5-29-1969

The Amplifier - v. 14, no. 11

Associated Students of the Montana College of Mineral Science and Technology

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Honorary degrees to be given

Three native Butte men will be among five Montana Tech alumni to be awarded professional degrees June 1 at the 69th commencement exercises on campus, according to Dr. E. G. Koch, president of the college.

Those to receive degrees are Robert G. Ingersoll, geologist in charge of Butte mines, The Anaconda Co., geological engineering degree; William R. Kahla, vice president, producing, Oasis Oil Co., Libya, petroleum engineering degree; Frank J. Laird, assistant director, environmental engineering degree; Thomas P. Liss, general manager, Highland Laird, assistant director, environmental engineering degree; Lawrence J. McCarthey and Associates, Plains, Mont., geophysical engineering degree.

In order to receive such an honor, the person must have been engaged in a science professional career for at least ten years, the last five of which have been in a responsible capacity, and have contributed in an outstanding manner to his profession.

William R. Kahla

Kahla's birthplace is Lake City, Minn. In 1949 he was awarded a Bachelor of Science degree in petroleum engineering from Montana Tech. He began his career with Marathon Oil Co. in 1949. During his years with the company he served as field engineer in Sidney, Neb., reservoir engineer, Casper, Wyo., district reservoir engineer, Cody, Wyo., and division reservoir engineer, Casper. In 1959 he accepted a transfer to Oasis Oil Company of Libya, Inc., which is a part of Marathon Oil. With Oasis, Kahla has served as chief engineer, assistant to the executive vice president and since 1966 has been vice president in charge of operations, engineering and planning.

Kahla is a member of the Board of Directors of the Society of Petroleum Engineers of A.I.M.E. and represents the overseas district. He was the first president of the Libyan Association of Petroleum Technologists and is a member of the American Institute of Mining and Metallurgical Engineers publication, "Ore Deposits of the United States, 1933-1967."

He is a member of A.I.M.E., Montana Tech Alumni Association, Northwest Mining Association, Butte Chamber of Commerce, Elks and Rotary.

Ingersoll's wife is the former Mallory Anne O'Connell of Butte. They have three children.

Mr. Frank J. Laird

His publications include papers entitled "Mine Ventilation," "Expanded Cellular Foam in Metal Mining" and "Hygiene in Underground Mines." He has worked on several cooperative publications with the U.S. Public Health Service and the U.S. Bureau of Mines.

He is a member of A.I.M.E., Butte Rotary, Serra, Elks, Community Chest, United Givers and Y.M.C.A.

Laird was born in Butte and was graduated from Montana Tech in 1944 with a B.S. in mining engineering. In 1946 he joined The Anaconda Company as assistant mining engineer. He then became head unit mining engineer. Between 1951 and 1957 he was assistant ventilation engineer, ventilation engineer and assistant industrial hygiene engineer, and head ventilation and industrial hygiene engineer. Between 1957 and 1963 he was assistant chief ventilation and industrial hygiene engineer. In 1965 Laird took his present position as assistant director of environmental engineering in New York.

Laird and his wife, the former Andree Flemming of Butte, have five children.

Mr. Thomas P. Liss

Liss was born in Butte and graduated from Montana Tech in 1950 with a degree in metallurgical engineering. In 1952 he joined The Galigher Company of Salt Lake as a junior metallurgist. In his 16 years with Galigher he also served as a consultant to such firms as Anaconda Cerro de Pasco, Minerales Productos, Derivados, and Bethlehem Copper Corp. Ltd. He was made vice president of the company and is a member of the Board of Directors. Presently he is employed by Bethlehem Copper as general manager of the Highland Valley division.

Liss also hails from Butte. He was graduated from Montana Tech in 1950 with a degree in metallurgical engineering. After graduation he joined the Galigher Company of Salt Lake as a junior metallurgist. In his 16 years with Galigher he also served as a consultant to such firms as Anaconda Cerro de Pasco, Minerales Productos, Derivados, and Bethlehem Copper Corp. Ltd. He was made vice president of the company and is a member of the Board of Directors. Presently he is employed by Bethlehem Copper as general manager of the Highland Valley division.

Liss is a member of A.I.M.E. and of the Canadian Institute of Mining and Metallurgical Engineers. He is married to the former Elena Limber of Santiago, Chile.

McCarthy is another Butte man. He received his B.S. in petroleum engineering in 1956 from Montana Tech. Upon graduation he joined The Geophysical Service Company, Inc. For two years between 1955 and 1960 he also served as a consultant for Standard Oil of California. In 1960 he became a security analyst for Wr. H. Tefftney & Company of Butte, and in 1961 he joined Consolidated Geophysical Surveys as the West Coast manager. In November 1961 he formed his own firm, GOMAC, and moved to Granville, Ohio. The firm of exploration consultants now is called Lawrence J. McCarthy and Associates, located in Platts, Mont.

McCarthy's article, "Geophysics is Key to New Ohio Trempealeau Exploration" appeared in the Jan. 20, 1964 issue of The Oil and Gas Journal.

Mr. Lawrence J. McCarthy

McCarthy's wife is the former Margaret J. Stobie of Plains, Mont. They have two daughters.
THE AMPLIFIER

May 29, 1969

Students awards

It was recently announced that three Montana Tech students were recipients of a special award from the American Metals Climax Foundation.

The purpose of the award is to honor writing ability.

According to Dr. Charles Hensley, assistant professor of the Engineering Science Department, the papers may be a special project or a paper generated as part of a regular classroom assignment.

The papers were judged according to four special characteristics: (1) the paper demonstrating the most effort; (2) the greatest technical content; (3) clearness of presentation, and (4) the best use of grammar.

One hundred dollars was presented to each of the three winning students.

The judges were from the Tech faculty, and the awards were presented at the annual Honors Convocation on May 27.

Also in the awards spotlight were several Butte Central and Butte High seniors who plan to attend Montana Tech in the fall.

The First Metals Bank and Trust Company has awarded four scholarships that will cover fees and books for the '69-'70 academic year.

The recipients are: Robert Yakawich and Claudine Micone of Butte Central, and Bob Fulks and Linda Ratliff of Butte High.

Dr. Bartlett's Speech

by George Rider

Dr. Neil Bartlett, professor of chemistry at Princeton University, addressed the Montana Section of the American Chemical Society Tuesday, May 6, at the Red Rooster supper club. His topic was "The Oxidizing Properties of the Transition Metal Hexafluorides and Related Compounds."

According to Dr. Frank Diebold, assistant professor of Chemistry at Montana Tech D.r, Bartlett is a specialist in inorganic fluorine chemistry and has been widely honored for his creation of the first noble-gas compound.

Before his achievement in June 1962, at the age of 29, the rare gas xenon, was believed to be "noble" that is incapable of joining to other elements to form stable compounds.

Dr. Bartlett's creation of the compound xenon hexafluoroplatinate clearly demonstrated the misconception about the noble-gas electron. All chemists have, as a consequence some to realize the simple theory has severe limitations and specialists in chemical theory have been stimulated to resolve the problem of bonding brought into focus by the noble-gas compounds.

In 1965, Dr. Bartlett received the Research Corporation Award which is given in recognition of a man of science who has made notable contributions to human knowledge. He has also received the 1965 Steacie Prize, awarded by the National Council of Canada for outstanding young scientists, and the 1962 Corday Morgan Medal and Prize of the Chemical Society of Great Britain.

Dr. Bartlett received his Ph.D. from King's College, the University of Durham, England, in 1958. He joined the faculty of the University of British Columbia in 1959, a lecturer and rose to the rank of professor in 1964. He was appointed to the Princeton University faculty as a professor in 1966.

Parkinson to receive degree

An honorary law degree will be conferred on C. Jay Parkinson who will deliver the commencement address June 1 at Montana Tech's sixty-ninth graduation ceremonies, according to Dr. E. G. Koch, president of the college.

Mr. C. Jay Parkinson

Parkinson is chairman of the Board of Directors and chief executive officer of The Anaconda Company.

He was graduated from the University of Utah in 1931 and received his LL.B. in 1934 from the University of Utah Law School.

Parkinson has been a member of law firms in Salt Lake and in Los Angeles. In 1953 he was elected vice president of the Anaconda Aluminum Company, New York. Parkinson was appointed general counsel of The Anaconda Company in 1957 and the following year was elected vice president. In 1964 he became president of the Company and of the Chile Copper Company, the Chile Exploration Company, the Andes Copper Mining Company and vice president of the Miles Investment Corporation.

Aside from his business, Parkinson is director, Chase Manhattan Bank, American Arbitration Association, United Cerebral Palsy Research and Educational Foundation, Inc., and Stauffer Chemical Company. He is vice president of the New York State Chamber of Commerce and is a member of the national board of directors of the National Advisory Council of Muscular Dystrophy Association.

Scholarship awarded

by Mike Bowman

The Prudential Federal Savings and Loan Association of Butte awarded a scholarship to a freshman student at Tech. He is Steve Czehura, son of Mr. and Mrs. Emil Czehura of Helena. Steve is an engineering student who plays football as a guard for the Orediggers. Last year he also received two prominent Boy Scout honors, the Eagle Scout award, which is the highest in scouting, and the God and Country award, which was presented for service to his local church.

The Prudential scholarship of $350 is authorized and administered by the Board of Directors of the Prudential Federal Savings and Loan Association. It is presented annually to a student in any field at Montana Tech.

Compliments of-

Roberts

Rocky Mountain Equipment Company

Acoma Lounge

and Supper Club

Food and Music Nightly

• Orders to Go

Broadway and Wyoming

Bonneville High School Chorus

High school students recipients of scholarships

Three local high school students have been selected as recipients of the First Metals Bank and Trust Company scholarships for pre-professional studies at Montana Tech. James Fulks and Linda Ratliff of Butte High School and Claudine Micone of Girls' Central High School will receive the scholarships, according to W. C. Laity, scholarship committee chairman.

James Fulks, who is a member of various organizations at Butte High, plans to become a high school or college teacher and major in history. He is the son of Mr. and Mrs. Robert Fulks, 3120 Burlington.

Miss Micone, plans to major in sociology or French. She is the daughter of Mr. and Mrs. Vincent N. Micone, 814 West Mercury. Her high school activities include Pep Club, French Club, Model UN, and the school newspaper.

Professor Laity added that several students from Butte have been able to obtain financial assistance for their college educations through these scholarships provided by the First Metals Bank and Trust Company.

Fee Change

by Kent Bowman

An increase in student fees for Montana Tech has been approved by the Board of Regents. These new fees will be effective July 1, 1969.

Fees for Montana resident students will increase fifteen dollars ($15) per semester or a total of thirty dollars ($30). Non-resident students will be required to pay an additional thirty dollars ($30) per semester for a total of sixty dollars ($60).

Board and room rates for students living in the Residence Hall will also increase in July. A double room will now be ninety-four dollars ($94) a month. Rent for a single room or a suite will be ninety-seven ($97) per month.

Montana Tech students are not alone, however. Student fees and board and room rates are increasing at each of the six units of the Montana University System.
Clay Report Published

The sixth in a series of progress reports on a study of the clay and shale resources of Montana has been published by the Montana Bureau of Mines and Geology. Results of ceramic tests, expandability tests, X-ray analyses (including available a-lumina for selected samples) are reported for 54 samples from the Helena area, 48 from the Great Falls area, and 32 from other localities in Montana.

Methods of collecting and preparing the samples and performing the various tests are described. The results are presented in tabular form, and the suitability of the general locations from which the samples have been obtained as reported in this and previous publications is described.

A copy of this bulletin can be obtained by writing or visiting the Montana Bureau of Mines and Geology, room 203-B, Main Hall, Montana College of Mineral Science and Technology. The price of the bulletin is fifteen cents.

Bureau of Mines

The appointment of Uuno Sahinen as State Geologist and Director of the Montana Bureau of Mines and Geology at Montana College of Mineral Science and Technology has been announced by Dr. E. G. Koch, president of the college.

Sahinen, who is a certified professional geologist and a registered mining engineer, qualifies for the position under provisions of a new law passed by the 1969 State Legislature. After graduating in 1929 from Montana Tech, Sahinen worked for two years for the North Butte Mining Company, then joined the staff of the Montana Bureau of Mines and Geology as a geologist. While working for the Bureau he obtained his Master's degree in geological engineering. In 1940-41, as geological engineer for the United States Engineering Department, he was assigned to the construction of Fort Peck Dam. He served in the U. S. Navy for three years during World War II and returned to the Bureau as a geologist in 1945. In 1957 he was appointed chief geologist and in 1962 he became associate director. Since 1965 he has served also as director of the Mineral Resources Research Council.

Sahinen is a member of the American Institute of Mining, Metallurgical and Petroleum Engineers, the Society of Economic Geologists, the National Society of Professional Engineers, the American Institute of Professional Geologists, the Association of American State Geologists, the Montana Geological Society, the American Mining Congress, the Northwest Mining Association, and the Montana Mining Association. He also is active in Rotary Club and is a member of the Gold Hill Lutheran Church Council.

A copy of this bulletin can be obtained by writing or visiting the Montana Bureau of Mines and Geology, room 203-B, Main Hall, Montana College of Mineral Science and Technology. The price of the bulletin is fifteen cents.

Tech Has Exhibit at Home Show

Montana Tech was represented with a display at the annual Home and Sport Show by Tech's Circle K Club. The club, under the direction of chairman Mike Chapman, planned and manned the exhibit with the aid of the A.W.S. The exhibit was termed as very beneficial in terms of reaching many people who would ordinarily not come in contact with the school.

Departments providing display were Chemistry, Metallurgy, Petroleum, Speech, Biology, Languages and Mineral Dressing. The sonic ring cleaner and electronics of water displays drew large crowds. Much literature about Tech was also given out.

Coeds and Circle K members operated the displays and answered questions about Tech. The space for the exhibit was provided by the First Metals Bank and Trust Co.

Aeromagnetic map available for study

The U.S. Geological Survey has released a preliminary draft of an aeromagnetic map of the Barker and Neihart 15-minute quadrangles depicting an area at the juncture of Judith Basin, Cascade, and Meagher Counties. Total intensity of the magnetic field is contoured at intervals of 20 gammas. Flight paths are indicated by thin broken lines.

Scale of the map is 1:62,500, or about 1 mile/inch.

The area mapped includes both the Neihart and the Barker-Hughesville mining districts, which were also shown on geologic maps recently released to open files. The geologic maps are on a larger scale, however, and show only the east-central one-degree area as shown on the aeromagnetic map.

To correlate aeromagnetic anomalies with terrain requires comparison with the topographic map. Since many of the aeromagnetic map shows no roads, towns, land subdivisions, or physical features.

One copy of the aeromagnetic map of the Barker and Neihart quadrangles has been placed in the Library at Montana College of Mineral Science and Technology, Butte. Copies can be made at private expense by various blueprint and reproduction companies in Spokane.

The U.S. Geological Survey also has released to open file a preliminary map of the central part of northwestern flank of the Ruby Range in both sides of the Madison-Beaverhead County line. The rocks exposed in the area are Precambrian metamorphosed rocks complexly folded and faulted. Of principal economic interest is the iron formation that extends across Carter County over the general part of the area. This deposit has been shown in greater detail on a smaller map previously placed in open file. However, the present map depicts the relationship of the iron deposit to the general geology and structure of the surrounding area.

The map is drawn on a topographic base at a scale of 1:24,000, or 2000 ft./in. Lithologic units emphasized are dolomite, iron-formation, quartzite, and metabasaltic-metagabbro. Several other kinds of rock are identified by letter designations, and structural attitudes are indicated by abundant dip-and-strike symbols. One copy of the map, in part hand colored, is available for study in the Library at Montana College of Mineral Science and Technology, Butte. Material for reproduction copies can be made at private expense with the U.S. Geological Survey, Building 25, Federal Center, Denver, Colorado 80225.
Segregation an American right

The Supreme Court ruling in the 1954 Brown decision did not constitutionally deny the principles of segregation. This is because giving one the negro the right to integrate but conversely pointed out the right of the white to associate. Yet in a way they are far more vital now than ever before. I did not realize the course upon which I had embarked. The scope of the name of the Amplifier has been altered two or three times during the year and it is still undergoing change.

In this discussion of the academic year, I feel a measure of fulfillment in the development of the Amplifier. This accomplishment could have neither been achieved without the people who really make up the paper. These silent workers are the writers and staff of the paper, who have contributed to its body. I hope that they may have felt as myself that they have participated in a most worthwhile and rewarding experience. The success of the paper is theirs.

Two Policemen are killed by wounded gunman

After working a gunman's arm twice in each leg and three times in the right forearm, in a valiant attempt to prevent his shooting them, two policemen died when the assailant switched the gun to his left hand and fired the fatal shots.

The two policemen, graduates of the McGillory Police Academy, upheld, to the very end, their high moral teachings. In a recent interview McGillory expressed his pride in the deceased detectives. "It is very difficult," said McGillory, "because of man's instinct for self-preservation, we can't carry a gun."

I continued my interview as we walked out into the street. The scene of the two policemen facing the gunman, his gun a旨在, and the shots firing by a shot, shut, shot through my mind. I could not control myself. I yelled, "McGillory! What would you have done if you were in the same boat as those policemen?" "Well, I'm not a policeman. I'd have..."

Cheri Norene

Exactly where am I? He is someone who can take a car apart, fix anything that needs fixing, put it back together and have the engine purring like a kitten. But he can't understand why some living doll wants to dance all night instead of sitting through a whole afternoon of football on TV.

A boy is someone who can tell the athletic greats of football, basketball, and baseball, also the narrow goals, and models of cars. But he can't remember what color dress his special date wore to the prom or the name of their favorite song.

A boy will be brave during a crisis, strong when his muscles are needed, and dynamic when the occasion arises; but he can become a stammering, bashful idiot when that special girl logs his way, lazy when his dad wants the down payment uninterested if a subject bores him.

And now what is a girl? She is someone who can take two things at a time in her hair and sleep (?) on them all the same. She can buy some material one week before the dance, cut and sew it together, and emerge that night that dancing dream like a dress; but in our society, we would pour a spark plug from a car, and wonder why those fellows want to spend their time fixing cars instead of riding them.

She can list all the new records and recording artists, fashions and makeup, but not the numbers of basketball players and football players. Now as for the color of a guard's eyes, this she will know.

A girl can be mysterious, bashful, coy, and a flirt when it seems necessary, weak and helpless if the right guy is near, and all about outdoor American girl if need be. She can be studious and industrious if final tests are on, but mention a party and she's off like a rocket. She's been so helpful if mom puts her foot down, and a daydreaming indoor girl if so inclined.

All in all, a boy and a girl are indistinguishable and stay here, so let's make the best of it.

The Chess Club

by Cliff Hoshaw

One of the newest clubs on campus is the chess club. The club is less than ten years old, but within the past two decades its stature of its formation. There is no mention of it in the Magma earlier than 1963, but we cannot be certain that it was not formed before then.

Only the late Adam J. Smith, holder of the Montana chess championship for several years, knows that an ancestor of the Montana chess club in its early years until his untimely death in traffic accident in 1966. After his death, Professor Young took over the reins of the growing club.

Dean Stolz remembers that in 1957, there was no official chess club. There were only a few professors playing chess in the Petroleum Building. The chess club grew out of a few students' interest in the game these professors played. This interest prompted them to form the chess club at some unknown date in the recent past.

Today some fifty to sixty students and professors play chess in the Petroleum Building. Many of the club members and some are graduates of Butte High's chess club. As they come to Tech, they bring in a pool of chess players with them. Games of chess are becoming common sights in the S.B. In such a technological-oriented society like Montana, a game of chess is a boon. Now is the time to take part in the weekly Monday night meeting of the club and learn how to play this most useful game.
On campus disorders
by L. V. P. Raman
Morbid disorders are currently plaguing and rocking several universities. They are spreading fast like infection and wildfire. Some of the students’ grievances seem to be legitimate; some of the demands are just. Any liberating forces that move towards progress can only be gratified at the growing awareness and concern on the part of students towards severe social and political ills. If allowed to persist, they would eventually demoralize and undermine the nation. They have the potential to cause damage to the society and the “establishment” if not controlled. They should know that chaos and anarchy are not techniques by which to bring about reform. They are the result of serious victim and casualty in such an event is freedom. Violent agitations and outright vandalism outrage the public. Any such acts of vandalism will see students deteriorate into a hooligan and be deemed a criminal. As responsible individuals, we cannot sit back and witness the liquidation of the universities.

Wesley Club
by True Trueax
This year the Wesley Club at Tech has been highly active. A Tech student who is officers in this Methodist organization are: President Joyce Roberts, V.P. Paul Richard, S.Ecretary Addrien LaPalm, Treasurer Sherrel Mueller.

Dick Dollar was sponsored at Tech by members of the club along with sensitivity training labs, and discussions on sex, death, and careers.

Some of the members are working with the Water Valley and some with the club better known, is being so blatantly ignored by the militant protesters. Their very impatience makes them irrational, intolerant and possibly insane. Coercion should not be rewarded.

The reactionary bullies on the campuses should be cracked down on. There should be no question of negotiations with the rowdies who tear down buildings, go about looting, forcibly occupy buildings and seize labs at gun point. Any such system is of necessity an irresponsible one. The absense of such an irresponsible allegation labels the the writer to be a rat scurrying for a hole under the cover of generalizations he does not wish to state. Generalizations he hasn’t the ability or integrity to ground in reality.

If a man does not agree with a statement made, he should at least be able to specify exactly that with which he does not agree (and why). From then on, it is a test of sheer rationality. The most serious victim to those in need as well as measures to increase the employment of the disadvantaged.

The most critical of these criteria is to determine the potential of any program that might be offered.

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What is Wesley Foundation?

Wesley Foundation is - a seeking, studying student group not cowed by the old, unduly impressed with the new.

not afraid to ask questions, and to probe for better answers.

open to comment and formulations of truth from whatever source.

desirous of making intellectual assent and profession of faith into overt, concrete, secular and humanizing action.

a place for students to come to meet other serious-minded students . . . to have meaningful conversations . . . to search in small groups for better truths . . . to worship . . . to counsel with adults . . . to know relevant issues and make proper responses.

the ministry of The United Methodist Church on the Tech campus.

Comments
by Lloyd J. Little
Now that we have all heard the cracker-barrel wisdom of Mr. Bowman (which consists of a long string of bromides and two-bit generalities), I thought I would counter-attack some of his collective demurrings which may or may not be aimed at me.

A man of good will does not enter the intellectual market place by emptying gut-buckets in public. For example, the phrase “for the benefit of those readers who are led up with the garbage this paper often prints: you such a collective demurrings (aimed at any man of self-esteem—only a coward or idiot would not be offended by such an irresponsible allegation) labels the the writer to be a rat scurrying for a hole under the cover of generalizations he does not wish to state. Generalizations he hasn’t the ability or integrity to ground in reality.

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The most critical of these criteria is to determine the potential of any program that might be offered.

First -- The plan offered must support the perfect assistance to those who need it.

Second -- The plan offered must provide employment incentives to those who are able to work.

Third -- The plan offered must be relatively easier to administer.

The proposal that meets these requirements best known as the negative income tax. Under this program a family with zero income could receive amounts of money in the form of a negative income tax program. On the other hand, a family who had a member working would always be better off than a family who did not have a member working.

Under the present welfare program, however, persons on welfare generally lose a dollar in relief for every dollar earned. Consequently these people have no incentive what so ever to work for a living. Additionally the present day welfare recipient is usually reducto ad absurdum. Even though it may be less than what he is getting on welfare. This is due to the mere fact that if he gets a job and loses it, it may take him many months to get back on relief. There are no such disincentives as this under the negative income tax program.

The negative income tax like the positive income tax would be on an advance basis. In other words a person who is employed and eligible for the negative income tax, would receive a supplement added onto his per capita income. The person who is not employed would withhold under the positive income tax program. On the other hand the unemployed person would receive a welfare check which he would later receive.

Once a year all file would make adjustments for the unemployment benefits. If by having the payments automatic, they would become a civil right insured by law, they would not have preference to any one individual over another, and by being administered in this manner, they would treat these people as responsible individuals rather than incompetent dependents of the state.

In conclusion we can see that the negative income tax program will be a radical step for the future. In fact, no other program has yet been suggested that will come close to the proposed negative income tax program.

Dear Editor:

One can appreciate the sense of wonder and of power generated by an introduction of philosophically and philosophical thought only by undergoing such an introduction. An experience usually results in the philosophical neophyte’s passionate embrace of one or the other system of philosophical thought as the only rational system.

In point of fact, anyone with more than a nodding acquaintance with the systems, and their limitations is aware of the fact that any system which purports to make statements re- garding the "real world" or "real world" is by its very nature not a logical system.

Any such system is of necessity based on certain assumptions, be they called "self-evident facts," "axioms," etc.

The acceptance or rejection of any particular axioms or assumptions as pertaining or relating to reality is done on purely subjective grounds, and is done not by "logical process," but by faith, although the act of faith may be cloaked in such phrases as "we accept as self-evident," it is obviously a faith.

It is therefore dangerous, from an intellectual standpoint, to characterize any philosophical system of any kind, be it objectivism, rationalism, hedonism, or what-have-you. For further information I would refer the interested readers to:

Stoll: Set Theory & Logic, Freeman 1963
Suppes: Introduction to Log- ic, Van Nostrand 1957
Alvin J. Nelson, Jr. Mathematics
Amplifier May Feature Girl

Lorraine Nygard

Culminating this year's series of Amplifier Feature Girls is Lorraine Nygard. Our blue eyed flax haired Feature Girl of Norwegian ancestry, the land of the Lapps and the midnight sun, promises you the sun and the pleasures that are summer. An adept equestrian Miss Nygard designs and makes her own clothes. As a former Tech coed, she regrets that, "most people at Tech do not express themselves and hence do not expand their thoughts."
Mud and Muck
from The Muckers

Have you been feeling run down and out of sorts lately? For a quick pick me up, attend a Student Council meeting for the invigorating discussions held there about the paper, among other things!

Student unrest has finally arrived at Tech or seemingly so as it comes to light that many students are teaching classes themselves due to the absence of certain faculty members. Saturday mornings are typical of this.

The Golden Rule Store recently had its grand opening here in Butte. This occasion was accentuated by an overwhelming sale of garbage cans, among other things. Could this be a reflection on Butte I see?

Tech students may not be rioting yet, but Mrs. Alt would vouch that they sure do make a lot of noise in the wee hours of the morning, especially on speech trips.

Gee, come to think of it, did any of you notice how long it took our trusty engineers to fix the SUB clock? More than this, how about those axle-breaking holes just behind the statue?

If an unusual amount of guys smiled at you during our M Day celebration girls, don't get excited, they were just campaigning.

J. P. stands for the Junior From. Take your girl to it if for nothing else but to step on her toes! This little endearment should be used if she has made a practice of throwing sacks, orange peels, carrots, and other miscellaneous objects at you or made a practice of spilling coffee on your pants daily, burning the seat of your car, or most nastily, shut off your supply of beer that is.

Instead of shouting "Who's got the action?" the question seems to be, "Who's got the beer?". Mike and Claude you seem to be smiling.

Why not move Tech to Bozeman???

by Larry C. Hoffman

Before you read farther, I would like to make clear that I am violently and rabidly opposed to moving this school to Bozeman under any circumstances. The purpose of this article is to try and point out how the opportunities offered by our location are being wasted. From this viewpoint, the school might as well be in Bozeman. Since I have been most closely associated with the mining department, most of my points will be in this area, but the people in other departments can no doubt come up with points of their own.

As a freshman, I took almost no course work directly related to my field. If I had had no definite plan to go into mining engineering, there was no incentive or promotion to do so by the department. Like nearly all other departments, there was no interest in underclassmen as potential department students. It was all a sheer coincidence if a student were to choose mining as a curriculum. In engineering graphics no effort was made to acquaint a student with the machinery of the industry, either by special drawing problems or a field trip to the Anaconda Company design department. None of the potentially available people were asked to give talks on design and drafting problems. Why be in Butte?

In the first introductory mining science course, we spent one whole afternoon taking a rock drill apart and calculating the theoretical horsepower. We did not go to the ACM rock drill repair shop, the finest in the country and see all the different types of drills disassembled and being repaired. We had chance to find out the major causes of breakdowns, or how long a drill lasts, or any of a hundred other pieces of information that an experienced drill runner or mechanic could have told us if there had been a field trip to the "fabulous natural industrial laboratory that is Butte" that we hear so much about as a major reason not to move the school to Bozeman. Why be in Butte? In the study of pumping we saw only the main Kelly pumps, we had no guest speaker on the problems encountered installing those pumps, or maintaining the system. We did not go to the mines to see blasting agents or techniques, ore handling methods, ground support problems, mine management methods, instrumentation design, etc., etc., etc.

As a senior I finally went to the famous ACM geology department for a couple of hours and spent several lab periods mapping underground and in the pit. But where was the tour through the mines to show us the Butte geology as a tangible thing instead of a bunch of colored lines on a two dimensional piece of paper or chalk board. Why be in Butte? How about an electric machinery course. We didn't hear a word from, or see any of, the ACM electrical department. How come a permanent rock drill has never been built and maintained in one of the deep mines? Professor Finch tried to put in a ventilation lab program but was stopped by the strike. Why hadn't it been established years ago? In thermodynamics how many students ever hear of any of the different varieties of heat exchangers on the hill and under it? Why be in Butte?

Needless to say, further examples are almost endless. Does it make sense that this school should be so upset over not having a first place football team when we are wasting our most valuable asset, indeed ignoring it? Once upon a time nearly every student graduating from any of the deep mines got a job in one of the Butte related plants. This gave him the practical background that, in combination with a first class technical training, made him one of the most sought after engineers. Now there are no jobs in the mines and the possible and profitable ones are in machine shops. But there is a move on to transfer Tech to Bozeman someone will dig up this article and ask if anything has been done to utilize the opportunity of Butte. And much, much more, I hope that the staff can point to an active and growing program to use the classroom that is Butte.

The Living Dialectical Truth

We, the humanity of tomorrow, today's youth stand before you, not in judgment or in great expectation. The destruction of the race of man rests in our hands (we have rejected the hand of providence which have been dealt, and have asked the unanswerable question. If we cannot find the answer to the query now, surely as you and I are alive today, the race of man will be gone tomorrow. If we cannot comprehend and grasp the hate and love of man for his fellow being, if we are not willing to give of ourselves for the other, to sacrifice our worldly possessions for our brethren, then there will be no tomorrow as we know it today. We reject you (the establishment) entirely. The lie must either become a truth or the knowledge as we know it now must cease. The die has been cast, your reaction to our being will determine the existence of man for generations to come.

The lie lives and is perpetuated in our very essence. Some seek the divine Creator of us all in the acknowledgment of the Death of God. The gnomes is buried in the universities of his birth, and we burn and raze our homes praying for the damnation of mankind. We proclaim free love and disillusion the harlot's daughter.
The good old days

By C. C. Hoshaw, Jr.

I sit and listen to the old men speak
And tell of days gone by,
When men were so meek,
And I know they lie.
There were no "good old days,"
Only days to come,
And a changening of the ways.
An eternal strain to gain a worldly sum
And the old days of warfare
Are no better than today's,
Only kindness and loving care
Is worth the price it pays.
Ah, yes, gone are the "good old days"
And here to stay are the new ways.

All Women Belong to AWS

by Colleen Caron

The Associated Women Students is an organization which includes all women students on campus. A.W.S. is an international organization comprised of all campuses with at least twenty-five girls, attending classes there. The purpose of A.W.S. is to bring all the girls together so that they may try to solve campus problems as a group. On most other college campuses, A.W.S.'s main purpose is to regulate dorm hours. Since Tech has no dorm for women, A.W.S.'s main function is to sponsor activities and to promote Montana Tech.

A.W.S. officers are: President (elected in the spring for the following year), Vice-President, Secretary, and three delegates, who are usually taken to Grand Teton National Park, Wyoming and Glacier National Park, Montana. Winter trips are taken to Bitterroot, Glacier National Park and Bridger Bowl in Bozeman.

This year Mr. Armey's classes have played soccer, volleyball, tennis and golf.

S. E. G. Elects

The Montana Tech student chapter of the Society of Exploration Geophysicists (SEG) elected new officers at a recent meeting. The new officers are Fred Hoffman, President; Tom Jones, Vice-President; and Eric Johnson, Secretary-Treasurer. This chapter of SEG was chartered at Montana Tech last fall. During the school year, lectures on earth science topics are sponsored. Membership is open to any student interested in earth science problems.

Mountaineer Club activities

The Mountaineer Club, under club advisor, Dr. Goebel, was formed in the fall of 1966 to promote safe mountaineering at Montana Tech for students and faculty. The club takes trips to embark on journeys during different seasons of the year. Summer trips are usually taken to Grand Teton National Park, Wyoming and Glacier National Park, Montana. Winter trips are taken to Bitterroot, Glacier National Park and Bridger Bowl in Bozeman. The spring trip this year was to Mount Haggin. Those attending were Bob Chebul, Kay Lear, Clara Progrega, Dr. Goebel, Byron Maxwell, Pat Whalen, Scott Hulse, Mike Whitmore, and Bruce and Nancy Dreher. Bruce is the assistant ranger at Boulder.

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THE AMPLIFIER

May 26, 1969

P.E. Program

With the physical education program, almost over for this school year, plans are being made for next year's program.

Mrs. Sarsfield says she plans to have the girls do a variety of things. She would like them to get some marching done for a drill team. In the fall semester, Mrs. Sarsfield will have the girls playing volleyball indoors and if the weather is good she will teach them speedball, which is a combination of basketball and soccer played on a soccer field.

In the spring semester the girls will take to tennis, basketball and softball. She said she would also like to give them exercises to keep slims by.

The boys will also do many different things, according to the athletic director, Mr. Armey. Touch football, soccer, softball, tennis, golf and swimming will be on the agenda for the fall semester. The spring semester will see a primary physical education examination along with basketball, volleyball and softball.

This year Mr. Armey's classes have played soccer, basketball, volleyball, tennis and golf.

Alt, Little show well in meet

Six members of the track and tennis teams represented Montana Tech in the 1969 Conference Meet in Billings on May 16. The track team, accompanied by Coach Lester, scored four points in the meet. Lee Alt will become a member of the "M" Club as he raced to a second place finish in the 100-yard dash. Lee covered the distance in 10.2 seconds. Also representing the team were Ralph Sorenson and Mike Bowman, who both ran the mile event, and Mike Thurman, who made his first appearance on the team. Mike threw the shot and discus, but failed to get in the top five.

Two members of the tennis team also represented Tech. They were Lloyd Little and Mike Parent. Both netmen were knocked out of the tourney by Eastern's John Gannon. Parent lost to him 6-0, 6-4, while Little bowed to him 1-6, 6-3, 6-4. For second place, Gannon won the championship in both doubles and singles. Tech defaulted in the doubles due to an injury on Little's hand.

The five members of the golf teams who had qualified for play in this meet didn't go because the golf meet was to be played on the following Monday and Tuesday and none of the golfers wanted to play then. Bill Osborn shot the low score in the 9-hole tryouts with a 40.

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What should a bride wear?

Fashion's corner

by True Truex

June seems to be the favorite month for weddings — and why not? June is a romantic month, June belonged to Juno who was the goddess of women. Juno blessed weddings that took place during her month of June.

Wedding gowns are, to this day, most often white or off-white. Perhaps this old verse had something to do with forming this age-old tradition:

Married in white, you have chosen right;
Married in red, you'd better be dead;
Married in yellow, ashamed of the fellow;
Married in blue, your lover is true;
Married in green, ashamed to be seen;
Married in black, you'll ride in the back;
Married in pearl, you'll live in a whirl;
Married in pink, your spirits will sink;
Married in brown, you'll live out of town.

Orange blossoms have been worn by brides from time immemorial. The orange tree is an evergreen, and is believed to stand for a couple's everlasting love. Orientals have always considered orange blossoms lucky because the orange tree bears blossoms and fruit at the same time.

Wedding veils have many origins. In the most common, perhaps, is that which comes from the Far East custom of Pardah in which women were entirely covered, except for their eyes, until their wedding day. Wearing wedding veils may also be a left-over from the bridal canopy which was held over the heads of the bride and groom to protect them from the Evil Eye.

Have you ever noticed the knots tied in the ribbons on a bride's bouquet? Since wishes were supposed to be tied with a cord, and since the bride's friends wished her many, many good wishes, thus the ribbons of her bouquet are many-knotted!

The lovers' knot stems from customs of the remotest times, when the tying of a knot stood for love and duty. The Dutch are said to be the first who actually tied a knot in a cord or ribbon as a symbol of unity or oneness. This custom spread through Holland to England, and is responsible for the expression we use today — "the knot was tied," meaning the marriage has taken place.

The bride's bouquet plays a superstitious role in the life of the girl who catches it after the ceremony. This is very common practice among today's brides. But we forget two things — to make a wish for the bride's good fortune, and to untie one of the knots in the ribbon. The girl who catches the bride's bouquet and does these two things, will be the next one in the group to be married.

The bride's bouquet is an expression we are all familiar with. It related to the saying, "never, two without three." When these superstitions really rested people's behavior, it was thought that the jinx could be broken by being a bridesmaid seven times. Since the moon changed every seven days, so would the luck of the last bridesmaid. The best man had a real purpose at a wedding, the bridesmaids, best man, maid of honor, etc., stemmed from the old Roman law requiring that ten witnesses be present at a marriage ceremony. It was their sole purpose to ward off any bad or jealous demons. The bridesmaids were required to dress like the bride and the groomsman like the groom to confuse the evil spirits who were envious of such happiness, that they would not know which two were being married.

The best man had a real purpose at one time, other than honor the groom with his presence. At that time, the groom captured his bride and it was the job of the best man to beat or jestigate relatives while the young couple made their gateway!

Interview

by John McGinley

The following is an interview with Niles Bauer and Gary Fisher from the rock group "Iglesia." Niles attends Montana Tech and is a member in good standing in "The American Association of Long-Hair Pinkos.

How long has the Back Page been together?

Niles: We've been together in present form for about one year.

What do you plan on staying together?

Fisher: We'd like to stay together for at least another four years, but the Draft might have something to say about that.

Have you ever thought of leaving Montana?

Niles: We're supposed to have a tour this summer.

Fisher: We're going to tour some western states but we're not sure which ones. We'll find out more about it this month.

Have you ever thought of picking up a regular job?

Niles: We'd like to but we haven't found anybody good enough. We were looking for someone who'd have experience since we're a group.

One of the most common complaints about your group is that you're great copiers but that you lack originality. How much of your own stuff do you do?

Niles: We've written two songs of our own.

Fisher: We've also decided to stop being so commercial, and start finding our own arrangements of songs.

Your people have a reputation for being somewhat straight while in the group. How do you feel about drugs?

Fisher: We've been together in present form for about one year.

Niles: I like hair.

Fisher: On the whole, people here will prejudge a group on appearance without even trying to find out how good they sound.

Humans and Social Studies

by Jane Rohret

Tech has had quite a broad variety of Humanities and Social Science courses in the past, considering that no degrees have yet been offered in these departments. It may be possible to earn a minor for students to obtain degrees in English or History if the required authorization is acquired.

Even if a student does not obtain a humanities degree at Tech, he can pick up an excellent basis and many requirements for a degree at another school in the Montana State School System. In the past, Tech's Humanities and Social Sciences Department has offered numerous courses in Economics, English, Foreign Languages, Geography, International Relations, Literature, Public Speaking, Drama, Debate, Music, Philosophy, Psychology, and Sociology. Some Humanities and Social Science credits are requisites for professional degrees, others are optional, elective, or may be used toward degrees at other schools.

The opportunities for a graduate major in humanities are various and almost limitless, and are quite self-evident in the subjects listed.

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May 29, 1969 THE AMPLIFIER
Tech's football recruiting
by Mike Parent

Six top-notch high school athletes have accepted athletic grants-in-aid to play football this fall at Montana Tech, announced Charley Armey, head football coach.

They are Stan Mayra, Butte; Nick Obstar, Great Falls; R. J. Spomer, Belgrade; Kermit Behnke, Great Falls; Jon Chapman, Gardiner, and Greg Hahn, Helena.

Mayra, a 6-2, 225 pound tackle, has played four years of football at Christian Brothers' High School and also has participated in basketball and track.

Obstar, a 5-10, 185 pound fullback from C. M. Russell, where he lettered for three years.

Spomer, is a 6-3, 210 pound fullback. He played both offensive and defensive units during four years of varsity in high school.

Behnke, a 5-11, 185 pound running back from Great Falls High School was Class AA first team All-State selection at running back and first team selection for the East-West Game. Last year he rushed for 509 yards against Butte High.

Chapman, 6-4, 215 pound defensive end from Gardiner High School, played two years on the All-Conference team and played four years of varsity basketball with two years on the All-Conference basketball team.

Hahn is a 6-2, 205 pound linebacker from Helena Central High School, where he played for three years.

Other players who will attend Montana Tech in the fall will be announced later, according to Armey.

Spring intrasquad scrimmage
by Mike Parent

Montana Tech's football squad played an offensive-defensive scrimmage Saturday night, May 10 in Alumni Coliseum.

The defense outscored the offense 21-12 in the 40-minute contest. The game was the first under the new lighting system.

A special scoring system was used for this game since the Orediggers pitted the first string defense against the offense.

The offense picked up 512 yards, but the defense grabbed three fumbles, and a pass interception and held the offense to a fourth down punt situation seven times.

Don Heater, 5'2'', 190 pound running back from Thompson Falls, highlighted the intrasquad scrimmage with a 73-yard run in the first quarter.

According to Head Coach Charley Armey, "Heater showed remarkable development throughout spring practice. His power running and broken-field running gives Montana Tech the most thrilling ballplayer in years. He is not only a spectacular gridiron player but also an outstanding student."

A 14-yard pass to running back Lonnie Andrews from Warren Bickford was the other score by the offense.

The game's defensive coach was Dan Murja and the offensive coach was Wayne Paffbassen.

The Anderson Carlisle Society
by Kent Bowman

The Anderson-Carlisle Society or more appropriately the Anderson-Carlisle Technical Society, was named for two of Montana Tech's students who lost their lives during the service during the first World War. It was started in 1922 and 1935 became the first affiliated society to qualify as a student chapter of A.I.M.E.

The society consists of three different branches. The branch of students interested in mining, civil, electrical, mechanical and air-pollution control engineers.

The final meet for the Oredigger track team will be in Billings on May 16 and 17 for the Conference meet.

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In May 1969, the Student Union Building at Montana Tech was remodeled. The new Student Union Building is expected to begin construction next fall. The addition to the building will add 28,000 square feet of floor space when completed and will cost an estimated $737,000. The addition to the building was designed by the architectural firm of Charles Kestle and associates of Butte.

Construction to begin next fall on SUB

ARCHITECT'S DRAWING — of the redesigned Student Union Building on the Montana Tech campus shows the planned finished building. The building will have 28,000 square feet of floor space when completed and will cost an estimated $737,000. The addition to the building was designed by the architectural firm of Charles Kestle and associates of Butte.

Montana Tech Seniors

Mr. Robert Raymond, a resident of Butte, will receive his Master of Science Degree in Mineral Dressing Engineering this spring. In his years at Tech Mr. Raymond was a member of Theta Tau and A.I.M.E. His thesis concerns research done as a project contracted with White Pine Copper Company and is entitled, “The Distillation of Chalcopyrite Dispersions Using Aluminum and Iron (II1) Salts.” After graduation, he will work at Kennebec in Salt Lake.

Mr. James W. Lewis, a resident of Butte, will receive his Bachelor of Science Degree in Mining Engineering this spring. He has been an active member of the student body in his years at Tech and was appointed delegate to the Dean’s Disciplinary Commission. He has been a member of M-Club, A.I.M.E., a Regent of Theta Tau, and he was on the football team two years. Mr. Lewis’s thesis is entitled, “Coagulation of Fine Particulate Chalcopyrite.” After graduation he will work as a Metallurgical Engineer at the Alcoa Company in Washington.

Mr. Bruce Wight, of Darby, Montana, will receive his Bachelor of Science Degree in Mineral Dressing Engineering this spring.

Mike Dewey came from North Carolina as a transfer student from Emory University in Atlanta Georgia. After graduating in June with degrees in Mining and Geological Engineering, Mike plans to go to work in Jefferson City, Tennessee for the New Jersey Zinc Company. While at Emory University he joined the Fraternity of Phi Gamma Delta and served as one of its officers. Mike also was a member of the Intercollegiate Council and the Bench and Bar. He has been equally active here at Tech having served as President of the Mining and Geological Engineering Club, as Secretary of the Camera Club, as Secretary of the International Club and as a member of the Anderson Carlisle Society and the Wesley Club. Mike also did a fine job as editor of the Amplifier.

Bill Daily will graduate this June from Tech with a B.S. in Petroleum Engineering. Bill attended Carroll College for one year before coming to Montana Tech. He has won a Montana Tech Honor Scholarship, an Advanced Fee Scholarship, a Chevron Scholarship, several grants; he has been a member of AIME, Anderson Carlisle Society, Student Council, M-Club President; played football and basketball and directed intramural sports. Bill has accepted a position with Sinclair Oil in Casper, Wyoming.

More Seniors

John W. Blumer came to Tech from Harvard in 1965 and now he is going to graduate in June with a B.S. in Geological Engineering. During his stay at Tech he was active as President of the Mineral Club, Vive President of the Drama Club and captain of the football team, all conference in 67. John also acted as VP President of the Senior Class and won the Amex summer field camp scholarship in 1968. Best of luck to John.

Gary Dahl originally hailing from Superior, Wisconsin, came to Tech in 1964 and in June will leave with a degree in Geological Engineering. Some of Gary’s achievements are: President of the Student Chapter of the A.I.M.E. in 67-68. He was named in Who’s Who in American Colleges and Universities in 69-70. Gary serves as the Vice President of the Junior class in 66-67. He was a member of the Copper Guild. He was also captain of the football team in 68-69. Congratulations, Gary.

George Phillips, presently a graduate student in Geology, is a native of Asheville, North Carolina. During his years at Montana Tech he was an active member of A.I.M.E., the Mineral Club, Sigma Rho. He was the recipient of the Outstanding Junior Award and the AIME scholarship. He received his Bachelor of Science degree in 1966 from Montana School of Mines. He doesn’t yet know where he will be working.

Henry G. McClaran will receive his Master of Science degree as a Geological Engineer. He is presently working for the Montana Bureau of Mines and Geology. He was an active member of A.I.M.E., Sigma Rho and the Anderson Carlisle Society. He was the recipient of the AIME scholarship in 1967.

David Wolf received his Master’s Degree in Geology last February. He received his Bachelor’s Degree in Mining and Geological Engineering. He is presently working as a Consultant with the Northern Utah Smelting and Refining Company, Inc. in the Canadian Army from 1961 to 1966. He was in A.I.M.E. and S.A.T.M. He worked full time as a Deputy Sheriff for Silver Bow County. He has not signed with anyone for a job at the time this article was written.

John M. Arno, a native of Butte, resides at 10402 Nevada Street. John attended the University of Idaho from 1959 to 1960 and started at Tech in 1960. He attended Tech until January of 1961 and in August of 1961 he entered the Army and was released in 1964 carrying the rank of Captain. John returned to Tech in 1965 and is presently working as a Mining Engineer this June. While at Tech, John received the Kenneth Anderson Carlisle Honor Award in 1967. He was in A.I.M.E. and A.S.T.M. John worked full time as a Deputy Sheriff for Silver Bow County. He has not signed with anyone for a job at the time this article was written.

William H. Barnes is from Helena, B.C., Canada. He was in the Canadian Army from 1961 to 1964 when he entered Mount Royal College. After graduating from Mount Royal College, he transferred to Tech in 1967 where he will graduate in Mining Engineering in June. While at Tech, he was an A.I.M.E. member and was chosen as Who’s Who. While in Canada, he was secretary of the Circle K. He had not signed for a job when this article was written.

Jim Ross will return to Canada to begin work upon graduating this spring. He will accept a position with the Northern Consolidation Coal Company. Jim will receive a degree in Mining Engineering. He has served as treasurer and corr. secretary for the Mount Royal College and as President of the A.I.M.E. He has served as President of the Student Council and of the Theta Tau chapter.

Claude Huber hopes to work with the open pit in Butte. He has accepted an offer from Minerals Incorporated of Salt Lake. Claude has been a member of the Student Council and of the Theta Tau chapter. He has served as President of the Mining Engineers and Geology in Butte. He served one year as vice-president of the mining section of the Anderson Carlisle Society. Claude is a member of A.I.M.E. and A.S.T.M. Claude’s extra curricular activities include instructing American Red Cross first aid and belonging to the T-Z Ski Patrol.

Ernest W. Bond will be graduating with a bachelor’s degree in Geological Engineering, and is going to work as a hydrologist for the U.S. Bureau of Mines and Geology in Butte. He served one year as vice-president of the mining section of the Anderson Carlisle Society. Ernest’s extra curricular activities include instructing American Red Cross first aid and belonging to the T-Z Ski Patrol.

John Harvey will graduate from Montana Tech in June, 1969, with a Bachelor’s Degree in Engineering Science. During his college career, John was a member of Sigma Rho and SAE. He was on the Honor Roll for three semesters, and received a Butte Rotary Club Scholarship and a Fee Scholarship. He plans to work toward his Master’s Degree.

John M. Arno, a June graduate and a member of the Montana Tech, Arno, will graduate from Klamath Falls, Oregon. He started at Tech in 1962 and was in the U.S. Army from 1965 to 1966. John will graduate this June in Mining Engineering. While at Tech John was a member of the Theta Tau Fraternity and the A.I.M.E. He accepted a job with the American Smelting and Refining Company, Tucson, Arizona.

John M. Badovonic is a native of Butte. He resides at 1042 Nevada Street. John attended the University of Idaho from 1959 to 1960 and started at Tech in 1960. He attended Tech until January of 1961 and in August of 1961 he entered the Army and was released in 1964 carrying the rank of Captain. John returned to Tech in 1965 and is presently working as a Mining Engineer this June. While at Tech, John received the Kenneth Anderson Carlisle Honor Award in 1967. He was in A.I.M.E. and A.S.T.M. John worked full time as a Deputy Sheriff for Silver Bow County. He has not signed with anyone for a job at the time this article was written.
Montana School of Mines: First Victory in Nine Years—It's the Spirit That Counts

by George McVey

A tired but happy Montana School of Mines football team trudged off the field with a victory under its belt in 1953.

Nine years and 44 games were to march wearyly by before the Orediggers, as the team is known in the Upper Missouri Collegiate Conference, were to win again.

In the passing years the team and Coach Ed Simonich, former Notre Dame linemane, have never come in defeat. They are the no-win champions of the world.

When at last victory came, on a recent Saturday, Nov. 4, in a game against the Havre Northmen, the no-win champions of the world history under its belt in 1953. It was the first victory in nine years. It was to carry Coach Simonich off the field in triumph.

"They've got to maintain a strict C average or lose their eligibility," said the coach. "And they've got to play hard and get into pretty good shape. Only they're liable to miss so many practice sessions they're not in shape on Saturday.

So it isn't that Coach Simonich doesn't have the urge to win. He has another explanation: "Some days we may have more coaches out than players." And then he went on: "Lots of our players never played high school football. They feel they have a chance to play here, so they come out. And I'm glad to get many of them. Some of them turn out to be pretty good. They have real spirit."

Coach Simonich also explained that classrooms and laboratory work interferes with football all season.

"They've got to maintain a strict C average or lose their eligibility," said the coach. "And they've got to play hard and get into pretty good shape. Only they're liable to miss so many practice sessions they're not in shape on Saturday."

"There's no pressure here to win. We've got the world's greatest alumni. But I like to win. It's hard to maintain a high morale when you lose all the time; somehow we manage."

Coach Simonich's compliments about the Mines School alumni might be explained in another way.

When the old crowd came back—often from the far corners of the world—they are likely first to drop in at the Mines' research laboratory to find out what's new in mining, metallurgy, engineering or geology. Even Coach Simonich, who tips the scales at 250 pounds but looks as trim as a halfback, has the academic air about him. He graduated cum laude from Notre Dame.

With only a few more than 400 enrolled, the classes are so small that the professors make it a habit to give individual attention. This might explain how it is that a student chooses to skip football, rather than a class or a laboratory session. And most assuredly it explains why Mines graduates are in demand all over the world.

It could also explain how a school could survive a record of losing team. But it wouldn't explain a victory celebration that rocked old mine hill and high mine hill. The Orediggers finally last long enough to lose a football game.

Reprinted with permission from the Spokesman Review, Nov. 16, 1963

The Story of the Montana College of Jock Sciences and Football

by L. C. Hoffman

Once upon a time, not so long ago, there was a small but highly respected minerals school that a football team. The coach of this team was a very famous football player and instilled all the best of the qualities of sportsmanship into his players. Win, lose, or draw, it was how you played the game that counted. And for many hours they got that same gear that they played but they didn't help it. They were in school to become the finest engineers and geologists and only played football because they liked to. Many times the coach, Big Ed, had to fill in as a line man at scrimmages because too many of his players were delayed by late lab sessions, or on a field trip, or had an exam to study for. And the school loved their coach and team, they would have crawled through a six-inch pipe filled with broken glass and led the team if it would have helped the team.

Finally, after 42 consecutive losing games, that team won, and Butte won, too. All of a sudden the nine years didn't seem nearly as long, and a lot of work was a little easier to bear. In addition, there were two N.A.A. All-American honorable mention players from the Mines, as the school was then called, two All-Conference first teamers, and the All-Conference honorable mention as the Most Valuable Player. And how much did it help, the last thing to occur to them would be to ask how the football team was doing. When Gus H. Goudarzi, M.S. Geology, 1944, dropped in recently he per chance unconsciously gave the institution a new slogan. It had not one thing to do with football.

"If you want to see the world," he said, "It's not always necessary to go join the Army to see from the Montana School of Mines will serve the purpose just as well."

Goudarzi is associated with the U. S. Geological Survey. He is equally at home on the shores of Tripoli, Ghana or Saudi Arabia, or Butte, which he calls home. Sometimes his own family does not see him for six months at a time.

Many another Montana Mines graduate has a similar history. Even Coach Simonich, who tips the scales at 250 pounds but looks as trim as a halfback, has the academic air about him. He graduated cum laude from Notre Dame.

With only a few more than 400 enrolled, the classes are so small that the professors make it a habit to give individual attention. This might explain how it is that a student chooses to skip football, rather than a class or a laboratory session. And most assuredly it explains why Mines graduates are in demand all over the world.

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THE AMPLIFIER May 29, 1969
Montana Mines Ends 44-Game Loss Streak

BUTTE (UPI) — The Montana School of Mines ended a nine-year 44-game losing streak here Saturday afternoon, soundly and jubilantly defeating Northern Montana College of Havre 33-7.

One of the largest crowds ever witnessed the Orediggers return to the victory column. Some 2,000 fans were on hand for the game.

For coach Ed Simonich the victory was sweet. He had watched his teams lose 44 times. The School of Mines, a training ground for mining, petroleum and other professional engineers, is a school where football definitely is secondary. On many occasions Simonich himself had had to fall in as a lineman and back during practice sessions where the entire team could not show up because of a rigid study schedule.

Simonich is a former Notre Dame All-American. The School of Mines opened up the scoring in the first quarter when quarterback Dale Fellows passed from the Northern 22 to Mick O'Brien.

Scored Again

With less than a minute left in the first quarter the Mines scored again with Gary Evans carrying it over. George Sever kicked the extra point.

Rudy Watchler scored the next Orediggers' touchdown on a one yard run and Sever again converted.

The half ended 27-0 when Mike Hines intercepted a pass on the Northern 32 and ran it over. Fellows passed to Myron Taylor for the conversion.

In the third quarter Sever scored on a three yard run to close out the School of Mines scoring.

Northern's only touchdown came with 47 seconds remaining in the game.

Quarterback Jerry Mummm passed to halfback Dan Nelson and Jim Huggins kicked the extra point.

Before Saturday's victory, the closest the School of Mines ever came to victory in nine years was a scoreless tie played last year in Butte on a muddy field with Carroll College.

Simonich, a 6 feet 3, 250-pound former athlete has been School of Mines coach since 1957. He said recently that on an average afternoon he has from 12 to 18 players turn out for practice out of a squad numbering about 30.

It past years he has been so short of players that he has used such men as Mohammed Moshin, a 112-pound exchange student from Kuwait who never saw a football until he turned out for the Mines.

After nine frustrating years, the Montana School of Mines Orediggers Saturday chalked up their first football victory in 45 games, a 33-7 homecoming day pasting of the Northern Lights of Havre.

A shiraleed crew of some 2,000, including Senate Majority Leader Mike Mansfield, D-Mont., a Mines alumnus, watched Ed Simonich's gaunt take control in the opening minutes and never relinquish it as they drove to this long-awaited victory.

When the final gun was fired, Naranche Memorial Stadium was rocked by one of the most riotous spontaneous celebrations ever touched off there. Joyous Mines players carried their coaches — Simonich, Dan McCarthy and Gene Downey — off the field on their shoulders.

A horn-honking, cheering procession led the bus carrying Mines players throughout the uptown business district, a post-game celebration reminiscent of the old Grizzly-Bobcat games played in Butte.

It was a battle of the have-nots in the Montana College Conference. Neither Mines nor Northern had won a game this year. This was the Miners' day; it wasn't Northern's. Chuck Ross' battling Lights tried desperately, but they were up against a determined crew.

It was a game replete with all the color and thrills of major college football.

At halftime, Carol Dunstan, a sophomore student, was named homecoming queen. She is the daughter of Mr. and Mrs. C. H. Dunstan, 2700 Locust, and was a candidate also in 1961. Her princesses were Kittie Keane, daughter of Mrs. Mary Keane, 1111 Farrell, and S. A. di Skender, daughter of Mr. and Mrs. Rudy Skender, 1127 Utah.

Entertainment was provided by the Butte Central High School band, directed by Martin Cesare. Girls Central majorettes, directed by Mrs. LaVerne Combs and led by majorette Margie McCrae, provided halftime entertainment.

A harbinger of what was to come was a morning homecoming parade through the uptown Butte district. The Butte High School band, under director Ray Sims, and majorettes led by Linda Martin, headed the parade which included the VFW Drum and Bugle Corps.

The enthusiasm carried over to the game where, on a bright, sunny day in Butte, the longest winless streak in the nation came to an end.

The Red Rooster Supper Club

MINERS BANK OF MONTANA

MONTANA'S LEADING STORE FOR MEN AND BOYS

ED SIMONICH AND VICTORIOUS MINERS
Roger Pierce memorial art collection open to public

The Roger Pierce Memorial Art Collection, of 93 oil paintings of the mining and petroleum industry is on display now in the Crystal Room of the Thornton Building, across from the Finlen Hotel from May 27 through May 31st.

Fund raising for the purchase of Mr. Jack Hall, president of the Montana Tech Alumni Association under the chairmanship of Mr. Jack Hall, president of the Tech Alumni Association, who was appointed by Pete du Toit, president of the Tech Alumni Association. Roger made the original payment on the collection before his death in June, 1968. The principle donors to the fund which has purchased the entire collection from Raul de la Pena are: American Smelting and Refining Co., Anaconda Co., James Boyd, Copper Range Co., Brower Dellinger, Mrs. James R. Evans, Tchea Mining Co., John Lindsay in memory of George Taylor, National Lead Co., Vincent D. Perry, Phelps Dodge Co., Shattuck Denn Mining Corp., E. McTittman, and the Women’s Auxiliary of the A.I.M.E.

Mr. Raul de la Pena, author of the paintings is a Mining Engineer in Mexico. His work depict the history of mining in Mexico along with 20 paintings of beautiful mineral specimens. Mr. Pierce had always been a strong promoter for the World Museum of Mineral Arts in connection with the Butte museum. It is hoped that a building can be erected soon at the World Museum of Mining to house this valuable collection.

Roger Pierce
Famed Alumnus

Pierce was one of Montana Tech’s most distinguished alumni and contributed in great measure to the welfare of the school, both financially and through his worldwide contacts in securing support of Montana Tech projects. He addressed a dinner meeting of the Montana Tech Boosters Club in Butte May 6, 1968.

The 1963-64 president of the American Institute of Mining, Metallurgical and Petroleum Engineers was graduated from Montana Tech in 1935 with a B.S. degree in mining engineering. A year later he received his master’s degree at the same school. Montana Tech honored him with an engineer of mines professional degree in 1954 and the honorary degree of doctor of engineering degree in 1963. During his undergraduate days at Montana Tech he was employed by the Anaconda Co. from 1935 and 1937. Subsequently, he worked here as a research engineer and shift boss for the company. For the next 10 years he was a special representative for the Ingersoll Rand Co. in New York City. Beginning in 1947 he traveled the North American continent consulting in mine mechanics. Later he established his office as a consulting mining engineer. Pierce’s interest included co-ownership of the Cate Equipment Company.

Donald L. Cenis promoted

A graduate of Montana Tech, Donald L. Cenis, has been appointed as vice president of The Chase Manhattan Bank, N.A., in New York.

Cenis, who also serves as the bank’s technical director for mining and nuclear energy, was born in Billings. He received his B.S. degree in mining engineering from Tech in 1953, his B.S. in geological engineering in 1957 and his Master’s in mining engineering in 1957. In 1967 he was awarded a professional engineer of mines degree from Montana Tech.

Cenis has also agreed to serve as director of the Montana College of Mineral Science and Technology Foundation.

Santa Julia, a plant for flotation of dumps operated by the Commission of Mining Development in Pachua, State of Hidalgo.
Tech Building Plans

The roar of construction equipment was heard across the Montana Tech campus this fall as work commenced on several remodeling projects and new buildings.

A new heating plant, which will serve the entire campus, is scheduled for completion by early summer if weather permits. Contractor for the job is Edward A. Bentley of Bentley Construction Co., Butte. The plant was designed by the architect firm of Walter H. Hinick, of Butte. Cost of the plant will be $178,742.

The heating plant presently serving Montana Tech is located in the Mill Building. The new plant will have its own building located west of the Petroleum Building.

The college is making plans for more expansion. Remodeling projects which have recently been completed are the renovation of the gymnasium, $68,000; library, $32,000; metallurgy building, $71,000 and the Petroleum Building, $64,000.

Construction is planned to start on expansion and renovation of the Montana Tech Student Union Building this summer.

The original Student Union Building, built in 1959, will be expanded to house food service facilities, therefore leaving more room in the dormitory which presently houses food service.

According to architect Charles A. Kestie, the new Student Union will have enough dining space to seat 240 persons and up to 400 on a semi-staggered basis. Dining for students on a cash basis, that is students who do not make regular use of the food service, will be about 225 available seats.

There will be a complete kitchen facility, small coffee shop for after-hour use and vacations, and four meeting rooms also suitable for dining. A book store of about 3,200 square feet is included in the plans as is a new game and recreation area and expanded student office space.

Phases one of the plan will be the initial total building plus adequate equipment and furnishings to handle an enrollment at Tech up to 1,000. Other phases of construction will be added as enrollment increases up to 2,000.

The new addition and remodeling will cost an estimated $615,000. Built-in equipment for the food service, coffee shop and others will cost $93,000. Movable equipment and furnishings come to $18,500. Special furnishings for lounges, offices and the games and recreation room is allotted $10,000. The total cost of the project's Phase I plan is $737,000.

When completed the building will have about 28,000 square feet of floor space.

The architect says the roof on the architectural drawing is drawn in a Mansard style. He said "Some new contemporary forms and detail are possible within the Mansard system and yet it is compatible with existing roof forms on the campus."

Work is proposed to begin concurrently on the Student Union Building and remodeling of the dorm. The dorm project at a cost of about $300,000, will double the present capacity of about 130 students.

Roger Pierce

(Continued from page 14)

ment Co., president and owner of Shaft and Development Machines, Inc. and co-owner and officer of the Machinery Center, Inc., all of Salt Lake City. He was president of United Idaho Mining Co., and of the North Beck Mining Co. of Utah. He served as a consulting engineer for clients in the United States, Canada, and Latin America.

Pierce, when he became president of AIME, was the first graduate of Montana Tech so honored. A native of Pacific, Washington, he was the author of a book: "Modern Methods of Scraper Loading and Mucking," and innumerable technical articles in professional mining journals.

Among honors Pierce received in the professional field were numerous offices in the AIME, including chairmanship of the William Lawrence Saunders Gold Medal award, the Jackling award and others for outstanding achievements in mining circles. In addition to AIME, his memberships included the New York City Mining Club, Canadian Institute of Mining and Metallurgical engineers, the Mining and Metallurgical Society and Masonic Order, including the Shrine.

His prime interest aside from his mining career, was in Montana Tech. He visited Butte often and most of his visits were related to his interest in the College.

In his May address before the Tech Boosters he predicted the school could continue to grow as one of the world's finest minerals engineering training centers and urged that degrees be strengthened in every facet. He spoke for a top notch research center and also suggested a drive to secure a research center and also suggested a drive to secure a United States Bureau of Mines station here.

Pierce financed the campus planning program instituted by the Montana Tech Alumni Association some years ago. He also sponsored several research programs at the school, or helped secure sponsorship. He was active in the Sigma Rho Fraternity and gave financial assistance for the opening of the Sigma Rho House on West Park.

He was equally interested in the Butte World Museum of Mining. During his May visit here he announced the museum would receive 93 oil paintings on the history of mining in Mexico and throughout the world. The collection is the work of Raul de La Pena, a mining engineer and artist of world note. Pierce led in financing the collection for Butte.

He also said the museum will acquire 40 or more pen and ink sketches, the work of J. C. "Buck" O'Connell, a native of Butte, now in Salt Lake City.

Pierce also advocated the establishment here of a metals museum, "The World of Metals," to augment the start of a world museum of mineral art.

Roger Pierce

Named

Dr. C. H. Hewitt has been named associate director for exploration for Marathon Oil Company's Denver Research Center. He replaces Dr. R. Dana Russell who has been placed, at his request, on special assignment until his retirement in 1971.

Hacienda of the Moon, (Hacienda de la Luna), beneficiation and the walls of the shaft of the mine Rayas, discovered by Juan Rayas in Guanajuaco.

Rayas, discovered by Juan Rayas in Guanajuaco.
The Delta Chapter of Sigma Rho, the first chapter of the National College Fraternity to be associated with Montana Tech, was installed on May 10, 1927. Originally Sigma Rho was a professional engineering fraternity for mining engineers but has since been expanded to include all mineral industry engineers.

Although there are only two chapters of Sigma Rho, members of the fraternity are actively engaged in the mining engineering profession and can be found throughout the nation.

Much of fraternity life is social, but there is also a serious side of which the fraternity is actively promoting Montana Tech and the engineering profession by working with the school in an attempt to enlighten the public as to what engineering consists of and its relations capacity for state-wide Georgia Techmontana Tech.

A focus on Tech's Camera Club by Mary Ann Walker

Montana Tech's Camera Club, organized last year, has given many Tech students the chance to improve their picture taking ability.

The Camera club encourages good picture taking to benefit professional work, illustrate industrial programs, assist in geological study and provide an enjoyable hobby.

Under the direction of Mr. William Howell, the club, so far this year, has sponsored a picture taking contest, built a dark room in the dorm, and have secured a contract with the "Magna" to do all annual photography and printing.

The club, as of now, deals exclusively in black and white photography but hopes to go into color printing in the near future.

There are now 12 members in the club.

Any Tech student may join, with or without a camera. Plans for next year include: bringing in outside speakers and recruiting new members.

So all you photography fans who are interested, contact one of the officers Mike Dewey, Bob Chelsvig, or Carl Wagner for additional information.

The Newman Club by Jane Rohrer

Among the many clubs and organizations at Montana Tech dealing with hobbies, studies, careers, and interests are the ones concerned with religion. The Newman Club is one of these, and is an active and useful organization on the campus.

Montana Tech, being a state school in the Montana University System, is not of sectarian interest. The Newman Club seeks to promote growth, concern, and understanding about God among the students and staff at Montana Tech.

Organized on a national level in 1893, this Roman Catholic organization seeks to make Christ a primary subject in the lives of young Americans. Membership has continually expanded in the Newman Club, and there are now over 400,000 members in the several nations in which the Newman Club is now established.

As the club serves to develop Christian maturity in its members, there are many activities and ideas in which they participate. They hold regular business meetings to review club ideas and projects. Also there are study hours in which the club may sponsor speakers, movies, or other media for their Christian influence. Newman Club has made many useful contributions at Montana Tech, among which are a set of books now in the library.

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Mineral Dressing Department

**by Janet Martin**

Mineral Dressing Engineering is concerned with the separation of materials through the application of physical and chemical processes. Professional education for the mineral engineer begins after the student has had a foundation in the physical sciences, mathematics, and engineering principles. These basic courses are necessary for the student to understand the science and engineering involved in the separation and concentration of materials. With these courses engineering students must become well-versed in the humanities and social studies for awareness of their obligations and responsibilities in society.

Undergraduate and graduate students and faculty members all involved gave a great deal of effort for the solution of problems through research activities. Of course, the basic sciences and mathematics are necessary to the basic disciplines, but the student must be presented with opportunities of processes, unit equipment, and realistic problems.

At present the Mineral Dressing Department, headed by Professor C. E. Schuhman, is engaged in a research contract with White Pine Copper Company, White Pine, Michigan. The object of this research is to study the effects of various ions finely divided chalcocite. The project has the help of most professors in the department and has served as the source of theses and research papers.

The Mineral Dressing Department will award degrees to five men this spring. The Masters degrees will be Mr. Robert Ramsey, Mr. Brian Raynold, and Mr. Graham Cadwell. Those receiving the Bachelors degrees are Mr. James Michotte and Mr. Robert Ramsey. The new graduate can enter the metallurgical profession in any of its diverse branches. A recent graduate is now one of the nation's experts in the application of aluminum to automobile trim. Another recent graduate now owns his own business dealing in secondary metals; another is a nuclear power reactor expert, whereas others are "big wheeler dealers" in the industry. A good many have gone to or are in the process of going to school studying toward their Master of Science or Doctorate degrees.

At the present time employment opportunities for metallurgists are probably better than ever and there is every reason to believe that this situation will continue. As is noted in the lead article of the current Journal of Metals, John Ziman, an eminent physicist, has said "while the last quarter has been the era of solid state physics, the next two decades may well be the epoch of Materials Science." Rightly or wrongly, the curricula of mining and metallurgical engineering is reputed to be difficult and it is true that considerable chemistry and physics are required, but it is possible that the pushers are not pushers at all. However, since metallurgy is, in many ways applied chemistry and physics, the need is not always necessary and, hopefully, no more than the timid and indifferent students are discouraged. Each student chooses his electives, the Bachelor of Science curriculum is not specialized in any particular field and many students delay until the new graduate can enter the metallurgical profession in any of its diverse branches. A recent graduate is now one of the nation's experts in the application of aluminum to automobile trim. Another recent graduate now owns his own business dealing in secondary metals; another is a nuclear power reactor expert, whereas others are "big wheeler dealers" in the industry. A good many have gone to or are in the process of going to school studying toward their Master of Science or Doctorate degrees.
**Copper Guard**

by Mary Rowe

Since 1935 the Copper Guard has been in service to Montana Tech and its students. It received membership to the Inter-collegiate Knights, a service organization on many Montana campuses, in 1937. The present Copper Guard however, is no longer affiliated with the Knights because they found it hard to maintain the dues required.

Although they are one of the oldest clubs on campus, they still perform many invaluable functions for the school. "M". The Copper Guard is composed of fourteen members whose main function is the maintenance of the "M". When one of our school teams manages an athletic victory, the Copper Guard changes the lights forming the "M" to a "V". On holidays, they change the customary white lights to fit the traditional colors of the current holiday.

They also perform many other activities, such as, sponsoring the registration dances, the "M" day dance and the organization of the activities of "M" day. Membership to the club is on a strictly selection basis making it a very elite group. You have to be a sophomore engineering student and be voted in by the members of the preceding year's club.

Art Duggenhart was this year's president and Rick Dale was secretary. Professor McCasin is the faculty advisor.

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**Petroleum Dept.**

by Carol Stolz

The Petroleum Department is under the direction of a department head and 2 staff members. Dr. Herbert G. Warren is the head of the department and also a professor in the department.

The function of the department is primarily to educate students for work in the petroleum industry. Secondly, the petroleum department prepares educationally outstanding students for graduate work if they so desire. Graduate work in petroleum engineering is available at Tech. Approximately one out of every ten graduates of the petroleum department goes on to graduate school soon after graduation.

Graduates from the petroleum department choose from a wide variety of job opportunities offered to them. Graduating students become petroleum production engineers, petroleum reservoir engineers, drilling contractors, managers (many of which continue their education in other specific fields), pipeline engineers, company accountants, sales personnel, and employees in gas plants. In the past twenty years, graduates from the petroleum department have become owners of their own businesses, lawyers, bankers, and division and district engineers. Jobs (all over the world) are offered to graduating petroleum students: Canada, Alaska, South America, North Africa (four 1969 graduates of the department have been given jobs in Tripoli), and all over the U.S.

This year there are 79 Engineering students, 38 of whom are upperclassmen. Also this year in scholarships have been offered to upper classmen. Also this year in scholarships have been offered to upper classmen.

**History & Purpose of Theta Tau**

by George Rider

Founded October 15, 1932, at the University of Minnesota, Minneapolis, Montana, Theta Tau was created by Erich J. Schrader and associates to place Engineers in the same status with Doctors and Lawyers. Theta Tau first used the skull and cross as their symbols but it seemed a little archaic so they changed it to the Greek symbols Θ and Τ. The purpose of Theta Tau is to create a brotherhood for the professional development of Engineers in the united effort of mankind.

There are nearly 30 chapters of OT in all parts of the United States, so it has become necessary to organize a central control which is called "National" and a designated portion of the dues is paid by each member to the "National" which organizes conventions, prints literary material and handles correspondence between the chapters. Robert E. Pope, executive secretary, works full time handling all important matters. His salary is paid from the member's dues and is minimum, considering he is a licensed Engineer.

OT works with organizations such as AIME, which is also trying to ensure that Engineers are recognized as professionals and given the respect accordingly. Engineers now take an exam similar to bar exams and are licensed the same as lawyers. OT is the only national fraternity on campus. The requirements for membership into the fraternity is that the candidate must maintain a certain grade point, meet the approval of the other members, and be an engineering student.