHAPTER

First Row (Bottom)—Kime, Guerin, McArthur, Smith, Cookson, Jorgenson, Beck, Peterson
Second Row—Krumm, Fredericks, Akin, Nicole, Vaughan, McLaughlin, Shuttleworth, Knaebel, Kackley
Third—Row—Ver Bunker, Bridges, Eliot, Anderson, Pratt, Huyge, Foucault, Warner, Griffith
Fourth Row—Pickett, Haga, Mullins, Hunter, Rees, Seaman, Beppler, Kranenberg
Fifth Row (Top)—Vanderburg, Jewell, Satterley, Weed, Neil, Havens

Relations with other professional fraternities on the campus are particularly pleasant. The newest of the group, Triangle, is one of our most friendly competitors.

ALBERT W. MORSE,
Corresponding Secretary.

BETA CHAPTER

Total Number of Initiates . . .	255
Active Members	43
Pledges	2

Beta Chapter has passed through a very eventful winter, here in the land of ice and snow. On January 18, 1923, we initiated twelve new men into the mysteries of H. & T., and of a certainty, the pick of the present freshman class. On the following evening was prepared one of the most famous banquets in the memory of Beta Chapter, and all the new men were made to feel that a welcome awaited them in Theta Tau.

That the men of Beta are both able and popular, is readily seen by the number of offices and student bodies upon which they are represented. We have Judd Huyge as president of our Student Council and Mullins and Guerin are two of the other members. Our scholarship record is high, for we have ten to sixteen members comprising the Tau Beta Pi Chapter of the Michigan College of Mines. Haga (center), Warner and Cookson represent us on the basketball team. Kranenberg and Jewell were on the 1923 Hockey Team. McArthur was chairman of the Ice Carnival and toastmaster of the present Senior Class. Kime heads the committee for this year's M. C. M. "annual." The Lode is the college newspaper and we have Haga as the assistant editor, Satterley as the assistant business manager, and Neil and Warner as the circulation managers. Johnson is instructing in the Physics Department, Guerin in the Mining and Minerology Departments, and Haga in the Mining Department.

M. C. M. suffered a very severe loss when the entire Metallurgy Department burned, and both the U. S. Bureau of Mines and the Lode offices were consumed. It will probably take several years before the new building will be ready for occupancy.

Beta Chapter announces the pledging of George A. Krumm, Chicago, Ill. (Delta Tau Delta, Northwestern) and W. A. Beppler of Hancock, Mich.

We are sorry to lose Bill Beck, '22, who has just graduated, but wish him luck and success in his new position with the Wisconsin Steele Company, Nashwauk, Minn. We also lose Mike Fay, manager of last year's hockey team and editor of the "Lode." Mike intends to mold his future in Detroit, Mich. Four men from Beta Chapter, Pickett, Johnson, Huyge and Peterson, upon graduation this June, leave for work with the Bethlehem Steel Company, South Bethlehem, Pa. Brother Lester Vocke has been commissioned second lieutenant in the Field Artillery and sent to Fort Benjamin Harrison.

In about a month Beta Chapter will again be considerably broken up, until the following fall, as a great many of our men leave for the five weeks' work in the Iron Country (in mine inspection and underground surveying), others go out on the five weeks' trip in field geology, however, Beta will function continuously until the first of September, as a fair proportion of our men remain through the summer when they take the courses in metallurgy and ore dressing and the Freshmen take their twelve weeks' course in surveying.

The graduating class of M. C. M. will hold their formal commencement exercises on April 19, 1923, followed by the formal Senior banquet and the M. C. M. "annual" on the night of April 20.

E. R. Kime,
Secretary Beta Chapter.

GAMMA CHAPTER

Total Number of Initiates . . .	224
Number of Active Members . . .	24
Number of Pledges	0

Gamma has taken in no new men since the last issue of the Gear; the present enrollment consists of forty-four actives, three of whom are honorary members. Of these we will lose twenty-nine by graduation in May, leaving a nucleus of fifteen to start on next fall. The unusual size of our chapter this year was due to the fact that our Senior class is the largest in the history of the school and contained an exceptionally large number of men of Theta Tau calibre. Next year will probably see a smaller chapter.

The visit of the Grand Regent, Brother George D. Louderback, to Gamma this winter is, we feel, the best thing that has

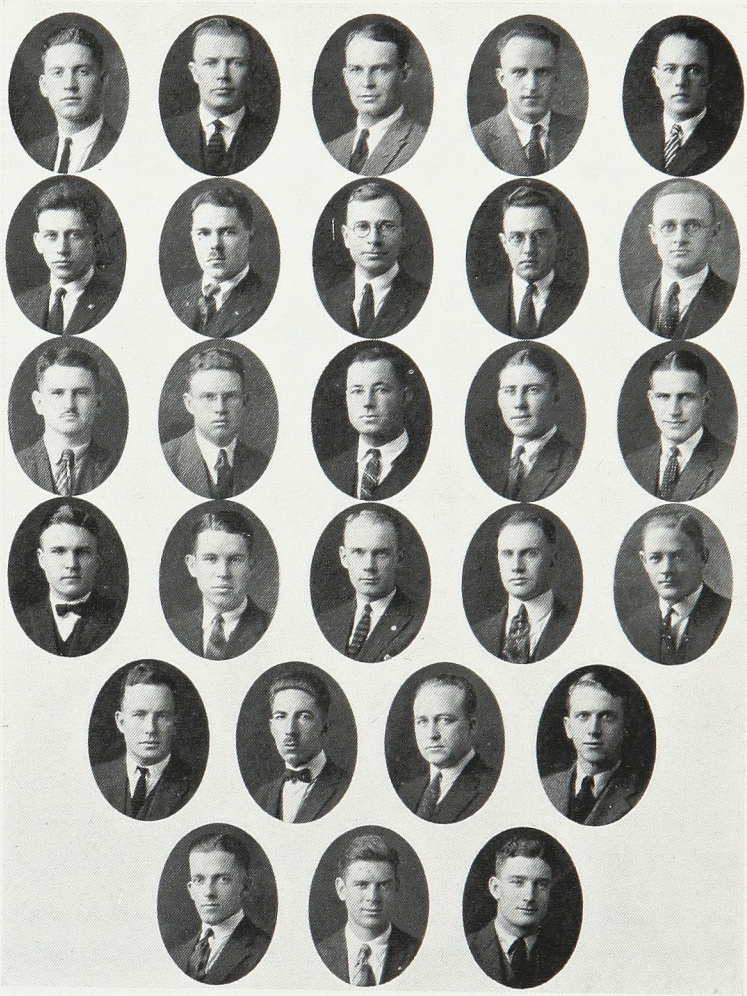
happened to us for a long time. We wish to thank him for his sincere advice and very valuable suggestions; we regret that he could not have remained with us longer. As a result of his visit, Gamma has inaugurated what is to us, a new system for conducting our meetings. We now have at each meeting an informal talk of a semi-technical character, by an alumnus of Theta Tau, either from this chapter or from some of the other chapters, and to date, these have proved highly entertaining as well as instructive. As an added attraction, refreshments are served at the conclusion of the meetings. Those of the alumni whom we have seen thus far, have been greatly in favor of the idea and have willingly consented to come out and talk to us. We have such talks scheduled for the remainder of the year at each regular meeting. A decided increase in the interest taken by the members of the chapter in these meetings, is already evident and we feel that the future holds great possibilities in this direction.

In athletics Mines has just completed a very successful basketball season by producing the best team in the Rocky Mountain Conference and placing all the men on the team on the all-conference fives. Of the five regulars, four were Theta Taus, including Captain Gebo. Brothers McGlone, Jordan and Mahood were selected for the all-conference first team and Brother Gebo for the all-conference second string.

It is rather early as yet to make any predictions as to the outcome of the baseball season, but with most of last year's championship team back, the prospects are unusually bright. Brother Jordan is captain and brothers Robinea, Worden, Gardere and McGlone, who was last year's captain, will comprise the rest of Gamma's letter men on the team from last season. Brothers Clothier and Slaughter also look like sure bets for berths on the regulars.

The annual Theta Tau dance was given on March 23 and was not only one of the best dances of the year, but was also a decided success financially.

In other activities Gamma, as usual, ranks high. Nine of our present chapter are members of Tau Beta Pi; these include Brother Dean Grant, honorary, and Brothers Evans, Hambly, Herron, Holkestad, Jordan, Martin, Price, and Ryan. Brother Martin is president of the Student Council and editor-in-chief of the Oredigger. Brother Budd has been elected to fill this office for next year. Brother C. E. McWhorter is football captain for next year and Brother Mahood has been selected to pilot next year's basketball team.



EPSILON CHAPTER

In closing we wish to congratulate the brothers of Alpha Chapter who have, by their hard work and untiring efforts, made the Gear a success. They deserve the hearty cooperation and unanimous support of all the chapters.

Gamma extends her very best wishes to her sister chapters and warmest regards to all Theta Tau alumni.

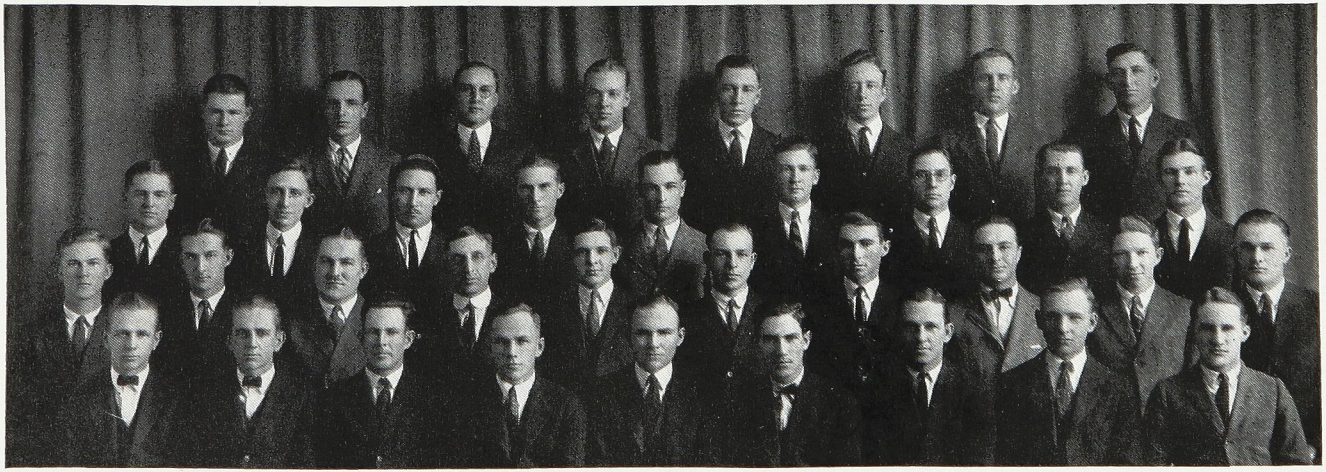
JOHN C. HERRON,
Corresponding Secretary.

EPSILON CHAPTER

Total Roll of Initiates	204
Active Chapter Roll	36
Number of Pledges	0

Epsilon Chapter is just completing a most successful year. We have been well represented in campus activities, and in scholastic honors the brothers have placed Theta Tau well to the front. Recently Brothers R. N. Nelson and P. D. Trask were elected to full membership in Sigma Xi, and Brothers G. O. Scarfe and M. B. Schmittou to undergraduate associate membership. Brother Trask won a University of California Traveling Fellowship and will spend next year studying at the University of Paris, France. Alumni on the campus are also upholding the chapter honors, and it is noteworthy that all the candidates for Doctors Degrees in the Department of Geology, are Theta Tau men.

In campus activities we are represented by Brother Krebs, who is manager of California's track team, and is putting it through a successful season. On the varsity football team, Dean at tackle and Gallagher at center showed true Theta Tau punch and workmanship in the way they helped mess up the aspirations of the Bear's opponents. This marks the third year on the varsity for both of them. Brother Donaldson is pulling a neat oar at number five in the varsity boat, and as he will be here for another season, he will very likely represent Theta Tau in the boat for two years. Brother Byler is circulation manager of the California Engineer. Brothers Thornburgh and Trask are representing, respectively, the College of Mining and the Department of Geology on the Graduate Students' Branch of the Alumni. Theta Tau was especially active in Engineers' Day activities on March 17, with Brothers Wiles, Bramming, Roripaugh, and Byler at the head of committees.



ZETA CHAPTER

Top Row—Hackney, Clardy, Learned, C. Patterson, Hawley, Brotherson, H. Patterson, Wenzel
Second Row—Patton, Anderson, Janes, Stagg, Bentley, Gregory, Harris, Bowman, Lucas
Third Row—Nichols, Smeltzer, Smith, Prof. Shaad, Luff, Endacott, Hibbs, Beeghly, Sharpe, Kindsvawter
Bottom Row—R. Patterson, W. Patterson, Barron, Clawson, Brehm, Cornelius, Bennett, Rose, Herndon

During the past year Epsilon has devised and perfected a definite procedure that is followed in the selection of new material, and we are especially pleased with the results of the last initiation. Epsilon took in seven new members this spring, all strong material that will help fill the places left by the graduation of nine brothers this May. The new brothers in Theta Tau are: G. O. Scarfe, E. N. Pennebaker, W. G. Donaldson, J. R. Sweet, W. G. Gallagher, S. B. Henry, and O. G. McDonald. We were very fortunate in having Grand Scribe Schrader drop in on us at the initiation. Brother Schrader gave a short talk on the subject of fraternity policies at the initiation banquet in San Francisco. In addition to Brother Schrader's two visits, we have been inspired throughout the past year by close association with Grand Regent Louderback, who has attended many of our meetings and advised and counselled us.

Following each of the regular meetings this year, we have had a Theta Tau alumnus or active brother, address the chapter on some subject of interest to engineers. That this has proved a fruitful course is evidenced by a resume of the subjects covered: Brother R. J. G. Stewart told of his experiences while spending two years in German prison camps, Brother C. L. Hulin gave an account of his expedition into South American tropics in search of oil, Brother E. D. Rooney explained the methods used in the Coeur D'Alenes in prospecting with the diamond drill, Brother R. P. Miller described the McKenzie River District, Alaska, as he found it while engaged in geological exploration work there last summer, and Grand Regent Louderback told us about the Theta Tau chapters which he visited during his recent trip East.

In closing, Epsilon sends greetings and best wishes to other chapters and extends a hearty welcome to all brothers who might be passing through Berkeley during the year.

RAY E. BYLER, *Scribe.*

ZETA CHAPTER

Total Number of Initiates . . .	170
Active Members	29
Pledges	7

Zeta chapter is nearing the completion of a very successful school year, and is looking forward to new conquests for next year. We hope to include among other victories next year that of gaining a new house of our own.

Zeta started the second semester of this school year with twenty-three active members. On February 27, eight of the pledges of last semester and last year, were initiated. On the night of March 6, a smoker was held at the house, and at the next meeting three men were chosen for pledging.

In school activities this year Zeta was well represented. We had Brother Endacott this year as captain of an ever-victorious basketball team, and Brother Bowman as a star forward on the same team. This spring Brother Wenzel is the leader of the Jayhawkers in baseball.

Theta Tau is well represented on the staff of the "Kansas Engineer," having the editor, circulation manager and his assistant, as well as the business manager.

We are still maintaining a high standard of scholarship, as shown by our standing in Tau Beta Pi. They took three more of our men this spring, giving us ten members of the twenty-nine active members of that organization.

Theta Tau came out very well in the annual school election held this spring. We had five men running for offices, and all five of them were elected by safe margins. The offices which we took were: president of the Men's Student Council, vice-president of the council, two engineering representatives out of three to the council, and president of the engineering school.

On the night of Tuesday, April 17, Zeta is going to have its annual Founders' Day banquet. This will be a gala affair and quite a number of the alumni are expected to return for it.

On May 5, we are going to hold our annual spring party, and expect to have *some* party. We believe in the ancient slogan, "All work and no play, etc.", so just watch us shine.

Zeta extends her best wishes and God speed to the brothers who are starting out in their chosen profession this spring, and extends a hearty welcome to any who might stray toward the 'Sunflower State.'

ROBERT SHARPE,
Corresponding Secretary.

THETA CHAPTER

Initiates since last Gear	5
Pledges	5

The chapter has recently added Professor Ralph E. Mayer to its list of honorary members. Professor Mayer, in addition to

being professor of Draughting and Mechanical Design, is secretary of the Enginering School. In this position he exerts a powerful influence over the incoming engineering students and will be of inestimable value to the chapter. As a leader and a friend, he has long been known to the students, faculty and friends of the Engineering School.

The new members of the chapter are well represented in the various activities of the institution. Brothers Steffens and Pyle are mechanical engineers, the latter was recently admitted to the local chapter of Tau Beta Pi honorary engineering fraternity. Brothers Brinkerhoff and Hawkins will be a valuable addition to the Miners, who, as has usually been the case in past years, form the majority of the local chapter. Brother Devlin is actively engaged in taking the course in Industrial Engineering. The Industrial Engineering Course has recently been inaugurated at Columbia, its curriculum includes a business training in addition to a broad range of engineering subjects. We are especially pleased to count an industrial engineer among our members. Brother Devlin is president of the local chapter of the Alpha Chi Fraternity.

The recent pledges are all very likely boys representing the Electrical and Mechanical branches of our profession. It has been a policy of the chapter of late to extend our membership to those engaged in the study of Electrical, Mechanical and Civil Engineering. We hope to obtain the same measure of success in our broader policy as we have upheld in recent years.

Wm. C. Gahagan, *Chapter Editor.*

IOTA CHAPTER

The college year opened in August with fifteen old men back full of the old pep and ready to put Theta Tau on the campus with a bang, as of the many years before.

Brother Watkins resigned as regent due to the fact that he was away so much on football trips that he couldn't do justice to the office and still play football. Brother Werner was elected in his place. As Brother Webster resigned as treasurer on account of too much school work, Brother Schmidt was elected to this office.

With the opening of school, the main attraction was football, and Theta Tau is duly proud of its gridiron warriors. H. E. Zoller, all state center and captain, there were few plays of the enemy that

Hank didn't break up and always could be depended on to pass the ball to a T, and still make his hole in the opposing line. M. W. Watkins, end, and a man that stopped things that came his way and busted up quite a few that went the other way.

B. E. Hoover, half back, now let me tell you, was there with the punch and that put the ball in the enemies' territory consistently.

D. L. Moodie, end, was there with the goods, and made a great mate for Watkins. Very few plays got around Dwight. Karl Hasselman, half back was a man feared by every one that ever tried to stop him. He is one of those hard hitting back field men that don't stop until five or six get on and ride.

Now we don't only play football, but we are enrolled conspicuously on the calendars of Tau Beta Pi and Phi Kappa Phi. In Tau Beta Pi: Webster, Zoller, Werner Frame Wheeler, Murphy and Frey. In Phi Kappa Phi, Wheeler, Webster, Frey, Erickson, Werner Frame. Pretty good, don't you think?

We hold our meetings regularly every two weeks. At these we have talks on various engineering subjects by our members. Also during the year we have smokers and banquets for a get-to-gether with Gamma Epsilon, and our pledges.

We are proud of our Chapter, and extend a hearty welcome to all brothers, active and alumni, who may at any time pass through this part of the country.

KARL HASSELMANN,
Corresponding Secretary.

KAPPA CHAPTER

We are glad to announce that Kappa at last has a permanent address. We hope that this will remedy the delays in the correspondence with the national officers.

Champaign, Illinois, Station A, Box 581.

Kappa Chapter is going to have their first talk from a faculty member at our meeting next Thursday evening. Professor Wilson, a member of Theta Tau, is going to talk to the brothers. Kappa Chapter intends to emphasize this from now on, as we have some fine material here. This is a duty that was overlooked or neglected by this chapter.

~~Doctor~~ L. D. Louderback visited Kappa Chapter during the last part of January. He happened to arrive during our vacation between semesters, as a result there were only two members

of Kappa Chapter in town. But although there were only two of us here, Doctor L. D. Louderback gave a better vision of Theta Tau then we had before. I was certainly fortunate to be here at that time. I only wish that the other members could have met and talked with Dr. Louderback.

Kappa Chapter expects to do many interesting things during the coming year. This semester we have been devoting our time to getting in mind the things we expect to carry out next year.

Fraternally yours,

S. R. Albert, *Corresponding Secretary.*

LAMBDA CHAPTER

The last year has been a successful one for Lambda Chapter in every respect. A series of social functions have served to bring about an even stronger basis on which to build the fraternal bonds which unite us.

Our fourth annual banquet was marked with enthusiasm. Every man present from the youngest initiate to the honorary members was made to feel his importance as a cog in the gears of the internal mechanism of the fraternity. Each of the alumni got up in turn and pledged himself to be an active alumnus of Theta Tau for the coming year.

The initiations we have held have helped strengthen the spirit of the chapter, especially since the visit made us by Brother Louderback. He gave us some suggestions that have been very successfully put into practice. After initiations we usually adjourn to some food dispensary and partake of a little nourishment. We find that an informal gathering of that kind serves to let the initiates into the fraternity atmosphere a little more gradually than abruptly accepting him after the formal initiation.

We are trying to establish closer relations with the Intermountain Alumni Association through monthly meetings with them.

Lambda has 26 active members and pledges, and they are "active" in every respect.

Our regent has just been elected president of the Student Body of the University of Utah. Many of our members hold important positions in other organizations.

Vernon L. Bell.

MU CHAPTER

Total Number of Initiates	34
Active Chapter	20
Initiates this Year	9

Mu started the year's activities off with eleven men.

The alumni, our first, have scattered far and wide. Brothers Brance and Wingard of '22 were here at the first of the year. Brother Brance was teaching in the Electrical Laboratory of the Federal Board for Vocational Education but soon went with the Century Electric Co. at St. Louis. Brother Wingard was with the State Geological Survey for a while until the call of the wild claimed him. He is now with the Compania Mexicana de Petroleo, "El Aguila," at Tampico. Brother Van de Graaff, '22, is with us this year as a fellow in the U. S. Bureau of Mines Experiment Station, where he worries with the magnetic separation of iron ores. Brothers David and Mallette are with the American Tel. & Tel. Co. at Atlanta, Ga., and Birmingham, Ala. Brother Stephen (and wife) are located in Birmingham, where "Steve" is connected with the contractors who are building the new plant of the Lehigh Portland Cement Co. Brother Moxley is with the Tennessee Coal Iron & R. R. Co. in the Birmingham district. Brother Booth, when last heard of, was at Anniston, Ala., with the Southern Manganese Corporation. Brother Cotlin holds a fellowship at New York University while Brother Shotts is in the same capacity at Yale. Brother Smith is with the Production Department of the Alabama Power Co. Brother Thompson is at Cicero, Ill., with the Western Electric Co. Brother Inglis is helping his father build concrete roads in Florida. Brothers Houghton and Patton are in parts unknown.

Mu is well represented in all phases of college life.

In athletics, Brother Newton, end, helped Alabama beat Pennsylvania. Brother Leake is the cage star as of old.

Among those of the "Junior Faculty" is Brother Gaston, instructor in Mechanical Drawing; Brother R. L. Harris, assistant in Mechanical Engineering Laboratories; Brother Meade, who has charge of field work in surveying and Brother Sneed, who teaches three Math. sections a day. Brother Anderson helps the dean in various ways.

Brother Powell was elected president of the Senior class and Brother Leake chosen orator. The manner in which these men carried off their part was indeed creditable.

Mu Chapter was fortunate this year in initiating such men as G. M. Cole '25, E. R. Coulbourn '23, R. B. Duggar '24, K. G. Harris '22, J. B. Martin '23, R. E. Meade Jr. '24, A. L. Powell '23, J. J. Shannon Jr. '25, and J. L. Shores '25. Brother K. G. Harris holds a fellowship in the U. S. Bureau of Mines Experiment Station, where he is investigating the use of the Table in the Concentration of High Silica Iron Ores.

We are planning to have our banquet soon, which will be a stag affair.

With the installation of Xi at Wisconsin, Mu put aside her swaddling clothes and now feels like one of the bunch.

Mu sends greetings and best wishes to all Theta Taus.

M. P. Anderson,
Corresponding Secretary.

NU CHAPTER

Total number of Initiates	56
Honorary Members	1
Active Chapters	34
Members Initiated since Dec. 15, 1922	14

Nu Chapter is pleased to announce the pledging of the following men:

S. F. Bittner
R. C. Clement
R. E. Kramer
J. Daschbach
Mark Downs
Maxwell M. Schrimgeour
H. P. Rossbach
W. F. Kaufman
George Saltsman
Art Weston
W. G. Sullivan

In the past year Nu Chapter has made considerable progress on the campus of Carnegie Tech. Regular meetings have been held throughout the school year and occasional social gatherings in the form of smokers have been held at the Bureau of Mines at which possible candidates were entertained. The programs at these affairs consisted of moving pictures supplied by the Bureau of Mines and talks by prominent faculty members and prominent engineers in the vicinity. We had the extreme pleasure of hearing Brother Holbrook, Dean of the School of Mines of Penn State, on one occasion.

This spring an inter-fraternity and inter-dormitory track meet is being held under the auspices of the Athletic Council and Theta

Tau has offered a silver loving cup as a trophy to the fraternity or dormitory winning the meet.

At the last meeting new officers for the coming year were elected.

The members have shown their usual activity on the campus. T. N. Griggs, our new regent, was elected to the office of president of the Student Council for the coming year and also was honored by being chosen for the presidency of the Student Branch of the Y. M. C. A. In the elections for the various class officers a number of the brothers have been nominated. Pledge Bittner is to be the manager of the basketball team next year. Many of the brothers are struggling for positions on the track team. McCormick has been appointed as chairman for the Commencement week program. Brother Jeffers has just completed a very successful year as president of the Student Activities Board. Brother Baugh was chosen for Tau Beta Pi in the spring elections.

We are planning a farewell to the Seniors in the form of a dance to be held at the Carnegie Union on Friday, June 1. If any of the brothers in the district of Pittsburgh whom we do not know would care to come we can assure them of a good time and a hearty welcome.

S. J. Duncan, *Scribe.*

XI CHAPTER

Total Initiates 12

Greetings, Brothers! On the first appearance of a chapter letter from Xi, we will try to present a little of the history of the organization and some information about the school in which we are located.

To begin with, the University of Wisconsin was founded in the year 1848, the year that Wisconsin was admitted to the Union as a state. The university is located at Madison, the capital of the state, in the south central portion. The city is surrounded by five beautiful lakes and many wooded hills, the university proper being situated along the shores of Lake Mendota, the largest of the chain. This gives a wide range of extra curricular activities to the students, and it is, as well, beneficial in enlarging the number of outside sports that may be indulged in.

The university is a state controlled institution, giving instruction in all the liberal arts and sciences, including work for the

higher degrees. Thus, there are in the several branches of the university, schools of Music, Chemistry, Commerce, Journalism, Library, Pharmacy, Education, and Physical Education in the Letters and Science College; Civil, Mechanical, Electrical, Chemical, Mining, Metallurgy, and Geology in the Engineering College; the College of Agriculture, the Law School, the Medical School, and the Graduate School. Beside these courses in residence, the university has a large enrollment in its Extension Division for correspondence study.

Up to the installation of Theta Tau at the University of Wisconsin, there have been no strictly professional fraternities in the engineering field. The engineering fraternities that have been established on the campus have assumed a social status which leaves the field open wide for the selection of good men for our organization. There are, in addition, the usual honorary scholastic fraternities here.

It was during the fall and winter of 1920-1921 that our local organization was perfected. Brother Ernest Schrader, brother of our Grand Scribe, brought the ideals of the fraternity before a few of us, and it was realized that this was the need of the Engineering School, and we formed a group with the goal of a petition to Theta Tau. A number of good men were included in our original organization, and in the spring of that year our petition was ready.

Our local was somewhat depleted in ranks by the loss of some men by graduation, but we got together more men in the fall and continued toward our purpose. When we received notice that Dr. Louderback was to give the installation ceremony, needless to say we were pleased. And personally I can say that that week end was an instructive and enjoyable one in the company of the Grand Regent and Brothers Lawrence, Hopkins, and Grettum from out of the city, and Brothers Lawrence, Ruble, McCleod and Goodridge in the faculty and school at Wisconsin. The ceremony was impressively rendered, and we can all feel highly honored by the fact that we had such a group to start us on our upward course in Theta Tau.

There were eleven members initiated, ten charter members, and one honorary, Brother Ernest Schrader. The men represent active elements on the campus at the university, scholastically, athletically, and socially, and it is the aim of every one of them to continue in the path outlined for us by the visiting officers.

FREDERICK W. NOLTE,
Corresponding Secretary.

OMICRON CHAPTER

OMICRON CHAPTER

As this is our first chapter letter some form of introduction to the Gear and the other chapters is called for at this time.

Omicron Chapter was installed at the University of Iowa on February 3, 1923, by Dr. George D. Louderback. Previous to this time Omicron Chapter was known as Theta Sigma Delta, members being taken from the College of Applied Science. Theta Sigma Delta was originally the Mecca Club, being founded in January, 1920, but the name was later changed to Theta Sigma Delta as the annual celebration of the Iowa Engineers is known as the Mecca celebration and it was thought best to change the name and avoid criticism of the rest of the student body of the college.

Iowa University is located at Iowa City, Iowa, and consists of the following colleges: Graduate, Liberal Arts, Law, Medicine, Dentistry, Pharmacy, Applied Science, Education, Commerce and the Schools of Music, Nursing and Public Health Nursing. The College of Applied Science was founded in 1903 and now consists of some 400 men. Courses taught include: Civil, Mechanical, Electrical, Sanitary and Chemical.

When Omicron Chapter was installed there were seventeen members and eleven pledges. Since that time ten of these men have been initiated and three more men pledged. Those initiated were: Ned Ashton, Raymond Anderson, Harold Phelps, Darrell Fisher, Mason Stober, Dick Van Gorp, Gill Freyder, Leo Vogt, Fred DeKlotz, and Ralph Van. The men pledged were: Albert Grother, Louis Wolters, and Harry D. Brockman.

Competition among the engineering fraternities for men is fairly keen, as we have at the present time five fraternities, all taking men from the College of Applied Science, and with only four hundred men to pick from it may plainly be seen that competition for the best runs pretty high.

We have during the past year been very active in student affairs, having two men on the football squad, Rich winning his "I" and Fisher his "I-2." Fisher will be back with us again next year, but we will lose Rich through graduation. Brother George Ashton was captain of the varsity cross-country team last fall, and is now out for the varsity track team. Brother Ned Ashton has done some excellent work in swimming this year, holding one or two of the university records, while Brother Phelps bids fair to take his place among the leaders in the two-mile in track this spring.

Three of our brothers are members of Tau Beta Pi, honorary engineering fraternity and members of Sigma Xi also. Brothers Holbrook and Rich are members of A. F. I., honorary Senior men's organization, to which twelve of the most prominent men on the campus are elected at the end of their Junior year. Brother Van Hoene was president of the A. I. E. E., while Brother Vogt is president of A. S. C. E., with Brother Moran as secretary. Omicron men will be found in every organization on the campus where it is possible for engineering students to belong and all of them will be found taking an active interest in the work in some manner.

The Transit, publication of the Associated Students of Applied Science, is edited by Brother Weir, who was recently elected to Sigma Delta Chi journalistic fraternity.

Omicron took the championship in the engineering fraternity basketball league this winter, winning every game. A team was entered in the interfraternity indoor relay carnival, but we were not so successful in this respect.

At our latest initiation Prof. R. B. Kittridge, head of the Department of Surveying, was initiated as an honorary member. Prof. Kittridge has been actively connected with the fraternity ever since its organization some three years ago, and we feel that he can aid us materially in every way possible.

Brother Phillips was forced to leave us early in March, as he had accepted a commission in the Engineer Corps of the regular army and was called without finishing his work for a master degree. He is now at Fort Humphries, Virginia, in the Army Engineering School.

Omicron will always be found "at home" to all the brothers from any place who happen to be near Iowa City. We are justly proud to be in H. and T. and will do our best to advance Theta Tau in every way possible.

K. J. Weir,
Corresponding Secretary.

Among the Alumni

ALPHA CHAPTER

Fred W. Buck, '09, is still in Duluth.

Geo. M. Shepard, '09, city engineer of St. Paul, Minn., announces the arrival of a daughter on October 2, 1922.

Marvin Barnum, '11, is president of the Northern Machinery Co. of Minneapolis.

Wm. Ripley Dorr, '14, has a son. He is now living in Los Angeles, Calif., where he is district manager for a pipe organ company. When Ripley left La Grange, Illinois, the officers of Emanuel church, where he had been choir master and organist for the past four years, presented him with a Japanese silk rug of exquisite workmanship in appreciation of his services.

Geo. A. Geib, '14, has resigned as captain corps of engineers, U. S. A., and associated himself with the S. W. Strauss Co., National Metropolitan Bank Bldg., Washington, D. C.

Thomas Askew, Jr., '16, is in business in Plainview, Minnesota.

David M. Giltinan, '16, announces the birth of a son, David Murray, on October 6, 1922.

Hugh A. Smith, '18, was married August 22, 1922, to Dorothy Neal (Sweetbriar '19), at Ocean Park, Washington. They reside in Boise, Idaho, where Hugh is Division Engineer for the Idaho Power Co.

Fred A. Davies, '16, is geologist for the Anaconda Copper Mining Co. for the company's petroleum exploration work. His headquarters are in Montana.

Don Capstick, '22, was recently married to Miss Madge Clinic. Don left the Minnesota Steel Co. some time ago, did a little valuation work for Stone-Webster Co., and was negotiating for a couple more jobs.

Roswell W. Prouty, '12, is still at the Copper Queen in Bisbee. He was seriously ill with pneumonia and one of his children was also very sick. News of his recovery has been gladly received.

Herb West, '21, recently broke into print in the Alumni Weekly. We take no responsibility for any of the statements he makes. "I am working for the Bunker Hill and Sullivan Mining Co. at

Idaho Continental Mine, which is near the Canadian border and about 26 miles away from a railroad and 56 miles from a town of any size. I might mention that we have had a part of our winter's snowfall, so our mail service is not the best. It isn't bad yet, for we have only eight feet so far, but we expect five or six more before spring."

E. H. Coe, '20, announces his marriage to Patience E. Quigley. It happened back in August, 1922. "Lootenant" Coe is stationed at Fort Snelling, Minn.

Roy O. Dunham, '14, announces that he has turned over the control and management of his home to one Richard Johnson Dunham, said control and management dating from May 25, 1922.

Of the Miners who finish their course this month Fred DeVaney is going to the Illinois Highway Department, Hank Latendresse moves down to New Mexico to run plane table for the Midwest Oil, Morse Winter is working for a contractor in western Minnesota, and Frank Mooney will work for the Bethlehem Steel Co., Bob Calhoun, Jack Middleton and Alex Gow are still "considering offers."

Ben Gandrud, '21, is with the Fairview Fluorspar and Zinc Co. at Rosiclare, Ill.

Loren Dawson, '21, left a few weeks ago for the wilds of northern Manitoba. He is working for the Pendennis Mining Co.

John W. Lewis, '12, delivered an address before the 1923 meeting of the American Institute of Mining Engineers on the Petroleum Resources of Venezuela. He predicted that this would become an important producer of petroleum as the fields are all close to ocean transportation and the oil of good quality. Brother Lewis is general manager of the New England Oil Co., having extensive interests in Venezuela. This seems to be quite a family affair, as we notice the following Theta Taus on the staff: H. J. Wasson, Alpha '14, chief geologist, C. R. Hill, Eta '12, E. W. Westervelt, Gamma '13, and Philip Nolan, Gamma '13.

BETA CHAPTER

Fred W. Varney, '06, has opened a contracting office in San Francisco. His address is not known, but his phone is Prospect 1233.

E. J. Haug, '09, is now living in Berkeley, Calif. His address is English Gardens Apts., 3141 College Ave.

James A. Barr, '05, recently completed a series of examina-

tions in eastern Tennessee, New Mexico and at Parrall, Mexico. He then left to make an intensive inspection of the mines and plants of the Wayne Iron Corporation at Williamsville, Mo.

Ernest Klepetko, '11, recently returned to Anaconda as contracting engineer. He designed, constructed, and started operation of the roofing plant of the A. C. M. Co. at Perth Amboy.

C. G. Thielicke, '12, announces the birth of a daughter, Margaret Jean, born October 4, 1922, at Globe, Ariz.

Byron O. Pickard, '07, is one of the authors of Technical Paper 314, U. S. Bureau of Mines, entitled Metal Mine Fires.

GAMMA CHAPTER

T. B. Romine, '19, is a geologist for the Standard Oil Co. of California, Box 912, Abilene, Texas.

Chas. A. Kumke, '06, is geologist for Ray Cons., Ray, Arizona.

Emory Marshall, '11, spent the winter developing a prospect near Cananea, Mexico. He met Curtis Burt, Beta '13, several times, and says there are two other Theta Taus in Cananea.

Alan Kissock, '11, is temporarily in Jackson, California, working on a mining property in which he is interested.

Lindley M. Reith, '18, is superintendent of the Pacific Lime and Plaster Co., at Sonora, California.

Hale M. Strock, Gamma '21, writes from Butte to say that the outlook is very encouraging except for himself. He was looking out from beneath the bandages of a fractured skull, which he accumulated in a cave-in last September.

W. M. Lewis, Gamma '08, ex Alpha, is still with the Luitweiler Pumping Engine Co., in Philadelphia. He promises to be at the next convention in New York.

R. P. Oliveros, Gamma '17, has returned to his home in Savannah, Georgia, from British Columbia.

E. A. Strong, Gamma '14, is manager of the Bellhelen Mine, fifty miles east of Tonopah, and is building a modern milling plant at the property. He was with the Dorr Co. for many years, so this should be the last word in cyanide mills.

EPSILON CHAPTER

Johnny Rogers, '21, is working out problems on the electrical precipitation of lead at the Bunker Hill & Sullivan, Kellogg, Idaho.

John Metz, '22, is preparing for a little sojourn in Alaska. He will be assistant engineer at the Kennicott Mine.

A. B. Yates, '22, is on the engineering staff of the Homestead.

Vincent Perry, '22, is working as the assistant engineer at the Maloney Mine.

Bryan Leiser, '21, is a teaching fellow in the Department of Geology here.

Bob Thornburgh, '21, is also a teaching fellow and preaches the gospel of rocks and minerals in the Geology Department.

C. Hulin, '20, is an instructor in geology.

M. G. Edwards, '12, University of Wisconsin, but an Epsilon initiate, is instructing in the Department of Geology and a candidate for a Doctor's Degree.

A. O. Woodford, '13, has come up from Pomona to the University to get his Doctor's Degree.

W. I. Foshag, '19, has been employed as mineralogist for the U. S. National Museum at Washington, but is in Berkeley at present to get a Doctor's Degree.

Brothers D. D. Trask, '17, and R. N. Nelson, '19, are also candidates for the degree, and are in Berkeley.

Quay Diven, '22, visited the chapter recently. He is resident geologist at Huntington Beach.

L. H. Chapman, '22, went to work in the mines at Randsburg so that he could enjoy the summer heat of the desert.

Dan McMillan, '20, crew captain, is showing the muckers the Varsity "stroke." He is stope boss at the Ruth Mine, Ely, Nevada.

G. B. Dillingham, '10, a charter member of Epsilon, is superintendent of the Cerro de Pasco Copper Corporation's mines at Morococha, Peru.

N. L. Taliaferro, '13, is geologist for the Ventura Oil Company, Los Angeles.

Ernst Behr, '10, is geologist for the Montana Cons. Oil Co., Roundup, Montana.

Arthur Eaton, '13, who has had an office as Consulting Petroleum Geologist in New York, has moved to San Francisco and is now located at 317 Merchants Exchange Bldg.

Arthur Livingston, Jr., '24, announces the birth of a son on April 1.

Stephen Gester, '13, is Geological Superintendent of the Standard Oil Co. of California. On January 26, 1923, he became the proud father of a second son.

George D. Smith, Jr., '11, who has been chairman of the Nevada Industrial Commission for six years, has resigned and is constructing a new million dollar hotel in San Francisco. His resignation was first presented last summer but was refused. His administration of the Commission has been praised by all employers and employees. He brought the work to a high state of efficiency.

ZETA CHAPTER

A. J. Albert '22 is working for the Sinclair Oil Co. at Coffeyville, Kansas. He will be there until May 1, 1923.

Harold Anderson '21 is instructor in the electric laboratories, at the University of Kansas.

John W. Bunn '20 who has been an instructor in the engineering school of the University of Kansas, has recently been appointed as head of freshman athletics here.

John H. Clawson '22 is working for the General Electric Co. at Schenectady, N. Y. His address is 24 Eagle Street.

Leon E. Edwards '22 is illuminating engineer for the Santa Fe at Topeka, Kansas. He is also classified as a professor of electrical engineering at Washburn College.

'Tis rumored that one of our members has committed the unforgivable. Samuel G. Fairchild '14 is practicing law at Hutchinson, Kansas.

R. E. Ferguson '22 is "Heating and Ventilating Engineer" for the Campbell Heating Company, of Kansas City, Mo.

P. S. Fox '20 who has been Assistant State Sanitary Engineer for Kansas, has accepted the position of State Sanitary Engineer of New Mexico. Pete's new home will be at Santa Fe.

Carl Gray '22 is with the Southwestern Belle Telephone Co. at St. Louis, Mo.

George Hawley '23 is with the United Water, Gas and Electric Co. of Hutchinson, Kansas.

Ralph N. Hoffman '13 is with the Andes Exploration Company, of Chanaral, Chile.

J. J. Jakowsky '20 is with the U. S. Bureau of Mines, Pittsburgh, Penn.

Darl S. (Tony) James '16 is master mechanic for the Swift & Co., packers. His present address is 3231 East 8th St., Kansas City, Mo.

Adrian E. Lindsey is head coach of Bethany College, Lindsburg, Kansas.

Albert H. Mangelsdorf '12 is in a seedy business. He and his brother are partners in the wholesale seed business, at St. Louis, Missouri.

Earl T. Newcomer '15, Tau Beta Pi, Sigma Xi, is in the undertaking business. He and his father own the largest undertaking establishment in Kansas City, Mo.

Ross I. Parker '12 (Initiate number 1 of Zeta chapter) is one of the managers of the General Electric Co., at Chicago.

H. A. Rice is head of the civil engineering department at the University of Kansas. H. A. still tells the rare ones.

Roland O. (Tiny) Ruble '18 is an instructor in the engineering school at the University of Wisconsin.

Melbourne F. (Fat) Sinnard '22 is a salesman for the Independence Stove and Foundry Co., of Independence, Mo. Fat sells 'em furnaces when they're sitting in front of an electric fan.

Jamison Vawter '16 is a professor in the civil engineering department at the University of Illinois.

John R. Wahlstedt '21 is an instructor at N. E. High School, Kansas City, Mo. Johnny sent us cigars the first of the year, after announcing his marriage.

J. Clark Davis '21 is working for the General Electric Co., but was loaned by them to the Kansas City Light and Power Co. to install and test their sub-stations. Shorty recently took upon himself the nuptial vows.

Morris Lee Rask, Delta '22, is assistant coach at the Fort Collins High School, Colorado.

Prof. Frank E. VanHorn, Hon. Delta, was elected secretary of the Mineralogical Society of America at the Ann Arbor meeting. He and Henry Chadbourn, Alpha '21, represented Case School of Applied Science at the meeting.

Duncan R. Linsley, Eta '22, is with Harris Forbes & Co. in New York City. His business is investment banking.

F. S. Blackall, Eta '22, was married in August, 1922, to Miss Hazel White of New Haven, Connecticut.

E. H. Spurney, Theta '17, announces the birth of a daughter, Jane Gilchridt, in July, 1922.

K. H. Gordon, Kappa '18, is working on transmission line design for the Pennsylvania Railroad System. His marriage to Miss Inez F. McClellen at Aledo, Illinois, took place in June, 1921.

Edwin G. Machin, Iota '22, is resident engineer on a bridge job at Shelbyville, Ill., with the Illinois Highway.

Herman Mutz, Iota '20, is shift bossing for the United Verde Copper Co., at Jerome. Since his graduation he has been project engineer for the New Mexico Highway Commission, superintendent of the Campbell Mine, Red River, New Mexico and stope engineer for the United Verde Extension.

S. W. Riter, Lambda '21, has returned from Mexico to take post graduate work in geology at the University of Chicago. He was with the Mexican Gulf Oil Co. at Vera Cruz.

James T. Bonner, Lambda '20, was married in December. 1922, to Esther Meacham of Tacoma, Washington.

J. L. Bliss, Zeta '13, has been promoted to district manager of western agents for the Detroit Steel Products Co. His office is in Kansas City, 609 Interstate Bldg.

R. V. Norris, consulting engineer at Wilkes-Barre, Pa., has made his son R. V. Norris, Jr., Theta '17, a junior partner. The firm name is to be R. V. Norris & Son. Brother Norris is a graduate of Yale as well as of Columbia. Since graduation he has been assistant colliery superintendent, mining engineer for the Lehigh Coal & Navigation Co., Lieutenant of Engineers, A. E. F., and junior and senior accountant in Los Angeles.

D. B. Frisbie, Delta '11, is southern manager for the Barber-Greene Co., makers of automatic loading and conveying machinery. His headquarters are in Atlanta, Georgia.

V. C. Fugman, Delta '10, and president of the Cleveland Alumni Association during the past two years, can be addressed c. o. International G. E. Co., 4 Rue de Agneosean, Paris, France. He wrote Brother Schrader from Rugby, England, with best wishes for all the members.

Howard H. Fields, Beta '13, ex Alpha, is on the staff of the A. S. & R. Co. at Denver. At the annual meeting of the Colorado Metal Mining Association recently he delivered an address on the Coolbaugh Process which is applicable to many complex ores.

Lost Alumni

The following is a list of alumni for whom we have no correct address. Mail addressed to the addresses we have, has been returned. It will be a great help to the fraternity if any alumni who know the whereabouts of any of the men listed will notify the editor. A report from the secretary of each chapter on each man listed from his chapter will be appreciated. The lost list is growing each year, something must be done about it.

ALPHA

Allan, T. H.
Beinhorn, P.
Dennis, R. C.
Hartman, L. R.
Knowlton, H. H.
Ritchie, J. R.
Rose, W. A.
Spring, W. W.
Sullivan, D. C.
Zanger, C.

BETA

Brown, P. D.
Carlson, A. E.
Carroll, W. F.
Crocker, B. C.
Cook, W. R.
Cramer, C. F.
David, J.
Gibbs, F. G.
Hall, G. A.
Harrington, J. M.
Haug, E. J.
Hughes, W. L.
Idema, R. D.
Kingston, C. J.
Kratz, A. M.
McDougall, H. A.
McLean, J. B.
McNabb, W. F.
Menche, A. H.
Moore, H. F.
Phillips, R. B.
Ricker, E. A.
Scott, W. G.
Shick, H. B.
Smale, L. A.

GAMMA

Bicknell, F. P.
Bott, H. E.
Brooke, L.
Calvert, C. E.
Curtis, L. P.
Delaittre, H. H.
Dick, J. E.
Follansbee, F. S.
Garnett, S. A.
Heitzman, M. G.
Lynch, V.
McGuire, P. J.
Metzger, O. H.
Putnam, W. F.
Robertson, F.
Wasley, W. A.
West, J. R.
Wheeler, R. M.
Whelsel, R. V.
White, R. F.
Wood, F. H.
Young, G. K.

DELTA

Fitzgerald, H. D.
Main, W. C.
Moses, J. E.
Perkins, J. C.
Scott, J. C.
Spowl, N. E.
Strong, M. R.
Walton, A. K.

EPSILON

Adair, S. E.
Allan, C. A.
Buddle, G. A.
Bremner
Daugherty, E. Y.
Green, F. C.
Foshag, Wm. F.
Fraser, S. E.
Hanna, Marcus
Hawkins, J. T.
Hazzard, A. M.
Kerwin, T. D.
King, C. R.
Krebs, C. E.
Lawson, A. W.
Morley, W. S.
Metz, J.
Morel, L. F.
Ottis, B. A.
Putnam, L. G.
Schilling, K. H.
Stoner, R. C.
Wilcox, A. D.

ZETA

Brown, N. W.
Buckhannan, J. P.
Calene, E. L.
Doane, P. D.
Fairchild, S. G.
Geigher, C. S.
Henderson, R. S.
Herndon, H. P.
Holt, H. C.
Hostetler, C. B.
Hunt, J. L.
Mathews, W. R.
McCune, M.
Moffett, J. O.
Reid, T. C.
Saunders, S. G.
Schanze, A. E.
Shreve, J. D.
Staley, H. H.

ETA

Bannister, A. E.
Benton, H. G.
Farthing, W. J.
Goff, J. C.
Harper, R.
Hurlbutt, F. L.
Ingle, J. B.
Kittredge, G. D.
Krug, F. S., Jr.
Miller, E. F.
Muther, W. P.
Nielson, O. E.
O'Donnell, O.
Patterson, R. D.
Pryor, W. L.
Pyle, O. B.
Whitman, P. G.

THETA

Benson, R.
Bird, H. E.
Gibson, A. W.
Hadsell, I. W.
Klugescheid, W. P.
Lee, L. V.
MacCarthy, C. F.
McKay, R.
Miller, J. S.
Rollins, W.
Sadtler, C. B.
Sommerville, W. B., Jr.
Webb, T. H.
Wright, F. S.

IOTA

Adams, B. W.
Burge, R. S.
Geib, F. C.
Grotts, F.
Horner, H. A.
Hummel, C. B.
Mann, W. J.
Nolte, W. J.
Stevenson, T. A.

KAPPA

Bartlett, C. H.
Haake, H. G.
Hickey, D. W., Jr.
Jenson, J. E.
MacHovec, E. P.
Marquhardt, H. W.
MacDonald, J. W.
Nagel, C.
Owen, H. L.
Peck, R. L.
Reece, R. H.
Warren, C. C.

LAMBDA

Goldsbrough, S. L.
Gray, R.
Hales, M.
Parmley, T. J.

K. H. GEDNEY COMPANY

Architects
Engineers

HASTINGS, NEBRASKA

Extract from a recent letter to THE GEAR

¶ "Please publish a more complete list of consulting engineers. I, myself, have considerable consulting work which I must turn over to engineers in other towns who are complete strangers to me. A list of general contractors would be of value also, inasmuch as I could direct business to them, when I'm engaged away from my own organization. In this way we could help one another, and get better acquainted with members outside our own chapter."