# UM-Rolla: A History Of MSM/UMR

# UM-Rolla: A History Of MSM/UMR

By Lawrence O. Christensen and Jack B. Ridley

University of Missouri Printing Services University of Missouri, Columbia, Missouri 65211



### Acknowledgments

Writing a book is both an exhilarating experience and an exercise in humility. It has been exhilarating to vicariously experience the achievements and triumphs of generations of faculty, staff, and students at this institution of learning. At the same time, this has been an exercise in humility because we recognize that no narrative is ever complete. In spite of our best efforts, some aspects of this institution's history remain untold because we lacked space to record them or because we remain ignorant of them. For the omissions, we must accept the blame. For the positive qualities of the book, we are obliged to share the credit.

This book is the result of the efforts of many people. In particular, we are grateful to Chancellor Joseph M. Marchello, who conceived the idea and provided encouragement along the way and wrote the Epilogue; to the Office of Public Information staff (Lynn Waggoner, director; Martin Blank; Winona Roberts; and Martha McKinzie), who provided editorial assistance; to Frank Mackaman, director of the Alumni/Development Office, who shared with us his knowledge of the heritage of this institution; to Catherine Jenks, director of University Public Relations and Affirmative Action, who provided knowledge of "town and gown," which enriched the book; to Ernest Gutierrez, UMR senior photographer, who prepared the photographs for the book; to Ronald Bohley, director, and the staff of the Curtis Laws Wilson Library, who cooperated and assisted in a variety of ways; to Harold Perry, director, and Ron Gini, Linda Peacher, and Yvonne Ball of University Printing Services, who provided so many hours; and to Melody Bitzer, who deciphered our scribblings and typed the manuscript.

To our wives, Maxine and Marcia, we are grateful for their evaluation of the manuscript as it took shape, and for their encouragement and forbearance.

For all those students, alumni, faculty, staff, and friends of MSM/UMR who answered our questions and so graciously shared their recollections and reminiscences regarding life on this campus, we are grateful. In particular, we wish to thank the following for

To UM-Rolla Chancellor Joseph M. Marchello, who conceived the idea for this book, and to the alumni, faculty, staff, and students of MSM/UMR, who are responsible for the rich tradition of this institution.

## Contents

| ix                       |
|--------------------------|
| 1<br>5<br>23<br>45<br>73 |
| 97                       |
| 101                      |
| 117<br>135               |
| 145                      |
| 149                      |
| 165                      |
| 183                      |
| 185                      |
| 213                      |
| 233                      |
| 235                      |
| 297                      |
| 301                      |
|                          |

granting oral interviews: Merl Baker; Jo W. Barr; Jerome T. Berry; Mrs. Gale Bullman; John O. Campbell, Jr.; Roy T. Clayton; Benjamin Coil; E. Jefferson Crum; Elmer Ellis; Fred Finley; James Fox; Muir Frey; H. Q Fuller; Elmer Gammeter; C. James Grimm; Mrs. Berna Harvey; Ted Heiser; Billy M. Huff; William T. Kay; Daniel Kennedy; C.B. Kentnor, Jr.; Harry Kessler; Peter Kurtz, Jr.; John Livingston; John Lyons; Robert Martin; William McCartney; Charles McGrady; Mrs. V.H. McNutt; Mrs. C.J. Millar; Robert Moore; Herman Pfeifer; Jim C. Pogue; John Post; Walter Remmers; Charles Remington; J. Kent Roberts; B. Ken Robertson; F.M. Stewart; T.J. Stewart; Dudley Thompson; Armin Tucker; Norman Tucker; Robert Van Nostrand; A.B. Waltenspiel; Virgil Whitworth; Rex Williams; Robert Wolf; and Jacques Zoller.

In addition to the publications listed in the Notes on Sources, written contributions by the following were used in the book: Merl Baker, Ronald Corradin, Gene Green, Fred Hauenstein, Wallace B. Howe, T.W. Hunt, Harry Kessler, J.W. Koenig, Clair V. Mann, Larry Nuss, Frank B. Powell, John Powell, Mrs. John G. Roy, Lois Russow, B.R. Sarchet, Fred Schneeberger, T.J. Stewart, and W.W. Westerfeld. Representatives of the various campus departments provided information for the Appendix.

We thank the UM-Rolla Press Council under whose authorization the book was published. The council, appointed by the chancellor in 1982, is the standing body of the University of Missouri-Rolla responsible for the selection, review, and publication of books and related documents about and for the campus. Membership on the council is by position. The current members are: Lynn Waggoner (chairman), director, Office of Public Information; Catherine Jenks, director, University Public Relations and Affirmative Action; Frank Mackaman, director, Alumni/Development; Bobby Wixson, provost, Academic Services; Neil Smith, director, Business Services; Dan Klingenberg, manager, Bookstore; Patricia Plummer, chairperson, Academic Council Publications Committee; and Dale Moore, editor, ROLLAMO.

—Lawrence O. Christensen and Jack B. Ridley

#### PART I

The years between the end of the Civil War and the beginning of World War I were a time of unprecedented growth and expansion in America, and a period in which increased mechanization and industrialization transformed the nature of American life, business, and education.

The Civil War served as a catalyst for economic and industrial development in the United States and created new attitudes and energies in the American people, as well as in business and industry. The war had accustomed businessmen and manufacturers to nation-wide operations and large-scale organizations and pointed the way to mass markets and methods of mass production. At the war's end, America stood on the threshold of a new age.

In the 50 years after Appomattox, America experienced a second industrial revolution, and its economy, which had been expanding rapidly before the Civil War, grew with explosive force in the decades that followed. By the outbreak of World War I, America was no longer a predominantly agricultural and rural society. Instead, it had become a modern industrial nation.

America's railroads served as the principal commercial arteries in its increasingly complex and interdependent economic system, and the post-Civil War years witnessed a boom in railroad construction. The growth of America's rail system, in turn, sparked industrialization and stimulated mining and agriculture. The railroads provided a cheap means of transporting raw materials to factories and made it possible to feed the growing number of people who were living and working in the cities. They also opened new markets for manufactured goods and industrial growth thrived on a truly national market, which saw Chicago harvesters, Texas beef, Minneapolis flour, Waterbury clocks, and Toledo glass rushed to almost any populated place at 30 or more miles an hour.

America was rich in many of the natural resources that were essential to industrial development such as iron, coal, oil, water, and timber. The petroleum industry began with the drilling of the first commercially productive oil well in Pennsylvania in 1859. The discovery of deposits of iron ore in Minnesota in the 1860s and 1870s gave America the greatest iron ore district in the world. It also had the largest known deposits of bituminous coal, and fresh deposits of copper, lead, gold, silver, and other minerals came to light late in the century. As America's industrial base grew, the exploitation of these natural resources to provide raw materials and energy increased significantly.

When America had assembled the necessary natural, capital, and human resources, along with a new transportation system and new mills and factories, its industrial output soared. In 1860, America ranked behind Britain, France, and Germany as an industrial power. In 1890, however, America ranked first among industrial nations, and the value of its manufactured goods almost equaled the combined production of Britain, France, and Germany.

As the size of America's market increased, the scale of production grew proportionately. Machines became more complex, and the idea of interchangeable parts and the introduction of the assembly line formed the heart of America's new production methods.

Accompanying the industrial revolution was an agricultural revolution which saw the mechanization of many farming operations and the widespread use of fertilizers increase production tremendously. By 1870, mechanical reapers, binders, combines, gangplows, harrows, seeders, and cultivators all were in wide use.

The mechanization of American industry and agriculture brought increasing numbers of people to America's cities. This migration coupled with the arrival of immigrants from overseas in record numbers caused those cities to grow at a rate faster than the nation as a whole. By 1900, one-third of America's population could be classified as "urban," compared to 15 percent in 1860.

The mechanization of America's farms and industries created a demand for inventions and innovations, and America's inventors outdid themselves to meet these new needs. Altogether, 440,000 patents were granted between 1860 and 1890.

The management of America's vast railroad network, its continentwide industries, and its national and international markets required a new technology of business administration and communication. Inventions such as the typewriter, cash register, stock ticker, fountain pen, and Addressograph helped to quicken business transactions. America's first transcontinental telegraph system was com-

pleted in 1861, and in 1866, Cyrus Field employed new techniques to repair and improve his trans-Atlantic cable, and stock quotations spanned the Atlantic Ocean. The telephone, perhaps the era's most important communication innovation, was invented by Alexander Graham Bell in 1876, and the first commercial telephone exchange opened in New Haven, Conn., in 1878.

The impact of the era's many inventions touched almost every facet of American life. Making their appearance during this period were: the air brake, phonograph, incandescent light bulb, powered airplane, diesel engine, gasoline carburetor, refrigerated railroad car, linotype, safety razor, barbed wire, electric fan, moving pictures, electric vacuum cleaner, automobile, motorcycle, photographic paper, cylinder lock, and pneumatic tire.

During this era, the typical inventor was not an engineer or a scientist working in an industrial or university laboratory. More often than not, he was an individual tinkerer, like Thomas Edison or Alexander Graham Bell, who financed his own projects. That would soon change.

The industrialization of America brought calls for the introduction of practical courses of study and specialized education in the sciences to supply the expertise America would need to keep its factories, mines, and farms productive; provide its cities with power plants, paved streets, intracity city transportation systems, sewage systems, and safe water supplies; and develop the innovations of the future. It was an auspicious time in American history for technology. The University of Missouri School of Mines and Metallurgy was an idea whose time had come.

# CHAPTER I The Founding Years

Director Charles P. Williams, the man who would lead the University of Missouri School of Mines and Metallurgy, called the first class to order on Nov. 6, 1871. The Board of Curators had rented the top two floors of the newly constructed Public Education Building to house the School. Director Williams; Nelson W. Allen, a senior in mathematics from the University of Missouri; and William Cooch, whom Williams had brought with him from Delaware, taught the 32 students who enrolled that first year. It did not appear to be a very auspicious beginning, but then it had taken the state seven years to meet the requirements of the Morrill Act.



Charles Penrose Williams, director, 1871-77.

#### Morrill Act

The Morrill Land Grant Act was introduced by Vermont Senator Justin S. Morrill as early as 1857. It passed Congress and was signed by President Abraham Lincoln during the summer of 1862. It granted each state federal land to support at least one college of agriculture and mechanic arts. Acceptance of the provisions of the act entitled a state to receive 30,000 acres for each of its congressmen. Missouri, with 11 representatives, qualified for 330,000 acres. The Missouri General Assembly accepted its grant on March 17, 1863, but Civil War, Reconstruction, and indecision delayed action until 1870.

The indecision was whether to establish a mining school in the mineral district of southeast Missouri or to create an agriculture and mechanic college as part of the state university at Columbia. The debate developed during the 1860s and divided the two houses of the General Assembly. The Missouri House of Representatives supported a separate campus. Members of the state Senate, however, followed James S. Rollins, father of the University of Missouri, in advocating that the Columbia campus incorporate the new areas.

In 1869, the Senate passed a version of Rollins' bill which placed the agriculture and mechanic arts departments on the Columbia campus. When the House considered the measure, Representative William N. Nalle of Fredericktown amended it to provide for a separate school of mines and metallurgy to be located in the mineral district of southeast Missouri. Another amendment by Nalle required the University's Board of Curators to locate the school of mines in the mineral district county that donated the most land and money to the state.

The possibility of losing the lands guaranteed by the Morrill Act finally produced compromise. Congress originally required that states accepting the terms of the act establish schools within five years. In 1866, Congress extended the deadline an additional five years. The Senate accepted the Nalle amendments, and on Feb. 24, Gov. Joseph W. McClurg signed the act that placed the agricultural and mechanical college in Columbia and provided for a school of mines and metallurgy in southeast Missouri. The Board of Curators divided the funds that would be realized from the sale of land so that the School of Mines would receive one-fourth of the Morrill endowment.

#### Why Rolla?

The legislation that established the School also made the Board of Curators responsible for administering it and choosing its location. On May 5, 1870, the Board selected a committee composed of A.J. Conant, B.F. Northcutt, F.T. Russell, O.S. Reed, W.W. Orrick, and James S. Rollins to select the site. Five counties were interested in having the school located within their boundaries. The county courts of Washington and St. Francois counties submitted bond issues but voters rejected them. The committee refused to consider the bid of Madison County which was incorrectly prepared. Only Phelps and Iron counties presented substantial offers for the committee to consider.

Both Phelps and Iron counties offered bonds and land, which complicated the bids because the value of the land could only be estimated. The Iron County Court pledged \$83,500 in bonds and \$30,000 in lands. Phelps County officials made an initial offer of \$50,000 in bonds, but after learning of Iron County's bid, they increased that offer by \$25,000. They also promised three parcels of land valued at \$55,545. The committee appointed F.T. Russell and B.F. Northcutt to inspect the lands offered and evaluate the bids. Since Phelps County outbid Iron by \$17,045, the committee recommended that Phelps receive the School. It also recommended that the Board locate the campus on the 130 acres known as Fort Wyman, one of the parcels of land donated by the county. The Board accepted both recommendations, and on March 10, 1871, the General Assembly confirmed these actions in law. The School of Mines and Metallurgy would be located in Rolla.

#### Choosing A Director

With the question of location resolved, the Board addressed the problems of erecting a building and choosing a faculty. Even before the legislature confirmed the Board's selection of Phelps County as the School's location, it appointed committees from its members to supervise the construction of a building and to hire professors and "a principal for the School of Mines."

A.J. Conant of St. Louis, a member of both committees, contacted Professor Charles P. Williams and perhaps others. Williams, a professor of chemistry at Delaware College and chemist to the state of Delaware, wrote a letter of application in April to Dr. Daniel Read, president of the University of Missouri.

President Read answered Williams' inquiry by asking for more information. Williams, 33, wrote that he had been engaged "in the study and practice of my profession of analytical chemist, metallurgist and mining geologist" for the last 15 or 16 years. He apparently earned both A.B. and A.M. degrees from the Polytechnic College of Pennsylvania in 1859. In his letter to Read, Williams wrote that in "55, '56, '57, '58, and '59, [he was a] student of analytical chemistry and instructor of natural sciences in an academy near Philadelphia." During the next three years, Williams had worked in the Lake Superior mining region. Between 1863 and 1868, he served as a metallurgist and geologist in Colorado, California, Nevada, Mexico, and the iron region around Lake Superior while retaining his head-quarters and laboratory in Philadelphia. After 1868, he edited a mining journal, taught at the Polytechnic College of Pennsylvania and in 1870, assumed his positions in Delaware.

In early August 1871, Samuel G. Williams, a member of the Board of Curators from Rolla, reported on the School's progress. He wrote the *Rolla Herald* that President Read was in the "eastern states" interviewing candidates for the directorship. The Board hoped to have someone hired by Aug. 15. The curator also wrote that the Board had employed an architect to design a building for the Fort Wyman site, and that "We expect to have the whole stone work completed this fall before the freezing time."

Professor Williams of Delaware College must have been as impressive in person as he was on paper. President Read hired him, and by early September Williams had arrived in Rolla.

The town that Director Williams and his wife and two children first saw in the fall of 1871 had a population of about 1,300. It had no improved streets, two weekly newspapers, three blacksmith shops, three wagon shops, two flour mills, one carding mill, three livery stables, one auction house, one dentist, nine physicians, 11 lawyers, a number of retail stores, no banks, nine saloons, and four churches. The small town had one ornament: a recently built public school.

#### Rolla Building

Rolla citizens expressed pride in their "modern Italian style" Public School Building, which later became known as the Rolla Building. It contained over 8,000 square feet, and had four floors including the basement. Its foundation walls were two feet thick and stood four feet below and four feet above ground. The builders used more than 1,000 feet of cut sandstone in constructing the steps, window sills, and foundation cap.

The Public School Building provided more space than Rolla needed for school purposes. A building for the School of Mines remained in the planning stage. George I. Barnett, a St. Louis architect, had been commissioned to design the new structure. While discussing the plan for the School of Mines building, Director Williams, A.J. Conant, and President Read decided to approach the Rolla Board of Education about renting part of the Public School Building. They also hired Henry Wolff to level the Fort Wyman site in preparation for laying the foundation of the new building.

The Rolla Board of Education accepted the offer to lodge the School of Mines in its building. It rented the top two floors for \$1,300 per year and retained two rooms on the first floor for Rolla's elementary and high schools. With a location secured, Director Williams announced the opening of the School of Mines in local newspapers. One advertisement told prospective students that school would begin on Nov. 6, 1871. It also advised that the School would offer a three-year course of study that included "practical instruction in Engineering, Mechanics, Geology, Mineralogy, General and Analytical Chemistry, Assaying, and Physics." Those completing the full three-year course would, after passing an examination, receive a mining engineer degree. Those pursuing other than the full course would earn "certificates of proficiency."

#### Mining Education

Only a few schools offered a mining education curriculum in 1871. Director Williams' alma mater, Polytechnic College of Pennsylvania, chartered in 1853, conferred the first American degree in mining engineering. Columbia School of Mines, a part of Columbia University in New York, started in 1864. It graduated its first class in 1867. By 1892, it had produced 402 of the 871 mining engineering graduates from American schools. The Massachusetts Institute of Technology, which conferred its first mining degree in 1868, ranked second in the number of mining graduates with 126.

Other schools offering mining curricula during the 1860s included Rensselaer Polytechnic Institute, the University of Michigan, Washington and Lee University, Lehigh University, and Lafayette College. The last two schools graduated their first mining students the same year that the Missouri School of Mines opened. Washington University of St. Louis also began offering instruction in mining and metallurgy that year. Schools such as Michigan School of Mines, 1886; Colorado School of Mines, 1872; South Dakota School of Mines, 1887; University of Arizona School of Mines, 1891; University of Nevada School of Mines, 1892; Montana School of Mines, 1891; and New Mexico School of Mines, 1893, all came after the Rolla school. Although the Colorado School of Mines started in 1872, it did not graduate its first student until 1882, eight years after the first student received a degree from the Missouri School of Mines.

While only a few schools provided instruction in mining engineering in 1871, more than 70 institutions offered degrees in engineering, and 563 schools conferred some type of college degree. Burton Bledstein, author of a major study of higher education, called the decade between 1865 and 1875 the "age of the university" in American education. In 1870, more than 52,000 students enrolled in colleges and universities. Bledstein explained the impressive growth in higher education as a response of the middle class to an increasingly specialized, complex society. He wrote:

By and large the American university came into existence to serve and promote professional authority in society. . . . The development of higher education in America made possible a social faith in merit, competence, discipline, and control that were basic to accepted conceptions of achievement and success.

#### Nov. 23, 1871

Director Williams and President Read mirrored Bledstein's thoughts when they formally inaugurated the University of Missouri School of Mines and Metallurgy on Nov. 23, 1871. Read described the purpose of the School in this manner:

It is, as far as possible, to supply, to those engaged in mining and metallurgical operations, agents competent to take charge of new and old works, and to conduct them upon thoroughly scientific principles. In no department of industrial effort is science so much required—nowhere is there so much waste in consequence of ignorance.

In his address, Director Williams compared the success of European mining with the unexploited resources of the United States in general and Missouri in particular. He explained the reason for the difference in development by comparing the state of mining education in Europe with that in the United States. And he asked:

Is there not room enough and need pressing enough to establish a school, academy, college, or what you will, wherein sufficient science shall be offered and sufficient practical knowledge be furnished to bring a class of young men up to the standard necessary not only to see the difficulties with which our mining industry is now beset, but also to appreciate them and to provide for their removal?

#### Curriculum

Director Williams designed a curriculum based on his experiences in industry and education. He sought to create "a school of technology" in which students first learned pure sciences and mathematics and then applied their learning to practical problems. The "regular" course of study taken the first year included advanced algebra, geometry, the beginning of trigonometry, mensuration (the art of measuring geometric quantities), surveying, general chemistry, physics, mineralogy (descriptive and determinative), crystallography (the science of crystal structure and phenomena), outlines of zoology, analytical chemistry, blowpipe and humid qualitative analysis, and drawing (mechanical and free hand).

The student, during the second year, finished trigonometry; took analytical geometry, calculus and surveying (field practices, projections, shades, shadows); began descriptive geometry; and studied machinery and motors, chemistry (general and industrial), metallurgy, physics, analytical chemistry (qualitative and quantitative humid analysis), geology (physiographical, dynamical, historical lithology, phenomena of veins and mineral deposits), and drawing (free hand and mechanical). The last year, the student enrolled in calculus, analytical mechanics, applied mechanics, field practice and engineering topography, metallurgy and assaying (wet and dry methods), analytical chemistry (quantitative analysis), machinery and motors, mining (methods of explorations and exploitation, extraction, crushing and concentration, mining regions), and drawing (maps, plans, and sections of mines). Third-year students also at-

tended lectures on mining law sometime before graduation. There were evening lectures on human physiology and domestic hygiene, and optional courses included French and German. A provision of the Morrill Act required instruction in military tactics.

During those last months of 1871, Director Williams discovered that some students needed better preparation to enter the "regular" course of study. In 1870, only 2 percent of the 17-year-old population of the U.S. had graduated from high school. Rolla area residents urged the director to establish a year's course of study that prepared students for the "regular" course. Coincidentally, the Columbia School of Mines added a preparatory year to its curriculum in 1872.

The first Missouri School of Mines preparatory students took arithmetic and elementary algebra under the guidance of Allen, blowpipe analysis and general chemistry from Cooch, and physical geography from Williams. By the fall of 1873, the School required preparatory students to pass examinations "in the ordinary branches of an English education" and to have reached the age of 16. Students spent 23 hours per week in recitation and an hour each day in drawing class. They received no laboratory practice, but they could take Latin as an optional course. Director Williams described the regimen as serving the functions "of an academy, from which the School of Mines will probably for some time to come, at least, draw its largest proportion of students, thus serving to preserve the proper standard of scholarship in the technical school."

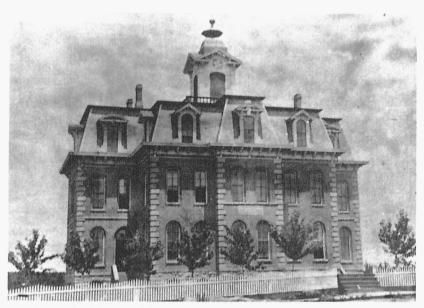
Special students formed a third category. While preparatory and regular students had to pass examinations and meet age requirements (regular students had to be 17), special students faced no such hurdles. They could be admitted anytime and select any series of classes if they enrolled in 16 weekly recitations. Because special students could not qualify for degrees, they earned certificates of proficiency upon completion of a satisfactory examination. In 1873, the School admitted seven men and 18 women as special students. They included Jennie and Julia Bishop, the daughters of the founder of Rolla. That fall, 17 regular students and 33 preparatory students joined those special students to give the School an enrollment of 75.

#### Purchasing the Rolla Building

As Director Williams was creating a curriculum for the School, plans went forward for developing the Fort Wyman site. The Board

of Curators instructed the School of Mines' building committee to erect a building costing between \$50,000 and \$75,000. Architect George Barnett designed a three-story, Italian structure that measured 60 feet by 130 feet. The committee asked contractors to submit bids, and A.E. Dye, the man who had built the Public School Building, made the lowest offer of \$85,000. At its Dec. 13, 1871, meeting, the Board of Curators accepted Dye's offer. Nine months later, the Board changed its mind. Phelps County's bonds and land had failed to sell, and with no other money available, the Board deemed it "inexpedient to decide upon building any structures for the School of Mines and Metallurgy."

Plans for creating a campus at Fort Wyman were again halted the next year when William James, owner of the Maramec Iron Works, brought suit in Boone County Circuit Court. This suit contested the validity of the Phelps County bonds that had been issued during the bidding for the School. The Boone County Circuit Court ruled that they were valid. James appealed that decision and the Missouri Supreme Court in October 1874 declared them invalid because Phelps County voters had not approved their issuance.



The Rolla Building, circa 1894-95.

Meanwhile, the Rolla Board of Education was experiencing financial difficulties. It opened school during January 1872, in the two rooms not rented to the School of Mines. In March it ran out of funds for teachers' salaries and closed. It held classes again in September of 1872, but not again until 1875.

The legal action taken by William James and the long-term financial distress of the Rolla Board of Education related to the depression of 1873. Bank failures became epidemic, and in that year, James chose to expand his iron manufacturing operation to the Little Piney River near the all-important railroad. He spent nearly \$300,000 before declaring bankruptcy in 1878.

Depression conditions resulted in difficult times for the School of Mines. A decision made by School officials in 1874 may have averted the institution's demise. In April of that year, the Board of Curators appointed a committee to investigate the purchase of the Rolla Public School Building.

The committee would also be responsible for securing the donation of the 20 acres of land surrounding the building. In June, negotiations to purchase the building began. In January 1875, the Board paid the Rolla Board of Education \$25,000 for the Public School Building which had cost \$35,000 to build. The School of Mines now had a permanent home.

#### Faculty

While the Board of Curators sought a permanent building for the School, Director Williams expanded his faculty. In the fall of 1872 Col. James W. Abert, professor of English on the University of Missouri campus, joined the School of Mines as professor of applied mathematics and civil engineering. Abert, a graduate of Princeton and West Point, had accompanied John Charles Fremont on one of his explorations, fought in the Mexican and Seminole Wars, and served in the U.S. Army during the Civil War.

The next year Director Williams recruited his old friend George D. Emerson of New York City. Williams had known Emerson during the 1860s when both of them worked in the Lake Superior mining region. Emerson earned a law degree from the Cincinnati Law College in 1841. His education in engineering came from working on various projects in the Lake Superior district and serving as a military

engineer in the Union Army. Emerson took the civil engineering duties from Abert and also taught mining engineering and graphics.

Capt. R.W. Douthat also joined the faculty in 1873 as professor of English branches. Douthat was born in Christiansburg, Va., on April 13, 1840. He served the Confederacy during the Civil War and enjoyed describing his experiences as a captain in Gen. Pickett's famous charge at Gettysburg. Douthat did not hold a regular college degree. He attended Emory and Henry College for less than a year before he entered the service. After the war, Douthat taught and farmed in Floyd County, Va., and Tennessee. He rose to the position of high school principal in his hometown before resigning to accept the School of Mines offer. Douthat loved languages and, at various times, taught Latin, Spanish, and German. He called himself "doctor," but where he received such an honor, if he did, is unknown. Roanoke College in Salem, Va., and Emory and Henry College both gave him honorary master of arts degrees in 1874.

Nelson W. Allen taught mathematics through 1874, when he resigned to pursue the ministry. William Cooch taught elementary chemistry and English through 1873 and then left Rolla for parts unknown. Van Court Yantis replaced Allen as professor of mathematics. He came from Saline County, Mo., had no college degree, knew mathematics, and stayed until 1878.

#### Enrollment

These additions to the faculty were justified by a growing student body. Enrollment grew from 75 students in 1873 to 107 in 1874. Enrollment remained high during 1875, as 101 students attended the School. In both 1874 and 1875, 83 students took special or preparatory courses, and 24 students enrolled in the engineering curriculum in 1874. Eighteen sought engineering degrees in 1875. In both years, women students represented a significant portion of the enrollment. Twenty-six women took courses in 1874 and 28 enrolled in 1875. All of the women were special students.

#### Regulations

Director Williams and his faculty watched carefully over the student body. The Board of Curators prescribed that students could not present petitions "or other papers, to the Board of Curators in regard to the government of the university, or to the appointment or dismissal of professors, or the holding of meetings to criticise [sic] the government of the university. . " Any student guilty of such an offense might be dismissed by the faculty. Student meetings could not be held without the consent of the president. The regulations read:

In general terms, students are held responsible for good order and the diligent use of their time. The University is no place for *idlers*, for the *disorderly*, or those who do not propose to give their *whole time* to the work allotted to them by the faculty. The loss of a single recitation not only injures the student, but all connected with him.

Finally, the Board expected students to attend public worship at least once a week and prohibited "all practices inconsistent with the due observance of the Seventh day."

Women students were important to the campus but also caused some concern. An investigating committee from the Missouri General



Some of the first coeds to attend MSM during 1875 and 1885.

Assembly observed, "that the Director and faculty exert every watchful care and control over the student, and that the young ladies who attend upon the instruction there given, exercise a purifying

moral restraint on all the classes. . ." School officials limited the purifying influence, however, by segregating women students. A newspaper reported that, "No communication is allowed between the sexes in the building or on the grounds. The ladies ascend and descend by one pair of stairs and the gentlemen by another." One room on the third floor was set aside "exclusively for the ladies." Both sexes, however, did attend some classes together.

Most of the students came from the area and lived at home. John Holt Gill, one of the first graduates, rode the train each day from his home on the Little Piney River, 10 miles west of Rolla. John W. Pack, also a member of the first graduating class, drove a team of horses from his father's farm six miles from Rolla. Another student, Almon Hare, walked the four miles between his home and the School.

In the spring of 1872, Gustavus A. Duncan, the third member of the graduating class of 1874, organized what he called a club. Duncan, Gill, Pack, Pat Smith, and Hillary Williams rented three rooms over a hardware store, hired a cook, and "went to housekeeping." They reserved the front room for study and "its quiet was never disturbed during study hours."



The first graduates of MSM in 1874 were John W. Pack, John H. Gill, and Gustavus A. Duncan.

#### A Duel

Duncan remembered only one disturbance during his student days. The Morrill Act required military training for students and between 1873 and 1877 the School of Mines had a company. Company rules required cadets to wear gloves when entering the armory or handling weapons. When John McCown of West Plains walked into the armory and took possession of his weapon without gloves



Three cadets of the 1875-77 period, (l. to r.) Millard Faulkner, John Livesay, and Capt. George Love.

on, Sgt. Peter Blow, the nephew of Henry T. Blow, a St. Louis politician, ordered him to leave. The disagreement led to a duel and McCown shot Blow in the cheek and throat. Blow went to a hospital in St. Louis, and McCown was arrested and released on a \$600 bond. The duel occurred on April 7, and by April 25, Blow had returned to school. A couple of weeks later while playing baseball, Blow hit a triple, ran to third, began coughing, and spit out the bullet that had lodged in his throat.

#### Extracurricular Activities

Duncan described relationships between faculty and students as being congenial. He admired his teachers and commented, "I think an unusual closeness of relation and understanding existed among these fine men and the school body, and I have retained a warm personal regard for them all." He also noted that "co-eds enlivened the old Rolla Building. . ." and that "romance was not wanting."

Student dances at Germania Hall on the southwest corner of Sixth and Pine streets and at Campbell Hall, where the old shoe factory now stands, provided opportunities for romance. Literary and debating societies offered another form of coeducational socializing. Rolla citizens paid to attend a meeting of the School of Mines Literary and Debating Society in 1874. They heard Lola Shaw sing and saw an act from the *Merchant of Venice* with Miss Shaw playing Portia, James B. Harrison playing the Merchant, Oliver Bumpass playing the Duke, and John E. McGrath playing Shylock. The Irving Literary Society also provided musical and literary entertainment. Each semester ended with students offering examples of their poetic, literary, and oratorical talents.

Periodic field trips broke the academic routine and provided opportunities for faculty members and students to get better acquainted. Col. Abert wrote about a trip to Shannon County to observe a copper mine. "We had an ambulance and pair of horses, a buggy and horse, one riding horse and seven of the human kind." They went to Eminence a "village . . . of some 14 houses." Abert thought the building that housed W.J. Wingo's paper the *Current Wave* the most attractive. On another occasion, Director Williams and Professor Emerson took three seniors and four juniors to St. Louis to tour the Vulcan Iron Works, the Missouri Zinc Co., and the coke works across the river. Between 1875 and 1877, Director Williams also served as state geologist and frequently employed students to aid in his geological surveys.

#### Financial Problems

When the General Assembly moved the Missouri State Geological Survey to Rolla and appointed Williams to direct it, state officials sought to economize. Until 1875, the School had been financed through—the 10 percent interest Phelps County paid on its bonds. When the Supreme Court declared those bonds invalid, it ordered Phelps County to cease interest payments. In that year, the legislature adjourned without making an appropriation for the School. Gov.

C.H. Hardin called a special session of the legislature for the purpose of appropriating funds. The legislators passed a biennial appropriation of \$10,000 for the School of Mines (\$2,500 less per year than its previous budget) and a biennial appropriation for the Geological Survey, stipulating that it must be moved from the Columbia to the Rolla campus.

Gov. Hardin and the legislature felt pressure from the students to adequately fund the School. In January 1875, the students held a mass meeting and composed a petition requesting that the General Assembly provide "at least so much support in the way of appropriation as has from year to year been granted the different normal schools in the state." They identified themselves as residents of the "mineral districts of Missouri" and stated that they attended the School of Mines "for the purpose of being educated in those branches of science connected with engineering, mining, and metallurgy, in order that they may be able to aid in the development of the vast, but as yet almost untouched mineral wealth of this and other sections of the state." Seventy-one students, including 16 women, signed the petition.

More students had signed the petition than were enrolled in 1876. Only 66 students registered that year, and only 43 enrolled in 1877. By that time, the depression had reached crisis proportions, and fewer students who lived in Missouri could afford the \$20 fee required to attend the School. Students from other states paid a fee of \$30. In addition, because of the legislature's initial failure to appropriate funds for the School, many prospective students feared that it might close.

#### Williams' Resignation

Faced with a declining enrollment and insufficient funding to support faculty salaries at their current level, Director Williams resigned during the spring of 1877. He remained state geologist until 1878, when he resigned that position and returned to Philadelphia. Williams left the School with a solid faculty, an established academic program, and 12 alumni who had earned degrees—seven in mining engineering and five in civil engineering. When he came to Rolla he envisioned a school that combined learning and application, and he succeeded in establishing just such a school.

Perhaps L.R. Grabill, an 1878 graduate, best summarized Williams' contribution:

We present ourselves as defenders of the new education whose adherents, work not only with their heads, but with their hands; whose mental exercise is not that of combing the pages of ancient history or translating with nicety the idioms of a dead language; but whose pride is that in the training we received, we have been brought more often into contact with the intrinsic details of practical problems of daily occurrence; whose enjoyment lies not wholly in the contemplation of man's work, man's laws, and man's logic—but who delight to unravel the mysteries and solve the problems which nature lays before us, in accordance with the laws and logic of nature herself.

# CHAPTER II The Turbulent Years 1877-1897

The Board of Curators chose Charles E. Wait, 28, to replace Williams as director. Wait was born and grew up in Little Rock, Ark. He was described as small of stature but of high dignity. Director Wait had a receding hairline and a droopy mustache, which helped hide his tender years. He graduated from the University of Virginia in 1872, with a bachelor's degree in mathematics, and he earned degrees in civil and mining engineering after two additional years of study in the same school. Before coming to Rolla, Wait taught at St. John's College in Little Rock, served as chemist to the Geological Survey of Alabama, worked in the mines of California, and directed the opening of antimony mines in southern Arkansas.



Charles Edmund Wait, director, 1877-88.

#### Enrollment

The young director faced circumstances that would have challenged a seasoned veteran. Enrollment plummeted to 43 in the fall of 1877, and a reorganization of the faculty by the executive committee of the Board of Curators reduced the number of positions from five to four. Wait occupied the chair of analytical chemistry and metallurgy. The committee combined the chairs of civil engineering and graphics and mine engineering into a single chair of engineering and graphics. It selected J.W. Abert to fill the new position, leaving his good friend George D. Emerson without a job. Van Court Yantis held the chair of pure and applied mathematics, and R.W. Douthat remained head of the preparatory department and professor of languages. Abert resigned his position in October, and Emerson took over the chair of engineering and graphics.

The enrollment problem proved more difficult to solve than the personnel problem. Led by Professor R.W. Douthat, the faculty attacked it by expanding the curriculum. Beginning in 1878, the faculty offered what it called an optional course. The course included classes in bookkeeping, a program for the preparation of public school teachers, and expanded language offerings. As Douthat stated:

The course of study is not just what it was two years ago, but has been so modified as to offer all that could be desired by young men and women who propose to become teachers in the public schools, or who desire it to fit themselves for bookkeeping in retail, wholesale or commission business, or in great railroading, mining or manufacturing companies.

The expanded curriculum, newspaper advertisements, and recruiting trips into southwest Missouri by Douthat produced increased enrollments between 1877 and 1880. From the low recorded in 1877, the number of students increased to 71 in 1880. The curriculum attracted women students whose number increased from 16 in 1877 to 30 in 1879, but then fell to 22 in 1880.

Although enrollment improved in 1880, University President Samuel S. Laws advocated the transfer of the technical departments of MSM to Columbia and the transfer of the Columbia normal department to Rolla. In the fall of 1877, a College of Engineering had been started at Columbia. Douthat argued against President Laws' proposal, however, because it would limit the opportunities for

students in the Ozarks and would violate the laws under which the School of Mines and Metallurgy had been created. The Board of Curators rejected the idea of consolidation, and, in 1881, the state legislature appropriated funds to pay for the Rolla Building.

During the next two years, Professor Douthat attempted to increase enrollment by creating a girls' course in arts and by founding the Western Conservatory of Music as a separate school in Rolla. The girls' course in arts appeared in the 1881-1882 catalogue as a four-year program that combined such courses as United States and English history with bookkeeping and calculus. Students took drawing each semester and a foreign language six of the eight terms. All of the courses included in the girls' course had been offered earlier so the new program failed to encourage women to attend the School of Mines.



Professor R.W. Douthat.

The Western Conservatory of Music began in September 1882. In organizing the conservatory, Douthat developed two ideas that he hoped would enhance the position of the School of Mines. He thought a boarding house for students combined with a course of study that included music education would swell the enrollment of the School of Mines. He announced the conservatory's opening in a footnote to 3,500 circulars printed in both English and Spanish that he mailed at his own expense during the summer of 1882.

Douthat purchased property between Seventh and Eighth and Rolla and Main streets on which an old tobacco factory stood. When remodeled, Poverty Flats, as it was called, contained 16 separate rooms for students, a large kitchen and dining room, and quarters for Douthat's family of nine children. He also rented a home in the block between Ninth and Tenth and Main and Park streets that he converted into a boarding house for girls. The girls' boarding house was named Black Jacks because of the oak trees in the yard. The Methodist Episcopal Church South, a brick building whose site Douthat had contributed, housed the conservatory.

Douthat next cast his net into the Southwest. From Texas and Mexico he lured Spanish-speaking students to the Ozarks. Nine "Latin" students enrolled in MSM in 1882, and 19 entered the next year. Most of the "Latins" lived in Poverty Flats, and Douthat's daughter remembered his teaching them English at the dining room table. She wrote that her father's "love of the Spanish language grew deeper . . . due to this contact."

#### Controversy

Until April 1883, Douthat's efforts seemed to be appreciated by Wait and the rest of the faculty. The enrollment stood at 110, and the *Rolla Herald* reported in January that the School of Mines had sent out a circular to teachers which outlined course offerings for the second semester and a 12-week summer school. In an April 2 letter to the *Herald*, Douthat informed teachers that the summer school would not be conducted. He cited "the heavy opposition of those who thought the School of Mines would be degraded by having any connection with the Summer School or the Conservatory."

This opposition came from the "technical faculty," George D. Emerson; Geordie Z. Whitney, professor of mathematics; and Director Wait. They had become disturbed at the expansion of the curriculum, and on April 14, 1883, struck the girls' course in arts and the bachelor of philosophy degree from the catalogue. Wait tried to explain the action in a long letter to the *Rolla Herald* in which he systematically discussed each of the School's remaining programs. By June the Board of Curators had become aware of the dissension, and it observed "... the school at Rolla ... is not a High School or

Academy or College or University in the popular acceptation of those terms, whose function is to impart the general instruction afforded by such institutions; but it is which the law very properly designates it, a 'School of Mines and Metallurgy,' with limited powers and specific lines of instruction, technical and professional and not general and academic." The School's role was to teach mining skill and art.

As the summer warmed so did the controversy. In August, the *Rolla Herald* editorialized that except for one faculty member, "the faculty of the School of Mines . . . have *[sic]* been enjoying themselves *[sic]* at some eastern place of recreation to the utter neglect of the school's interest." Douthat remained in Rolla. Florence Whiting, who had resigned her position, defended absent faculty members, "Those who are accustomed to the labors of the classroom know that it is impossible to work with energy unless recreation is enjoyed during a portion of the year."

Geordie Z. Whitney replaced Douthat as secretary of the faculty when school resumed in September. Later, Wait, Emerson, and Whitney held a faculty meeting without Douthat's knowledge. They created a reorganization plan for the preparatory department and sent it to the Board of Curators. The plan specified that no more than \$1,600 could be provided for Douthat's department. His salary alone had been \$1,500. It called for the creation of two new instructorships, a \$1,000 position in mathematics and chemistry, and a \$600 position in English. Pending Board approval, the plan was to take effect in September 1884.

Douthat was outraged. He wrote, "I have for years stood in the way of the transfer of the School of Mines to Columbia, I have time and again saved the school from death, I have done twice as much work as any other member of the faculty." He saw the reorganization as an effort to force him to resign. He charged that "the Scientific Faculty was bent on the 'destruction' of the School of Mines." He became personal:

Why should these schemers plan for assistants in chemistry and preparatory mathematics? In order to have more time to do nothing. They desired to have only three hours work a day in School, so that each might have more time for his own pleasure or extra profits. Why did they want salaries reduced in the preparatory department? In order that more might be added to their own.

Finally, he noted that a loss in salary of \$900 per year would force him and his "large family to wear very indifferent clothing and to live very poorly for a time . . ."

In June 1884, the Board of Curators adopted the reorganization plan. Douthat went before the Board, and, according to George Emerson, "retracted and withdrew all charges made by him against the Scientific Faculty of the School of Mines. . . ." Douthat announced in the *Rolla Herald* that he would devote full time to the School of Mines. He offered the conservatory and boarding houses for sale at a price of \$2,000. That fall he accepted the salary of \$600, sent his family to live with relatives, and sold his Rolla property at a loss to pay obligations resulting from his investments in houses and the music school. He even lost his treasured library. He resigned in December 1884. Geordie Z. Whitney soon followed.

Their departure did not end the controversy. During the spring of 1885, both the governor and the state legislature entered the fray. Gov. T.T. Crittenden asserted, "The school is not in as prosperous a condition as could be desired. . . ." and recommended its removal to Columbia and the establishment of a state normal school in its place. The governor echoed the proposal that President Laws had made in 1880. A meeting of Rolla citizens responded to the governor's proposal with a resolution. It rejected the idea of removing the School and pointed to the limited support the institution had received from the state. A committee composed of S.B. Rowe, W.J. Powell, D.W. Malcolm, E.W. Bishop, and W.W. Southgate was charged with protecting the rights and expressing the wishes of Rolla citizens in regard to the School. At its next meeting, the Board of Curators resolved that discussion of removal did no good.

An editorial in the *Rolla Herald* requested that the General Assembly require the Board of Curators to organize the School to comply with the Morrill Act of 1862, "to afford the means of a liberal and practical education to the industrial classes in the several pursuits and professions of life." The writer urged the General Assembly "not to strangle a school with a restricted curriculum and then complain because it does not bloom with health. Not to shut off the supply of blood and then think strange that there is so little life."

The General Assembly followed a course laid out by the School's advocates. It passed legislation directing the Board of Curators to "adopt a liberal academic course of study to be taught in the College [sic] of Mines and Metallurgy" and authorized the conferring of

bachelor of arts degrees. Crittenden signed the act on March 31, 1885. The Board directed Wait and his faculty to create the proper curriculum. Ironically the departed Douthat had been victorious.

## Curriculum Changes

The 1885-1886 catalogue outlined the academic course, as it was called. It could be completed in three years instead of the four required for the girl's course in arts. It required less advanced mathematics and much less language study than the earlier program, but it retained a semester of bookkeeping. The faculty chose not to exercise its power to confer arts degrees, preferring to give diplomas of graduation. In 1889 the faculty voted to confer bachelor of science degrees in science to recognize accomplishment in non-engineering disciplines, but continued to give diplomas as late as 1901.

## A Second Building

While the legislature disagreed with Wait about curriculum, it approved a \$10,000 appropriation for a new chemical laboratory. A committee of the General Assembly visited the campus in February



Old Chemistry Building.

1885, and noted that having the laboratory on the first floor of the Rolla Building caused noxious fumes and gases to permeate "the entire building, making it unpleasant and unhealthful. . . ." By May, Wait had completed the plans for a one-story stone-and-brick building that measured  $57 \times 100$  feet. The structure contained 12 rooms, had a full basement and 19-foot ceilings in the laboratory section. A local architect named Henry Hohenschild was put in charge of construction. Construction went well, and, in May 1886, Director Wait delivered a paper on the building before the American Institute of Mining Engineers. In later years called "Old Chem," the building incorporated the most advanced ideas in laboratories.

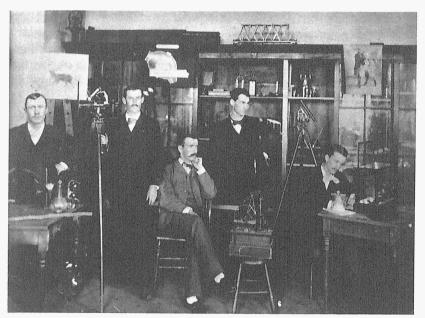
## Faculty Changes

With the resignations of Douthat and Whitney, Wait sought new faculty members. Faculty turnover had been a problem even before the crisis of 1884. Between 1878 and 1882, four different men had occupied the chair of mathematics. For the academic year 1882-1883, the Board of Curators finally appointed a professor of physics, J.M. Morris, but then abolished the position. In 1883, Wait hired Virginia G. Conkling to replace Florence Whiting in the preparatory department, but she remained for only one year. Wait hired E.D.W. Eaton to replace Whitney and E.A. Drake to replace Douthat.

### Enrollment

A full staff and new chemical laboratory did little to improve enrollment. In 1886, only 46 students registered—11 in the regular course and 35 in the preparatory department or as special students. Thirteen of them were women. Some improvement occurred the next year, with 59 students registered, 19 in the regular course, 40 in the preparatory department or as special students. Twenty-two of the students were women. Enrollment declined again in 1888 when only 50 students enrolled—20 in the regular course, and 30 in other categories. Twenty-one of those students were women.

Director Wait completed his administration in July 1888. He could count as major contributions the construction of a fine chemical laboratory, final payment of the debt on the Rolla Building, and



MSM students and a classroom in 1882.

keeping the School afloat in a time of great turbulence. However, the technical nature of the School had not been fully established and it continued to serve as a high school or junior college for local young men and women.

Wait served as director for 11 years. During the next nine years, three different men held that position. They moved the School toward greater emphasis on technical education, but the turbulence of the middle 1880s continued into the 1890s.

### **Echols**

William Holding Echols, director from 1888-1891, came in 1887 as a replacement for George D. Emerson. With Emerson's departure, the last of the faculty recruited by Charles Williams ended connection with the School. Echols was born in 1859 and attended private schools in Tennessee and Virginia before entering the University of Virginia in 1878. He graduated in 1882, with a bachelor of science degree and a degree in civil engineering. He built railroad bridges, worked a claim with pick and sledge hammer in Colorado, became

superintendent for a mining company, and served as the first resident engineer of the Memphis and Birmingham Railway before accepting his first teaching position at the School of Mines and Metallurgy. When Wait resigned to accept a professorship of chemistry at the University of Tennessee, the Board of Curators promoted Echols to director. He was clean shaven, with red hair and brown eyes. Echols was only 29 years old when he became director.



William Holding Echols, director, 1888-91.

With only E.A. Drake remaining on the faculty, Echols had the unique opportunity of reorganizing the School and of recruiting a faculty without the interference of vested faculty interests. He divided instruction into two divisions: Academic and Technical. The preparatory department and academic department were combined into the Academic Division. The Technical Division included the departments of engineering, analytical chemistry and metallurgy, pure mathematics, mineralogy and geology, and physics. Since he could not fill the chairs of mineralogy and geology and physics, chemistry picked up the former and engineering picked up the latter.

Echols assumed responsibility for engineering. He chose W.H. Seamon, who held a bachelor of applied science degree from the

University of Virginia, to chair chemistry. He stayed until 1890, when Chase Palmer, a Ph.D. holder from Johns Hopkins University, the first bona fide Ph.D. faculty member to teach at MSM replaced him. Palmer stayed only one year. Walter Buck Richards, a master of arts degree holder from the University of Virginia, headed the mathematics department. George R. Dean, 21-year-old freshman from Waterloo, Ill., and a mathematical genius, served as an instructor in mathematics and physics. E.A. Drake served as head of the academic department. Paul Julius Wilkins, holder of a bachelor of science degree from Michigan A & M College, served as instructor in the preparatory department.

Echols left no doubt about the direction in which he planned to move the School. In the catalogue for 1888-1889, he called the School of Mines and Metallurgy an "Institute of Technology, a College of Engineering with Civil and Mining Engineering and Metallurgy as specialties." Following the practice of the Massachusetts Institute of Technology as well as guidelines established by the American Society of Civil Engineers, Echols and the faculty decided to confer bachelor of science degrees in civil, mining, and mechanical engineering. The granting of the full degree of civil, mining, or mechanical engineering was delayed until after the graduate had proved himself on the job. In 1889-1890, Echols established six degree programs, including the three named earlier, plus chemistry, mathematics and physics, and general science. The director also gave the School a new slogan: "Work is Victory."

During the Echols years the enrollment increased, and, in 1889, the number of technical students surpassed those taking preparatory or special work. Sixty-five enrolled that year with 33 in the regular course. Twenty-six students were women. In 1890, 69 students registered, and in 1891 the number reached 80.

Besides boosting enrollment, Echols succeeded in having sidewalks built, having a wooden picket fence constructed along Main and State streets between 11th and 12th streets, and securing the first School-owned dormitory. The legislature made a special appropriation of \$5,000 to build the dormitory, and Henry Hohenschild designed it. It was completed in 1889 and became known as the Club House. We know it today as the Chancellor's Residence. It contained rooms for 25 to 30 students, and its dining room could accommodate 60.

Students who stayed in the Club House paid \$12 per month in advance. Out of that, \$1 went for rent, \$1 went for hiring a caterer, and \$10 went for the purchase of supplies, lights, and necessary upkeep. At the end of each term any unexpended funds were returned to the students. The School furnished all of the necessities except sheets, blankets, pillow slips, towels, and napkins. Students living in the Club House made their own rules of conduct and government, subject to approval by the director. Each term the students elected a three-member committee whose responsibility it was to see that all of the rules were rigidly enforced.



The Director's Residence, circa 1904.

Despite these accomplishments, Echols became dissatisfied with conditions. In a public letter to the General Assembly, dated Jan. 10, 1891, Echols discussed the reason for his dissatisfaction. He began by calling the School, "a forlorn foundling whose parentage was due to contention, despised by the mother institution, and regarded with disfavor by the people of its adoption, shorn of its birthright and thrown back upon the lawmakers who established it, as a subject for public charity." He went on to record the institution's past difficulties and then urged that professors of geology and physics be appointed.

He earnestly recommended that "the name of the college be changed into the Missouri Institute of Technology, as more appropriate to the purpose and intent of its establishment. . ." Echols ended by urging the legislature to develop the School "on lines parallel with the design of the Massachusetts Institute of Technology, the grandest institution of technical and industrial learning in the world."

### Harris

During the spring of 1891, Echols resigned as director to accept the position of professor of mathematics and engineering at the University of Virginia. He recommended as his successor Elmo G. Harris. Harris had been a classmate at the University of Virginia and had worked with him on railway projects.

Elmo Golightly Harris was born in Spartansburg, S.C. in 1861. He attended public schools in his hometown before entering the University of Virginia and graduating in 1882 with a degree in civil engineering. He worked on various projects in a number of southern



Elmo Golightly Harris, director, 1891-93.

states and at one point served as the city engineer in Little Rock, Ark. He developed an airlift pump for water wells and became a leader in other uses of compressed air and in centrifugal pump technology. Before coming to MSM, he was an engineer for an Arkansas railroad. Harris retained Echols' administrative structure and degree programs except for the bachelor of science degree in general science. He also expanded the engineering curriculum into a four-year program and instituted two-year diploma courses in assaying, surveying, and electricity. These differed from degree courses by leaving out all studies which were not strictly technical, such as English, languages, and history.

Faculty turnover continued to plague the School during the Harris years. When Echols returned to Virginia, George R. Dean, who had been a mathematics instructor and who had earned degrees in civil engineering (1890) and mathematics and physics (1891), went with him as his assistant. Professor Drake also resigned in 1891, and Thomas Lewis Rubey, with an A.M. from the University of Missouri, replaced him. Cuthbert P. Conrad, with an A.M. from the University of Virginia, served as head of chemistry during 1891-1892. When he died, W.H. Seamon, who had been engaged in mining in southwest Missouri since 1890, returned to campus as his replacement. Walter Buck Richards provided stability by continuing as head of mathematics, and P.J. Wilkins stayed at his post in the preparatory department. For the second time the campus acquired a professor of physics, when Austin L. McRae, with a science doctorate from Harvard, came to Rolla from his post as assistant professor of physics at the University of Missouri.

Harris had hardly settled into the director's chair when a controversy erupted in what an enthusiastic editor described as "the billowy spurs of the Ozarks . . . where no person need ever be sick or die, save from old age or contagious disease. . . ." In his 1892-1893 budget, Harris requested \$10,000 for an engineering building in which space would be provided for "exhibiting and operating the typical machines, and for models of typical machinery, furnaces, etc; a Geological Museum, and a well-lighted drawing room; and an auditorium." He also asked for a professor of geology. W.H. Seamon, head of chemistry and in charge of geology and mineralogy, disagreed with Harris' ideas, and with Henry Hohenschild, designed a very different structure. Seamon's and Hohenschild's building would be an ore dressing and metallurgical laboratory that could handle

railroad car lots of ore. Their estimates placed the cost of such a building at \$15,000 with an additional \$15,000 needed for equipment. Without Harris' approval, E.Y. Mitchell, chairman of the executive committee of the Board of Curators, took both plans before the Board of Curators.

The Board recommended that the General Assembly appropriate \$25,000 to build Seamon's building. Meanwhile, a bill supporting Harris' concept was introduced in the General Assembly. Seamon went to Jefferson City and persuaded the committee assigned the bill to appropriate \$25,000 to build his mining and metallurgical laboratory instead of Harris' engineering building. The \$25,000 appropriation passed.

Harris believed that Seamon had been insubordinate. He also believed that the executive committee, the Board of Curators, and the legislature did not support him. Harris resigned as director effective June 1893 and requested that he be retained as professor of engineering, a desire honored by the Board of Curators.

#### Richards

The Board promoted Walter Buck Richards, 30, to replace Harris. Richards was born, reared, and educated in Virginia. He earned a master's degree in mathematics in 1895 and also received the Jefferson Literary Society's award as the best debater in the University of Virginia. He declined a teaching offer from his alma mater to accept a position at McCabe's University in Petersburg, Va. He taught Greek, German, Latin, mathematics, and engineering. Richards came to MSM in 1888. He was a square-jawed, fleshy man with his hair parted in the middle.

In December 1893, Richards presented his ideas on how the School should proceed to the Board of Curators. He observed that during the Wait administration, the School "seemed to have sunk the instruction to meet the abilities, the preparation, and the disposition of the actual applicants. Everyone who wished to enter was admitted, and was taught whatever he might elect to study or might be capable of learning. . . ." He noted that in 1882-83, out of 110 students, only 13 were engineering students. "This policy brought the School into disfavor and disrepute," he asserted.

He noted that in 1888 the School took a new direction; it made a commitment to "develop the school on its proper technical side,



Walter Buck Richards, director, 1893-97.

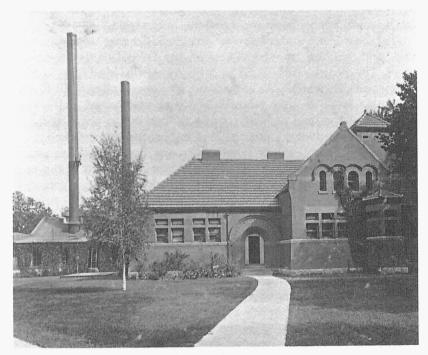
directing its energies more and more prominently and exclusively into their appropriate channels." New buildings, new apparatus, and the addition of needed professorships indicated that commitment. Richards applauded that development, but wrote, "I do not like the idea of sending forth bachelors of science who cannot speak nor write good English, and who have no ability to read productions, scientific or other, in any tongue but their own." He had begun teaching a class of French, and, he hoped that "ere long we may be able to demand either French or German of all applicants for graduation."

The new professorships to which Richards referred were in physics and mining and metallurgy. In the fall of 1893, the Board of Curators invited M.H. Ihlseng of the Colorado School of Mines to become the first professor of mining and metallurgy in the School's history. He accepted the post, visited Rolla, encountered the continuing debate over the mining and metallurgical laboratory, and resigned. To replace him, Richards hired Harry K. Landis, a graduate of Lehigh University, who immediately entered the mining and metallurgical laboratory controversy on Hohenschild's side. Seamon became temporarily withdrawn from the controversy when he left

campus to catalogue the Missouri Mineral Exhibit at the Chicago World's Fair. The exhibit came back to the School and formed the basis of the mineral collection.

## Mining and Metallurgical Laboratory

By December 1893, Rolla builder Robert McCaw had received the contract to build the mining and metallurgical laboratory according to the plan designed by Hohenschild, Seamon, and, now, Landis. Richards attempted to persuade Landis to plan the new building along the lines proposed by Harris. He failed to win Landis' support and filed charges of insubordination and incompetency against him. Richards' view was sustained by the Board of Curators, and Landis was not rehired for a second year. Courtenay DeKalb of San Francisco became the new professor of mining and metallurgy and stayed until the end of Richards' tenure as director. Seamon resigned in 1895.



Mining and Metallurgical Laboratory.

Richards lost on the question of the building. Completed in 1895, the Mining and Metallurgical Laboratory, later the Power Plant Building, contained a lecture room, a drafting room, a mineralogical laboratory, a reference library, and a mill room, equipped with the best machinery available for crushing and processing ore. Two tubular boilers provided steam to operate an automatic engine and to provide steam for heating the Rolla Building and the Chemical Laboratory.

## Curriculum Changes

The director hired Eugene Thomas Allen, with a Ph.D. from Johns Hopkins, to chair chemistry, and Arthur H. Timmerman, a graduate of Cornell University, to replace A.L. McRae as professor of physics. McRae left to become a physicist at the University of Texas. The director also recommended that the degree of mechanical engineer be dropped from the catalogue until the School of Mines had laboratory facilities and apparatus to provide better instruction.

The Board of Curators readily accepted Richards' recommendation, and, in 1896, moved to restrict the School's offerings even more. The Board asked MSM to drop courses in electricity and in mechanical engineering, and to limit its course offerings "to the legitimate work of said school." Richards maintained that every mining engineer had to have courses in mechanical engineering or the School's graduates would have to tell prospective employers, "I attended a mining school where we were not allowed to study mechanical engineering. 'Well,' the manager might say, 'if the pick and shovel are the only machines that you know, I can give you a job underground at \$1.50 a day.' "The courses in electricity were stricken from the catalogue.

The effort to restrict the School of Mines represented nothing new in the relationship between the Columbia and Rolla campuses. Committees of both the Missouri House of Representatives and Senate in 1879 commented on limited appropriations for the Rolla campus. The House committee noted that "appropriations exhaust at mid-winter." During the early 1880s, both the *Lebanon Rustic Leader*, a newspaper, and a member of the Board of Curators from St. James named S.H. Headlee advocated that the School of Mines separate from Columbia because the Ozark school was being neglected. And

during the period 1889 through 1895, at least three bills were introduced in the legislature calling for the separation of the two campuses. None of them passed.

### Richards Leaves

Richards opposed separating the School of Mines and Metallurgy from the University of Missouri, but it was not that issue that caused his departure from the School. The enmity that had grown up between him and Hohenschild over the Mining and Metallurgy Laboratory was the contributing factor.

Hohenschild won a state Senate seat in 1896. He had solicited the support of both Richards and Professor T.L. Rubey. Rubey had some political clout because he had been a state representative from Laclede County. Both refused to support Hohenschild. Once in office, the former architect provided crucial votes for Gov. Lon Stephens' program, and Stephens allowed Hohenschild to recommend members of the Board of Curators.

On July 21, 1897, the result of Hohenschild's influence became clear when the executive committee recommended "that the place of director of the School of Mines and Metallurgy, and professor of mathematics, now filled by W.B. Richards, be vacated. Also, that the place of instructor in the academic department now filled by Thomas L. Rubey be vacated." The Board approved the committee's recommendation and asked that Richards and Rubey be notified that their positions were vacated. The dismissed faculty members asked for a hearing, but the request was denied. Courtenay DeKalb resigned in support of Richards, and the decks were cleared for a new regime.

During the turbulent Harris and Richards administrations enrollments ranged from a high of 121 students in 1893-94 to a low of 72 in 1895-1896. In 1896-1897, 104 students registered for classes. The ratio of technical to academic or special students increased. In 1896-97 there were 69 technical students and only 26 registered as academic or special.

Another change occurred in the nature of the student body when the General Assembly dropped the preparatory department in 1894 and to fill the void, the city of Rolla opened a two-year high school in 1895. The number of women enrolled in MSM declined from 34 to 17. When the Rolla High School graduated its first class in 1897, only four women attended the School of Mines. Before the change, women, mostly of high school age, had composed about 25 percent of the

student body.



Coeds in 1896, (l. to r.) Sylvia Burgher, Grace Richardson, Elinor Wilkins, and Jessie Via.

Between 1877 and 1897, the School conferred 28 degrees in mining engineering, 27 degrees in civil engineering, one bachelor of philosophy degree, five bachelor of science in chemistry degrees, and four bachelor of science in general science degrees. In addition, the School granted 121 licenses and certificates of proficiency during those years. Some students, such as George R. Dean, earned more than one degree. Floyd Davis, who graduated in 1883, earned the only bachelor of philosophy degree ever granted at MSM plus degrees in both mining engineering and civil engineering. Two women also received degrees during these years. Sally E. Millard earned a bachelor of science degree in general sciences in 1891, and Mary Page Buskett earned the same degree in 1893.

# Daniel C. Jackling

Of the graduates from this era, Daniel C. Jackling made the most significant mark. "A poor orphan lad," reared on a small farm, he

worked his way through the School of Mines and Metallurgy, serving for a year as assistant in chemistry at \$50 per month. He earned degrees in civil engineering and chemistry in 1892 and 1893. Mining historian T.A. Rickard called Jackling's education "the lever by which he opened the world oyster, in the shape of the greatest copper mine on this continent." Jackling was a millionaire by 40, primarily as a result of his pioneering work in handling low-grade porphyry ores and by developing such concerns as Utah Copper, Ohio Copper, and Ray Consolidated. He was described as a handsome man with "the swaggering walk of whom [sic] the novelists write." He became so wealthy that he owned a 300-foot yacht that carried a crew of 50, had accommodations for 30 guests, contained a movie theater and miniature golf course, and could defend itself with two brass guns against pirates. He owned a private railroad car. In 1926, he received the Mining and Metallurgy Society's gold medal for distinguished service.

While Jackling earned \$50 a month as an assistant in chemistry, Director Richards earned \$191.65 per month; E.G. Harris received \$166.65; and the two other professors, W.H. Seamon and A.L. McRae each earned \$150. Instructors such as T.L. Rubey and P.J. Wilkins each earned only \$100 per month. Over the years, faculty salaries remained in the range of \$1200 to \$1500 per year, with the director receiving an additional \$300 per year for an administrative increment. The next director, George E. Ladd, would change the salary level and much else on the Rolla campus.

# CHAPTER III The Maturing Years

During the years between 1897 and World War I, the Missouri School of Mines and Metallurgy matured into a bona fide engineering school with 65 faculty members, over 250 students, and nine substantial buildings. The School began the period offering degrees in mining, civil engineering, metallurgy, and general science. By World War I, after intervention by the General Assembly and a Missouri Supreme Court decision, MSM also conferred degrees in mechanical, chemical, and electrical engineering.

Continued controversy and resignations by School directors marked the transition. The Board of Curators expressed the desire to hire a metallurgist of national reputation to replace Richards as director. The initial search ended without success, and school began in September 1897 with Professor E.G. Harris in charge. Then, on Sept. 18, the Board chose Dr. George E. Ladd, 33, a geologist, for the post. Ladd would serve as director for a decade, and his creative and assertive leadership would contribute greatly to the School's evolution.

### George E. Ladd

Ladd brought to the position a Harvard Ph.D., a will to succeed, and a variety of experiences. Ladd was born in Haverhill, Mass. He hoped to attend Harvard University, but his public school education poorly prepared him, and he studied for an additional year. After failing two entrance examinations to Harvard, he qualified under a special rule, but an officer of the school told him, "Harvard doesn't want boys like you." He persevered and entered as a special student. An accidental meeting with America's premier geologist, Nathaniel Shaler, led him away from law and to geology. He studied with Shaler, earning an A.B. in 1887, an A.M. in 1888, and a Ph.D. in 1894. Late in life, Ladd observed, "In college I learned the value of

cooperation by playing football. I never played for Harvard. In my days 'poor boys' were never given a chance on its athletic teams." Ladd had enrolled as a special student in another college and had played on its team. Between 1887 and 1894, he taught part time at Harvard and worked on geological surveys in Missouri and Texas, and for the U.S. Geological Survey. He held the position of assistant geologist and chemist for the Georgia Geological Survey when he accepted the position of director of MSM.



George Edgar Ladd, director, 1897-1907.

Ladd assumed his duties in October. The new director described Rolla as a small town with about 1,200 people. The business district stretched from the railroad tracks to Pine Street and then in a southerly direction down Pine for two blocks. He went on:

There were no public improvements. There were no sidewalks outside of the small business section. Here and there one would cross a street, and before getting to the next corner, would have to pass over a rather deep ditch, which usually had water in it, by means of a single plank. Only those with a vast knowledge of details ventured out at night without carrying a lantern.

There were seven saloons. The second floor of the Grant House, corner of Eighth and Pine streets, contained a ballroom known as the Opera House where commencements and public functions were held.



Testing steam drill, Mining and Metallurgical Laboratory, 1897-1898.

As Ladd went northwest from Pine Street, he viewed a campus that had been recently improved. Professor E.G. Harris during 1895 and 1896 had supervised renovation, including building a terrace and encircling the campus with an iron picket fence embedded in a stone base. (A section of this fence still stands around the Chancellor's Residence). The grove of trees east of the Rolla Building had been thinned, and the campus grounds had been graded and leveled. A new steam heating system had replaced stoves in the Chemical and Rolla Buildings, and a 180-foot well, with water pumped by a windmill, had been drilled.

As he remembered his initial reaction to the campus, Ladd was not impressed:

The School had only a small group of buildings. One of them (the present director's residence) was closed, and two of them were in bad repair. One of my first acts was to put tie-rods through the Mining Building . . . to keep some of the walls from falling. They were badly cracked. The Chemical Laboratory was the only building well designed, but that was too small, and anything but attractive looking. The Rolla Building was useful and not ugly in design. Hohenschild's Club House and Mining Building were monstrosities.

(Ladd was referring to Henry Hohenschild who was the architect of the two structures.)

In his appraisal of the Missouri School of Mines, Ladd quoted Dr. Wadsworth, president of the Michigan School of Mines, who, in an 1897 article, had written of the Missouri school that it was "unworthy

of being called a mining school. It is merely a country academy." Ladd complained that the student body was largely local and that many were girls. He found "very few technical students—no modern improvements in the way of utilities; little in the way of equipment . . . , and an utterly inadequate income." In abundant supply, however, were political strife and feuds.

Henry H. Hohenschild occupied the center of controversy. Ladd referred to him as "the principal agitator" and wrote:

When I called at his office and delivered my letter of introduction from Dr. Vincil, [John D. Vincil, President of the Board of Curators] he made a long harangue and told me, from his point of view, 'who was who' in Rolla. He gave me the names of several business men and said, as though he were a dictator, that if I so much as entered the store of one of these people, he would see that I was immediately dismissed as Director of the School. . . .

Ladd encountered other problems. During the first meeting of the Board of Curators that Ladd attended, in December 1897, a motion was made to abolish courses in civil engineering and English at the School of Mines. Before the Board of Curators voted on the measure, Ladd rose and spoke against it. When he had finished his statement, "several members of the Board arose and asked President Vincil if they might confer with . . . [him] in an adjacent room." As Ladd described the incident, "I was taken 'up on a high mountain' and offered what was no less than a bribe." The conspiring Curators suggested to the young director that the cost of living in Rolla was low, that his salary was relatively large at \$3,000 per year, and that if he would "go along" with the Board, he could remain director as long as he pleased, "even though the School be, as might happen, removed to Columbia." Ladd refused the offer, expressing his desire to promote the interests of the School.

### Curriculum Limitations

The effort to abolish instruction in civil engineering and English failed, but the issue of limiting MSM offerings remained. At the Board of Curators meeting in December 1898, a motion was made and seconded that the School cease all instruction in mechanical and electrical engineering. Ladd again protested the effort to circumscribe

the School's curriculum and secured a delay in the Board's consideration of the matter until he could survey the curricula of similar schools. Ladd succeeded in demonstrating a need for the courses and the Board specifically authorized "to have taught . . . enough of Mechanical and Electrical Engineering so as to make the students of said school expert Mining Engineers."

### Division of Funds

Richard H. Jesse, president of the University, also attempted to limit the share of funds that MSM received. In 1870, the General Assembly had granted MSM one-fourth of the revenue from lands granted to the University by the Morrill Act. The one-fourth/three-fourths formula was specified in the law that established the College of Agriculture and the School of Mines. During the Dec. 22, 1897, meeting of the Board of Curators, President Jesse proposed a reduction in MSM's proportion to one-eighth. The Board delayed action until the matter could be investigated and then let the matter drop.

When it came to apportioning proceeds from the state's collateral inheritance tax, the Board of Curators and the General Assembly considered giving the School of Mines much less than Director Ladd thought appropriate. The legislature had passed the original inheritance tax act in 1895. Proceeds from the tax created a scholarship fund for students of the University. In 1899, the legislature revised the act and specified that tax money would be used for the general support of "Missouri University and its departments." The statute provided that the School of Mines receive one-eighth of the money collected. There were eight departments in the University entitled to share the funds. By 1901, some members of the legislature and the Board of Curators were discussing a reduction of MSM's portion to one-tenth.

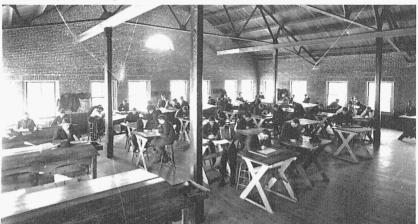
Ladd asserted that his School deserved at least one-fifth of the tax. He pointed out that MSM received one-fourth of the Morrill Act money. He recognized that the Columbia campus needed support, however, and believed that one-fifth of the inheritance tax was MSM's fair share. The director carried the day when he persuaded members of the House Committee on Education to accept his ratio. He showed the committee that MSM paid one-fourth of the support of the University's high school examiner. The committee and the

General Assembly understood Ladd's message—if the University expected MSM to pay one-fourth of the expense of a University function, the School deserved at least one-fifth of the tax fund. The legislature passed and Gov. Alexander Dockery approved a 1901 act that assigned one-fifth of the tax fund to the Rolla School.

Besides securing a larger share of the collateral inheritance tax for the School, Ladd also succeeded in getting larger state appropriations for his institution. Biennial appropriations for operating expenses climbed from \$16,000 in 1897-1898 to \$50,000 in 1907-1908, Ladd's last year. In addition, the director persuaded the legislature to appropriate \$348,000 for buildings, equipment, repairs, renovations, and books during his decade of leadership.

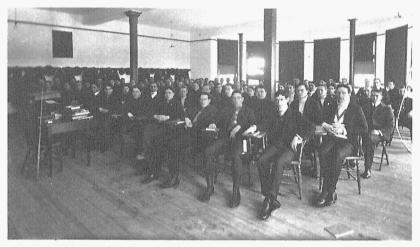
## Campus Changes

With these appropriations, Ladd built a modern educational plant. He increased the area of the campus by 25 percent. Workmen landscaped and built sidewalks on the campus. New buildings included Mechanical Hall which went up in 1902. Norwood Hall, sometimes called the "Main Building" was completed in 1903. Started during Ladd's administration but not completed until 1911, the Metallurgy Building provided an ore dressing laboratory. Ladd added a second floor and two wings, each measuring 55 x 60 feet, to the Chemistry Building, and increased the size of the Power Plant. Two



Top floor, Mechanical Hall, circa 1904.

temporary frame buildings completed campus expansion under Ladd. One housed a workshop and dynamo laboratory; the other served as a gymnasium. Ladd also saw that the latest equipment was installed in the buildings. One source called him the "building director."



Classroom, Norwood Hall, circa 1904.

### Ladd's Success

Ladd cultivated those who could help him achieve his goal of improving the quality of the School of Mines. He persuaded men such as Govs. Lon V. Stephens and Alexander Dockery that MSM would have an illustrious future, if it had proper facilities. Other political allies included Sens. James B. Harrison and Frank Farris. Rolla supporters such as Judge C.C. Bland, Col. Charles L. Woods, J.O. Holmes, and B.H. Rucker served as important friends. Woods published the *Rolla Herald*, and Bland and Rucker exerted significant political influence. Luman Frank Parker, Rolla attorney, and later solicitor general for the St. Louis and San Francisco Railroad proved to be an untiring, stedfast, aggressive friend of the School of Mines.

Ladd also numbered among his friends M.E. Benton, J.T. Moore, D.A. McMillan, B.G. Thurman, and A. McVey, all members of the

Board of Curators who served on the executive committee at one time or another. John D. Vincil, president of the Board of Curators, supported Ladd as he pursued his goal of strengthening the School. (Norwood Hall was named after Vincil's father-in-law, Dr. J.G. Norwood, a physicist and dean of the Medical School at the University of Missouri).

Vincil aided Ladd in reestablishing the Missouri Geological Survey on the Rolla campus. The survey was inactive between 1878 and 1889. The legislature had placed the operation in Jefferson City in the latter year. In Ladd's view and in the view of a number of newspapers, including the Kansas City Star, the survey belonged in Rolla. Walter Williams, a member of the Board of Curators, founder of the University's Journalism School, and later president of the University, attempted to place the survey in Columbia. On Feb. 9, 1901, the General Assembly met in Rolla, and Ladd addressed its members, outlining the School's needs and making the case for removing the Geological Survey to his campus. On March 21, 1901, the Rolla Herald reported that the legislature had placed the survey back in the Ozarks. For a short time, it was housed in the Club House, but after the completion of Norwood Hall, the survey occupied the east half of the Rolla Building, and in 1904 the Club House became the Director's Residence.



Office, 1904.

## Faculty Changes

Just as Ladd improved MSM by securing the Geological Survey and expanding campus facilities, he increased the size and improved the quality of the faculty. When he arrived, Ladd inherited a faculty that he termed "on the whole a strong one." E.G. Harris headed the civil engineering department. Ladd thought that he "was perhaps too much of a stickler for the textbook learning, but he made his students work." J.B. Scott taught English, and P.J. Wilkins, whom the students called "Peter Jimmy," taught languages. The director wrote that they "handled their work reasonably well and were very useful faculty members because of their practical common sense in dealing with student problems." Ladd called George Dean, professor and head of mathematics, "a teaching genius."

Dean was a student and teacher at MSM during the late 1880s and early 1890s. Besides being Echols' assistant at the University of Virginia, Dean taught at Maryville Seminary, Coe College, and Kansas City Central High School before returning to MSM in 1897. Dean became a legend before his retirement in 1935. Daniel C. Jackling remembered "purloining a neighbor's wagon, setting it up in the drafting room of the old main building, loading it with pole wood to greet Dean as he came to class the following morning." Jackling participated in that Halloween prank and thought that Dean knew of his part in it, but wrote, "I can't bring myself to believe that his knowledge, or suspicions at least, had anything to do with flunking me in descriptive geometry, largely because my drawings were unquestionably rotten." Another Halloween prank involved Dean's horse "Calculus." Students painted it green to resemble an emerald zebra. The pranks did not suggest an absence of respect for the professor. In the ROLLAMO of 1910, the editor wrote:

Here's to Dean, both tried and true, He's sometimes happy, sometimes blue; He raises h--- with everyone And sprinkles through his math with fun.

An active researcher, he published articles in the *American Mathematical Monthly*, the *General Electric Review*, the *London Electrician*, and the *Physical Review*. During the summer, he often worked in the General Electric Laboratory in Schenectady, N.Y., and worked with the eminent scientist, Steinmetz.

Through Dean's influence Leon Ellis Garrett joined the faculty in

1901. Garrett was born in 1872, and was reared in Maryville, Mo. He attended the town's seminary where he met Dean. When Dean went to Coe College in Cedar Rapids, Iowa, Garrett enrolled in Coe and lived in Professor Dean's home. Between 1894 and 1898, Garrett taught in Nodaway County, Mo., schools and in 1898 enrolled at MSM. He earned a B.S. in general science in 1901 and joined the mathematics faculty as an assistant. He earned promotions to instructor in 1902 and associate professor in 1905.

Other faculty members recruited during Ladd's administration who made a lasting impact on the campus included a young St. Louisan named Victor Hugo Gottschalk. He earned a B.S. in chemistry in 1898 and a master's in 1900, both from MSM. Gottschalk succeeded Dr. Eugene T. Allen when Allen resigned as professor of chemistry. He assumed the professorship of chemistry at the age of 22. In 1910, the *ROLLAMO* jingle dedicated to him went:

Here's to Gottschalk, Chemistry's dream, He smokes Bull Durham, inhales the steam: He talks in dashes, fits and starts That nearly break the Freshmen's heart.

Ladd also hired A.L. McRae and Durward Copeland. McRae had left MSM in 1894 to take a position at the University of Texas. He returned to Missouri in 1896, working as a consulting electrical engineer for a St. Louis firm. He rejoined MSM in 1899. Ladd recruited Durward Copeland from the Michigan College of Mines in 1907 to chair the department of metallurgy and ore dressing. Copeland was born in Chelsea, Mass. in 1880. He earned a B.S. in mining and metallurgy from the Massachusetts Institute of Technology in 1903 and taught in Michigan from 1904 through 1907. The 1910 ROLLAMO made fun of his speech:

Here's to Copeland, good old scout, Who puts the Senior Class to rout; He stutters, stammers, hops and skips, Andrunshistalkcloseinlikethis.

During Ladd's administration, the teaching staff increased from 10 to 26, the number of full professors went from five to seven, assistant professors from none to four, instructors remained at four, and assistants went from one to 11.

The director supplemented his staff by bringing eminent guest lecturers to campus. During 1903-1904 both Dr. Heinrich O. Hofman and Robert H. Richards of the Massachusetts Institute of Technology

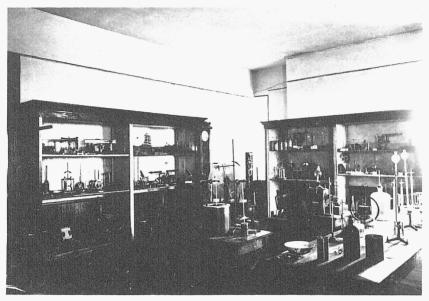
taught at MSM. Hofman was said to be the best known metallurgist in the country, and Richards was known as America's greatest authority on ore dressing.

Neither guest lecturers nor an increased staff quite offset an increasing enrollment that placed a heavy burden on instructors. In succeeding years, enrollments increased from 117 in 1897 to 210 in 1907. The figure reached over 200 in 1902. It dipped below that number only once when it went to 194. The highest enrollment recorded during Ladd's years was 224 in 1904. Professor George Dean described the work load of E.G. Harris in civil engineering: Harris ". . . carried all the work in the civil engineering dept. and was on duty in the classroom and in the drawing room about eight hours a day or more." Dean and two assistants taught all of the courses in mathematics. John B. Scott and P.J. Wilkins taught English, history, political economy, psychology, logic, physical geography, physiology, and foreign languages. It may have been his heavy load that caused E.G. Harris to leave MSM for Pennsylvania State College in 1902. Conditions must have been little better in Pennsylvania, because Harris returned to the School of Mines in the fall of 1903.

The experiences of a student named Frederick Hauenstein suggest that the faculty took time from heavy work loads to aid students. Hauenstein received the first bachelor of science degree granted by Westminster College in 1900 and a master of science degree from the same school in 1901. That fall, he enrolled in the School of Mines. During his last semester, he was having difficulty with the course in assaying. Dr. McRae took his problem to a faculty meeting. Hauenstein was allowed to drop all of his classes except assaying for a week. During that week, he solved all of the assaying problems. Later, he reentered his other classes and graduated on schedule.

The weekly schedule for students such as Hauenstein included 15 hours per week in lectures and recitations and 10 hours per week in laboratories. Students maintained such schedules in order to complete curricula that required 167 semester hours for graduation in general science, 190 hours in metallurgy, 186 hours in mining engineering, and 176 hours in civil engineering. Ladd resurrected the bachelor of science in general science in 1898 and dropped the academic course in June 1900. Until after the passage of the Buford Act, degree programs were: the bachelor of science in general science, metallurgy, mining engineering, and civil engineering.

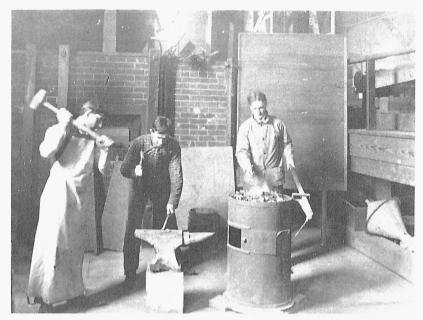
Ladd instituted a trimester system to fit the more than 40 hours per year required to complete any degree program. The first semester extended from September until Christmas, the second from the first week in January until about St. Patrick's Day, and the third from March 20 until about June 15. A summer session, which was attended primarily by area teachers, was also available.



Apparatus room, physical laboratory, 1897-98.

For students who wanted specific training, the School of Mines offered two-year short courses in assaying and technical analysis, surveying, and electricity. The special course in electricity, for example, required students to take mathematics, including algebra and both solid and analytical geometry, English, and general chemistry the first year; and elementary mechanics, general physics, calculus, dynamo machinery, and thermodynamics the second year. To complete the 89-hour program, students took electives.

In his efforts to improve the student body, Ladd upgraded admission standards. He continued the practice of accepting students who had completed 14 units of work from accredited high schools. The School of Mines had begun listing acceptable high schools as early as 1893. Other candidates were required to pass examinations in English, science, mathematics, and languages.



Blacksmithing, Mining and Metallurgical Laboratory, 1897-1898.

The number of graduates during Ladd's administration indicates his influence on the School. During his 10 years, MSM conferred 157 bachelor's degrees, an average of more than 15 per year. In the last five years of Ladd's administration, 101 students earned B.S. degrees. During the decade before Ladd became director, MSM granted only 35 degrees, and during the School's first 27 years, an average of only four students per year earned degrees.

Those earning degrees during Ladd's decade had access to a much improved library. In 1893, the MSM library held only 3,000 volumes; only 700 additional volumes had been added by 1896. By 1906, the library contained 6,000 volumes and subscribed to 72 periodicals and five newspapers. The completion of Norwood Hall made it possible to move the library from the Rolla Building in 1905, and the books were catalogued under the Dewey Decimal system in 1906.

Ladd greatly improved every aspect of the Missouri School of Mines and Metallurgy. The tall, mustachioed, vigorous director provided aggressive leadership in securing legislative appropriations that built the buildings, equipped the laboratories, hired the faculty, and improved the library.

### Ladd's Resignation

Ladd's problems began with the selection of architects for Mechanical and Norwood halls. His first encounter with local architect Henry Hohenschild, at that time the area's state senator, had been unpleasant. Moreover, Ladd disliked the Club House and the Power Plant, two buildings Hohenschild had designed for the campus. So, the director decided to open the commissions for Mechanical and Norwood halls to competitive bidding. Hohenschild lost, became incensed, and began working against Ladd. Ironically, Hohenschild recruited Dr. E.R. Buckley as an ally against the director. Buckley had been Ladd's choice for state geologist and occupied that post.



Surveying class, 1897-98.

Ladd's enemies found an opportunity to attack when he became director of the Missouri Mineral Exhibit at the 1904 Louisiana Purchase Exposition, popularly known as the St. Louis World's Fair. A nine-man commission was charged with choosing a director of the exhibit. With the approval of the executive committee of the School, Ladd spent \$500 of MSM's money on a lobbying effort for James Clark Draper, professor of geology and mineralogy at the School of Mines, for the position. Instead of Draper, the commission chose Col. H.H. Gregg of Joplin. Gregg proved ineffective, and after Ladd returned from his 1903 summer vacation, the commission urged him to become director. Ladd expressed reluctance at taking the job,

but when pressed by the Board and governor, he could offer no valid reason for refusing it. Luman F. Parker also urged him to accept.

Before he took the position, Ladd cleared with the state attorney general the problem of accepting two salaries from the state. Ladd paid extra compensation out of his own income to Professor Leon Stacy Griswold for his covering Ladd's classes when work on the exhibit required his absence. Under Ladd's direction, the exhibit was a great success, and when the fair closed, he secured the minerals and the fixtures, furniture, and other items used in the exhibit as a gift to MSM.

While the fair occupied Ladd's time, Henry Hohenschild worked diligently to secure the nomination and election of Joseph W. Folk as governor of Missouri. Ladd's political friends, Charles Woods, B.H. Rucker, and others, opposed Folk's candidacy. After Folk won election, Hohenschild persuaded Folk to oppose Ladd. To compound Ladd's problems, his good friend on the Board of Curators, John D. Vincil, died.

Hohenschild persuaded W.J. Salts, a member of the House of Representatives from Phelps County, to ask for an investigation of



Chemistry lab, circa 1904.

Ladd's conduct during the World's Fair. Charges against Ladd included drawing two salaries, padding expense accounts, dereliction of duties as director of the School, and teaching students to play pool. Ladd's friend and supporter, Charles Woods, was criticized for accepting printing contracts from the School while also serving as secretary of the executive committee.

Gov. Folk instructed the Visiting Committee to investigate these charges. The committee was a group appointed by the governor to annually appraise the condition of state institutions. During the probe, the committee refused to hear Ladd or to allow his attorney to be present until some members of the Rolla community forcibly entered the room and demanded that Ladd be allowed to defend himself. Meanwhile, students paraded in support of their director and burned Hohenschild in effigy.

The committee found that Ladd's absences had prevented his fulfilling responsibilities as director, that the expenditure of School funds to promote Draper's candidacy was inappropriate and that Ladd "habitually frequents a public billiard hall in Rolla" and encouraged students to play pool. Yet, it did not recommend his removal. The Board of Curators met on Oct. 25, 1906, and gave Ladd a vote of confidence.

Nevertheless, on Feb. 5, 1907, Ladd resigned as director, effective Sept. 1. He gave as his reason for leaving the desire to pursue mining investments in the Joplin area. He had recently found a rich vein of zinc on 10 acres that he had leased, and he held options on other property in the area. Newspapers at the time noted that his decision was influenced by the political controversy that had swirled around him and the likelihood of continued problems with Folk in the governor's chair. He later confirmed those reports. Three of his supporters on the Board of Curators had been lost. Dr. J.D. Vincil and D.A. McMillan had died and B.G. Thurman resigned. Another influential and ardent supporter, Luman F. Parker, was seriously ill and died not long after Ladd's resignation.

The mining investments proved less lucrative than expected. In 1908, Ladd accepted appointment as president of Oklahoma School of Mines, serving until 1913. He moved to the presidency of New Mexico College of Agriculture and Mechanic Arts at Las Cruces and stayed until 1917 when he became economic geologist in the United States Office of Public Roads. He continued in that position until his retirement.

## Young

To replace Ladd, the Board of Curators selected Lewis E. Young, 28. Young was born in Topeka, Kan. in 1878. He earned a B.S. in mining engineering from Pennsylvania State College in 1900. He worked briefly for the Pittsburgh Coal Company, and then became an instructor in mining engineering at Iowa State College and assistant geologist with the Iowa Geological Survey. Iowa State granted him the degree engineer of mines upon his completion of prescribed graduate courses and in recognition of his professional experience. In



Lewis Emmanuel Young, director, 1907-13.

1903, the Colorado School of Mines hired him as professor of mining. He held that position when the Board chose him as director of the School of Mines and Metallurgy.

The new director understood the problems that had ensnared his predecessor. He wrote:

The committee of the Board of Curators which appointed me director of the School of Mines in 1907 cautioned me against the political factions which have existed in Rolla for many years, and particularly pointed out the danger of entanglements with certain politicians who have been active in various local fights.

So warned, Young sought to improve the School, while avoiding the strife that had plagued Ladd.

### Faculty Improvement

Young emphasized improving the teaching staff. He encouraged Leon Garrett to attend the University of Wisconsin for advanced training in mechanics during the 1910-1911 academic year, and provided V.H. Gottschalk the opportunity to complete his graduate work. He recruited Louis Agassiz Test, who held a Ph.D. from the University of Chicago, as an assistant professor of chemistry, and Guy Henry Cox, holder of an M.A. from the University of Wisconsin, as an assistant professor of mineralogy and petrography. Frederick William Buerstatte, who held a B.S. from the University of Wisconsin and had acquired extensive experience in industry, came as an instructor in mechanical drawing. Frank Edward "Spike" Dennie, a four-letter man from Brown University, became the School's first instructor in physical education and the School's first bona fide football coach. He also taught civil engineering courses. He had a quick temper and was called "Mr. Bang."



1909 faculty baseball team, (l. to r.) Standing: L.E. Garrett, E.G. Harris, D. Copeland, L.S. Griswold, V.H. Gottschalk, H.T. Mann, G.W. Corey, E.S. Smith, and J.H. Bowen. Seated: P.J. Wilkins, Director L.E. Young, R.C. Thompson, B. Dudley, A.L. McRae, and John B. Scott. At right front, unidentified.

George Dean, Elmo G. Harris, and A.L. McRae remained as "giants of the faculty." According to Enoch R. Needles, who was a freshman in 1909 and went on to have a distinguished career in civil engineering, these three "would have been giants on any faculty." Their talents were complemented by other holdovers from Ladd's administration, including Durward Copeland, P.J. Wilkins, John B. Scott, and Joseph Henry Bowen. Bowen taught shop work and drawing. His jingle in the *ROLLAMO* of 1910 went:

Here's to Bowen, short and fat, Who loves to wear an old straw hat: He runs the shop and thinks it's fun To have them make 'another one.'

### Degrees

Until the addition of chemical, mechanical, and electrical engineering in 1916, the curriculum of MSM changed little. Opportunities for greater specialization represented some change and reflected industrial developments. In the mining curriculum during the fourth year students could concentrate on mining geology, mining machinery, ore dressing, metal mining, or coal mining. Another change systematized graduate study. Until 1919, master's degrees could be earned only in general science areas. Graduate degrees in engineering were called professional degrees. One could earn a professional degree in two ways: through completing 53 hours of graduate work and writing a satisfactory thesis or by completing three years of satisfactory professional practice and writing a thesis. MSM awarded advanced degrees in mining, called engineer of mines; in metallurgy, called metallurgical engineer; and in civil, called civil engineer. Between 1908 and 1913 MSM awarded 35 professional degrees and three master of science in general science degrees. The School awarded 200 bachelor of science degrees: 45 in general science, 14 in civil engineering, 127 in mining engineering, and 14 in metallurgy.

#### Enrollment

Young generally maintained the enrollment levels achieved by Ladd. Only in the years 1910, 1911, and 1912 did the number of

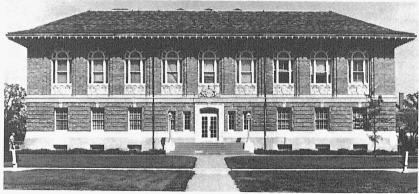
students drop below 200, and that occurred because of a slump in the mining industry. Enrollments ranged from a low of 181 to a high of 254 during Young's six years.

# Building

Young continued Ladd's efforts to improve campus facilities. In 1909, he established a Mine Experiment Station on campus. Its goal was to stimulate original research and experiments on the properties and uses of mineral products and to investigate engineering problems related to the mineral industry. Researchers also worked on preventing accidents in mining and in the processing of ores. The station published a series of *Technical Bulletins* reporting the results of research activities.

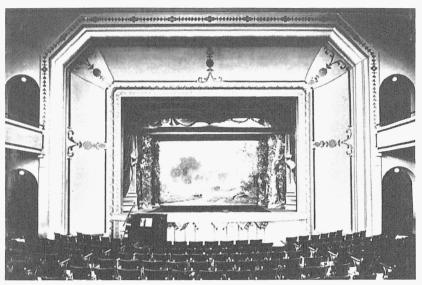
Director Young made other contributions to the School by persuading Daniel C. Jackling to become interested in his alma mater. In 1910, Jackling established a loan fund in his own name. Students in financial need who had established a record of achievement could borrrow up to \$100 per year from the fund. Jackling also contributed funds to build an athletic field for the campus. Jackling Field provided a football field, baseball diamond, and track. Concrete bleachers at the new field were completed in 1909.

During Young's administration, the General Assembly appropriated \$70,000 for building Parker Hall. Completed in 1912, Parker Hall was named in honor of Luman F. Parker, Rolla attorney and long-time friend of the School.



Parker Hall.

The first floor contained the School's administrative offices, a faculty room, a Curators' room, headquarters of the campus Young Men's Christian Association, and a two-story 550-seat auditorium. The library occupied the front section of the second floor, running the length of the building and containing 3,000 square feet of floor space. It had steel stacking for 50,000 volumes, ample space for MSM's 14,500 books. To oversee the new library, Young hired the School's first professional librarian, Jesse Cunningham. The basement of Parker Hall held the engineering laboratory, a facility for testing materials.



Parker Hall auditorium.

The architectural firm of Hellmuth and Hellmuth of St. Louis designed the beautiful gray hydraulic pressed brick structure. George Hellmuth had been a student at MSM during the early 1890s. Young evidently appreciated the firm's work, for he retained it to draw preliminary plans for MSM's next building.

# Young's Resignation

For some time, Young had seen the need for a permanent gymnasium. With the approval of the Board of Curators, and the

help of interested faculty members, he formulated plans for an athletic facility. The Board approved the retention of Hellmuth and Hellmuth to incorporate these plans into a building. Young secured a \$5,000 contribution from Daniel C. Jackling to help finance it. In the legislative session of 1913, the General Assembly appropriated \$70,000 for the structure.

Meanwhile, the gubernatorial election of 1912 brought victory for Elliott W. Major, Democrat and close political friend of Henry Hohenschild. After the legislature made the appropriation for the gymnasium, Gov. Major sent a letter to the Board of Curators requesting that Hohenschild receive the commission to design the building. The executive committee of the School appointed Hohenschild, and George Hellmuth threatened to bring suit for his commission, arguing that the legislature had made the appropriation based on his firm's plans and that he had a contract. Jackling sent a telegram to Board President David R. Francis urging him to stop Hohenschild's appointment. Young resigned his position.

In his letter to the public explaining his resignation, Young cited the cautionary words of the Board of Curators about mixing politics in MSM's affairs, and wrote, "during these six years I have been connected with the School I have endeavored faithfully and conscien-



Leon Ellis Garrett, director, 1913-15.

tiously to keep the School out of politics." Referring to Hohenschild, he observed that he objected to the appointment "of anyone who had been identified with any of the troubles which have almost wrecked the School in the past." He resigned because he "felt [he] . . . could no longer serve the School of Mines with the enthusiasm and spirit of loyalty which are so essential to success in any administrative work."

The Board appointed Leon E. Garrett to serve as acting director effective June 30, 1913. Hohenschild became the architect of Jackling Gymnasium.

The structure that Hohenschild built was of dark, rough, red brick trimmed with gray terra-cotta. Jackling Gymnasium was completed in 1915. The ground floor contained a swimming pool, and locker and



Jackling Gymnasium.

training rooms. A mezzanine held committee rooms, an auxiliary gym, and a balcony that hung over the swimming pool. A gymnasium was on the second floor. A track circled the gym. It took 26 laps to complete a mile. A large lounging room was in the south end of the third floor. The building also served as a student union.

#### Buford Act

Garrett served as acting director from June 30, 1913, until Dec. 28, 1914, when the Board of Curators appointed Durward Copeland as director. In June of 1913, Copeland had received a leave of absence to study the latest mining techniques and had gone to South America. Although informed of his appointment, he did not get back to Rolla until Jan. 21, 1915.



Durward Copeland, director, 1915.

These two faculty members who were elevated to lead the School faced the threat of its demise. Not from a loss of students did this threat come: enrollment stood at 251 in 1913-1914, 262 in 1914-1915, and 265 in 1915-1916. It came from the Board of Curators and the University administration. George Dean remembered that both University of Missouri President Richard H. Jesse, who retired in 1907, and his successor, Albert Ross Hill, "thought the School of Mines, that is, the courses in mining, metallurgy and civil engineering, ought to be moved to Columbia, and naturally contested every inch of progress the School of Mines made."

Every Director except Young confirmed Dean's observation, and Ladd recorded an incident that suggests his successor might have been unaware of President Hill's activities. Ladd wrote:

About two years after I resigned as director . . . I received a letter from the president of the University asking me to let him know if I were to be in St. Louis . . . as he would like to meet me there . . . It developed that the object of the meeting was to move the School of Mines to Columbia . . . 'What do you care now, Ladd? If you will keep out of the State and keep hands off, we can move the School to the University, take it out of local strife, and take care of it nicely at Columbia.'

Ladd responded that he "considered the Missouri School of Mines a sort of child . . . which had grown up from a weakly, half starved urchin to sturdy manhood through [his] . . . efforts and devotion. I would not then, or ever, desert its interests."

President Hill received support for his idea from Visiting Committees in 1911 and 1913. Both committees recommended that "at some near future time the work of this institution [M.S.M.] should be transferred to the State University, and this plant used for some other class of educational work or public purpose." In the spring of 1913, President Hill proposed to a group of Rolla citizens that all engineering courses be moved to Columbia and that the Rolla school become a manual training school patterned after Hadley Technical School in St. Louis. Rolla Curator S.L. Baysinger and B.H. Rucker traveled to Mississippi, Louisiana, and Texas inspecting manual training schools at University expense. According to Charles Woods, the proposition was discussed at a surreptitious meeting of a splinter group of the Rolla Chamber of Commerce. Woods threatened to expose the matter in the *Rolla Herald* and it was dropped.

Ultimately, the Rolla community's response became the Buford Act. Written by Curator S.L. Baysinger, whose trip to investigate manual training schools soured him on the idea, and the newly appointed director, Durward Copeland, it simply specified that MSM could offer "the bachelor of science and professional degrees in mining engineering, in metallurgy, in mechanical engineering, in electrical engineering, in chemical engineering, in civil engineering, and the degrees of bachelor and master of science in general science." They took their draft to Representative Frank Farris, who introduced it in the House of Representatives during the 1915 session. The bill became stalled in the House, so Baysinger persuaded Carter Buford, who represented the Rolla district in the Senate, to introduce it in the

upper house. Students of MSM sent a petition to the General Assembly in support of the measure. It passed the Senate by a vote of 26 to 4, the House by a vote of 106 to 28, and was signed by Gov. Major on March 23, 1915.

On April 6, the Rolla community held a banquet in Mechanical Hall celebrating the passage of the bill and honoring Director Copeland. Two days later Copeland resigned as director, effective immediately.

Controversy over the Buford Act and harsh criticisms of his role in the matter caused Copeland to resign. According to S.L. Baysinger, Copeland became angered when the Board of Curators passed a resolution stating that the position of director of the School of Mines



Austin Lee McRae, director, 1915-20.

had the same status as dean of any of the colleges on the Columbia campus. Copeland retained his position as professor of metallurgy, but took another leave of absence to continue his study of mining practices. He visited his parents, returned for commencement on May 23, and never returned again.

Garrett accepted the position of acting director after Copeland's departure, and then, in early June, the Board of Curators appointed

Austin Lee McRae, physicist, director. McRae wore frameless glasses and had a short goatee and close-cropped hair. He had an enduring interest in athletics and, while an assistant professor on the Columbia campus, had coached the first football team that school ever had.

## The Supreme Court Decides

The Board of Curators voted 5 to 3 against complying with the Buford Act. The majority of the board maintained that it was the Curators' prerogative, not the legislature's, to establish curriculum in the University. President of the Board David R. Francis ordered that MSM catalogues that described degree programs in mechanical, chemical, and electrical engineering, be withheld from the mails. Baysinger defied the order and B.H. Rucker, Rolla postmaster, sent out 2,000 of the catalogues.

MSM supporters responded to the Board's refusal to comply with the Buford Act with a case before the Supreme Court of Missouri. A student named Harry T. Heimberger became the plaintiff. The Court ruled "that all the engineering science is not only akin to, but is in aid to the mining engineer, and for this reason, if for no other, the Buford Act is not only a just and proper law, but a law that must be put in force, in order to carry out the original designs of the creator of the School of Mines, and to afford the best there is in the education and training of students in mining engineering and metallurgy."

Implementation of the Buford Act caused little expansion of faculty or curriculum, since many of the courses prescribed in those degree programs were previously offered. Nor did the Act result in an immediate substantial increase in enrollment. In 1915-1916, 265 students registered and in 1916-1917, 288 enrolled. In February 1917 Dr. McRae announced that \$50 would be given "to the man getting the largest number of new students here next year."

By the next fall, however, McRae's attention would not be riveted on enrollment, but the war and its effects on MSM.

# "No Place For Idlers," Student Life 1876-1917

The war was on everyone's mind in 1917. A February issue of the *Missouri Miner*, the student newspaper, reported that a company of infantry would be organized on campus immediately at the outbreak of war with Germany. A student named G. Ebmeyer would be the captain. Treating the serious prospect of war humorously, the reporter wrote, "When interviewed last week the Captain said the company would first march to St. Louis and capture the two main German strongholds . . . Anheiser-Busch [sic] and Lemps." (The latter was also a brewery.)

In a further show of patriotism, a *Miner* editor in March 1917, called for the erection of a flagpole on campus so that the United States flag could be displayed on a daily basis. Until a pole could be erected, Dr. McRae suggested that the American flag be flown from Jackling Gymnasium. The Student Council volunteered to be responsible for raising and lowering it. Among the speakers at a mass meeting was Dr. Joseph Barley, professor of English, who talked on the topic "My Country: May she ever be right in all her acts, but my country, right or wrong." The April 6 *Miner* alerted "all men who have had any military training" of a meeting "to arrange for starting drill next week." War had been declared on April 2.

One student perhaps captured the feelings of most when he said, "All of us, by the mere fact of our citizenship, are under the obligation of military service." On April 13, the *Miner* described the first drill of 55 men and noted that drills were held every Tuesday and Thursday from 4 to 5 in the afternoon. It also reported that the Board of Curators had decreed that all freshmen and sophomores who were ably fit must take military science and tactics, beginning in the fall of 1917. The senior class enlisted in the Officers Reserve Corps almost unanimously. In May, they were awaiting orders from Fort Riley.

The war spirit even affected the St. Pat's celebration. In the spring of 1918, when St. Pat asked the traditional question, "Does anyone know where the Blarney Stone is?" A student named Al Laun answered that, "the Blarney Stone had been stolen by a German Spy, but it now stands as a foot stone at the tomb where the Kaiser's hopes and ambitions are now buried." "And where is that?" demanded St. Pat. Laun replied, "Beneath the flag of the U.S.A." As reported in the *ROLLAMO* of 1918, "Amidst cheers and hand clappings, old Glory was hoisted to the top of the flag pole. Just under it waived [sic] the service flag of M.S.M. bearing 300 stars, the contribution of M.S.M. to the service of the nation. . . ."

Those who went to war from the School of Mines had little time to secure training in the Reserve Officers Training Corps. Although required under the Morrill Act of 1862, military training had not been provided on the Rolla campus for 40 years, when it was resumed in the fall of 1917.

The program had begun in 1873 when Professor James W. Abert organized a company and dressed it in a regulation Union Army coat of navy blue and trousers of Confederate gray. Initially, cadets drilled one hour twice a week, but Abert had increased the meeting times to four days a week by 1875. School officials required able-bodied students to participate.

Parades supplemented drill and gave the cadets an opportunity to display their skills. The first parade was held in April 1873, and the last one in June 1876. Abert resigned in 1877 and military training ended. The Board of Curators launched an economy effort in that year and Abert was not replaced.

# Organizations

Among activities which occupied the students in the 1870s was a Shakespearean Club, which community leaders organized. Members elected Dr. W.E. Glenn as president and Director Charles Wait as vice president. Pet Gallaher served as secretary, and Lola Shaw became treasurer.

Besides the Irving Literary Society, students enjoyed the Emersonian Club. Named after Professor George D. Emerson, the club met in Rolla homes and reviewed books of the day. As remembered by Luella Scott, the club had 12 members, including Professor

Emerson. He reviewed a book so interestingly that members scheduled only him for an entire program.

During the 1890s, the Philo Literary Society for men and the Alpha Club for women provided members an opportunity to debate, practice oratory, and read their poetry and prose. Students also organized the first technical societies. By 1893, they had formed the Missouri Mining Club. It met twice a month to discuss problems, new developments, and ideas in mining and metallurgy. Students interested in electricity organized an Electrical Club in 1895, and students also created an Engineer's Club that year. Chemistry students formed a Journal Club, whose one purpose was to review chemical publications.

In 1910, the Mining Club became the Mining Association and affiliated with the American Institute of Mining Engineers and the Engineers' Club of St. Louis. Its objectives included advancing the knowledge of mining among its members; the promotion of "good fellowship among the students and alumni of the Missouri School of Mines; and . . . to bring the Missouri School of Mines into closer touch with the mining profession at large."

Student organizations increased in number and variety as enrollments increased after the turn of the century. Foreign students organized an International Club in 1907. The club had 11 members, with five from Mexico, two from Russia, and one each from the Philippines, Sweden, Japan, and Chile. By 1909, the Cosmopolitan Club had replaced its forerunner with 11 students representing eight countries.

A select group of students developed an unusual club. Called Quo Vadis, it centered on riding trains free and took as its symbol the hobo. With a motto of "please Mum," colors of black and blue and a flower called the dog fennel, Quo Vadis held two national conventions in Rolla. Representatives came from William Jewell, Drury, University of Oklahoma, University of Missouri, and Westminster. In 1915, School of Mines members included such campus leaders as Charles Yancey "Boots" Clayton and William "Mac" McCartney.

The Trowel Club, the Pipe and Bowl, and the Satyrs suggest the diversity of student organizations. Those interested in the Masonic order created the Trowel Club in 1914. Ten students, 10 faculty members, and three alumni comprised its membership. Sophomores organized the Satyrs in 1913 as an honorary fraternity. The Pipe and Bowl appeared in 1914 as an organization, "To promote good fellow-

ship among the students of M.S.M. and to further the interests of the School."

Fraternities came to MSM in 1903. College fraternities had been around since the late 1820s, and by 1870 had become an important and controversial feature of student life on many campuses. The arrival of Sigma Nu on the Rolla campus in 1903 is another indication of the evolution of the School from a "country academy" to a college. Ray F. Rucker and John T. Price, MSM students, brought a representative from the national Sigma Nu office to Rolla, and, on Jan. 23, 10 other students joined them as charter members of Gamma Xi Chapter. In April, other students established Beta Alpha Chapter of Kappa Alpha, and, in December, still others formed Beta Chi Chapter of Kappa Sigma. Two years later, William McTighe and Taris Walker. along with five others, received a charter for Pi Kappa Alpha. Its first pledge was Horace Tharp Mann, later a professor at the School of Mines. Not until 1917, when Lambda Chi Alpha was established, did a fifth fraternity join the group. As early as 1907, Sigma Nu, Kappa Alpha, and Kappa Sigma provided houses for their members.



Ray Rucker, class of 1906.

In addition to fraternities, School of Mines students organized eating clubs. Members shared the expenses of providing for their meals. Students identified themselves in the *ROLLAMO* as belonging to these clubs just as they did with the fraternities. In the 1910

yearbook, the Lucky Strike and Miner's Club were listed. In 1914, eating clubs included Grubstakers, R-Way, Beanery, Muckers, and Prospectors. The next year Corsair and Bonanza joined the others. By 1916, MSM students supported seven eating clubs and four fraternities.

Two honorary fraternities and the Young Men's Christian Association also were on campus. Both Tau Beta Pi and Theta Tau awarded membership to individuals who achieved superior marks in engineering studies. Tau Beta Pi installed officers on the Rolla campus in December 1906, and Theta Tau came to Rolla in February 1916. In 1904, the YMCA organized on the MSM campus. On Friday evenings, members heard talks by members of the faculty, ministers, or businessmen. Bible classes met on Sunday afternoons. Members of the YMCA met freshmen at the trains in the fall and helped them find rooms, informed them of eating places, and assisted them in enrolling. It also sponsored intramural football and basketball teams. In 1916, it had a membership of 148 out of an enrollment of 288. Campus officials supported the YMCA by providing space for it in Parker Hall.

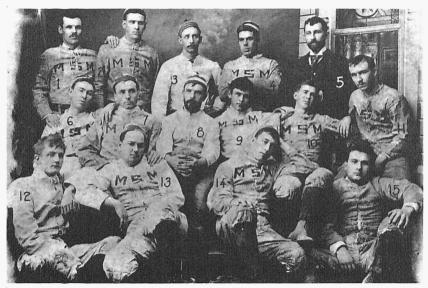
Campus musical groups developed along with other student activities during the early 1900s. In 1907, the first MSM orchestra began playing under the direction of C.W. Keniston. A member of that group wrote, "Our first rehearsal was not a great success, but since it was not altogether a failure we were not discouraged." The orchestra played concerts in Iberia, Salem, and other area towns, and provided the music for commencements and other campus events. In 1912, Professor Victor Hugo Gottschalk assumed the directorship, but, like his predecessors and successors, worked with his musicians for pleasure rather than pay. For a time, the campus also sported a student glee club and a mandolin club.

#### **Athletics**

Like other aspects of campus life, MSM athletics began slowly, picking up momentum after the turn of the century. In 1891, students formed an athletic association, and the next year School authorities graded and enclosed an athletic field. At the 1892 commencement, the association held a field day that included a baseball throw, broad jump, running contests, and a tennis match. Intercollegiate play began in 1893 when the Miner football team lost to Drury. (The MSM

team practiced for only two weeks before the game was played.) Dr. Austin Lee McRae, who had introduced football at the University of Missouri, coached the Miner team, secured faculty approval for athletic competition, and dressed his players in uniforms of orange and white to represent the School's colors of silver and gold. Professor of mining and metallurgy Harry K. Landis played end and captained the 1893 team.

Stringent rules about who could participate did not exist. Even the rules of play had evolved slowly between 1869, when Rutgers played Princeton in the first intercollegiate game, and 1889, when Walter Camp selected the first All-America team. Intercollegiate athletics were new.



1893 football team.

In 1894, the Miners played a one-game schedule, defeating Drury by a score of 8 to 6. The Miners found no opponents in 1895 and played Drury again the next year. In 1897, the School's executive committee allocated \$100 to be spent on the football field, but specified that "no part is to be spent on Foot Balls. . . ." In 1898, the Miners played Washington University in St. Louis for the first time, and 2000 people saw the Miners lose.

The School of Mines scheduled Marion Sims College, the University of Missouri, Kirksville Osteopaths, Drury, Washington Universi-

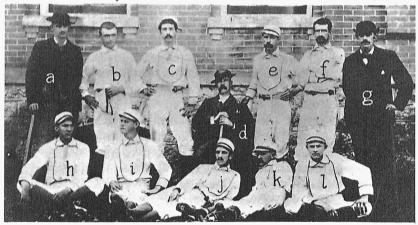
ty, and St. Louis University in 1900, losing only to Missouri and Kirksville. In that year, Director Ladd reported on the success of the athletic program and called attention to the good moral effect that playing team sports had produced in his young men.

During the 1890s and early 1900s the School provided no money for athletic teams. In 1898, the football squad sponsored a concert in an effort to raise money. In 1906, Emory Wishon, the Athletic Association's student manager, raised \$200 by conducting a street fair.

The Athletic Association hired its first coach in 1904. E.F. Boland, a star performer in football and baseball for Syracuse University, coached at MSM for three years and produced relatively successful teams. He became discouraged, however, because the men refused to train. He left Rolla to pitch for the Silverton and Ouray, Colo., baseball teams. He returned to Rolla in 1908, enrolled as a junior in MSM, and coached as an unpaid assistant.

The School had no organized athletic department until 1909 when F.E. Dennie became the first coach employed primarily for that purpose. Before Dennie came, the football coach was paid out of the proceeds from the games and from contributions from the faculty and townspeople.

Director Young hired Dennie to coach and to teach civil engineering. The students wrote a new constitution for the Athletic Association, establishing a board of control that consisted of the athletic director and the president and treasurer of the association. The



MSM "Ozark" baseball team of the 1880s.

athletic director managed all of the teams and appointed students as assistant managers. Dennie's football teams played ambitious schedules and were successful. The 1909 team defeated St. Louis University, Carleton College, Kirksville Osteopaths, Kirksville Normal, and Drury. It lost to Central College, Barnes Medics, the Haskell Indians, and the University of Missouri.

A number of students watched the Miners play Missouri that year. Enoch R. Needles and his roommate Ray Gould Knickerbocker "walked from Rolla to Jefferson City" on their way to the game. They forded the Gasconade River barefoot, and plowed through loose gravel creek beds, and along primitive gravel roads. . . ." Knickerbocker's feet became swollen, "his toes blistered and he lost all nails off all 10 toes." On their way back they "became separated at Hermann, Missouri, when a railroad officer chased ten of . . . [them] off the top of a Missouri Pacific mail coach." Needles wrote:

By the time we got back in Rolla on Monday at noon I had become qualified for membership in Quo Vadis, that fine fraternity of railroad gentlemen. But all of us had been exuberant rooters in Columbia on that Saturday afternoon.

They saw an exciting contest. Before the game, the teams had agreed on a 25-minute first half and a 20-minute second half. After 20 minutes of the first half, the Miners stood on the Tigers' 15-yard-line, when the officials called time. The Miners did not notice the mistake until 15 minutes into the second half. The score remained 0 to 0 until the last eight minutes of the game. Columbia's greater depth made the difference, and the Tigers defeated the Miners 13 to 0.

A Miner player named K.P. Gilchrist impressed the Tiger coach. He induced the authorities at Columbia to allow Gilchrist to play for the Tigers against Kansas. Whether or not Gilchrist made the difference, Missouri defeated Kansas in 1909. Gilchrist went on to football fame at Annapolis, serving as Captain there in his final year at the Naval Academy.

Dennie compiled a respectable record, but E.H. McCleary, who replaced him as coach in 1912, produced the first outstanding football team. McCleary received a B.S. in engineer of mines degree from Pennsylvania State College in 1910. His 1913 Miner team lost only one game and tied another. The great team defeated Cape Girardeau Normal, 51 to 0; St. Louis University, 60 to 0; Drury, 26 to 0; Washington University, 19 to 3; and Oklahoma A&M, 14 to 0. The victory over St. Louis University gave the Miners their first national

recognition. McCleary's team tied a powerful Christian Brothers College team 7 to 7 and lost to the University of Missouri 44 to 14. Snow kept the Miners from practicing in Rolla before the Missouri game. The Rolla team traveled to St. Louis and practiced twice, but that was inadequate preparation for the big game. To celebrate the 1913 team's accomplishments, the School held its first football banquet. Coach McCleary rashly predicted that the Miners would have a perfect season in 1914.

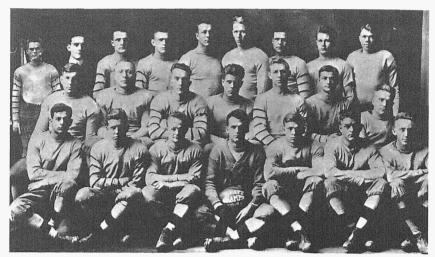
His prediction was surprisingly accurate, but instead of Mc-Cleary's coaching the Miners, acting Director Leon Garrett hired "Big Tom" Kelly for the job. Kelly had graduated from Chicago University in 1910 and served that school as an assistant coach. From 1911 through 1913, he coached and was athletic director at Muhlenberg College in Allentown, Pa.

Under his direction, the Miners held their scheduled opponents scoreless, while they scored 540 points. The Miners defeated the University of Missouri 9 to 0; Washington University, 19 to 0; the University of Arkansas, 40 to 0; the Kansas School of Mines, 87 to 0; Drury, 68 to 0; Pittsburg, Kan. Normal, 104 to 0; Kirksville Osteopaths, 150 to 0; and St. Louis University, 63 to 0.

Christian Brothers College of St. Louis scored the only points against the Miners in an unsanctioned game, but the St. Louis school still lost by a score of 27 to 6. Newspapers urged the two teams to play because they were the best in the state. Football fans considered the contest the state championship game. Not only the MSM faculty but the Board of Curators tried to stop it. On a cold, rainy day, the Miners played against C.B.C. without faculty consent. Scheduled to depart from Rolla at 6 p.m., the Miners boarded a train at 4 a.m. in order to avoid a last-minute effort to stop them from leaving. When the team returned, the faculty suspended the entire squad. Acting Director Leon Garrett, a strong football supporter, intervened and the team was reinstated.

Garrett achieved his stated goal of putting the School of Mines on the map by having a great football team. To secure the talent for his team, Garrett's newly hired coach ranged widely. John Logan Imlay, a star halfback, and Walter H. Askew, a superb lineman, came from Aberdeen, S.D. Imlay had played at the University of North Dakota before joining the Miners. Charles Francis Copley, another lineman, traveled from Mahanoy City, Pa., to play for the Miners. Coach Kelly recruited other players from Chicago and Belleville, Ill., and Omaha,

Neb. Earl Freeman, a star kicker, came from St. Louis as did Doug Houston and Joe Wilson. Halfback William McCartney came from Webster Groves. In an interview, McCartney said that some members of the team received as much as \$100 per month from townspeople who wanted a winning football team. Eight freshmen played on the 1914 team.



1914 football team. Front row, (l. to r.) H. Vogel, Tom Dawson, Y. Klepel, Capt. R.L. Mountjoy, H.D. Kline, George Kublin (cheerleader), W.H. Boyle.

Second row, E.H. Long, C.F. Copley, J.G. Wilson, W.O. Brandenberger, W.H. Askew, J.L. Imlay, R.W. Rogers.

Third row, H. Houston, Coach Saunders, W.W. Kiskaddon, W.H. McCartney, J.B. Cole (manager), F.L. Dover, Earl Freeman, B. Massey, R.O. Shriver.

Academic problems plagued some of Coach Kelly's stars. According to a newspaper report, a "curly-headed, driving halfback" named Pitt Bland devoted too much time to football and insufficient time to the classroom. Another article called Bland "one of the best backfield players in the Missouri-Valley, possibly in the West."

The 1914 phenomenon was not repeated in 1915. Only five players returned, and Coach Kelly took a job as director of athletics at the University of Alabama before the season began. F. E. Dennie returned from St. Louis University to coach the 1915 Miners to a 5 - 2 season.

The 1916, 1917, and 1918 Miner football teams reverted to the caliber of play that had marked the pre-1914 teams. In 1916, the

Miners scored only 27 points to their opponents' 347. In 1918, the School of Mines played only three games in a war-reduced schedule.

Other sports took a backseat to football at MSM. The Miners played their first full intercollegiate basketball schedule in 1909. In 1910, they played Drury and Springfield Normal twice and St. Louis University. The 1914 *ROLLAMO* enclosed the following statement in a black border.

In Memoriam Basketball Passed away in 1912 At the Missouri School of Mines We anxiously await the hoped for resurrection in 1915.

The editor's hope was realized with the completion of Jackling Gymnasium. The Miners also fielded baseball and track teams, but played limited schedules in both sports. The 1910 baseball season consisted of four doubleheaders. In 1914, they played 11 games. In track the Miners often participated in only one meet.

Students who participated in intercollegiate athletics in 1914 could earn sweaters. Money for the sweaters came from an event appropriately called Sweater Day. In 1917, the Johnson Brothers, owners of a local pool hall and bowling alley, turned their establishment over to the students for a day. School authorities dismissed classes, and the student newspaper urged, "Let us get together Miners and make Washington's birthday a big success, and for the first time give every M man his sweater." The next issue of the *Miner* pronounced the event a "Great Success."

#### **Publications**

The addition of a regularly published newspaper marked an important advance in student life. Students had produced short-lived papers before the continuously published *Missouri Miner* began in January 1915. In the 1880s students published a paper called *The Notebook*. Later, MSM students contributed to a student paper published at the University of Missouri called *The Argus*. At various times the *Rolla Herald* and *New Era* included an MSM column written by students. And in 1912 and 1913, A.W. Gleason intermittently published a paper called the *Missouri Miner*.

In 1914, Fred Grotts recruited J.L. Head and G.E. Johnson to help him publish a regular edition of the *Miner*. The first issue of the weekly appeared on Jan. 28, 1915. The initial four-page product soon expanded into an eight-page paper that attracted subscriptions from students and alumni.

Another major student publication, the *ROLLAMO*, began publication in 1907. D.C. Jackling supported the compilation of that first yearbook with a \$100 gift. A board composed of students raised money to produce other volumes through annual minstrel shows put on by student volunteers and by the young women of Rolla. In 1916, the *ROLLAMO* Board sponsored movies on every Friday and Saturday night. Individuals paid a dime for admission. The *Missouri Miner* told students that they must support the Parker Hall movies if they wanted a yearbook at a reasonable price. The *ROLLAMO* presented an excellent record of student life during these years and often revealed the well-honed sense of humor and artistic and literary skills of its editor.

#### Student Council

As the enrollment increased, the need for student government became obvious. After discussion, the students and faculty decided upon a 15-member council. Faculty representatives numbered five, and each class received representation according to its year in school—seniors, four; juniors, three; sophomores, two; and freshmen, one. During its early years, the council recommended measures for student discipline and regulated school organizations.

By 1917, the form and function of the Student Council had come under serious attack. Dr. McRae appointed a committee to design a new constitution. The form adopted by the students provided for the student body to elect three seniors and two juniors who would form a council. Instead of faculty members serving on the council, Dr. McRae established a faculty committee on discipline and petitions.

#### Student Conduct

That committee on discipline assumed much less responsibility for student conduct than earlier School authorities had been willing to accept. In the 1880s, Director Wait had placed students who violated his stringent rules of conduct on a black list that he made public. Students receiving demerits for unexcused absences and tardies appeared on the list. (Wait may have been prompted to take action in 1880 by the student who received 243 demerits for 110 absences and 21 tardies.) By 1889, students acquiring 100 demerits were expelled; 50 demerits caused authorities to notify parents. Students received 10 demerits for an unexcused absence from laboratory or field work; five demerits for absence from lecture; and two demerits for tardiness. Loitering on the steps of a building earned 15 demerits, and leaving town without permission earned 25.

Wait and his faculty also dealt with parental permissiveness. Before final examinations some parents signed excuses for their son or daughter to miss the exam. The problem became so acute in 1879 that the faculty refused to accept any excuses for missing finals.

Wait's successor, William Echols, forbade five specific activities. Students could not enter a billiard hall or saloon for any reason or use intoxicating drinks of any kind. They were not to engage in noisy and disorderly conduct about the buildings. No student could smoke in the buildings or on campus. Students were not to leave town without permission of the director. Echols also forbade students from marring buildings or furniture in any way.

Buck Richards established only two rules: be a gentleman and work. He required all students to stand written examinations on all studies, and he established 75 percent as the minimum passing grade. Richards sent monthly reports showing grades and attendance to parents or guardians of students.

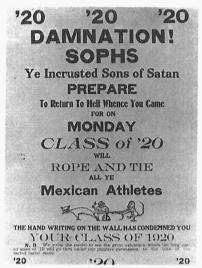
Director Ladd placed less emphasis on discipline. He and the faculty took the approach that their roles were to teach and that the private lives of the students were their own. (Besides, Ladd loved to play pool.) The elimination of the preparatory department removed the problem of caring for young students.

Conditions had become so lax by 1914 that the sophomore class history in the *ROLLAMO* described heaven as a place "where there are no Physics exams, Calculus, Faculty, Freshmen, or other horrible things, but where life is one grand continuous performance of banquets, bumming trips, and perhaps (Oh! Shades of Days gone by) keg parties." The *Missouri Miner* in 1917 decried the flagrant use of tobacco, reporting, "Again, the entrance to Norwood Hall looks like a cheap lodging house lobby, or forty-niner emporium. The deep, rich mahogany stains on the wall and floor, and the cigarette butts

certainly give a unique appearance—probably homelike and congenial to many of us." And with regard to examinations, the *Miner* observed, ". . .it has been noticed, not only by Professors but by students as well, that certain men habitually resort to cribbing during quizzes. This is not right."

#### Student Costs

The costs of attending MSM remained low. The School charged no tuition for Missouri students, but it did charge some fees. In the 1879 catalogue, officials estimated that all student costs—fees, board, housing, and washing—averaged \$195 per year. The 1893 catalogue fixed the costs at from \$140 to \$200 per year. In that year, students paid an entrance fee of \$10, a library fee of \$2 per semester, and a laboratory fee of \$10 to \$14. By 1913 the Board of Curators had decided to charge out-of-state students an additional \$20 per year for the privilege of attending MSM but Missouri students could still attend for a total cost of about \$279 per year. Nine years later, the fee structure remained about the same. The 1922 estimate was \$275 per year. These last estimates included \$25 for field excursions. Over a 43-year period the cost to attend MSM increased by about \$50.



Announcement of the freshman fight, 1916.

## Trips

Trips to practice what was taught in the classroom had been a feature of the School since Director Williams took students to St. Louis in the 1870s. By 1912, the effort to expose students to industrial conditions had become systematized. Sophomores took a two-week trip in the spring to visit coal mines and plants in the St. Louis area. Juniors took a week to do topographic surveys around Rolla and in the spring made a three-week excursion to Colorado and Utah. Seniors took three weeks to visit mines and plants in Missouri, traveling to St. Louis, Herculaneum, Crystal City, Flat River, Iron Montain, and Joplin.

Students delighted in describing their experiences on these trips, and their descriptions reveal that they learned and had fun.

One student wrote:

Enduring starvation, rain and snow, delay upon delay, and the ceaseless flow of pseudo wit, humor, and delicate repartee of Metz, Clayton, Miller, Copelin and Castillon for 20 hours, we reached Leadville at 12:30 the following night in a blinding snow-storm.

In 1917, the spring junior trip was canceled because of expense. Professor C.R. Forbes, head of the mining (engineering) department, noted that the mining and metallurgy program continued to demand practical experience, but students could now satisfy the requirement by describing their summer work in written reports. He continued to believe that a student should have "the contact with men. . ., and the opportunity to judge of his own fitness and liking for the mining business."

#### Alumni Association

Many MSM students worked in the western mining districts during the summer and many graduates of the School of Mines went west immediately upon completion of their degrees. The first organized meeting of the Missouri School of Mines and Metallurgy alumni was held on Aug. 18, 1882, in Denver, Colo. Professor George D. Emerson entertained the graduates at the Windsor Hotel in conjunction with the annual meeting of the American Institute of Mining Engineers. Those present included G.A. Duncan and J.W.

Pack, two of the School's first three graduates; A.W. Hare; L.R. Grabill; W.W. Wishon; L.X. Smith; W.R. Painter; F.W. Gibb; Emma Wishon; F.O. Blake (and his wife, the former Fannie Hoskinson); Nellie Mussey; and Mrs. C.E. Mussey.

Although that meeting resulted in the election of a full slate of Alumni Association officers, there is no record of further alumni activity until 1896-1897. The School's catalogue for that year listed as president Floyd Davis, an 1883 graduate, and Sally Millard, an 1891 graduate, as secretary of the association. There was no further activity until 1915 when Alumni Association chapters formed in St. Louis, Joplin, and Kansas City, and officers were elected to head a central organization. These efforts also waned. Finally, Professor George R. Dean breathed life into a permanent Alumni Association in 1921.

# Freshman Fight

Members of Dean's association who graduated after 1908 certainly remembered two annual events—the celebration of St. Patrick's Day and the freshman fight. St. Pat's continues today as the most important campus social activity. The freshman fight ended with the cessation of hazing after World War II.



Fairgrounds camp-out the evening before the freshman fight, 1916.

When hazing began at MSM is unclear, but the hazing of freshmen had become a practice by the early 1900s. The *ROLLAMO* of 1907 described the introduction to college life given the freshmen in 1903. The sophomores had made a heavy canvas blanket equipped with handles along its sides. They captured freshmen and placed them on the blanket, "the object being to discover which freshmen could be sent the highest or present the most amusing spectacle."

The freshmen decided to organize to marshal their forces. They elected officers, and that night marched through the streets giving class yells. The yells roused the sophomores and upperclassmen and the School assembled on the football field. The freshmen divided themselves into squares, eight men deep, and awaited the sophomores, who advanced in a body.

According to the 1907 ROLLAMO:

As they came forward, the Freshmen made a coup which won the night for them. They had a long rope, said to have been supplied by 'Arizona Pete' Radovich . . ., with this they encircled the oncoming sophomores, while the others fell upon them. A wrestling match followed and continued for an hour, when the sophomores were willing to admit defeat.

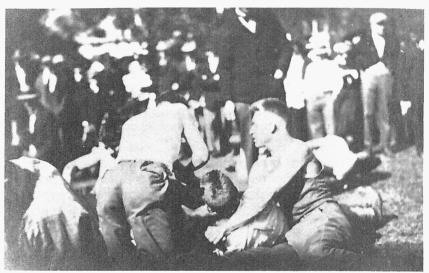
That defeat ended hazing for those freshmen.

The *ROLLAMO* also reported that as sophomores, the perpetrators of the rope trick fooled the 1904 freshmen. They selected two swift runners who enticed the neophytes to follow them into the unfamiliar countryside at night. The freshmen failed to catch the two runners, stopped the chase at various times, and staggered back into town singly or in small groups. The sophomores captured them one by one and forced them to perform stunts.

From those beginnings, the custom of a freshman fight and the various aspects of hazing evolved. In 1906, the sophomores plastered Rolla with signs specifying what the freshmen were forbidden to do. The freshmen challenged them to a fight, and a contest to remove the freshman colors from a pole on the football field resulted in a freshman victory. The upperclassmen responded by forbidding freshmen to wear corduroy pants. The wearing of green caps by freshmen also began that year.

In 1908 freshmen began taking to the woods to spend the night. By 1910, tying the freshmen up during the fight, painting them green, covering them with molasses, and marching them through town to Heller's store where they purchased the green caps also had

become aspects of the fight. Later additions included paddling, rolling peanuts across the street with one's nose, and swims in the Frisco Pond. Usually, the sophomores won the fight, but in 1916 the freshmen won. The juniors and seniors "undertook to teach the Freshmen the fundamentals of college education. . . ." They administered "eggs of the old and true molasses, paint, lampblack, flypaper," and adorned the persons of the freshmen with interesting placards. After the freshmen were humiliated in the afternoon, they were accepted into MSM fellowship at the sophomore smoker that evening.



Freshman fight, 1916.

## Entertainment

Smokers, dances, and banquets occurred throughout the year. The 1906 senior smoker included physical activities such as fencing, boxing, and wrestling; singing; smoking cigars and pipes; and eating lunch. For a time each class had a smoker and gave a banquet. In 1910, the MSM orchestra played twice a month for informal dances in Mechanical Hall. Formal, all-school dances were held in both the temporary gymnasium constructed during Ladd's administration and in Jackling Gymnasium after its completion. Fraternities hosted a

number of dances. The Pi Kappa Alpha men gave an annual Halloween dance. Sigma Nu's dance took place in January. Kappa Sigma held an elaborate ball in April. And Kappa Alpha held an annual Thanksgiving dinner.

Enoch Needles remembered a Harvest Moon party at the Pi Kappa Alpha house located on Eighth Street just below John Scott's drugstore. As a pledge in 1909, Needles spent several hours waxing the dance floor. He wrote:

I was just beginning to learn to dance. The waxing was more successful than the dancing, for my feet became confused and before I could recover I was seated on the dance floor, in the presence of my future wife, whom I had just met for the first time in my life.

Campus entertainment provided most of the activity for MSM students. A primitive motion picture opened in 1909 to supplement John Scott's drugstore as a place to go in Rolla. Needles described the drugstore as an institution, "where we had sodas and sundaes and met the always wonderful young ladies of Rolla as they chanced to stop by." Students frequently walked to the depot to watch the train, the Meteor, roll in, and they congregated at the post office to await the sorting of new mail.



Enoch R. Needles, class of 1914.

#### St. Pat's

It is no wonder that students so relished the St. Pat's celebration. St. Pat's began on the MSM campus in 1908. In that year, engineering students in Columbia invited the Miners to send a representative to help them honor St. Patrick. The Miners raised money to send John Bowles, discovered that they had funds left over, and decided to hold their own St. Patrick's celebration.

The students formed a committee to organize the event, but they had to be secretive because March 17 was a school day, and School officials had not given permission to hold a celebration. According to the *ROLLAMO*:

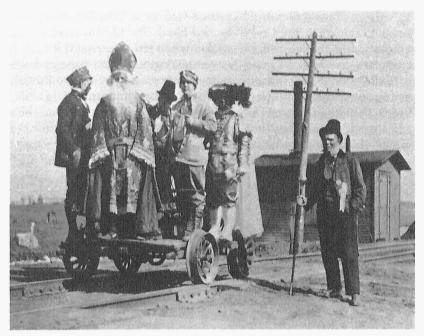
On the 16th the Committee made . . . [its] assistants spend nearly all night decorating the huge entrance of Norwood Hall, and taking care of the night watchman. Other deputies were busy posting the town with bills, declaring a holiday for the following day, and requesting students to meet at the depot at 8 a.m.

The students responded and they were supplied with green sashes and shillelaghs. St. Patrick arrived and led the students from the depot to Norwood Hall. He proceeded to interpret the marks on the blarney stone; surveyed a quadrangle with his transit, a forked stick with a beer bottle resting on it; and knighted Director Young and members of the senior class. George Menefee received the honor of being the first St. Patrick. At a meeting of the senior class on March 7, 1909, it was decided that the juniors would engineer St. Pat's in the future.

As MSM students celebrated St. Patrick's day in succeeding years, they made the ceremony more elaborate. In 1909, the upperclassmen sent the freshmen to the woods to collect shillelaghs for the student body. Buying of the green began the same year. To gain admittance to campus on March 16 or 17, students bought and wore green ribbons that cost 75 cents. Snake killing started in 1912, and the practices of giving a masked ball and having St. Patrick ride a manure spreader in the parade began in 1913. In 1915, St. Patrick crowned the first queen, Helen Baysinger, daughter of S.L. Baysinger, a member of the Board of Curators. In 1918, the students crowned as St. Pat's queen Mrs. F.D. Gardner, the governor's wife.

The MSM St. Patrick's Day celebration became so famous that a St. Louis daily newspaper covered the event in 1916. The reporter began, "Rolla . . . a town you ought to see before you go to Paris and die."





St. Pat's arrival at railway station, 1915.

By that time the celebration began on the 16th with receptions and dances at fraternity houses. On the 17th, St. Pat arrived at the depot riding his hand car, boarded a manure spreader, and led a parade to Parker Hall. After locating the blarney stone, he knighted the members of the senior class, who were attired in long green robes and green mortar boards. In the afternoon, the students put on a minstrel show in Parker Hall auditorium. That evening a costume ball in Jackling Gymnasium attracted 250 guests. St. Patrick arrived after the dance began and the audience bowed to him and kowtowed whenever he so directed. Then St. Patrick crowned the queen. The costume ball continued until the early morning hours.

#### Two Pioneers

Eva Endurance Hirdler Greene pioneered as a woman in the engineering profession. She transferred to the School of Mines from Washington University entering as a junior in 1909. When she arrived

to register, "the windows of Norwood Hall were crowded with boys, eager to see what 'the Co-Ed' looked like." She fit into campus life quickly. Although she did not smoke, when she discovered it to be a custom to give a smoke to anyone requesting one, "she got a package of 'Bull Durham' and some cigarette papers so as to be able to furnish smokes on request." When it came time for the senior trip, the faculty voted that co-eds must have chaperons. Without funds to hire someone to accompany her, Hirdler persuaded J.A. Hielscher, "a rather elderly man who was a member of the class," to accept appointment as her guardian and made the trip.





Eva Endurance Hirdler Greene.

Vachel H. McNutt.

Hirdler graduated in 1911 with a B.S. in general science degree, although she had taken courses that equipped her to pursue a career as a mining engineer. She did reconnaissance work on iron ore deposits in southeast Missouri, served as chief clerk with the Missouri Geological Survey, explored for iron ore deposits in Canada using Indian guides and living in tents and worked as an engineer on projects in Tulsa, Okla. Later in life she took courses in psychology, earned a California State Teacher's Credential in 1950 and taught at Golden State University. During her active career, she found time to get married, changing her name to Greene, and to rear a family.

In 1972, the faculty at UM-Rolla voted to award the 88-year-old great-grandmother a B.S. degree in mining engineering. She believed that the faculty in 1911 had refused to grant her the mining degree

because she was attempting to break into what was then an all-male profession.

Vachel Harry McNutt pioneered in oil and potash exploration and development. He earned a B.S. in mining engineering degree in 1910, an M.S. in 1912, and an engineer of mines degree in 1915. While earning advanced degrees, McNutt taught petroleum geology at MSM. In 1914, he became a partner in the firm of Valerius, McNutt, and Hughes in Tulsa, Okla. In 1923, McNutt made important oil discoveries in Russell County, Kan. and eastern New Mexico. Three years later, he discovered the first large subterranean potash deposits in the Western Hemisphere near Carlsbad, N.M. McNutt's discovery led to the development of the United States Potash Co. and pioneering success in the commercial mining of potash in this country.

His wife, Amy Shelton McNutt, accompanied him on many of his explorations and managed the McNutt enterprises during the last years of his life when he was in ill health and after his death in 1936. A loyal friend and benefactress of MSM, Mrs. McNutt established the V.H. McNutt Memorial Foundation in her husband's memory, with the department of geology and geophysics as beneficiary. In 1964, she was awarded this institution's first honorary degree of doctor of humane letters.

Between 1876 and World War I, MSM educated a number of engineers and scientists who contributed importantly to the country's development. Those who discussed or wrote about their student days not only remembered their classroom experiences but their lives outside the classroom. None remembered that attending MSM allowed them to be idle

## PART II

As the school year began at MSM in the autumn of 1918, Liberty Loan parades, the construction of a gigantic war machine and an influenza epidemic riveted student attention. American "doughboys" disembarked into the European theater of war at the rate of over 250,000 per month and fanned out into northern France from Ypres to Verdun. By November, the guns had fallen silent on the Western Front as an armistice was signed.

Following a somewhat disillusioning experience in peacemaking, Americans settled down in the 1920s to seek a return to "normalcy." But normalcy was not to be the benchmark of America in the 1920s; it was to be a decade of change. By 1929, one out of six American families owned an automobile, and numerous technological gadgets, including radios and refrigerators, filled American homes. The federal government prohibited the manufacture, sale, and transportation of intoxicating beverages. "Flaming youth" startled their elders by wearing wristwatches, smoking cigarettes, reading Fitzgerald and O'Neill, listening to jazz, and dancing new lascivious dance steps such as the "bunny hug" and the "Charleston."

It was a time of unprecedented prosperity for many, as illustrated by the popular song "Oh, how the money rolls in!" Some felt that America had reached a permanent plateau of prosperity. The feeling of optimism spilled over into America's educational system. One of America's more influential intellectuals, John Dewey, asserted that science and technology could chart a rational and fruitful course for society. Thorstein Veblen placed his faith for societal improvement in the hands of engineers who he believed might ultimately produce an economic utopia.

The optimism of the '20s was replaced by despair in the '30s. Totalitarian dictators seized power in some major European states, and a cloud of economic collapse, known as the Great Depression, settled over the developed nations of the world. Images of the Depression years in America cut across the span of time to remind us of those miserable sharecropper shacks, the black blizzards of the

Dust Bowl, and soup lines in the cities. All reveal the plight of those who endured the Great Depression.

In response to the Depression, the federal government launched, under the auspices of the New Deal, a variety of programs aimed at overcoming the slump. As the Depression deepened, Americans sought escape from the harsh realities of life as families huddled around the radio to hear Roosevelt's Fireside Chats and to find comic relief in the antics of "Amos and Andy." The motion picture industry boomed in the late '30s as escapist themes and double features briefly diverted Americans' attention from their miseries.

Enrollments at colleges and universities declined until 1935, when they increased despite budget crunches. One bright spot of the bleak decade was the increasing emphasis on scientific and technological research. Although a New Deal program for science and technology was not achieved, advances in basic and applied research in medicine, nuclear fission, electrical power, and the automobile and aircraft industries created demands for all types of engineers, a development which augured well for teaching and research in higher education.

By the early '40s, concern for economic affairs had given way to worry over the war clouds that engulfed much of the world. On Dec. 7, 1941, Japanese planes attacked the American naval base at Pearl Harbor, Hawaii, bringing the United States into World War II. As never before, men looked to science and technology as the savior of civilization. Many universities were sustained during the war by military research projects and training programs, as scientists and engineers pooled their resources in order to create decisive weapons for war.

As GI's fought the Afrika Korps, on the home front more women began wearing slacks in public, cuffs on trousers disappeared, items as diverse as sugar and gasoline were rationed, and cities were blacked out at night.

Germany surrendered on May 8, 1945, followed by Japan on Aug. 15, 1945. The world had reached the threshold of the atomic age, and with it came the hope that the 20th century nightmares of Depression, dictatorship, and total war had passed.

## **Engineering Education**

The years from 1918 to 1945 were ones of growth in American higher education. World War I had illustrated in great measure the

value of technical education, as engineers assumed positions of great significance in the planning and conduct of the war. Ironically, modern war, with all of its destructiveness, has provided a most useful measure of and stimulus to the acceleration of technological achievement and flexibility.

The era prior to World War I had been one of considerable diversification in the engineering profession. After the war, the automobile and aircraft industries expanded greatly with an accompanying demand for engineers with specialties in mechanical and aerospace, metallurgical, petroleum, geological, and chemical engineering. Schools of technology responded to meet public demands for new courses and curricula, often with little attention to comprehensive planning even though guidelines existed.

Charles R. Mann of the University of Chicago had, in 1918 under the auspices of the Carnegie Foundation for the Advancement of Teaching, issued the first comprehensive study of engineering education entitled *A Study of Engineering Education*. Besides expanding course offerings, engineering educators sought to broaden the curriculum by stressing science, humanities, and social sciences courses for technical students.

They believed that engineers needed greater breadth in their education if they were to develop the intellectual, administrative, and economic skills required for success in the job market. Between 1923 and 1929, W.E. Wickenden, under the auspices of the Society for the Promotion of Engineering Education, investigated the whole issue of engineering education. The so-called "Wickenden Report," published in 1930, evaluated the full scope of engineering education in the United States. It profoundly influenced American engineering curricula and educational policies of professional engineering societies. Following the recommendations of the Wickenden Report, educators established the Engineers' Council for Professional Development (ECPD), in 1932 with the authority to accredit engineering curricula. Though accreditation by ECPD was voluntary, institutions hastened to gain accreditation. By 1937, ECPD had accredited MSM curricula in ceramic, civil, electrical, metallurgical, and mine engineering.

By the 1930s, engineering education had made considerable strides toward producing engineers who were not only technically competent, but who also were grounded in traditional liberal education. Non-technical courses such as history, English, and economics became common requirements.

American society in the 1930s increasingly emphasized basic and applied scientific research, and technological institutions provided a natural environment for such activities. Graduate study and accompanying research activity came to be common features of many engineering schools.

With America's entry into World War II came the realization that the nation's colleges and universities had not produced enough scientists and engineers to meet the urgent demands of this most technological of wars. Large numbers of engineers, especially in electrical, civil, mechanical, and chemical areas were needed. The federal government initiated a specialized program to train technicians. From 1940 to 1945, more than 200 institutions took part in the Engineering, Science and Management War Training Program, offering over 31,000 engineering courses to more than 1.3 million people. This special training provided a large pool of students after 1945 who sought baccalaureate degrees in engineering.

Along with changes in curricula, a greater variety of course offerings and a new emphasis on research, technological schools between the world wars shared with other colleges and universities a tremendous expansion in extracurricular activities. Intercollegiate athletics, fraternities, social clubs, theater groups, and student newspapers all came to play a more important role on campuses. The American college and university, as we know it today, was taking shape.

# The Boys At Work, 1918-1945

The average student arises some time between seven and half-past each morning in order that he may thus have enough time to prepare rather leisurely for his eight o'clock class. The routine of class attendance is quite similar for each of the four years—lecture classes each hour from eight till noon with but an occasional 'free' hour. The great preponderance of theoretical knowledge obtained by students at M.S.M. is absorbed during these hours each day . . . .

Theoretical knowledge . . . is put to the test of practicality in those hours following lunch . . . Labs, however, last only till four o'clock and from that time henceforward the time of the student is his own or at least to a certain extent it is his till that time when the prerequisite activity of all 'students,' studying, demands his attention. (From 'College Daze,' 1939 ROLLAMO)

This description of "the boys at work," refers to the daily routine of the 1938-1939 school year, but it could have fit the situation for the entire inter-war era. Though the routine of attending classes and labs remained the same, the structure of the School, including curriculum, the student body, faculty, and administration underwent considerable change. These changes, in large part, reflected the needs, developments, and trends of American society.

# Impact of the Great War on MSM

World War I began for America in the spring of 1917, and it had a major, long-range impact upon schools of technology. The immediate result for MSM was a marked decline in the number of students. Of 300 students enrolled in the spring of 1917, only 42 returned in the 1918 fall semester; 258 having gone to war. For a short time, many of the Miners became combatants. According to the Miner, 85 former students were commissioned as officers, and, as expected, most

became engineer officers. Others served as engineering specialists as noncommissioned officers.

Two Miners received the Distinguished Service Cross from General John J. Pershing, and, according to the student newspaper, a former student, H.F. Allison, fired the first shot in France by a member of the American Expeditionary Force. A famous MSM alumnus, D.C. Jackling, went to Washington to take charge of the nation's explosives plant construction. In a war so dependent upon metals, other MSM graduates such as W.S. Thomas, class of 1894 (who demonstrated the use of coking Montana coal on a commercial scale), and H.R. Hanley, class of 1901 (who developed the process of electrolytic removal of zinc from copper and silver ore), and others contributed to a successful war effort.

On campus students and faculty demonstrated their patriotism by manufacturing chemicals for research to offset the loss of chemicals from German manufacturers. Chemicals produced at MSM were shipped to Eastman Kodak.

For years after World War I, the war continued to affect the Missouri School of Mines. In addition to the long-range impact of broader engineering specialties to meet societal needs, MSM developed an unusual program for war veterans. Federal assistance became available for veterans of the war to pursue a baccalaureate degree or to take vocational courses. In 1920, the federal government dispatched Maj. Charles Edward Cooke to Rolla to assist in the organization of a department of vocational education at MSM. This was the first separate department of its type in the United States. The vocational education department stressed geodetic skills. While some veterans chose to learn surveying or topographical skills, others enrolled in a degree program in one of the established academic areas. By the spring of 1921, 78 "vocates" had enrolled at MSM. By the fall of 1921, the vocational education department was staffed by 30 professionals and the number of vocates had increased to 200 out of a total MSM enrollment of 562. This significant program, which enabled hundreds of veterans to attend college, was phased out by the spring of 1926.

## Curriculum

One of the enduring challenges of engineering education in America has been to achieve full recognition as a professional field of study while deviating from the traditional classical curriculum of other universities. By the 1920s, a broadening in curricula in technological institutions across the nation was under way, resulting in a new emphasis on science, mathematics, humanities, and social sciences. The end result, it was hoped, would be an engineer better prepared to meet societal challenges.

The Missouri School of Mines and Metallurgy initiated some changes reflecting the new emphasis. A department of economics (established in 1920 and abolished in 1941) ultimately included the disciplines of economics, history, psychology, and sociology. By 1926, however, history, psychology, and sociology had been transferred to the new department of biology (which by 1939 was called the department of history, psychology, and biology). In addition, a department of hygiene and student health was listed in the School catalogue from 1920 to 1940 though no credit was given for courses in hygiene after 1924. (Dr. Frederick William Shaw taught hygiene courses and looked after student health.) George "Prof" Dean offered a summary of curriculum planning at MSM in the Feb. 6, 1935 Miner:

In the old days, when a student had nerve enough and thought he had enough credit for graduation, he used to get a club in one hand and a gun in the other and go around and hold up the faculty. Those who did not have the nerve usually dropped out.

After World War I this situation changed. Those who entered the School in 1918 enrolled in a trimester plan. Credit hours required for graduation varied from 185 to 197, depending upon the program. In 1922, the School returned to the semester system and the curriculum was overhauled. Each engineering curriculum henceforth required 172 hours for graduation; 164 of those hours were required courses. Only eight hours of electives were permitted. The general science program required 130 hours for graduation. Further curriculum revision in 1930, resulted in 158 hours being required for graduation in engineering or general science.

Degree candidates might pursue programs in mine, metallurgical, civil, mechanical, electrical, chemical, and (as of 1926), ceramic engineering. Several options also were available within a degree program. Mine engineering included options in coal mining, mining geology, and petroleum engineering. A general science curriculum permitted students, by 1937, to major in biology, ceramic engineer-

ing, chemistry, drawing, economics, English, geology, metallurgy, or physics.

Besides the requirements in their major field, undergraduates shared a common curriculum including mathematics, chemistry, military science, and physical education.

While undergradute education was the primary thrust at MSM in the inter-war period, some programs were available for those few who wished to do graduate work. Master of science degrees were available in mining, metallurgical, civil, mechanical, electrical, and ceramic engineering, and general science. In the 1925-1926 school year, one could take courses at MSM leading to the Ph.D., although the degree was granted through the graduate school at the University of Missouri.

## **Enrollment and Enrollment Distribution**

Enrollment trends from 1918 to 1945 reflected society's increased demand for engineers as well as the impact of national and international events. From 235 in 1918, the School's enrollment gradually increased during the 1920s. By the 1931-32 school year, student registration reached a high of 680. As the Great Depression deepened, enrollment declined, falling to 529 in 1932-33. The next year it "bottomed out" at 385. The Depression years were lean ones for students, faculty, and staff as they, like most Americans, found it necessary to make do with less. By 1934-35, enrollment was increasing again and reached a pre-war peak in 1940-41.

In 1920, the *Professional Engineer* stated that MSM led all other schools in the number of students enrolled in mining and metallurgical engineering. Until 1928, the number of students registered in mining surpassed all other engineering areas at MSM. In the 1928-29 school year, civil engineering students became the largest group. From 1937 to 1940, mining students once again claimed first place. Mechanical engineers held first place from 1941 to 1943 and were surpassed in 1944 and 1945 by chemical engineering majors.

The majority of students at MSM were Missourians. During the 1920s, the percentage of those students from Missouri ranged from 53 to 61 percent. This percentage increased in the 1930s, and in the 1934-35 school year, 79 percent of the student body were residents of Missouri. The typical student was an undergraduate, a resident of

Missouri, and a male. In 1927, the *Miner* listed 15 co-eds in the student body. By 1939, the number of women students had increased to 19. Female students at MSM were the exception, and females in engineering were even more so both at MSM and elsewhere. Most women enrolled in the general science program or took courses with the intention of transferring to other institutions. Female students at the School during the 1942-43 academic year enjoyed another distinction—women led the campus in grade-point averages that year.

The number of students from other nations was small, similar in numbers to that of the co-eds. In the 1920s and 30s, most international students were from Latin America and East Asia.

### Student Finances

In the years before massive federal support for higher education, students at MSM generally depended on their families and part-time jobs for financial support. During the Depression, several worked on government-sponsored projects. The U.S. Geological Survey, through the auspices of the Civil Works Administration, employed over 200, many of whom were students at MSM. For decades, MSM students worked at the Missouri State Geological Survey under the guidance of Henry A. "Chief" Buehler, state geologist and director of the survey from 1908 until his death in 1944.

Few scholarships were available. Beginning in 1926, A.P. Green of the A.P. Green Fire Brick Company of Mexico, Mo., a graduate of MSM, provided scholarship-loans to some students who wished to pursue degrees in ceramic engineering.

Daniel C. Jackling provided a loan fund for students of his alma mater. The Jackling Loan Fund was created in the 1920s. By 1930, the Daniel Jackling Foundation was established, although foundation monies were intended primarily for faculty enrichment, special research projects, and graduate work in mining, metallurgy, and geology.

During World War II, a Labor Federal Security Appropriation provided \$19,846 in funds to "technical-professional students" at MSM to be allocated in \$500 increments. These loans, precursors of massive federal aid in the post World War II era, were to be repaid within four years of graduation at 2½ percent interest. These loans were intended as incentives for students to pursue academic pro-

grams in the critically needed technical areas related to the war effort. Those who received loan or scholarship funds in the inter-war years were a distinct minority.

# Jobs

It was one thing to complete a degree program at MSM and another to find a job upon completion of the degree. Prior to 1923, the burden of job placement fell primarily on the individual, with some faculty assistance. The School encouraged on-the-job experience. In order to earn a degree, as of 1922, candidates were required to do a minimum of 12 weeks work in their chosen profession or to spend considerable time inspecting industrial establishments connected with their prospective profession. Most students fulfilled this requirement during the summer months, making contacts with prospective employers as well. Academic departments sponsored field and senior trips. For those graduates interested in the petroleum industry, oil booms in the Southwest provided jobs. In the spring of 1920, the *Miner* suggested that the Oklahoma oil fields claimed the majority of MSM graduates.

Alumni often proved to be valuable contacts for job seekers. In 1921, the MSM Alumni Association was formally established, the catalyst being the 50th anniversary of the School. The creation of an association, among other things, served to increase the placement possibilities for students.

In the same year, the Fulton administration charged Noel Hubbard, assistant registrar, with the responsibility for the development of a placement program.

During the Depression, job placement became a greater challenge, and finding a job with an adequate salary was an even greater one. Even in 1934 when enrollment plummeted, the percentage of graduates who found jobs was high. The *Miner* reported that of 1934 graduates, 87 percent of the civil engineers, 83 percent of the chemical engineers, 81 percent of the mine engineers, 75 percent of the ceramic engineers, 66 percent of the metallurgists, 72 percent of the electrical engineers, and 53 percent of the mechanical engineers had found jobs. Nationwide, 11.3 million were unemployed in 1934, a 22 percent unemployment rate.

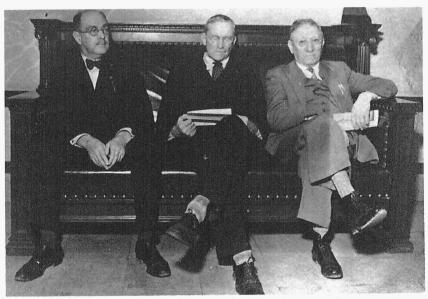
By the spring of 1936, two-thirds of graduating seniors in all areas at MSM had found employment and by 1937, 83 percent of the seniors had jobs by graduation.

# The Faculty

As the mind's eye strolls across the campus of the School of Mines in the years between the world wars, one can hear the clank, clatter of machines from the mechanical lab, the muffled sounds of students crossing campus, and the distinctive voices of the professors which filled the classrooms and laboratories and spilled out onto the campus.

Through the open window of a classroom, one can hear the booming voice of George "Old Prof" Dean, professor of mathematics and living legend, associate of General Electric's Steinmetz. Dean is berating his calculus students for their collective stupidity. As they stand awkwardly at the blackboard, ducking an occasional eraser, students are unable to fend off the invectives he hurls their way. One also might encounter eminent geologist, Dr. C.L. Dake, a short, slightly stooped man with a contagious smile. Across the way is the personification of the humanities during the inter-war years—Sam Lloyd, a short, dapper man with a twinkle in his eye.

A few other professors of that period that are familiar to all who know of School tradition are: Joe Beaty Butler, E.W. "Skip" Carlton,



Director Charles H. Fulton, Professors Elmo G. Harris and George R. Dean, 1920s.

C.Y. "Boots" Clayton, C.J. "Liz" Millar, Aaron Miles, H.R. "Cap" Hanley, Walter Schrenk, Leon E. Woodman, K.K. Kershner, Carroll Ralph Forbes, Joseph H. Bowen, R.O. Jackson, Rolfe Rankin, Oliver R. Grawe, Leon E. Garrett, V.B. Hinsch, Frank Conrad, M.D. Orten, A. Vern Kilpatrick, Reagan H. Young, Emerson C. Itschner, Clair V. Mann, Garrett Muilenburg, Floyd H. Frame, and Oscar A. Henning.

Ask 1918 to 1945 graduates of MSM the most impressive aspects of the School and most will include the faculty. The full-time faculty was not a large group—31 in 1920 and 76 by 1940. Unlike their highly specialized, degree-toting counterparts of today, the faculty did not carry an abundance of academic baggage. Few held the Ph.D. or its equivalent and few were research oriented. About one-third of the full-time faculty of the inter-war years had earned one of their degrees at MSM, including some of the more popular teachers such as Dean, Clayton, Lloyd, and Kershner. The School was predominantly an undergraduate campus with a teaching faculty.

In 1937, the editorial staff of the *Miner* deplored the lack of research on the part of MSM professors. Their survey revealed that from 1930 to 1937, 30 professors had published professional articles and only five had written more than five articles. Heavy teaching loads, lack of equipment, a dearth of graduate students, and the proclivities of the professors explain the low productivity in research.

In spite of this, few students complained of the emphasis on classroom teaching, and fewer believed that professors took no interest in their students. For the most part, students felt these were dedicated teachers. Oral interviews with students from those years give little credence to the maxim: "Those who can do, those who can't teach." Students generally revered their teachers; the professors, in turn, respected their students.

Faculty during the period underwent annual evaluation by their students. Sporadically, the "Faculty Personnel Record" would be posted or published in the *Miner*. In 1940, about one-third of the faculty petitioned Director Chedsey to keep the results of this rating poll private. Evidently, Chedsey honored the request.

Salaries for the faculty were low and fringe benefits were unimpressive. Both had improved somewhat, however, by the late '30s. In December 1939, a group hospitalization plan became available for faculty and staff and in September 1940, professors in the University of Missouri were given the opportunity to join a retirement plan (staff

and state each donated 5 percent). At the age of 70, teachers were eligible to receive retirement benefits.

## The Administration From McRae to Wilson

The chief administrators of the School of Mines in the 1918-1945 period (known as directors until 1941 when C.L. Wilson was named dean) reflect the changes which took place in American higher education in that era.

Director McRae resigned in 1920 for health reasons and was replaced by a nationally known metallurgist, Charles H. Fulton. Fulton had academic appointments at Columbia University School of Mines, the University of Wyoming, the South Dakota School of Mines, and Case School of Applied Science. He also had served as president of the South Dakota School of Mines prior to his appointment at MSM. Fulton would occupy the director's chair for 17 years, longer than any of his predecessors. Like most of his contemporaries in engineering education, he did not have a Ph.D.



Charles Herman Fulton, director, 1920-37.

Highlights of the Fulton years included curricular expansion and revision, creation of the office of the registrar, separation of electrical engineering from physics in 1924, creation of the ceramic engineering department in 1926, the creation of the Missouri Clay Testing and Research Laboratories in 1928, and a general improvement in the appearance of the campus.

Fulton permitted his faculty to play a considerable role in academic decision-making and faculty committees proliferated.

After 1931, economic difficulties resulted in massive cutbacks in state appropriations for education. This, in turn, resulted in an across-the-board salary cut of 20 percent for the faculty. This proved to be the greatest source of friction between the director and the faculty during Fulton's tenure. In 1937, Fulton resigned, citing a desire to return to his laboratory.

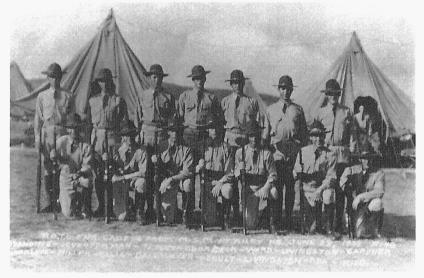
William R. Chedsey, a mining engineer, replaced Fulton. Chedsey had earned an engineer of mines degree from the Colorado School of Mines. His academic experience included appointments at the University of Idaho, Colorado School of Mines, and Pennsylvania State College. Accepting the notion that the School of Mines was foremost an engineering institution, he eliminated majors in biology, economics and English, all general science program specialties.



William Reuel Chedsey, director, 1937-41.

Chedsey expected his administration to function effectively and smoothly and he relied to a great degree on his department heads, who were to be liaisons between the faculty and director. The head should be the "scholastic and financial" leader of the academy. Chedsey's memos reflect a penchant for orderliness, a chain of command, and conservation.

Chedsey's four-year tenure as director was not a placid time for the School of Mines. The Depression, impending war in Europe, increasing enrollments, lack of student rooms, and frustrations caused by insufficient funds, inadequate facilities, and unsympathetic state officials resulted in a general state of gloom. In 1940, Director Chedsey announced his resignation, effective Aug. 31, 1941. As Chedsey departed, a debate over the future of the School had erupted, and the issue of separation once again reared its head. International events eclipsed local conflicts and quarrels. The destiny of the Missouri School of Mines and Metallurgy would be placed on hold until World War II had been won.



MSM ROTC cadets, 1938.

Chedsey was replaced by Curtis Laws Wilson, a metallurgist with a Ph.D. from Goettingen. Prior to his appointment as dean at MSM, Wilson had been a member of the faculty at Montana School of Mines and also served as the head of the metallurgy department at that institution. Professionally, Wilson was typical of the administrators of his era. Destined to serve longer than any of his predecessors, Wilson was well-organized, dedicated, urbane, forthright, and a strong executive.

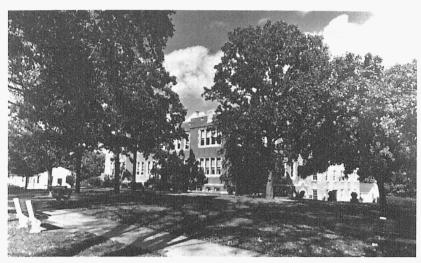
Wilson and his students barely had time to get acquainted when the Japanese attacked Pearl Harbor hurling the United States into the war. The new dean urged his students to remain in school until their degree programs were completed, pointing out that the nation would need engineers more than ever. For the time being, most students took Wilson's advice. Enrollment in 1942-1943 increased by 72 students.

# The Physical Plant

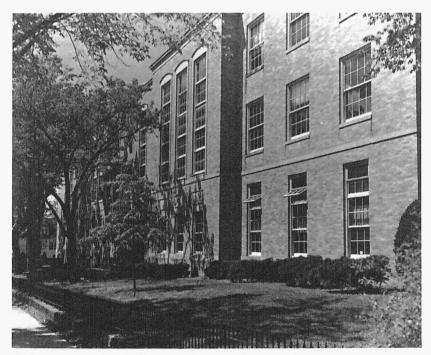
One of MSM's major deficiencies was the lack of a long-term plan for growth and development. In particular, the physical plant received less attention than any other aspect of the campus. Instead of anticipating needs as one observer put it, "buildings, well they just growed up." In the 1920s there was a great deal of construction on campus, but, except for the U.S. Bureau of Mines' Mississippi Valley Experiment Station, which was completed in 1924, these projects represented consolidation or completion of existing structures rather than plans for the future. The Power Plant was remodeled, and service tunnels, sidewalks, shrubs, a warehouse, and an infirmary were constructed, but all these projects were undertaken to alleviate existing problems.

As enrollment increased in the 1920s, plans were unveiled in the 1929-1930 school year for three new buildings and the repair and improvement of others. Buildings were to be constructed for the physics, electrical engineering, and mechanical engineering disciplines; for civil engineering and geology; and for chemistry and chemical engineering. The *Miner* made these plans public on Jan. 7, 1930, just before the nation came to recognize the severity of the Depression.

The Depression years need not have been years of abstinence from construction, as New Deal programs such as the Works Progress Administration constructed edifices on college campuses across the nation. Harris Hall, completed in 1940, was the only building on the MSM campus constructed with assistance from the WPA. It was the first new building on campus in a generation.

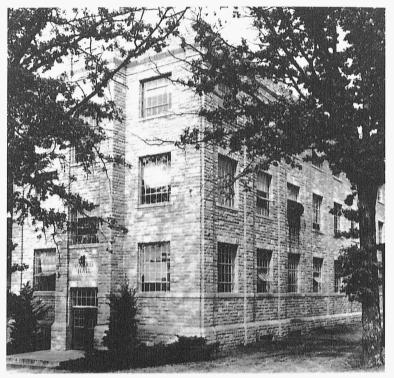


U.S. Bureau of Mines Mississippi Valley Experiment Station Building. (Fulton Hall.)



"New" Chemistry Building.

The CWA and WPA also sponsored painting and repair projects on campus from 1933 to 1936. The Chemical Engineering Building opened its doors in 1941. Massive building projects awaited the conclusion of the war when college enrollments were swelled by veterans of the war.



Harris Hall.

## The Impact of World War II

Construction of Fort Leonard Wood, nearby, had a great impact upon MSM and Rolla. By the spring of 1941, massive construction projects at the fort resulted in a student housing shortage. An estimated 12,000 construction workers sought housing in the area, and they were willing to pay higher rates for rooms than were students. Many citizens in Rolla bowed to tradition and kept students anyway, but the workers' need for rooms combined with increasing

student enrollment underscored the need for a student dormitory. Unfortunately, the state legislature, in spite of a vigorous demonstration by students and townspeople, remained unsympathetic and no dormitory was forthcoming.

World War II also affected MSM's academic programs. By 1942, the Board of Curators had approved an accelerated program which added a 12-week summer session so that students could more rapidly complete their degree programs. The campus also adopted several special federal programs to assist in the war effort: The Engineering, Science and Management War Training Program, the Civil Pilot Training Program, a Signal Corps Program, and the Army Specialized Training Program. Hundreds of young men came to campus to take part in these programs.

One program in particular, the Reserve Officer's Training Corps, prepared hundreds of young men at MSM for the roles they would play in World War II. ROTC attracted slightly over 50 percent of the student body through much of the inter-war period. In 1924, of 408 students on campus, 214 served in ROTC; in 1931, 390 of 679 students were trainees; and in 1940, 534 of 931 were active in the program. Fifteen to 20 percent of those in the basic program chose to continue in advanced ROTC and earn commissions. Those who enrolled in the program during the inter-war years included some who ultimately rose to the rank of general such as Byron E. Peebles, class of 1936, and Walter P. Leber, class of 1940.

Though MSM did not emphasize research to the degree that did some other institutions of technology in the 1940s, the campus sponsored some research projects for the war effort. Also, the U.S Bureau of Mines and the Geological Survey, both housed on campus, were involved in war-oriented research projects.

As the war continued, enrollment suffered. Engineering students who could complete their programs prior to July 1, 1945, received deferments. Others were called for their physicals. By the 1944-1945 school year, enrollment had dropped to 308, the lowest since 1918. Officials had little cause to be alarmed over the decrease in enrollment, however, for the end of the war was in sight.

The greatest impact of World War II lay ahead as the GI Bill made higher education available to thousands of veterans. As American educators looked ahead to the challenges, the administration and faculty of MSM faced an added problem—the issue of separation from the University of Missouri.

# The Boys At Play: Student Life, 1918-1945

Sturdy and strong are all the sons of Missouri Mining School.

(From "The Orange and White" by H.H. Armsby)

The class of men who attend the Missouri School of Mines are of vastly different character than the majority of students who attend college. As a general rule they are much older. I believe our average age of men was about twenty-four for this year 1920. . . . Needless to say we get men from every state in the Union. A man gets it into his head that he would make a mining engineer and he chooses one of the three great mining schools: Colorado School of Mines, Michigan School of Mines, or Missouri School of Mines. (From Alpha Kappa Kapers, Nov. 1, 1920)

In spite of the rather bold claim in the above quote, most students at the Missouri School of Mines from 1918 to 1945 hailed from Missouri or surrounding states. The prospective Miner in 1918, and



Eighth and Pine, 1920s.

for some years to come, might well arrive in Rolla by rail for the fall term. En route, the freshman might, while gazing out the window of the coach and drinking in the splendor of an Ozark autumn, reflect on the scholarly work that lay ahead.

Stepping off the train at Frisco Station, the freshman's musings might well be interrupted by the jeers of upperclassmen who had come to the depot to have a look at the freshman "crop." With the catcalls of upperclassmen resounding in his ears, the new Miner would stagger, suitcases in hand, northward on Pine Street through the business section of Rolla, past the Baltimore Hotel, past the Honky Tonk Diner (a little green building which was a favorite site for Miner bull sessions), past the post office (Harvey & Smith Student's Store is across the street—known by students as the "Hook 'em and Skin 'em" store), toward the campus of the School of Mines.



Aerial photograph of campus, circa 1925.

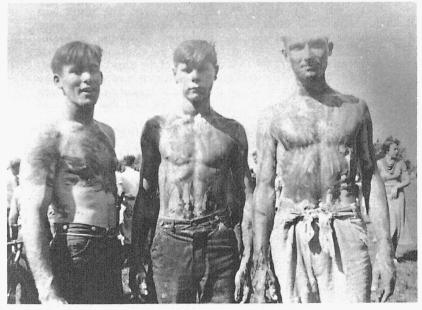
If the student had envisioned a placid campus setting replete with ivy-covered buildings and noble oaks, he would be disappointed. Prior to 1925 at least, the campus was rather bleak and disheveled. As the prospective student approached the campus on Pine Street from the south, he saw the Metallurgy Building, a nondescript structure. To the left was Norwood Hall, an honorable building but with a dingy interior. To the left of Norwood was the Rolla Building, "Old Chem," and the Director's Residence. Beyond Norwood to the north was Parker Hall and to the right of Parker Hall, there was a hole in the

ground where a lake had been planned. North of Parker Hall (as of 1923), the freshman would see the U.S. Bureau of Mines Building, while across the mall from Parker Hall, were the Power Plant, Mechanical Hall, and Jackling Gymnasium. To the left of the gymnasium was the football field. By 1925, the campus had become a more pleasant setting, thanks to renovation projects.

Having been matriculated by the appropriate School official, the new student would settle into his quarters, a room rented in town or a fraternity house. The "fun" was about to begin.

# Hazing

In addition to adapting to college life, freshmen of 1918-1945 vintage, like their predecessors, had to undergo the phenomenon of hazing. Some argued that hazing fostered a spirit of rambunctious independence in engineering institutions. Certainly, upperclassmen resisted administrative attempts to limit or abolish hazing on the grounds that such would suppress or destroy school spirit.



Aftermath of the freshman fight, 1935. From I. to r., James Wilson, John Soult, and John Livingston.

Particularly during the first week or so of the fall semester, freshmen experienced a plethora of hazing. They were required to wear green caps which they had to touch to faculty and seniors. They were to wear suspenders, gather in a body at athletic events, provide entertainment on demand to upperclassmen, attend all mass meetings, carry matches for upperclassmen, and the like.

Prior to World War II, the freshman fight continued to be the ultimate in hazing. Fred Finley's account in the Missouri Miner of the

1939 fight is a classic description:

After a remarkably quiet freshman week, the annual freshmansophomore war-fare reached its first violent outburst last Monday evening on the traditional golf course battle grounds. As the confident frosh, two hundred strong, marched over the hill toward town from a peaceful evening at school songs and yells, their path was blocked by a tiny group of some 400 sophomores and upperclassmen.

As the two groups met, the air was filled with sobs, groans, and gnashing of teeth and over this turmoil rose the continuous roar of the ripping of hundreds of pairs of trousers. For miles around the frightened hill-folk who inhabit this barren land were

awakened by this maelstrom of noise.

Quickly as it began, the fight was over. The result was inevitable. The frosh, inexperienced in pants warfare, were doomed to defeat from the beginning. Cowering in fright, hurrying before the blows and curses of the exultant sophs, their bare legs exposed to the freezing blasts of the torrid south wind, the crest fallen and deflated greenies retreated in confusion to the fair grounds, there to spend the night in tearful penance, each reflecting that mama was right when she said that he should attend a teachers college.

Early Tuesday morning, as soon as the frosh had donned another of their theoretically limitless supply of pants, the conflicting parties met on the upper football field for the second major engagement of the year. In spite of the efforts of several dozen Student Council referees, the events went off very

smoothly.

First, the frosh removed their shoes, which, incidentally, exposed the webbed feet of several frosh from Swampeast Missouri. Second, the two groups engaged in a tug of war, in which the freshmen were pulled through a stream of water which the industrious Student Council referees were supposedly playing over the center of the rope. Third, the sophs pulled the frosh through again. Fourth ditto.

After the 63rd time, the freshmen end of the rope led down into a great sea of mud, on the surface of which floated a miscellany of old tin cans, green slime, and freshmen. At this

point the Student Council referees, fearing extermination of the 43's, stopped proceedings and moved on the next event.

In the meantime the sophs, enraged by the sight of clean spots on several freshmen, started slinging verbal and material mud. Soon, while the hysterically happy drygoods merchants of Rolla were turning handsprings on the sidelines, trousers once

again began to perish.

Order was finally restored, partly through the efforts of the referees and partly because all the frosh were trouserless. The next event was a sandbag scrap, which is nothing more than an excuse for pants-ing party. Complications were introduced into this event by the fact that all the frosh were already pants-less. The resourceful sophs soon solved this problem, however, by compromising on the shirts of the unfortunate 43's.

Fearful that the frosh, already de-shoed, de-shirted, and depantsed, would next be relieved of their more intimate articles of apparel, the mud-coated and weary referees stopped this

event also.

In order to acquaint the two battling classes with one another and to promote good fellowship in general, the freshmen were next walked down a reception line to meet each sophomore individually. Armed with brick-bats, ax-handles, pitch-forks, horse-whips, and similar implements, each sophomore administered a friendly pat on various parts of each freshman's anatomy, as he passed by.

Then, after a few touches of vari-colored paints to break the monotony of the mud-colored complexion of the frosh, a molasses shampoo was administered to those whose soiled condition warranted it. Those who desired it were then given chaws of the finest obtainable long green, purchased by a special appropriation from the Student Council treasury. Strangely enough, not a freshman present refused a chaw of this delectable long green.

As the perfect end to a perfect day, the freshmen were forced to march into John Scott's drug store happy, those who survived this final ordeal gaily tripped their way homeward.



Freshman class, 1923.

From the perspective of the freshmen, Ted Herman, a freshman in 1923, wrote the following accounts of the fight to his mother:

About 2 miles south of Rolla August 24, 1923 4:30

#### Dear Mother:

The sophomores are keeping us out of town. You remember Karl telling about the class fight. Well, this is initiation week for the Freshies and they the sophomores are keeping us out of town. Monday night we slept out here in a barn, also Tuesday nite, but Wednesday night all the Freshmen got together marched into town, put our posters up, some of which I will send home. We marched out to the campus and sang the Miners song and gave a few yells and challenged the sophomores. Then we marched up town and passed out posters and read one in front of a huge crowd. Then after a while we heard the sophomores coming. We marched to the campus, waited about 15 minutes for them and then they came. Mamma, I wish you could have seen us. The crowd broke in one place and the sophomores tore through. We held our ground until they reached us and almost with a savage inspiration to get to them we met and the crowd of Freshmen and Sophomores melted in a pile. For once I was glad I had grown some muscle during the summer and I realized my strength. We tied the sophomores in about 35 minutes-a rare feat done by the Freshmen, Karl said it was the first time since his class did.

Well that nite I slept with another Freshman by the name of Bradford while Cook and Beatty came out to the barn. Karl took them out. Then Thursday nite (and to-nite I guess) we slept in the barn. We probably will sleep here tomorrow nite also, but Sunday nite we all sleep in the Fair Grounds and Monday morning at 9 the regular class fight is held in which the Freshmen are destined to lose if it takes every class and all the professors. Karl sure has treated us fine out here. We board with his mother \$27 a month, our room cost each of us about \$6.66 a month. But school expenses are terrible. We paid \$61 for total fees of which we probably get \$20 back. I figure expenses will run over \$500 and the studies gee, High school was a snap. I sure will have to work if I get by with everything.

I'll tell you what the sophomores do if they catch a freshman. They took 2 fellows that were sleeping on the roof of their fraternity house and threw them in a pond. Two other fellows had molasses poured in their hair and eggs mixed and broken in their hair. Other fellows had their face painted with shoeblackening. I'm doing my best to keep out of everything. Also every Freshman that gets caught gets paddled. They made one fellow auction off a sock, sell the post-office, and bark at the moon-just any foolish thing. It makes you love the school. I think I have \$70 left in the bank so don't be surprised if I have to sell my bonds soon.

I received the letter and package today, was sure glad to get the mail. Write often.

Your son Ted

P.S. Am writing this on a wagon seat. Tell the neighbors "Hello" Hello-Aunt May

Rolla, Mo. August 27, 1923

#### Dear Mother:

An addition to a late letter. The class fight was today. Saturday afternoon the soph's came to get us in our room. Beatty and I escaped by climbing out the bathroom window and jumping from the roof. Karl got Cook out. There were 4 soph's

We came back to town (in the afternoon we beat it out to our barn) Sat. nite bound and gagged a soph. in his room, This was 2:00. We kept him all day Sunday. Had quite a time keeping away from soph's Sunday nite. Took Harrison our prisoner to the Fair Grounds about 2:30. They hailed us big and we turned our prisoner over to them. They let him go before morning. The class fite was at 9:30. The Freshmen had disappeared. 30 had been tied. 30 were left to fight. This is approximate. They tied us in the fight in a little while. They painted our left leg green and our faces green. Beatty and I were in a bunch of 8 that broke and egg over each others head while the soph's poured on molasses and lamp black powder. We were jet black and sticky, our clothes were awful. I will send them home soon. It took us 1½ hours to get clean.

So I have a namesake. Well I guess there is someone in Raymond now that will remind the older people of me. I thought I would soon be forgotten.

With Love, Ted

National or international events occasionally interrupted the ritual of hazing. World War I put a damper on things as did World War II. When the United States entered World War I, the MSM administration banned hazing. Students complained that school spirit, "that old pep," would suffer. As soon as the Armistice was signed, the ban was rescinded and hazing resumed. In January 1919, the *Miner* reported a free-for-all "wrinkling" between freshmen and sophomores in front of the Rolla Post Office on Pine Street. In 1919, green caps were not available, because the *Miner* said, "The frosh have the I.W.W., Bolsheviks, or some of the clan [sic] to thank for the fact that they are not yet in the insignia of their lowly estate. . " Actually, a textile workers' strike in Chicago was the culprit.

During the fall semester of 1918, hazing became superfluous, when the Student Army Training Corps, under the auspices of the War Department, was established at MSM and at other colleges and universities. Its purpose was to verse students in the fundamentals of military drill and to provide officer training. For about two months, MSM became a veritable army training camp. The federal govern-

ment paid the "trainees" school expenses and \$30 per month, although it then requested \$5 per month back as a contribution to the United War Work Campaign. A bugle call at 6:15 a.m. announced the beginning of the day, followed by calisthenics, and, finally, breakfast. In the evenings, students would not be found in club houses or loafing in downtown Rolla. Instead, they were required to study from 7:30 to 9:30. Taps ended the day at 10 p.m. Officials forbade gambling, profanity, spitting, littering, smoking, and drinking on campus.

In addition to the rigors of military training, Miners, along with Americans everywhere, had to cope with a new scourge. As the lyrics of a song stated, "Everybody's got the In-flu-ennn-za." At the conclusion of the war, Spanish influenza swept through Europe and America with a vengeance. Fortunately, the virus did not reach crisis proportions in Rolla, though townspeople and students took precautions. Public gatherings were prohibited and a football game had to be canceled. (The campus avoided another epidemic in 1929. Frank J. Zvanut recalled that he and eight other Miners developed typhoid fever. Doc Baysinger and School officials maintained the strictest secrecy about the disease, placing those infected in the MSM infirmary. As in 1919, the discretion of those involved kept public panic from occurring.)

After the rather brief Spartan existence in 1918, student life returned to normal for the next two decades. Normal meant a certain number of student pranks. George Dean walked into his office one morning to find an assortment of livestock occupying the premises. The wizened "Old Prof" had long boasted of participating in a similar stunt against the director of the School in the 1890s. According to eyewitnesses, Dean never again mentioned the incident.

In the 1930s the Russell Brothers Circus wintered in Rolla. In spite of rigorous rules against cutting class, when the circus performed virtually the entire student body opted for the circus instead of the classroom. In 1936, the Russell Brothers Circus took part in the St. Pat's celebration as elephants and circus performers marched down Pine Street in the parade.

"Crashing" the movie theater also was a favorite pastime following a victory on the athletic fields. Crashing meant rushing into the theater en masse without purchasing tickets. The theater manager usually exhibited good sportsmanship by looking the other way. Besides, expelling students from the premises might end in a barrage

of rotten eggs and tomatoes. One inventive manager solved the problem one cold wintry evening by shutting off the projector and the furnace and opening the doors, literally freezing out the "crashers."

## Social Activities

Beyond the pranks and hazing, one of the unique features of American institutions of higher education has been the exhibition of a social as well as an educational character. This was particularly true by the 1920s. Demanding class schedules and labs coupled with a dearth of social activity made the development of social character at MSM a special challenge. It has often been necessary for Miners to create much of their own social life, and they have met the challenge, taking advantage of their surroundings to relieve the pressures of study.

From 1918 to 1945, social activities included long walks (particularly in spring and autumn), popcorn popping, card playing and bull sessions around a keg. Students of this era might seek a break from the tedium of studying by walking to the railroad tracks to watch the two expresses, the "Bluebonnet" and the "Meteor," speed through town about 15 minutes apart. Perhaps this prompted students to dream of more exciting places as these proud symbols of technology careened through the little country town.

Rolla was a relatively isolated little town before the advent of the modern highway system and trains were the best link to the outside world. In the 1920s, traveling by motor car from Rolla to St. Louis was a 17-hour ordeal. By rail, the trip took three to three and one-half hours. Travel by automobile became more feasible in 1931. In that year, Rolla residents celebrated the completion of the new legendary Highway 66 from Chicago to Los Angeles. The section from Rolla to Lebanon, Mo., was the last to be completed.

Given the rigors of travel in those days, when Robert Van Nostrand, James Fox, and John Zagata (all three of the class of '42), decided to drive to New York to attend the 1939 World's Fair, they undertook quite an adventure. The three sophomores and their dog departed in an ailing 1919 vintage Ford without floorboards. En route, the intrepid trio spent as much time under the car repairing it as in the car, but some days later they arrived in New York City. Imagine the astonishment of these three middle-Americans as they

explored the landmarks of the Fair, the Perisphere and the Trylon. One can imagine the stories they shared with friends upon their return to the School of Mines.

Aside from individual efforts, student organizations provided most of the organized social activities. Two new fraternities were added to the original five during these years, Triangle in 1927, formerly the Grubstakers, and Sigma Pi in 1933, originally the Prospectors. The first sorority, Phi Delta Chi (local), was chartered at MSM in 1940 with 19 members. As in the pre-World War I era, eating clubs continued to provide services beyond culinary functions. Quo Vadis survived World War I and the MSM Players treated audiences to five dramatic productions a year.



St. Pat and ROTC honor guard, 1920s.

By 1930, the St. Pat's Board had been founded to supervise the annual celebration. In 1937, a modern student council was begun. Between 1921 and 1937, students chartered local chapters of professional student organizations for all major engineering disciplines, and developed service and scholastic fraternities such as Blue Key (1933). As eating clubs such as Prospectors and Grubstakers evolved into social fraternities, those students preferring a less formal setting formed new eating clubs between 1937 and 1940 called Engineers, Shamrock, and Tech clubs.

The boys of MSM, no less than their counterparts elsewhere across America, liked music and dancing. This was the era of the "big band sound" and name bands were imported for major events such as St. Pat's. Local bands provided entertainment for affairs of less significance. For the 1935-1936 school year, the *Miner* announced no less than 31 dances planned by various campus organizations.

Dancing, however, required females, a rare commodity on the MSM campus between the wars. Girls were "imported" for the dances, and they were always at a premium as the following 1920 ad in "Alpha Kappa Kapers" suggests:

#### FOR SALE OR TRADE

Two perfectly good dates for next St. Pat's. Have three dates and can only use one of them . . . Both guaranteed sound of mind and limb, one slightly hamstrung but can't be noticed for fox-trot.

A large number of students participated in various orchestral groups on campus. John W. Scott provided valued, long-suffering service to the campus as the first director of the band. The Miner Band, originally consisting of about 20 people, gave its first concert in the fall term of 1926.

Students with a flair for photography and journalism could join the staff of the *ROLLAMO* or the *Missouri Miner*. Both were quality publications and in 1937, the *Miner* staff received an honor award rating for outstanding journalism from the National Scholastic Press Association.

Those who sought intellectual improvement and entertainment attended the "General Lecture" series started by School officials in 1924. Distinguished lecturers prior to World War II included Amelia Earhart (who predicted to skeptical Miners regular transoceanic flights in the near future), Richard Halliburton, the Don Cossack Choir, J.B. Priestly, Thomas Hart Benton, and Cornelius Vanderbilt,

Jr. In October 1939, Vanderbilt reported on the war in Europe and remarked to his audience, "I hope I am not looking at cannon fodder, but I am afraid I am."

The outstanding social event of the school year throughout the period was still the St. Patrick's celebration. Parades, masked balls, "green goo," the knighting ceremony, the scandalous Green Sheet (an unauthorized, anonymous version of the student newspaper), all were common to the festival year after year until 1943 when the war prompted the temporary suspension of St. Pat's.

## **Athletics**

Intramural sports, especially baseball and basketball, also provided entertainment for the "boys" and the faculty. During the 1920s, the faculty fielded a well-nigh invincible baseball team featuring Karl Kershner and Walter Schrenk as star pitchers and "Boots" Clayton as first base coach.

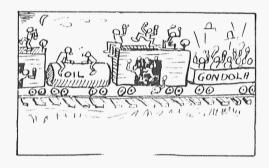
Varsity athletics still provided an outlet for the boys of MSM. While athletics was a source of school spirit for students and alumni, MSM officials did not attempt to field formidable athletic teams during the period. Although football was the dominant sport, no Miner team between 1918 and 1945 approached the success of the undefeated 1914 or (1980) teams. The 1925 team lost only to Washington University and the University of Missouri, and the 1930 team boasted a 5-1-1 record, losing only to Tulsa and outscoring its opponents 209 points to 70.

There were several organizational hallmarks. In 1921, the "M" Club was created for those who lettered in varsity sports and were invited to join. In 1922, the Booster Club provided a structured outlet for those in the region who wanted to actively support athletics at the School of Mines. The School joined the Missouri Intercollegiate Athletic Association in 1935. Until membership in the MIAA created a series of traditional rivalries, nothing could challenge the MSM-Washington University football game.

Between 1920 and 1940 Miner fans left this match-up in a gloomy mood as Washington University won 11 games and MSM none. This dismal statistic apparently did not detract from interest in the game. Until travel by automobile made the practice obsolete, Miners would hop a freight bound for St. Louis to attend the MSM-Washington

University football game. The "side-door Pullman" transported hundreds of Miners to cheer their football club if not to victory, at least to a good showing. Frisco officials frowned upon the ritual and on several occasions attempted to entice the rowdy fans into a passenger coach by offering special rates to them on football weekends. The lure of the gondola or box car proved too great, however, as illustrated in the following *Miner* cartoon and poem:

#### THE MINER "SPECIAL."



#### THE EXODUS.

On box cars, tank cars, blinds and rods, And in gondolas, too, The Miners bold will sally forth To clash with Washington U.

O'er mountain, plain, o'er field and brake, Thru bayou, burg and bog, The long freight trains are laden down, The boys are on the "hog."

While football remained the number-one varsity sport, the Miners also supported basketball and track teams during the 1920s. By the 1930s, swimming and wrestling had been added to the list of varsity sports. Whatever the sport, rigid class and lab requirements took precedence over athletics.

Athletics did not exactly attract national attention in the years between 1918 and 1945. MSM had no national champions, no "Galloping Ghosts," no "Gippers." The School of Mines kept its sports activities in perspective, but, athletics at MSM played a

significant, expanding role. Students enjoyed athletics, attended games in large numbers, and expressed pride in their teams.

## Student Attitudes

The social fabric of a college is determined not only by its social activities such as athletics and annual festivals, but also by its student attitudes and perspectives. According to student publications and those who attended MSM between 1918 and 1945, students were generally complacent and accepted the "way things were." The major exception was the controversy regarding the proposed separation of MSM from the University of Missouri. Editorial writers consistently bemoaned the lack of attendance at mass meetings and complained that students paid no heed to "Keep off the Grass" signs on campus. In spite of this, the evidence suggests that students, faculty, and administration shared a strong commitment to the School and exhibited a deep school spirit. Other complaints are rather timeless. In 1935, a columnist pointed out that standard texts in chemistry and physics had skyrocketed to \$4 each while essay books cost \$2.

Except for the fall of 1918 when the campus became an Army camp for a couple of months, campus regulations tended to be libertine compared to other schools across the nation. Consequently, students had little reason to be negative about campus regulations. There were dress codes for each class, but that was typical. The most stringent regulation dealt with absences from the classroom before and after holidays. Those with unexcused absences within two days before or after School holidays were required to take one to six additional credit hours in order to graduate. Such regulations were commonplace in higher education at the time, and Miners accepted them with few reservations.

The author of the *Miner* feature "Some Problems Confronting Mining Schools" reflected the attitudes of more introspective students when he suggested:

. . . the mind is not simply a storage chamber to be filled at will like an ore bin. . . . Unless we train his mind to make use [of facts and figures] we fall far from reaching the state of efficiency required by modern practice. In other words, unless we teach the individual to think while we are training him in his chosen vocation, we miss our goal.

As for national events, students expressed more interest in some matters than others. In the 1929-1930 school year, about half the student body of 553 students voted in a straw poll on the repeal of Prohibition. One-hundred-thirteen voted for repeal, 92 for modification, and 52 supported Prohibition.

While about half of the Miners expressed their viewpoints on liquor, few indicated their political preference in a 1932 straw vote for president. Out of a student body of 529, only 23 voted: 14 in favor of Herbert Hoover (an engineer!); seven in favor of Franklin Roosevelt; one in favor of the socialist, Norman Thomas; and one in favor of W.Z. Foster, the American Communist Party candidate.

MSM students generally reflected college student attitudes nationwide. As *Fortune* magazine reported in 1936:

The present-day college generation is fatalistic . . . . It keeps its shirt on, its pants buttoned, its chin up, and its mouth shut . . . . Security is the summum bonum of the present college generation.

By 1940, students were less prone to keep their feelings to themselves on issues ranging from the student housing shortage to presidential elections. The war in Europe had begun, the construction of Fort Leonard Wood was under way, and the debate over separation of MSM from the University of Missouri had become heated. In October, the *Miner* editorial staff endorsed Wendell Willkie for President. The next week, the *Miner-ROLLAMO* Board of Control forced the staff to rescind its endorsement by forbidding the active support of presidential candidates by a student publication.

# The Impact of World War II

As the 1939-1940 school year came to an end, there were signs of economic progress at home mixed with war clouds abroad. Eight hundred ninety-eight students had enrolled at MSM that year, 11 percent more than the previous year. The national economy, though still sluggish, showed signs of recovery. Germany attacked Poland in September 1939, prompting Britain and France to declare war on Germany. During 1940, the epic Battles of France and Britain raged.

In Rolla, the Miners were friskier than ever, as demonstrated by the worst freshman hazing in years. This prompted Director Chedsey to ban "pantsing," though the upperclassmen ignored the ban. The General Lecture series that year featured the Don Cossack Choir and Cornelius Vanderbilt Jr. Emeritus Professor Elmo Golightly Harris conducted the first class in Harris Hall, and state officials approved plans for the new Chemical Engineering Building.

In the 1940-1941 school year, registration increased to a record high of 931; MSM students received their draft numbers; FDR won a third term in spite of the *Miner's* endorsement of Willkie; and two Miner co-eds even dared serve as cheerleaders at athletic events.

With America's entry into World War II, the social life of the School dwindled along with enrollments. This was not a time for frivolity, and the students suspended hazing after the fall of 1942. The assumption that it would be resurrected at the conclusion of the war proved false. The freshman fight, pantsing, wrinkling, beanies, and all the rest had become history. The St. Patrick's celebration also was suspended until the war concluded. Even the *Miner*, first reduced to one publication per week, finally ceased publication because of lack of funds. Edward W. Sowers, editor of the Rolla *Daily New Era*, allowed students to include a "Miner section" in his paper during the interim.

By 1944, the end of the war was in sight and Dean Wilson and his faculty and staff began to prepare for the challenges they foresaw for higher education in the post-war era. The prospects must have been somewhat frightening. No one knew for certain what lay ahead, but it was expected that thousands of veterans would attend college, and as the floodgates of American higher education opened, educators wondered if quality would give way to quantity.

## Town and Gown

Townspeople, students, and faculty had a good working relationship. Both the town and the School were small and the interdependence between the two was recognized. Scott's Drug Store, the Honky-Tonk (until 1929 when the little green shack on 11th and Pine was demolished), and the H&S Student Store were favorite student "hang-outs." Those eager for news would congregate in the Long Garage. The owner, Edwin Long, owned a fine radio set that he generously shared with students and townspeople. He placed bulletins of pertinent news items and weather reports on the window of the garage.

Because the School had no dormitories, most students rented rooms from townspeople, a practice which doubtless contributed to a state of harmony between the School and city. In times of expanding enrollment, however, a scarcity of rooms to rent at affordable prices resulted in editorial grumbling in student publications.

In spite of general harmony, the town-gown relationship became strained at times. Students complained that there was "nothing to do" in the little country town. In the 1920s, they also complained of ramshackle and unpainted buildings in the business section, unkept roads, and poor drainage throughout the town. Add to this the lack of street lamps and the accompanying gloom of an Ozark winter and the scenario was hardly enticing for those who were accustomed to the gentility of urban life.

As expected, in a setting where everybody knew everybody, gossip abounded, particularly when it concerned alleged licentious behavior on the part of the Miners. In 1924, the parlors and sidewalks of Rolla literally hummed with news about an incident at the annual freshman smoker where students witnessed a demonstration of exotic dancing by a troupe of ladies from St. Louis. Indignant cries of church groups and sewing circles regarding "student boys just out of hand" prompted an editorial in the *Miner* condemning such gossip and concluding that when Sinclair Lewis conceived the novel *Main Street*, he must have had the people of Rolla in mind.

Townspeople often found legitimate reasons to complain about student behavior. Occasionally, the freshman fight spilled over into the streets of Rolla, and many also objected to the ritual of a bonfire on Pine Street, a custom that took place after Thanksgiving when freshmen were at last permitted to remove their beanies. Tradition called for the hats to be burned en masse in a bonfire in front of the H&S Student Store on Pine Street. The city police and some townspeople frowned on this and upon the proclivity of the frosh to ring the firebell during the ceremony.

In spite of Prohibition (1920-1933), Miners seemed able to find liquor. On football Saturdays, some enterprising seniors allegedly did a brisk business of selling "corn on the rocks" (corn whiskey and ice) behind the grandstand until the authorities discovered it, closed it down, and suspended two students in the process. To the disgust of some local citizens, students were apt to become rowdy during St. Patrick's celebrations.

During the decades between the world wars, Rolla was a peaceful little town nestled in the Ozark hills. Occasionally, its serenity was disturbed by the unauthorized sounding of the tocsin (the town's firebell), by the cries of freshmen and sophomores locked in combat, by a throng of crazed Miners rushing the theater after a rare victory at Jackling Field, or by the annual, and to some pagan, rite of spring known as St. Pat's. Hard feelings, gossip, and threats resulted from such outbreaks, but then students and townspeople settled back into their respective routines of classwork or making a living, and the two groups lived again in harmony. Year after year, the familiar summer haze would settle over the wooded hills and the little college town would slumber until the following school year.

# CHAPTER VII An Unhappy Stepchild

The most persistent and divisive issue facing those interested in the future of the University of Missouri School of Mines and Metallurgy was whether the campus would be better served as a part of the University of Missouri or separate from it. The founders of the School of Mines believed the former to be preferable and consequently, MSM became a division of the University of Missouri. The director of MSM served at the pleasure of the president and the Board of Curators of the University of Missouri.

Over the years, various groups, including faculty, administrators, students, alumni, and townspeople, argued that the School should separate from the University, or at least from its president.

The creation of the University of Missouri at Rolla in 1964 laid the separation issue to rest. But for many it is still impossible, almost half a century later, to discuss the matter without emotion.

### The Background

The 19th-century directors of MSM from Williams to Ladd occasionally accused University officials of apathy or worse. By the early 20th century, University authorities were considering moving the School of Mines to Columbia, leaving a manual training school in its place.

In 1915, the state legislature intervened in the controversy by passing the Buford Act, requiring the University of Missouri Board of Curators to add degrees in electrical, chemical, and mechanical engineering to the program at Rolla. After the Buford Act survived an appeal to the state Supreme Court, the issue died down. In 1941, the controversy flared up again, as Director W.R. Chedsey resigned. Chedsey maintained that President Middlebush had arranged his dismissal because, rather than curbing growth, he had performed his

job too well. Chedsey would be the School's last director. His successor, Curtis L. Wilson, was appointed dean of MSM.

America's entry into World War II, however, postponed a resolution of the controversy. The controversy resumed at the conclusion of the war and peaked in 1948-49. During that school year, the issue spilled out of the administration building into the streets of Rolla and finally to legislative halls in Jefferson City. This time, the controversy would extend beyond curators and administrators to include faculty, townspeople, state politicians, and alumni. The principal roles in the drama were played by President Middlebush, Dean Wilson, Rep. Booker H. Rucker, Sen. Emery Allison, Professor Clair V. Mann, Rolla businessman Frank B. Powell, and many prominent MSM graduates such as Daniel C. Jackling and Mervin J. Kelly.

## The Chedsey Administration

Frederick Middlebush's appointment as president of the University of Missouri in 1935 renewed the controversy over separation. Middlebush had stated ". . . the university should never expand its program at the expense of a high standard of quality; which means, in practice, beyond its assured degree of financial support." For a decade, Middlebush would adhere to a program of retrenchment in the interests of quality. He also sought to avoid duplication of programs. For MSM this meant emphasizing minerals engineering at the expense of newer curricular areas such as chemical, electrical, and mechanical engineering, even though these newer specialties were increasingly in demand in the marketplace.

William Chedsey became the 12th director of the Missouri School of Mines and Metallurgy in 1937. In keeping with University policies regarding unnecessary duplication of programs, Chedsey eliminated majors in biology, economics, engineering drawing, and English at MSM, programs which had been offered under the auspices of the general science degree.

While Chedsey complied with University dictates regarding duplication in arts and sciences, he did attempt to broaden the base of the engineering programs. In 1939, through Chedsey's initiative, the legislature earmarked \$250,000 for the construction of a Chemical Engineering Building at Rolla (though Gov. Stark withheld \$125,000).

The separation controversy again became a serious issue because

of student growth at MSM. In 1941, as the nation recovered from the Depression and war clouds in Europe and Asia threatened, student enrollment at MSM increased, particularly in the areas of chemical, electrical, and mechanical engineering. Chedsey sought to improve the facilities for these areas and by so doing, to gain accreditation for mechanical and chemical engineering by the Engineers' Council for Professional Development (ECPD). Electrical, ceramic, civil, metallurgical, and mining engineering had been accredited by 1937. These goals, however, conflicted with the objectives of President Middlebush.

The housing shortage, caused by expanding enrollments and development of nearby Fort Leonard Wood, prompted Chedsey to request legislative appropriations for MSM's first dormitory. This request, though, was not his top priority; a new Power Plant and completion of the Chemical Engineering Building came first.

On March 28, 1941, the University announced Dr. Chedsey's resignation, stating he "was not the man for the place." The announcement came as a surprise to Chedsey who questioned the ethics of those who made the announcement on his behalf and complained that he had not been given a hearing prior to the announcement. Though all of the reasons for the decision to dismiss Chedsey are not known, the differences between Middlebush and Chedsey regarding the future of MSM probably were of paramount importance. Chedsey officially submitted his resignation to the Curators on June 3, 1941, effective Aug. 31, 1941.

The issue of appropriations for a dormitory broke at the same time as Chedsey's resignation. In spite of student petitions to President Middlebush and a parade and demonstration by 300 Miners in Jefferson City, the legislature rejected the request for a dormitory. This was done with the blessing of the president and the Board of Curators who argued that the housing shortage would be temporary. Priorities, they stated, required funds for a Power Plant at MSM rather than living quarters for students.

Meanwhile, to protest the dismissal of Chedsey and because of frustrations regarding state appropriations, some townspeople formed the "Association for the Advancement of the Rolla School of Mines." In a public statement addressed to the governor of Missouri, the new association announced its intention of informing the public of misconduct on the part of the University President and the Board of Curators. The association further requested state support for a

dormitory at MSM, and demanded that subsequent appointees to the Board of Curators be familiar with the needs of engineering education. This open letter was signed by C.L. Morris and MSM alumni, R.F. Rucker, H.S. Pence, L.H. Goldman, and J.H. Dunn.

As these events unfolded, Rolla's state Senator Emery Allison, introduced Senate Bill 160, proposing that the chief administrative officer at MSM be directly responsible to the Board of Curators. The director would assume the powers of a president and the University of Missouri president would be relieved of any executive authority over the School of Mines. The bill was hailed as the "Rolla School of Mines' Emancipation Proclamation."

President Middlebush and the Board of Curators responded. In a lengthy public statement, the Board voiced opposition to the dorm and to Senate Bill 160. Separation, they argued, ran counter to trends for consolidation in American higher education. Finally, the Board stated, criticisms leveled at the Board and University administrators regarding unfair treatment of the School of Mines had no basis in fact. According to the *St. Louis Globe-Democrat*, "The Curators have consistently opposed movements to expand the program of education at Columbia and at Rolla beyond the limits imposed by the funds available. . . ." The bill was defeated and, for the time being, MSM would have neither a dormitory nor a separate administration.

During the spring of 1941, separation became an explosive issue. Students, townspeople, faculty, and administrators all became involved and the student editors of the *Missouri Miner* bristled with indignation, siding firmly with the separationists.

For the Middlebush administration the coming of the summer of 1941 meant respite. The legislature had adjourned, "the boys" had gone home for the summer, and Director Chedsey prepared to leave Missouri. By the fall, the climate at Rolla had changed. MSM had a new head, Dean Curtis L. Wilson, who presumably shared Middlebush's educational philosophy regarding the School of Mines. Probably in deference to the new dean, editors of the student newspaper dropped the separation issue. Before the conclusion of the fall semester, the Japanese attack on the American naval base at Pearl Harbor would bring America into another world war. For all concerned, the separation controversy would be postponed until the more important demands of winning the war could be met.

#### The Wilson Administration

The controversy regarding separation resumed after 1945. The years immediately following World War II were years of unprecedented growth for MSM and other institutions of higher learning as veterans flocked to colleges and universities across the nation. At MSM, the resulting housing, classroom, and laboratory shortages served to revive the separation issue.

Also, a clash between Dean Wilson and some members of the faculty intensified the separation issue. The most verbal of the faculty critics was Clair V. Mann, chairman of the engineering drawing department and author of *The History of Missouri School of Mines and Metallurgy*, published by the Phelps County Historical Society in 1941. Mann had devoted a substantial portion of his history to the idea that the School of Mines would be better served by separation from the University of Missouri.

In 1946, Wilson relieved Mann of his duties as chairman of engineering drawing, citing reasons other than the separation issue. Mann subsequently resigned his academic position at the School of Mines. Mann and his supporters barraged the faculty, the community, and the alumni with flyers such as the paid advertisement in *The Rolla Advertiser* of Sept. 19, 1946, which urged a public review of the controversy:

The suppression of a whole train of highly important and significant facts relating to affairs both of the University and the School of Mines which is current and has been in force during tenure of the present university administration, since 1937, cannot be condoned by the public on any legal ground whatever. It is an eminently fair question as to whether local and metropolitan newspapers have been "fair" with their general reading public by neglecting, as they surely have, these vital facts relative to Missouri's leading technical school. Its welfare cannot be permanently promoted when its vital affairs and its current condition are kept hidden from public view. It is past "high time" for bringing some of these conditions to the notice of the reading public and the highest officials in State government.

In 1947, administration critics gained support from some faculty and townspeople, including state Representative Booker H. Rucker of Rolla. In December 1946, Rucker conducted a poll of 1,000 graduates and 547 MSM students. The questionnaire contained the following: "I favor immediate separation of MSM from M.U." and, "I

DO NOT favor such separation." The poll was mailed to randomly selected alumni. Of those alumni who responded, 86.4 percent favored separation, 11.8 percent opposed it, and 1.8 percent were undecided. Of the 547 students on campus who voted, only 11 opposed separation or were undecided.

MSM's most distinguished graduate, Daniel C. Jackling, expressed ambivalence in a 1947 letter to B.H. Rucker:

I have expressed some reservations as to the wisdom of demanding complete severance of all relationships with the University, fearing that such action might prejudice the School of Mines in respect to financial support as a State institution. As you quite properly say, the School of Mines has been largely responsible for procuring its separate appropriations; but the enmities that might be aroused in a contest for complete independence could make it more difficult for Rolla to procure adequate funds than it has been in the past.

I am in hearty accord with the proposition that Rolla should be independent of the University in all educational matters, and as well that Rolla should have a separate Board of regents; although, if that should become too much of a hurdle in establishing more orderly conditions, it might not be too dangerous to have a minority of Rolla's Regents also Regents of the University . . . .

Jackling was more certain regarding the need to provide a broad engineering base for post-war students of technology:

... as long as a school of mining and metallurgy must either produce capable engineers or die in the fruitless attempt, the school of mines, or of metallurgy, or of technology, or by whatever name must, in order to justify its existence, offer complete courses in civil engineering, mechanical engineering, electrical engineering, and chemical engineering. . . .

In June 1948, the question of separation heated up even more when Dean Wilson summoned five tenured faculty members to his office where they were informed that they were to be transferred to the Columbia campus. Floyd H. Frame, professor of electrical engineering, and department head from 1924 to 1941, was to become an assistant professor of electrical engineering at Columbia. One-third of his time was to be devoted to electrical engineering, two-thirds to the University buildings department. Oscar A. Henning, professor of modern languages and modern foreign languages department head from 1930 to 1941, was to become an assistant professor of Germanic and Slavic languages. Karl K. Kershner, professor of chemistry, was to become an assistant professor of agricultural chemistry. Clarence J.

Monroe, associate professor of chemistry, was to be transferred at the same rank as was Garrett A. Muilenburg, professor of geology and department head from 1934 to 1941. Moving expenses were to be provided by the University. The move was not to affect their tenured status.

According to Frank C. Mann, chairman of the executive committee of the Board of Curators, this action was taken with the full approval of President Middlebush and the Board of Curators. Mann was quoted in the June 26, 1948 St. Louis Post-Dispatch as saying, "All five professors [are] . . . leaders of a group that lets its desire for autonomy interfere with its loyalty to the school."

Separation had become an emotional issue that divided all those interested in the Missouri School of Mines including students, alumni, and townspeople. One prominent alumnus who supported the transfer of the professors and opposed separation was Mervin J. Kelly, class of 1914. In 1948, Kelly, who was vice president of Bell Laboratories, and Alumni Association President Karl F. Hasselmann, prominent engineer and Texas oilman, issued a statement suggesting the transfer represented "a constructive step in the interest of education, research and progress."

The five professors vehemently denied charges of insubordination and disloyalty. Their cries were heard in particular by their students and some townspeople who supported the professors and separation.

The chairman of the Pittsburgh section of the MSM Alumni Association, W.O. Keeling, wrote that he did not wish to take a stand on separation, but concluded that the transfer of the professors was ". . . nothing but a frame-up designed to get rid of personnel who have become persona-non-grata to the administration . . . by humiliating the men to a point where they will voluntarily resign. . . ."

Five hundred sixty-eight students at MSM signed a petition requesting that Gov. Phil Donnelly conduct an investigation of the transfer of the five professors. The governor declined to meet with the petitioners though the petition was filed with his secretary.

All five professors, each of whom had been a member of the faculty for at least 27 years, chose to resign rather than accept the transfer or challenge the action in the courts.

The separation controversy did not abate with the resignation of the professors. Instead, the debate shifted from the ivy-covered halls of academe to the smoke-filled rooms of the political arena. In



Students gather to protest transfer of MSM professors, June 1948.

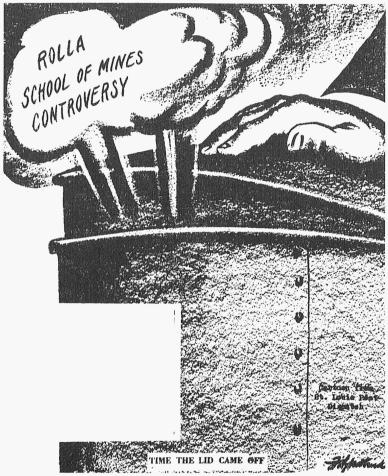
February 1949, B.H. Rucker introduced House Bill 82 which would have created a director for MSM. The director would have answered directly to the University Board of Curators, thus bypassing the University administration in Columbia.

Discussion of the bill on the floor of the House reached dramatic proportions in March of 1949 as prominent friends of MSM trekked to Jefferson City to speak for and against the bill. Those who spoke out in favor of the bill included Clair V. Mann and MSM alumni: Frank B. Powell, J.K. Walsh, John D. Powell, B.G. Nichols, and Llyn Bradford. Eugene Northern, Fred Schneeberger, James J. Murphy, Harry Pence, H.R. Hanley, and Carl Stifel were alumni who spoke in opposition to the bill. Although not appearing personally, Mervin J. Kelly, president of the Alumni Association, sent a communication opposing the passage of the bill. The aging Daniel C. Jackling did not appear, but discarded his earlier ambivalence in a letter dated March 9, 1949, in which he stated that if he were to become involved in the controversy he would exert his influence against passage of the bill. This letter was read during the debate by opponents of the bill.

The bill survived its first two readings, but in May of 1949, it failed to pass by a 64-40 vote (78 votes were needed for passage). The bill

represented the final serious attempt at a political solution to the controversy.

After 1948 there was less reason to fight for separate status for MSM. In that year the legislature appropriated \$500,000 for the construction of the Mechanical Engineering Laboratory Building. This appropriation represented a major turning point for the School, for it resulted in ECPD accreditation for mechanical engineering, another discipline beyond the traditional scope of the School of Mines.



Cartoon by Fitzpatrick, St. Louis Post-Dispatch, June 28, 1948.

Separationists, including Clair Mann, Senator Allison and Representative Rucker, took some credit for the appropriation. University officials had requested \$100,000 for a Mineral Industry Laboratory Building. House and Senate appropriation committees, at the urging of Allison, Mann, and Rucker, changed the amount of the request to \$500,000 and the nature of the request from the Mineral Industry Laboratory to the Mechanical Engineering Laboratory Building. The result was to greatly increase the status of a department outside the field of mines and metallurgy.

After 1948, University administrators would be more willing to develop quality programs at the School of Mines in areas of engineering beyond mines and metallurgy and in the sciences as well.



Mechanical Engineering Building.

## PART III

As the fall semester began at the School of Mines in 1945, the Japanese had just formally surrendered on the *U.S.S. Missouri* in Tokyo Bay. Within the next few months, nearly seven million men were released from the armed forces. Americans welcomed GIs home with a flourish complete with ticker tape parades, music, and dancing, and the GI Bill of Rights (Servicemen's Readjustment Act of 1944), which provided them an opportunity to pursue educational goals.

The flush of victory ended quickly, as a global competition began between East and West. American foreign policy set out on the grim mission of containing communism. It appeared initially that America held the upper hand, particularly because it alone had atomic weapons. By 1949, however, the Russians had exploded an atomic bomb, and the two superpowers possessed the awesome ability to annihilate one another.

In the early 1950s, a Korean "police action" abroad and McCarthyism at home held America's attention. If the situation eased in the mid-'50s, tension mounted again in 1957 when Soviet scientists launched the first successful space satellite, the "sputnik."

On the bright side, after 1945, the majority of American people had never had it so good. Economic growth began in the 1940s and continued through the 1960s with only an occasional slump. It was an age of unprecedented affluence for the majority and an age of hope for some of the minority, as desegregation and a civil rights movement began.

As Americans rushed to live in the suburbs, *My Fair Lady* opened on Broadway (1956), and teen-agers swooned and danced to a new and uniquely American musical sound, rock and roll. Beatniks of the '50s made way for hippies in the '60s. Americans spent a smaller percentage of their incomes for necessities and more for luxuries such as automobiles, recreation, and vacations.

Perhaps the most significant innovation in post-war American society was automation, a word coined by Ford Motor Co. officials in

1946 to describe a system Ford had installed for the automatic handling of parts. Such new production techniques brought the promise of even greater abundance and leisure.

Central to automation was the computer. As one observer in the early '60s put it, the computer, with its ability to handle information will ". . . have the most far-reaching consequences of any contemporary technical development. The potential for good in the computer, and the danger inherent in its misuse, exceed our ability to imagine."

For all Americans, and for scientists and engineers in a special way, among the most significant of the era's developments was the new emphasis on scientific research. In 1950, Congress established the National Science Foundation, symbolizing the federal government's new concern for scientific research and development.

After 1955, parents no longer worried that their children might fall prey to polio, the scourge of that decade, as Dr. Jonas Salk of the University of Pittsburgh developed an effective vaccine. The space program represented the most spectacular technological breakthrough of the era. Until the launching of sputnik in 1957, Americans had exhibited little interest in space exploration.

By 1958, the National Aeronautics and Space Administration (NASA) had been established and Missouri Miners such as George E. Mueller ('39) and DeMarquis D. Wyatt ('41) would serve as leaders in the early years of this organization. In 1961, John Fitzgerald Kennedy captured the American spirit of the times when he established the goal of "landing a man on the moon and returning him safely to earth . . . before the decade is out."

### The Scene in Higher Education

Since the Civil War, the major wars of the United States have had great impact upon the development of American colleges and universities. In particular, wars and accompanying acceleration of science and technology have affected technological institutions. Of all the American wars, World War II probably accentuated and quickened these trends the most. As one historian put it, the post World War II era had been "hectic and expansive, demanding the utmost in effort, enterprise, and ingenuity. It has been a growing period, but with a qualitative as well as a quantitative character."

The outstanding characteristic of American higher education after World War II was growth. This tremendous growth in student enrollments could be attributed partly to evolutionary trends in society: a growing popularity of higher education, a growth in population, and an expanding birthrate. Most of all, however, millions of veterans, abruptly released from military service, changed the nature of higher education. This backlog of men had not yet had a chance to pursue or complete their educational objectives. The GI Bill of Rights, adopted by Congress in June 1944, was the most progressive means ever devised of compensating veterans for service to their country.

The GI Bill meant that America's institutions of higher education were flooded with veterans. An awesome increase in enrollment required an immediate shift from wartime contraction to unprecedented growth. It also required shifting from a rather traditional curriculum to a much broader one to meet new needs. The challenge to the nation's colleges and universities was to make higher education available to these former servicemen while altering and broadening the curricula to meet societal demands.

Institutions of science and technology experienced this acceleration and expansion more acutely than other colleges. Students rushed into engineering areas such as electrical and mechanical, and the sciences, particularly chemistry, mathematics and physics.

A corresponding growth in faculty and an emphasis on research also occurred. Large numbers of people well-educated in engineering and science were needed. Master's degrees in engineering increased 50 percent more than the overall trend and doctorates increased at a rate 200 percent greater.

Federal funding for academic research also expanded as Soviet-American competition underlined the need for research and development. In 1930, about \$116 million was spent on research relating to science and industry. Of that, government participation amounted to 14 percent. By 1947, a total of \$1.1 billion was spent in scientific and industrial research. The government's share was 54 percent.

This unprecedented growth in number of students and faculty, curricula, and graduate programs tapered off in 1949-1950 as enrollments dipped, but a more controllable expansion resumed after the Korean War and continued through the mid-'60s.

Like the GI Bill, the National Defense Education Act of 1958 contributed to expansion and to the notion that college degrees

should be within the grasp of anyone who could earn them and that they should not be limited to those with the material wealth to afford them.

The launching of sputnik and the accompanying space race convinced most Americans of the need for professional scientific and technical training and research, and institutions of technology profited most of all.

#### CHAPTER VIII

## A Long Shadow On The Horizon, The Wilson Years, 1941-1963

Ralph Waldo Emerson said that an institution is but the lengthening shadow of a man. Dean Curtis L. Wilson has cast a long shadow on the horizon of the Missouri School of Mines and Metallurgy. (Noel Hubbard as cited in MSM Alumnus April 1963.)

Curtis Wilson occupied a challenging position at the crossroads of American higher education. As millions rushed to begin or complete the educational objectives interrupted by war, those who would guide MSM's destiny realized that success would come to those who seized the initiative. As Wilson stated in 1945, "our returned fighting men will have to be the hope of the world in peace as they were in war." Wilson went on to suggest that America's colleges and universities must make room for the more than 1.5 million veterans who would probably enroll in college, a large percentage of them in technical and professional programs. If that challenge were to be met, there would be "unlimited opportunities for useful work and new frontiers for the courageous," Curtis L. Wilson said in the June-July 1945 issue of the MSM Alumnus.

As the 1946-47 school year began, the immediate need was space for the record 2,565 students who gathered on a campus with a physical plant capable of dealing with about one-half that number. Classrooms, laboratories, and student housing facilities were swamped.

More than 1,800 of the students were veterans and many had families; a factor which complicated the housing problems. Wilson and his faculty and staff acted to solve the problem of space. Classes and labs operated from 7 a.m. to 10 p.m. Monday through Saturday. Mechanical Hall, long used, among other things, as a warehouse, became the home of the mining engineering department. The Missouri Geological Survey, housed in the Rolla Building, moved off campus to make way for the new humanities-social studies depart-

ment. A portion of the "Old Chem" building was converted into classrooms. The U.S. Experiment Station of the Bureau of Mines moved to its new location off campus, and the ceramic engineering staff moved into the Experiment Station Building (now Fulton Hall). A garage behind Mechanical Hall was transformed into a cafeteria.

In addition, the structures familiar to all college students in post-war America appeared on the periphery of the Rolla campus—14 barracks which were used for student housing, temporary classrooms, and warehouses.



Curtis Laws Wilson, dean, 1941-63.

## Curriculum and Enrollment Trends, 1945-63

The MSM *Bulletin* for 1945-46 listed in the following order eight courses of study for the prospective undergraduate: (1) mining engineering (also with mining geology and petroleum engineering options), (2) metallurgical engineering, (3) civil engineering, (4) science (chemistry, geology and physics options), (5) mechanical

engineering, (6) electrical engineering, (7) chemical engineering (also with a petroleum refining option), and (8) ceramic engineering. Regardless of the course of study, the successful candidate earned a bachelor of science degree after having completed 150 semester hours plus military science for freshmen and sophomores and orientation lectures and physical education courses for freshmen. In addition, all degree candidates were required to experience, usually during the summer months, eight weeks of work in industry relating to their specialties. Finally, until about 1955, an "inspection trip" during the senior year completed degree requirements. Otherwise, requirements changed little between 1945 and 1964. The 1952-1953 *Bulletin* cited one slight change—for all undergraduates the degree requirement was reduced to 148 semester hours.

Wilson recognized the need to achieve accreditation of all engineering programs on campus. By 1950, mechanical engineering and mining engineering's mining geology option had received ECPD approval and chemical engineering earned approval in 1951. By that year, all engineering curricula at MSM had received ECPD accreditation, a milestone in the development of quality undergraduate engineering programs. In 1957-1958, the School of Mines modernized its grading system by adopting the current 4.0 system.

Beyond curricular expansion, but related to it, is the growth of academic departments and disciplines. The humanities and social studies department was established in 1946. Samuel H. Lloyd served as the first chairman of these consolidated disciplines. In the fall of 1956, in deference to the recognized significance of the field, nuclear engineering became a curricular option of metallurgical engineering. Also in 1956, Aaron J. Miles and others took the initiative in creating a cooperative engineering program. Professor Clarence W. Grate directed the "co-op" program in which students, after successfully completing the freshman year might alternate semesters of school and work. This program served to combine financial assistance, on-the-job training, and academic pursuits. Among the most significant firms in the initial stages of the programs were McDonnell Aircraft, Caterpillar, and the Missouri State Highway Department. The latter agency employed over 100 Missouri Miners in co-op programs in 1957.

Another program employed in several technical schools including MSM was the "Three-Two Plan." Students could attend a liberal arts college for three years, then transfer to MSM for a two-year program.

In the process, the student could earn a B.A. degree from the liberal arts college and a B.S. degree in engineering from MSM. The three-two plan represented a response to those in engineering education who complained that engineering curricula ignored the arts and sciences. The three-two plan lost its appeal, as officials anticipated the creation of the University of Missouri at Rolla, complete with expansion of arts and sciences on campus.

In 1960, the MSM Computer Center was founded, thus providing a fundamental academic and research support facility for a school with an engineering emphasis. The Computer Center was created with the assistance of a grant from the National Science Foundation.

In 1961, degree programs in applied mathematics and geological engineering were added to the curricula. By the 1963-64 school year, the *Bulletin* listed the following curricula:

#### Engineering Curricula

1. Ceramic Engineering

2. Chemical Engineering, also with Petroleum Refining option

3. Civil Engineering

- 4. Electrical Engineering
- 5. Geological Engineering
- 6. Mechanical Engineering
- 7. Metallurgical Engineering, also with Nuclear Engineering option
- 8. Mining Engineering, also with Petroleum Engineering option

#### Science Curricula

- 1. Applied Mathematics
- 2. Chemistry
- 3. Geology, also with Geophysics option
- 4. Physics

One hundred forty-eight hours were now required for graduation, not including (as in 1945) military science for freshmen and sophomores and physical education for first-semester freshmen. Absent was the eight-week industrial experience requirement and the "inspection trip."

Enrollment by curriculum reflected changes that had taken place in the School since the conclusion of World War II. Non-mineral engineering areas had taken on new meaning in meeting society's needs. Compare the enrollment by curricula in 1945-46 and 1963-64:

1945-46 mining engineering (121), metallurgical engineering (64), civil engineering (111), electrical engineering (102), chemical engineering (102), ceramic engineering (21), science (16).

1963-64 mining engineering (79), metallurgical engineering (273), ceramic engineering (77), nuclear engineering (2), mechanical engineering (785), electrical engineering (838), chemical engineering (291), civil engineering (708), geological engineering (13), physics (184), chemistry (88), geology (69), mathematics (112), (453 in science total).

Though most mineral engineering disciplines had held their own, and metallurgical engineering had experienced considerable growth, civil, electrical, and mechanical engineering, along with the sciences, had the lion's share of enrollment. MSM's expansion during the Wilson years is also illustrated by the fact that, between 1871 and 1963, from the establishment of the School until Wilson's retirement as dean, three of every four diplomas granted by the institution bore Curtis Wilson's signature.

Enrollment at MSM from the conclusion of World War II to the creation of the University of Missouri at Rolla reflected an institution of technology responding to society's needs. From 1946 to 1948, record enrollments resulted from an influx of veterans. Enrollment peaked in 1948-49 at 3,025. In the fall of 1949, it dropped to 2,711, and, for the first time since 1945, the student body contained a majority of non-veterans. Enrollment reached a post-war low of 1,210 in 1952-53, but with the conclusion of the Korean War, it increased gradually every remaining year of the era. By the 1963-64 school year enrollment had reached a high of 3,620 students, including 364 graduate students and 69 women.

As enrollment increased sharply, dipped, and then gradually increased from 1945 to 1964, numbers of students by curricula reflected new directions in society and education. The number of women students did not change much (from 28 to 69) between 1945 and 1964, as engineering and science remained predominantly male disciplines. The number of graduate students changed considerably, however, from 26 in 1945-46 to 364 in 1963-64.

#### Graduate Education and Research

Research and graduate programs tend to go hand in hand in America. In this country, much of the basic research has always taken place in the university rather than the private or state laboratory. Prior to World War II, quality research and graduate programs could be found in only a handful of American colleges and universities. After the war, however, many state universities across America developed quality programs, as research efforts in science and technology, in particular, became stated national objectives.

Although Dean Wilson's first priority remained undergraduate education, a fledgling graduate program was nurtured during his administration. As early as 1925, students had been permitted to take courses at MSM which led to a Ph.D. granted by the University of Missouri. By the Wilson era, the University of Missouri had altered its policy somewhat. Now, specific academic departments at MSM were authorized to conduct graduate classes at the doctoral level. From 1941 to 1951, the University of Missouri authorized four departments at Rolla to conduct graduate work leading to the Ph.D.: ceramic engineering, geology, mining, and metallurgical engineering. In 1957 and 1960, respectively, Ph.D. programs in chemical engineering and engineering physics were approved. In 1962, the electrical engineering Ph.D. was approved.

William Smothers of Poplar Bluff was the first Miner to take advantage of the Ph.D. authorization at MSM. In June 1944, he earned a doctorate in ceramic engineering, the first person to complete all of his work for a Ph.D. at MSM.

Increased research activity also resulted from the recruitment of research-oriented faculty such as chemist Wouter Bosch and from the resources of the federal government which became available for research efforts. Until World War II, although certain individual faculty may have been recognized as distinguished research scholars, MSM's faculty, as a whole, was predominantly a teaching faculty. It would remain a teaching faculty during the Wilson years, though increased research activity is undeniable. From 1951 to 1953, 30 faculty members in 11 departments produced 93 publications. The following list of publications by department from 1951 to 1953 serves to indicate which departments were most active in research in the early '50s:

#### Department Publications, 1951-1953

| Ceramic Engineering    | 2  | Mathematics               | 2  |
|------------------------|----|---------------------------|----|
| Chemical Engineering   | 2  | Mechanical Engineering    | 2  |
| Civil Engineering      | 2  | Metallurgical Engineering | 30 |
| Electrical Engineering | 3  | Mining Engineering        | 10 |
| English                | 2  | Physics                   | 8  |
| Geology                | 20 |                           |    |

By 1960, 64 faculty and 89 graduate students were involved in research activities. Though considerable progress had been made, graduate education and research did not receive top priority. During the 1959-60 academic year, only \$133,000 was spent on research at MSM (\$75,000 of this was from the federal government).

In 1961, Missouri's first nuclear reactor was dedicated at MSM on Oct. 21, and in December, the Board of Curators approved the organization of the MSM Research Laboratories "to encourage basic and applied research among staff and students in all engineering and science disciplines."

The leadership of department chairmen including Harold Q Fuller in physics, Dudley Thompson in chemical engineering, Albert W. Schlechten in metallurgical engineering, and Theodore Planje in ceramic engineering provided impetus for graduate and research development. Graduate enrollment grew from 26 in 1945-46 to 364 in 1963-64. The 1950s had been a takeoff stage; the next decade would witness the development of more mature graduate and research programs.

Graduate education received a boost from federally funded research grants and programs such as the National Defense Education Act (NDEA) and the National Science Foundation (NSF). NSF-funded summer institutes for high school science teachers led to the establishment of the master of science for teachers (MST) degree in mathematics and the physical sciences.

## Space Program

After sputnik, the space program provided the impetus for technological research in America. Missouri Miners were important in the space program. DeMarquis D. Wyatt ('41) served as director of the Office of Programs for the National Aeronautics and Space Administration, and George E. Mueller ('39) served as deputy associate administrator for Manned Space Flight at NASA. These alumni provided encouragement for the development of such programs at MSM. Both visited the campus. Also, Werner von Braun came to campus to lecture in April 1963. Only the funds were lacking and these became available in 1963 when the state legislature appropriated \$2 million for a research center for the University of Missouri without specifying a campus. University President Elmer Ellis chose

to designate the Rolla campus as the site for what was called the "space center." The first of the research centers on the Rolla campus, what came to be known as the Materials Science Research Center, initially used research talents of faculty from the departments of ceramic, chemical, and metallurgical engineering and chemistry and physics. William James and Martin Straumanis were among scholars in the new center who investigated the crystal and microstructure properties of metallic, polymer, and ceramic materials as they related to physical and chemical behavior in earth and space environments. The center would not be ready for use in the Wilson years, but in a special sense, the Materials Research Center was a gift of MSM to UMR.

## Financing, Placement, and the Alumni Association

In the post-war world, the federal government assisted in the financing of higher education for veterans through the GI Bill, but this source of income diminished in the 1950s. By then, financing education had become a greater challenge, as Samuel Rezneck put it, "...by the democratic and technological necessity to make higher education accessible to all, regardless of means." In 1958, Congress responded to this challenge by passage of the National Defense Education Act. NDEA loans were repayable in 10 yearly installments at 3 percent interest. The first installment was due one year after graduation. By the spring semester of 1959, the Rolla campus had acquired \$78,788 in National Defense loan money and by the following fall, all but \$15,000 had been allocated to students at an average of \$640 per student. Those who ranked in the upper 25 percent of their high school class and who could demonstrate financial need received top priority.

In addition to federal assistance, the School of Mines had several privately endowed funds available to students such as the Daniel C. Jackling Loan Fund. Among the most significant endowments was the creation in 1962 of the McNutt Memorial Foundation. Mrs. V.H. McNutt established a \$1 million memorial foundation in honor of her husband, V.H. McNutt (B.S., 1910, M.S., 1912, E.M., 1915). The beneficiary was the department of geology. Income from the foundation was to be used by the department "to improve its staff and assist

its student body." Mrs. McNutt also set up the Robert Emmett Dye Scholarships in mining engineering.

As new efforts were being made at MSM to provide financial assistance to students, the School also assumed more responsibility for placement of students upon graduation. In 1944, Wilson appointed Rex Z. Williams, a professor of mechanics and department chairman, to the position of assistant dean. Williams' duties included placement, assuming responsibility for attracting prospective employers to campus, and for arranging interviews between employers and students. Williams later became associate dean.

Interest in those who attended the School of Mines did not end with graduation and placement. The MSM Alumni Association had been created in the 1920s, but after World War II, it became much more active. In 1953, Francis C. "Ike" Edwards became executive secretary of the Alumni Association, the first full-time professional employee of the association. The Alumni Association had suffered a schism in 1948-49 over the separation issue, but by the 1950s, progress had been made and wounds began to heal.

The generation of alumni after World War II was very active in campus affairs and gave time and money to help shape the institution's future.

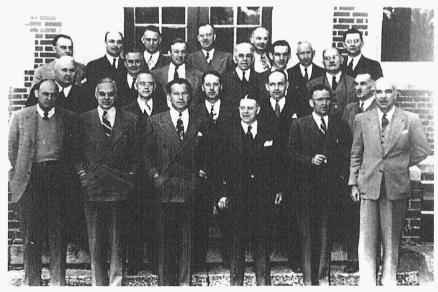
### The Faculty and Staff

As World War II concluded, many of the faculty and staff who dominated the school for a generation had stepped aside. George R. Dean, C.Y. "Boots" Clayton, H.H. Armsby, C.L. Dake, and Elmo G. Harris were gone. Others remained to provide the continuity that was so essential in times of dramatic change. Among them were Gale Bullman, Sam Lloyd, Aaron Miles, I.H. Lovett, Walter T. Schrenk, Rex Z. Williams, Joe B. Butler, O.R. Grawe, E.W. "Skip" Carlton, Noel (ol' Mother) Hubbard, R.M. Rankin, J. Donald Forrester, and William Jensen. In addition, and just as essential, were the new faculty—men who would remain and help determine the character of the institution.

Images are sometimes more important than words. Images of those faculty appear—faces, figures, gestures, or laughs—they belonged to those who give us pause and make us mellow. A variety of names will come to mind to the individual reader, but chances are

most would include for this generation Albert W. Schlechten, Jo W. Barr, R.H. Kerr, J. Kent Roberts, Theodore Planje, G.G. Skitek, Charles A. Johnson, Dickran H. Erkiletian, H. Q Fuller, C. James Grimm, Robert F. Bruzewski, Daniel S. Eppelsheimer, Charles R. Remington, Rodney A. Schaefer, Vernon A.C. Gevecker, Lloyd Christianson, John Brewer, and Leon Hershkowitz. One will also remember Dr. Earl Feind who directed student health from 1937 until 1968.

The 1945-46 faculty at MSM consisted of 67 members, 18 of whom held the Ph.D. or its equivalent. Seventeen additional faculty were hired for the 1946-47 school year. During the 1947-48 school year, 16 new faculty were added, bringing the total to 130 faculty. Of the 16



Officers and board of directors of the Alumni Association, the President's Board of Visitors, and UMR department heads, November 1947.

Front row, (l. to r.) G.C. Cunningham, '25; F.C. Schneeberger, '25; Karl Hasselmann, '25; Dean Curtis L. Wilson; Dr. Mervin J. Kelly, '14; Harry S. Pence, '23.

Second row, George E. Mellow, '18; Robert C. Weigel, '34; Aaron J. Miles, '30; and James L. Head, '16.

Third row: J.B. Butler; W.T. Schrenk; Dick Prough, '38; and O.R. Grawe.

Fourth row: J.D. Forrester; Paul G. Herold; Barney Nuell, '21; H.E. Zoller, '23; Joe Wanenmacher, '23; F.H. Frame; and A.W. Schlechten. MSM Alumnus (Nov.-Dec. 1947).





I. Kent Roberts, ROLLAMO '59.

Aaron J. Miles, ROLLAMO '59.

new teachers that year, one held a Ph.D.; seven had one or more degrees from MSM. By 1957-58, the faculty numbered 175 including 39 new members. From 1956 to 1959, 31 to 41 new faculty were hired each year. By 1963-64, the faculty numbered 204, and 54 had the Ph.D. or its equivalent. From 1945 to 1964, while the faculty increased more than threefold, the percentage of those with doctorates showed no change.



Harold Q Fuller, ROLLAMO '59.

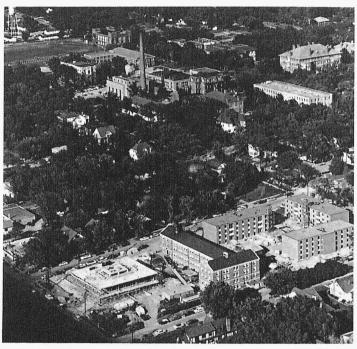


Theodore J. Planje, ROLLAMO '59.

Some academic departments during the Wilson era were staffed almost exclusively by faculty whose credentials were not conducive to research or graduate education. Teaching undergraduates remained the order of the day and, for the most part, the faculty of MSM approached this task with considerable zeal.

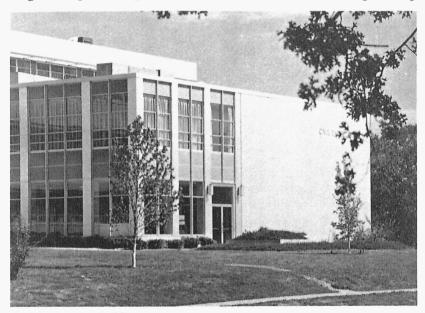
## The Physical Plant

If the inter-war years had been characterized by the lack of a systematic building program, the Wilson years offered a considerable contrast. Some features of the physical plant remained the same. The most persistent images that come to former students' minds over the years have been the Rolla Building and the smokestack(s) of the Power Plant, silhouetted against the western sky. These features remained, as did Norwood Hall, Parker Hall, the Dean's Residence, and the like.



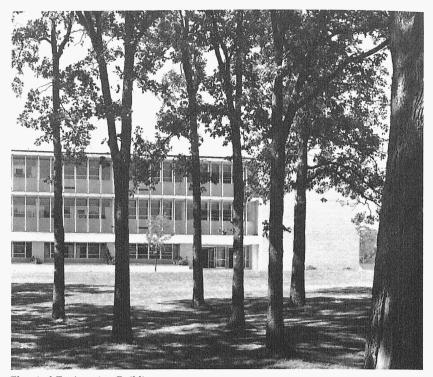
Aerial view of campus, 1957.

Between 1945 and 1963, \$20 million in building projects were undertaken. Those projects included in order of their completion: a new Power Plant, finishing construction of the south wing of the Chemical Engineering Building, the Mechanical Engineering Laboratory, an addition to the Mining Building, and the expansion and modernization of Fulton Hall. (In 1957, the old Experiment Station was dubbed Fulton Hall.) An Electrical Engineering Building, a Civil Engineering Building (later named Butler-Carlton Civil Engineering



Civil Engineering Building.

Hall), and a Physics Building were completed. A Nuclear Reactor Building and the remodeling of Norwood, "Old Chem" Building, the Rolla Building and Parker Hall should also be noted, as should four dormitory units complete with cafeteria, married student apartments, and a new student union building. One could also include a plethora of "temporary" buildings (barracks) added after World War II, some of which remained in 1982. Finally, a new athletic field had been constructed, and, in 1963, the legislature had appropriated \$1.5 million for a new library (later named the Curtis Laws Wilson Libary) and \$500,000 for an addition to the Physics Building. Certainly, the physical plant experienced profound growth during the period.



Electrical Engineering Building.

These capital improvements came in spurts. Chronic shortages of space from 1946 to 1948 highlighted the problem and found a sympathetic legislature willing to appropriate necessary funds. The second building "spurt" came as a result of passage of a \$75 million bond issue in Missouri in the mid-'50s. With public approval, the bond issue included \$4.9 million in requests from MSM. School of Mines officials had requested \$1 million for an Electrical Engineering Building, \$1.5 million for a Civil Engineering and Mechanics Building, \$750,000 for a Physics Building, \$500,000 for dormitories and \$350,000 for a student infirmary. As a result of the bond issue, all except the infirmary were constructed in the same time period. The construction of the new student center, which opened in 1960, was financed by federal loans which were to be repaid over a 40-year period. (The dormitories and cafeteria were named after UMR alumni

killed in World War II: Thomas W. Kelly, John M. McAnerney, William Altman, William Farrar, and John W. Rayl. Another dormitory completed in the 1965-66 academic year was named for Orvid J. Holtman.)



Campus scene, 1960s.

The final building "spurt" came as Wilson prepared to retire just before the School of Mines became the University of Missouri at Rolla.

This impressive building program was financed by three methods: legislative appropriation (such as the Mechanical Engineering Building), a bond issue (such as the Electrical and Civil Engineering buildings), and federal loans or grants (the Student Center by federal loan and the Nuclear Reactor in part by federal grant).

During the post-war years America recognized a need for higher education and state and federal agencies expressed a willingness to pay the costs. By the late '50s and early '60s the scientific and technological competition between the United States and the Soviet Union created a favorable climate for expenditures on campuses which stressed engineering and science.

Although University officials did not always get what they wanted (for instance, in 1948, MSM received a Mechanical Engineering Building although President Middlebush and Dean Wilson re-

quested a Mineral Industry Building), Dean Wilson and University of Missouri officials should be given credit for taking advantage of the opportunity for enlarging the physical plant.

Dr. Elmer Ellis, who became president of the University of Missouri in 1954, should also receive some of the credit for improving the physical plant. Ellis expressed genuine interest in growth of the Rolla campus and was instrumental in the acquisition of funds for the Student Center and in placing the Space Sciences Center for Materials Research on the Rolla campus.

## The Wilson Administration: The Balance Sheet

As the 1962-63 school year began, Curtis L. Wilson, dean of MSM since 1941, prepared for retirement. In August 1963, he would reach the age of 65, then the mandatory retirement age for administrators according to Board of Curators regulations.

When Wilson became dean, there had been 14 buildings on campus. By 1963, 32 buildings were on campus and two more were scheduled for construction. In 1941, 79 people made up the faculty; by 1963, there were 237. In 1941, the campus had a support staff of 143; by 1963 the staff exceeded 800. In the spring of 1941, 158 degrees were awarded at commencement, including 147 B.S. degrees, seven professional and four M.S. degrees; in 1962, 589 B.S. degrees and 82 M.S. degrees were awarded.

Wilson was a hard-working, well-organized, efficient, and fiscally conservative administrator who was loyal to his superiors, and he expected no less from his subordinates. In fact, he demanded unwavering loyalty on the part of his faculty and staff toward himself and toward the School.

Wilson had been cast into a challenging position by circumstance. In large measure, he met the challenges presented to him. He had operated the School for a generation and his departure indeed left a long shadow on the horizon.

As Wilson stepped down, a young mechanical engineer from Kentucky prepared to fill the dean's formidable shoes and the campus looked ahead with mixed emotions to the creation in 1964 of the University of Missouri at Rolla.

#### CHAPTER IX

## Mule Skinning And Matriculation, Student Life, 1946-1964

You can provide a million dollars worth of mule skinning, but you ain't turned a wheel until the mule himself moves. (MSM Alumnus, July-Aug., 1946)

The "mule" symbolizes the Missouri School of Mines; the mule-skinning was provided by students, faculty, and staff; and, if there were doubts about turning the wheel of change in 1946, such doubts did not linger. Perhaps the most dramatic changes occurred as World War II concluded. Record enrollments caused crowded conditions as never before, but there was more to the change than density. New signs of the times included army clothes and baby buggies, for most of the new students were veterans and many of them had families. In the years following World War II, these former GIs would alter the nature of the student body.

In the fall semester of 1946, about 2,600 students crowded into Rolla and spilled over into the surrounding towns of St. James, Newburg, and Doolittle. Living quarters were at a premium as this "Miner"-style Mother Goose Rhyme suggests:

Hey there, Landlady,
Have you any room?
Yes sir, Students,
And quiet as a tomb.
Down in the meadow, 'bout two miles away,
There's an old cowshed where you can hit the hay.

On campus, classes and labs ran from 7 a.m. to 10 p.m. six days per week. Temporary buildings, hastily assembled, appeared all over campus.

As the School exhibited a new look, the City of Rolla no longer fit the image of a quiet country town. Instead, Rolla resembled a boomtown. Thanks to nearby Fort Leonard Wood and MSM's growth, Rolla's population by 1946 was estimated to be 10,000. In

addition to the School of Mines and governmental agencies such as the USGS, the U.S. Bureau of Mines, and the Missouri State Geological Survey, the community could boast of the John Stephens Shinkle Shoe Co. and the Missouri Trachoma Hospital.

In the years from 1945 to 1964, students arriving in Rolla for the first time probably shared the experience of a *St. Louis Globe-Democrat* reporter:

Nestled amid the hills of the Ozarks is Rolla, gem city of the hill country and capital of a recreational fairyland that has few equals in the United States. . . .

Approaching the city by Highway 66 from St. Louis . . . one climbs a long grade, tops a ridge and then gets a magnificent view of blue-shadowed hills and fertile fields, with the town cupped within a protective valley. Sparkling sunlight flashes from roof and spire like welcoming beacons.

While the journalist was impressed with Rolla from afar, she was less impressed with the campus of the School of Mines, lamenting that "the once beautiful Missouri School of Mines [was] now littered with wooden barracks."



Campus scene, 1950s.

Even though the emphasis after 1945 was on change, some things remained the same. St. Pat's celebrations resumed in 1946 after having been suspended during World War II. The remodeled Pennant Tavern remained a favorite student watering hole as was Tucker's Soda Shop and Scott's Drug Store. The H & S Student Store, in its second generation, restricted its services to serving meals. New establishments which appealed to students included the De Luxe Recreation Hall and Montgomery's Rendezvous. The Houston House in Newburg, famous for its fried chicken and biscuits, was operated by Hub Houston, a member of the famed 1914 football team. In the 1960s the new Student Center became a hangout for students.

#### The Students

As was the case before World War II, most of the students were male undergraduates who came from Missouri and surrounding states. During the 1946-47 school year, of 2,565 students, more than half were veterans, 86 were graduate students, and 33 were women. Of the 2,711 students enrolled for the 1949-50 academic year, 1,450 were from Missouri and 368 were from Illinois. Students represented almost every state in the continental United States. Fifty came from other countries, including 10 from India, eight from China, and six from Turkey. In 1963-64, the student population increased to 3,620, including 364 graduate students and 69 women.

In 1950, two young black men, Elmer Bell, Jr., and George E. Horne of St. Louis applied for admission to the School of Mines. Their applications were of historical significance. Because they were denied admission, Bell, Horne, and Gus T. Ridgel (the latter sought admission to the graduate school at the University of Missouri), took their case to court. University officials also sought a judicial solution. Meanwhile, MSM students were asked in a straw poll whether blacks should be admitted to MSM. Students responding to the poll favored admitting blacks. Dean Wilson reported the results of the poll to the University of Missouri Board of Curators. On June 27, 1950, Judge Sam C. Blair of the Cole County Circuit Court delivered the decision: institutions of higher learning in Missouri would be required to admit scholastically qualified blacks to courses not immediately available at Lincoln University. After the June 1950 decision by Judge Blair, integration proceeded smoothly at the School of Mines.

The academic interests of School of Mines students reflected national trends. Through the 1945-64 period, civil, electrical, and mechanical engineering remained the most popular areas of specialty. By the late '50s, the sciences, especially physics, experienced considerable growth.



Registration day, Jackling Gymnasium.

### Social Activities

One persistent myth about MSM students is that they had neither the time for nor an interest in anything but study. As a first-generation Miner put it, this was "no place for idlers." Although scholarly pursuits always took much of the students' time, there had always been time for play.

Student activities in the 1945-64 period can be divided into two categories, "organized" and "spontaneous." Organized activities in the post-war period did not depart much from tradition. Activities centered on fraternity life, party weekends, dances, and other School-sponsored entertainment.

During the period, one old tradition was altered to fit the times. Busing co-eds from area women's colleges to Rolla for party weekends replaced "shipping them in by rail." Before the war, students had lined up at Frisco Depot in September to jeer at arriving freshmen. By the 1950s, Miners lined up at the bus station to ogle blind-dates arriving for party weekends.

Students, faculty, and friends of the School of Mines will surely recall those party weekends. These activities through the school year gave students something to look forward to and served as a respite from the pressures of study.



Military Ball, 1962.

Faculty and townspeople served as party chaperons. Adult chaperons were required for student organization social functions which included members of both sexes. Chaperons sometimes sat in an anteroom, engaged in idle conversation with a succession of pledges assigned to the task in 30-minute shifts while the party raged in a different wing of the house. As the weekend concluded, bleary-eyed Miners waved good-bye to their dates and returned to classes vowing to approach the next party weekend more cautiously. Such vows had been forgotten by the next party weekend.

The St. Pat's celebration remained the most important social tradition. This rite of spring resumed in 1946 and has been celebrated to the present day without interruption. The emphasis placed on this celebration is one of the unique features of the School of Mines. Between 1946 and 1964, a typical format for the celebration was as follows:

#### ORDER OF EVENTS

Friday
1:30 p.m.—St. Pat arrives at Frisco Station, Parade starts at Sixth and Pine and ends at 12th and Pine
2:30 p.m.—St. Pat gives his annual address. Awarding of trophies for floats; judging of beard contest
9:00 p.m.—Masquerade Ball at Jackling Gym
10:00 p.m.—Knighting Ceremonies for Seniors
Saturday
2-5 p.m.—Dixieland Concert at Kappa Alpha Fraternity House
2-5 p.m.—Sigma Nu Tea Dance
2-5 p.m.—Jazz Concert at Kappa Sigma
9:00 p.m.—Semi-Formal Dance at Jackling Gymnasium
10:00 p.m.—Coronation of Queen

From St. Patrick's arrival at Frisco Station until the queen's coronation ceremonies the next evening, it was difficult for anyone within Rolla's city limits to think of anything but the celebration. While the outline of the celebration changed little over time, the trappings became more glamorous, parades became larger, the knighting ceremony became more exclusive, and the preparation of shille-laghs by freshmen became more elaborate.

In 1955, a new spring festival sponsored by the social fraternities appeared and has developed as an important social tradition of the School. Originally called Greek Day and later Greek Week, the campus fraternities scheduled events to break the monotony of classwork between St. Pat's and final examinations. Greek Day or Week featured a carnival, games, and dancing. Money raised was donated to a local charity, thus contributing to a more positive relationship between town and School.

Another form of structured entertainment for students, the General Lecture Series, continued to be an important aspect of the Miners' social life. While this series prior to World War II included essayists, entrepreneurs, and adventurers, the post-1945 series reflected the new interests of American popular culture. Professional entertainers who visited the School included the Trapp Family Sing-

ers, Dave Brubeck, Skitch Henderson, and Liberace. The chairman of the humanities-social studies department, Professor Sam Lloyd, led the faculty committee on General Lectures. With the able assistance of his wife, Margaret McCaw Lloyd, Sam managed the series for more than a generation. In the process this couple added a special dimension to the social life of the faculty, staff, and friends of the School. Entertainers who performed in the General Lecture Series often performed informally at Sam and Margaret's home into the wee hours. Where else could Rolla folk chat with Lawrence Welk, Guy Lombardo, or Duke Ellington? When Louis Armstrong and his band performed at MSM in an era of strict segregation, Margaret took Armstrong and his musicians into her home and fed them.



Samuel H. Lloyd, ROLLAMO '56.

The Lloyd's social services were not limited to management of professional entertainment. Those who knew Margaret may recall her saying: "I awoke Sam in the middle of the night and said, 'Sam, I've got an idea. What do you think of this . . .?' " The "idea" might have been a dinner party, a new special interest group for Coterie or Dames, or it might have been a special party for alumni called "MSMAWMRGAAAOIT" (MSM Alumni Who Married Rolla Girls and Ain't Ashamed of It). For a generation, this gracious, creative couple worked their magic and served the School beyond reasonable expectation.

The tradition of hazing virtually disappeared after 1945. Veterans of Corregidor, North Africa, or Normandy were not inclined to tolerate dress codes, green beanies, or the freshman fight. Thereafter, hazing would be limited to the antics of fraternities and other organizational initiations and had little place in the life of the institution. This is not to suggest, however, that the post-war generation of Miners was less "playful" than its predecessors; its members were merely less traditional and more spontaneous.

As World War II ended, the student body, amply laced with war veterans, was rowdier than ever. In March 1945, following a student outburst, Dean Wilson reprimanded 50 students for their behavior saying, "You fifty raise as much h--- in this town as one thousand formerly did."

In October 1946, a throng rushed to the Rolla Building after a victory on Jackling Field and students broke open doors and windows in their haste to get to the roof of the building to ring the "Liberty Bell." Dean Wilson ultimately had the bell removed to the ground level to make it accessible because he feared someone would fall from the roof or the extra weight would cause it to collapse.

In the spring of 1945, city officials jailed an MSM student for turning on the town's pride and joy, the stoplight at Eighth and Pine, at 10:30 p.m. Two of his compatriots broke into the jail and released him. Ultimately, law enforcement officials dropped all charges. In 1946, the town's only stoplight again fell prey to youthful enthusiasm, as Miners politely stopped a lumberyard truck and proceeded to use the lumber to build a bonfire underneath the stoplight.

State Sen. Emery Allison of Rolla, a long-time School of Mines booster, must have regretted involving MSM students in his campaign for a U.S. Senate seat.

The May 22, 1950 issue of the Rolla Daily Herald said:

In a colorful scene from a bunting-draped platform on the High School athletic field, State Senator Emery W. Allison formally opened his campaign Saturday night for the Democratic nomination for United States Senator, before an audience of some 4,500 persons, including many of the speaker's colleagues in the Missouri Legislature.

Despite attempts by a group of some 100 MSM students to break up the rally, the Senator delivered his address as planned . . . .

About 7:30 . . . the small group of students took some of the torches from the Allison-for-Senator committee's truck, and formed a rump torchlight parade . . . .

In the confusion that followed, the program was delayed some 15 minutes. There was a little scuffling, but the Police and Highway Patrol quieted down the youths to a great extent . . . .

Allison lost in the primary. By the day after the rally, Curtis Wilson had acquired a few more gray hairs.

# Student Organizations

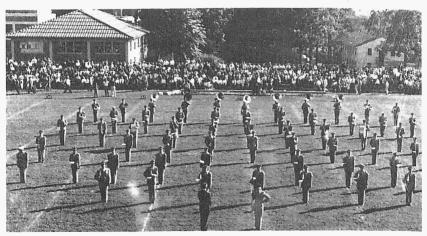
Campus organizations responsible for the bulk of the social activity assumed considerable significance. Organizations proliferated after 1945, including new social fraternities, religious clubs, and professional and eating groups. After 1945, the Student Council underwent reorganization. Twenty-two students comprised the new Council, 11 members representing the fraternities and 11 from independent student groups.

The social fraternities remained a major feature and were the center of social life for large numbers of students. The 1963-64 *Manual of Information* listed 16 social fraternities. For a student body of approximately 3,600, the number of fraternities symbolizes the significant role played by such organizations. Fraternities had long been important to this campus and, if anything, they became even more important during the 1950s and 1960s.

Fraternity houses had been scattered throughout the city. In deference to a better relationship between town and gown (particularly because of objectionable noise during parties), and because of the expanding number of fraternities, School officials set aside a 20-acre site just off Nagogami Road (Rt. E) as "fraternity row." By the late '50s, lots became available to fraternal organizations on a 99-year lease arrangement. New fraternity houses soon appeared on this site.

The Reserve Officers' Training Corps constituted another traditionally significant student organization. ROTC had been an important feature of the campus prior to World War II and continued to be popular after 1945. From 1956 to 1964, the ROTC engineering regiment at MSM was the largest unit of its type in the nation. The ROTC Band, Color Guard, and Pershing Rifles usually participated in area parades and festivals and were important symbols of student life between 1945 and 1964.

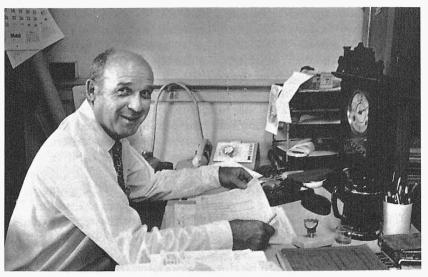
The band continued to be closely associated with ROTC and John W. Scott continued to serve as its director, until his death in 1950. The



ROTC Band on the field, 1962.

campus' special "music man" enrolled at MSM in 1885, managed Scott's Drug Store at Eighth and Pine, and in 1926 became director of the band. Scott served MSM students for almost three-quarters of a century.

Another popular alumnus, Tom Beveridge, reminisced about his experience with the band. His recollections will correspond to those



Tom Beveridge.

of musical Miners of both the pre-war and post-war generations. He says in "Reminiscences of a Senile Bandsman" in "57 Years of Musical Miners: A History of Bands at the University of Missouri-Rolla, 1908-1965":

The writer played a shaky French horn in the M.S.M. band from 1939 to 1942. Had he not played in the band, he would not have graduated from M.S.M., for at that time the compensation for playing in the band was the value of all fees. . . .

Membership involved compulsory attendance at the St. Louis U. and Washington U. football games without furnished transportation. In the fall of '39 Beveridge hitchhiked to the Washington University game on Thanksgiving Day, spent 10¢ at the game, and had 15¢ for the return trip. Hitchhiking back to Rolla was unrewarding and night found our hero near the west edge of St. Louis County with a thin topcoat, a French Horn and no money (the 15¢ was splurged on a hamburger and a cup of coffee somewhere on Lindbergh Avenue). The night was spent in a hayloft at below freezing temperatures and resulted in a two week stay in the M.S.M. infirmary and a bias against poverty.

The poverty state was erased in one night during the presidential campaign of 1940 when a German band plucked from . . . the ROTC band played at both Democratic and Republican rallies in Rolla. . . . This combination of musical ability and political ambidexterity netted the windfall of  $50\phi$  per musician per rally depite the fact that one of the parties had an audience of only a few curious onlookers who, we assumed were attracted more by the music than the candidates.

The M.S.M. band was the first military band to play at Fort Wood when it furnished music for the flag-raising ceremonies at Fort Wood in the fall of 1941. The bitter cold of that day was a welcome thing . . . since in those days Fort Wood had very few surfaced streets . . . and the otherwise muddy red-clay parade area was frozen solid. The weather did lend tonal variety to the ceremony as well as freeze the ground. Valves froze and the first trumpet played "To the Color" with the first two valves depressed, his numb right hand in his pocket and complete confidence in his trust that the valves would stay depressed. His trust was betrayed when the valves thawed midway through from the warmth of his breath and this stirring bugle call climbed a tone and a half in the middle of eighth notes without any modulation.

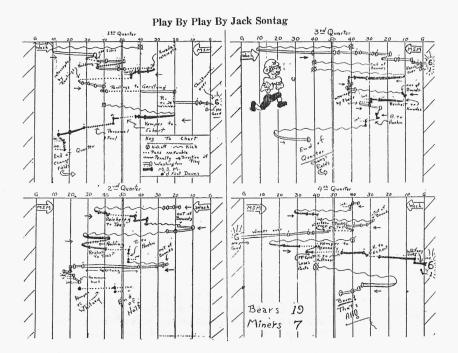
A freezing night marked the final trip of Mr. Scott with the band to which he had devoted decades of his time, hundreds of dollars of his money, and infinite patience. In February of 1950 he took the band to Salem in a bus furnished gratis by Rowe Carney. This writer, although a bald-headed alumnus, was at that time all suited up for the trip to augment the French Horn section.

The heater system on the bus failed to do its task and Mr. Scott aggravated a cold which led to fatal flu. Many generations of bandsmen lamented the death of a man who had been a father, leader and source of unadvertised financial helps, but the writer cannot help but feel that Mr. Scott knew that this was his last trip and passed away with a sense of satisfaction in having a last night with "my boys."

#### **Athletics**

The academic program at MSM between 1945 and 1964 may have been typical of American technological institutions which stressed undergraduate education, but the social experiences at Rolla were less typical. Athletics must be included in the "less typical" category.

Take, for example, student reporter Jack Sontag's coverage of football games. The following rendition of the 1948 School of Mines—Washington University game appeared in the student newspaper the following week:



The Missouri School of Mines, at Rolla, one of those schools that does not 'pay its players,' rides high atop the MIAA football heap today after winning its first conference game. But don't count on the Miners staying there long, because the facts of football life tell you so . . . .

Coach Gale Bullman, the Miners' head coach since 1936, will tell you that he has never asked a person to enroll at the school. He just waits to see who shows up for practice in the fall. Quite often, such a situation leads to a disappointing record. The Miners currently are 2-3 over-all; last year for the first time, they were 0-9. Occasionally, when the available material is good and the chips fall right, it means a conference championship. Usually, however, the Miners are somewhere in between. . . .

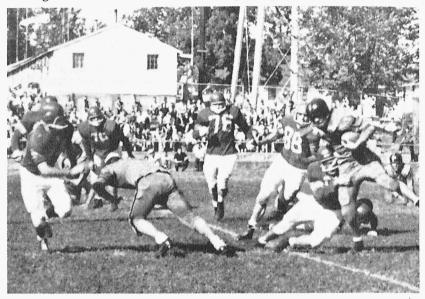
There were no athletic scholarships. The best Coach Bullman could do for the truly needy athlete was to permit him to "bunk" unofficially in an unused room in Jackling Gymnasium. In the Bullman years, it was not unusual to find about a dozen young men living in the more isolated recesses of the gymnasium.

Lack of scholarships and a demanding academic schedule combined to discourage those athletes who were not good students from attending MSM. Athletic schedules accommodated academic schedules. Bullman always attempted to end the football season by Nov. 1 to allow players ample time to catch up in the classroom before final exams. Coaches never knew for certain who would show up for practice because labs usually ended at 5 p.m. One Miner quarterback in 1961 could practice only on Fridays. The year before, one scholar-athlete made the team as a tackle but did not go to away games because he had to study.

In spite of the so-called disadvantages, there were successes. In 1946, the School of Mines lost to Oklahoma City University by a score of 74 to 6, but it was a victory of sorts for the Miners. Jerry Berry's

touchdown was the first the Chiefs had given up all year, and the point spread at the end of the game wasn't as bad as the experts had predicted. Besides, several of the opposition players allegedly had played three or four years for Alabama's Crimson Tide or other national powerhouses.

In 1947 the football team won its first MIAA championship, although only two games were played at home because of inadequate seating facilities at the stadium. During this period, the football team



Football, Gale Bullman style.

would win two more conference championships, (in 1949 and 1950), and would be co-champion in 1956. The 1947-48 school year was a banner year for Miner athletics. In football, tennis, and swimming, teams finished atop the conference, the track team finished second in the conference and the basketball team finished 10-9, its first winning record in recent memory.

In 1948-49, sporting a new T-formation, the football team finished 4-3-2, a more typical record for teams of the period. The most memorable football team of the 1945-64 era was the 1950 team which won the conference, defeated Washington University for the first time in 35 years (34-19), and ended the year with a Corn Bowl victory over Illinois Normal (7-6).



Finish line of the mile run.

Though football reigned supreme, students also took pride in varsity basketball, tennis, golf, track, swimming, and rifle teams. The 1957-58 basketball team lost 24 games in a row, but the 25th game, a 60-55 victory over Washington University, made the season worthwhile.

Discuss Miner athletics with anyone familiar with the School of Mines and before the conversation goes far, the discussion will center on Gale Bullman. The most famous and beloved coach in the history of the institution did not like to be called "Coach." Known to all as Gale, Bullman earned a law degree at Washington University before accepting the job of head football coach at MSM in 1937. His tenure

was interrupted by a tour in the Navy during World War II, but he returned to Rolla in 1946 and remained in the athletic department until his retirement in 1970.

Gale Bullman taught his athletes to enjoy themselves. The skeptic need only ask the boys who played for him. The answer is in their faces.



Gale Bullman, ROLLAMO '56.

In addition to his role as head football coach and later as athletic director, Bullman should be credited with developing the intramural program. In 1945, intramurals included football, basketball, wrestling, boxing, cross country, swimming, and volleyball. By the 1950s, softball, handball, horseshoes, golf, and table tennis had been added to the list, altogether an impressive variety for a small school.

Athletics, be they varsity or intramural, were an integral almost casual part of the student experience at MSM between 1945 and 1964. With an emphasis on enjoyment and in the absence of athletic scholarships, here was a sports program which stressed academic performance over athletic prowess. These factors doubtless rendered those rare conference championships and victories over a rival like Washington University even more satisfying and memorable. Keep this in mind when judging students of those years as they rushed out to celebrate those sweet victories by ringing bells, rushing theaters, igniting bonfires, or otherwise disturbing the town's tranquility.

In spite of change and growth the student of 1945-46 vintage would have felt at home on the campus during the 1963-64 school year. Continuity had been the benchmark of the institution during the Wilson years, but ahead lay a decade of unprecedented change for the institution at Rolla.

# PART IV

Exhilaration, commitment, and a belief that society could solve its problems inaugurated the decade of the 1960s. A vibrant civil rights movement penetrated the walls of segregation. A war on poverty seemed to be a logical extension of the New Deal and a final fulfillment of the "American dream." The spirit of problem solving extended to Southeast Asia and the decision to "stop aggression" in Vietnam. All things seemed possible, and American leaders attacked problems with vigor.

The assassination of John F. Kennedy in November 1963, cast a pall over American enthusiasm, but Lyndon B. Johnson picked up the reins and forged ahead. The Civil Rights Act of 1964 and the Voting Rights Act of 1965 meant that segregation would no longer be sanctioned by American law. Yet, blacks rioted in Watts in 1965, and each summer brought further disorder to the cities. Likewise, some citizens began to question the country's effort in Vietnam, as the war became ever more costly in lives and money. By 1968, more than 500,000 American troops were fighting in Vietnam.

Amidst the turmoil, the United States landed a man on the moon. Scientists and engineers made breakthroughs in research, and computer technology revolutionized many aspects of life. Meanwhile, the American people engaged in heated debates over issues such as the role of women and the way young people dressed, behaved, and related to adults, and changes in sexual attitudes.

In April 1968, Martin Luther King, Jr., who had led the non-violent civil rights movement, fell at the hands of an assassin. Two months later, another killer struck down Robert F. Kennedy, the same night that he had won the California Democratic presidential primary. Those two assassinations, the war in Vietnam, the difficulty of waging war on poverty, and the continued violence in American cities, combined to dissipate the enthusiasm that had marked the beginning of the decade. In 1968, Richard M. Nixon won a narrow victory over Hubert H. Humphrey, as George C. Wallace garnered more than 10 million votes. The new president's plan to end the war

included reducing United States troops in Vietnam from more than 541,000 in 1969 to 48,000 in 1972, widening military action to Cambodia and Laos, resuming the bombing of North Vietnam, and mining that country's harbors. His course was marked by protests against the war. A demonstration against the invasion of Cambodia in May 1970, resulted in National Guard troops killing four students at Kent State University in Ohio. The Kent State episode spawned protests on campuses across the country and caused 400 colleges and universities to close their doors temporarily. Nevertheless, American involvement in the war continued until a cease-fire agreement was signed in late January.

By the time South Vietnam fell to the communists in April 1975, Gerald R. Ford occupied the White House. Richard Nixon, who had won re-election in 1972, resigned the presidency in August 1974, as a result of the scandal called Watergate.

While undergoing the trauma of Watergate, the nation, in 1973-74, came to realize its economic vulnerability and its energy dependence. Because of U.S. support for Israel in the Yom Kippur War, Arab countries quadrupled the price and then shut off the flow of oil to the U.S. Before the end of the 1970s, the price of crude oil in the United States had increased from \$3 to \$40 per barrel. While officials in Washington called for energy conservation and energy independence, United States dependence on foreign oil increased from one-quarter of its total usage in 1971 to nearly one-half in 1978.

Inflation was fueled by the combination of increased energy costs and supporting the war in Vietnam without increasing taxes. The country's failure in Vietnam, the political catastrophe of Watergate, and the intractable economic dislocations caused by the energy shortage and inflation created serious feelings of self-doubt in the American people during the 1970s. Jimmy Carter was elected president in 1976. He continued the struggle with economic problems and made advances in human rights. In 1980, the electorate voted in Ronald Reagan.

# CHAPTER X Transformation, "It Was A Revolution MSM To UMR": 1963-1982

The Rolla campus shared the national exhilaration and optimism of the 1960s but never succumbed to the pessimism of the 1970s. Under the direction of Merl Baker, who came to campus as dean of MSM in 1963 and resigned as chancellor of UMR in 1973, the institution was transformed from an engineering school into a technological university, with degree programs in the humanities and social sciences, graduate programs in engineering and science, and a strong commitment to research. Changes during the Baker years equipped the School to avoid some of the pitfalls of the '70s. When the energy crisis hit and the nation realized more fully the importance of technology, UMR's specialties were those most in demand.

#### Merl Baker

Merl Baker was 39 when he became dean. He earned master's and Ph.D. degrees from Purdue University and spent his professional career at the University of Kentucky, advancing from assistant to full professor of mechanical engineering between 1948 and 1955.

Baker received a clear charge from his immediate superior, University of Missouri President Elmer Ellis. Ellis told him to strengthen the faculty by increasing the percentage of faculty with doctorates, to broaden and deepen offerings in the social sciences and humanities, to expand the graduate program, and to emphasize research. Baker agreed with these ideas.

National policies aided the new head of MSM in his attempt to meet these goals. The federal government continued to expand its role in education, and, by 1967, it was providing 25 percent of higher education's total budget. During the Kennedy-Johnson years, Congress passed legislation that authorized \$1.5 billion in matching funds for new construction on the nation's campuses. Other legislation established a broad program of undergraduate scholarships, a program that combined federal loans with jobs for college students, and grants to college libraries. Dozens of Great Society programs included funds for colleges and universities.

During Baker's first year as dean, the expansionary spirit of the federal government was shared by the state legislature. Through legislative action, the state acquired the University of Kansas City, a private school that had fallen on difficult financial times. The



Merl Baker, dean, 1963-64; chancellor, 1964-73.

legislature appropriated funds to convert the University's Normandy Residence Center in St. Louis, started in 1960, into a two-year campus, with plans to make it a four-year school by 1966. The General Assembly authorized the University of Missouri Board of Curators to govern these two new campuses. The Board combined them with the Columbia and Rolla schools to form the University of Missouri system.

#### The Name

With the creation of the University system, President Ellis and the Board of Curators sought uniformity in naming the four campuses. This provided an opportunity to change the name of the Rolla campus. Baker and other faculty members believed that the University of Missouri School of Mines and Metallurgy no longer described the School, since enrollments in mechanical, electrical, civil, and chemical engineering had long surpassed those in mining and metallurgical engineering. The proposed expansion in the sciences, humanities, and social sciences also made the old name too narrow.

Baker appointed a committee composed of Ralph Lee, Aaron J. Miles, Theodore J. Planje, Joseph H. Senne, and Dudley Thompson, who served as chairman, to advise him on a name. The committee solicited opinions from alumni, students, and faculty about three names: University of Missouri School of Mines and Metallurgy, University of Missouri at Rolla, and University of Missouri School of Engineering and Sciences. A majority of the 100 students polled preferred to keep the old name. The alumni favored a change, although not by a large margin. The faculty wanted a new name. The committee reported that it had "not been able to detect any organized or logical opposition (to the name change). Comments which have been offered in opposition have been traced to nostalgia, sentiment and personal reasons." Baker and the committee agreed on the name University of Missouri at Rolla which conformed with the name selected for the Kansas City campus. The Board of Curators received and accepted Baker's recommendation. The St. Louis campus would also conform. The new names became official on July 1, 1964. The Columbia campus did not follow the others; it became the University of Missouri, Columbia, rather than "at Columbia." The University of Missouri at Rolla became the University of Missouri-Rolla in January 1968. It became popularly known as UMR and, later, as UM-Rolla.

In his letter to Ellis recommending the new name, Baker wrote that "The University of Missouri at Rolla would continue to specialize in mining and metallurgy, engineering, and the sciences relating to the mineral industry and engineering." He recognized the popularity of the name Missouri School of Mines and concluded "none of us wants to lose the traditional value of this." In subsequent years, UMR publications and news releases carefully pointed out that UMR was formerly the University of Missouri School of Mines and Metallurgy.

A decade later when Curtis Laws Wilson was asked about the new name he said, "I like UMR. I've heard a few people complain because they still wanted MSM, but UMR is better—once you get used to it."

# Reorganization

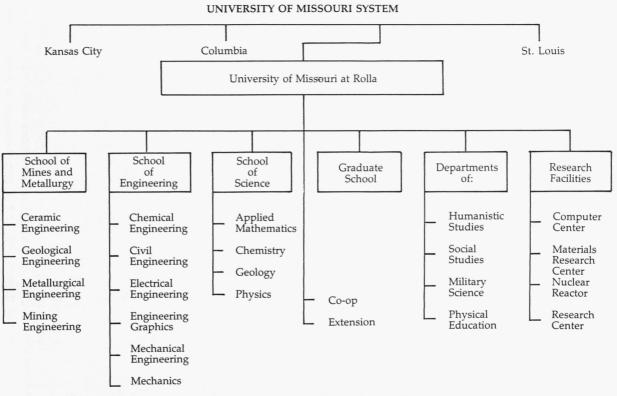
The Board of Curators approved two other changes. It accepted President Ellis' recommendation to change Baker's title to chancellor, making the Rolla campus the first in the system to be headed by someone with that designation. And it adopted Baker's reorganization of the campus into four schools, four departments, and four research centers as shown in the accompanying chart. The name School of Mines and Metallurgy was retained as one of the academic subdivisions.

#### Administration

The new structure allowed Baker to select those who would serve in key administrative positions. During the spring of 1964, Baker appointed Dudley Thompson, former chairman of chemistry and chemical engineering, dean of faculties and director of the School of Engineering. Theodore J. Planje left his chairmanship of ceramic engineering to become director of the School of Mines and Metallurgy. Wouter Bosch, who had been appointed head of graduate study in 1963, was given the title of director of the Graduate School. Paul Dean Proctor took the post of director of the School of Science, leaving the chairmanship of geology. Paul E. Ponder became assistant to the chancellor.

A year later, Chancellor Baker elevated Aaron J. Miles to dean of the School of Engineering from his chairmanship of mechanical engineering. He also changed the titles of the heads of the other schools from director to dean. Dudley Thompson remained as dean of faculties. That summer, Baker appointed G. Edwin Lorey director of the extension division. In choosing his administrative officers, Baker selected individuals who had been on campus for a number of years.

Thompson, Planje, Ponder, and Lorey continued to fill administrative positions during the remainder of Baker's decade and beyond. Miles reached mandatory retirement age in 1967, and Baker brought



Proposed 1964 Organization of Instruction and Research University of Missouri at Rolla

J. Stuart Johnson back to campus to serve as dean of the School of Engineering. He had taught in the electrical engineering department from 1937 until 1944. Johnson held B.S. and M.S. degrees in electrical engineering from the University of Missouri and a Ph.D. from Iowa State University. Before his return to Rolla, he had been dean of the College of Engineering at Wayne State University in Detroit.

At the retirement of Wouter Bosch as dean of the Graduate School in 1968, Robert H. McFarland, a physicist with a Ph.D. from the University of Wisconsin, was hired to fill that position. McFarland had taught at Kansas State University from 1947 until 1960, and then had taken a job at the Lawrence Livermore Laboratory.

# Department Chairmen

In choosing his administration, Baker sought Ph.D. holders with administrative and research backgrounds. He appointed Ernest M. Spokes chairman of the mining engineering department and Charles Hatfield chairman of the mathematics department. He also named James G. Harris chairman of the social studies department and Jim C. Pogue chairman of the humanities department after dividing the department over which Sam Lloyd had presided for so many years. Baker divided the chemistry and chemical engineering department and chose William H. Webb chairman of chemistry and Mailand R. Strunk chairman of chemical engineering. He recruited Harry Weart from Cornell University as chairman of metallurgical engineering. All of these individuals held doctoral degrees.

Baker selected more new chairmen in 1965: Joseph H. Senne, Jr. replaced E.W. "Skip" Carlton who retired as head of civil engineering; Thomas R. Beveridge replaced Paul Proctor as chairman of geology; Robert E. Moore replaced T.J. Planje as head of ceramic engineering; and Thomas R. Faucett became chairman of mechanical engineering, replacing Aaron J. Miles. Harold Q Fuller continued to chair the physics department and R.F. Davidson remained head of engineering mechanics. Roger Nolte remained chairman of electrical engineering. Lloyd Christianson remained chairman of the engineering graphics department.

After those appointments, only a few changes were made in administrative leadership during the remainder of Baker's tenure. The mathematics department had a succession of chairmen with Charles Antle replacing Hatfield in 1966, J.R. Foote replacing Antle in 1967, and Glen Haddock replacing Foote in 1968. Louis J. Grimm succeeded him in 1981. J. Robert Betten succeeded Roger Nolte as chairman of electrical engineering in 1967. After the death of R.F. Davidson, Peter Hansen became chairman of engineering mechanics in 1971.

# Improving Faculty

The emphasis on holding doctoral degrees extended to the entire faculty. Baker instituted a policy of encouraging those on campus without doctorates to earn them. By 1966, 10 UMR professors were working toward doctorates through NSF grants. Baker also initiated



Campus scene, early 1960s.

campus programs to provide support for faculty development with faculty research grants, summer research fellowships and appointments, and grants for the purchase of special equipment.

Through those incentives and by recruiting faculty with doctorates when increased enrollments and emphasis on research justified a larger instructional staff, Baker upgraded the quality of the faculty as measured by percentage of members holding doctorates. In his first three years, the percentage increased from 44 to 52. In 1973, when Baker resigned, 80.5 percent of the full-time faculty held doctorates.

After Ellis retired in 1966, Dr. John C. Weaver became president of the University of Missouri and continued support for these changes.

#### Enrollment

New faculty arriving on campus to teach growing numbers of undergraduate and graduate students, the construction of new buildings, the creation of research centers, the expansion of the social sciences and humanities all coincided during the late 1960s to give the campus an air of excitement. Undergraduate enrollment went from 3,927 in the fall of 1964 to a peak during Baker's years of 5,285 in the fall of 1970. The number of graduate students increased from 413 to a high of 680 between 1964 and 1969, and then leveled off at between 500 and 600 during the 1970s. Hiring as many as 49 new faculty members in one year, Baker increased the size of the instructional staff from 243 full-time faculty in 1963-1964 to 389 in 1970-1971.

#### Research and Graduate School

Baker tied together research, Missouri's industrial development, and graduate and undergraduate education. In his inaugural address he said, "The development of the University of Missouri-Rolla in research both at graduate and undergraduate levels will go hand in hand with the development of industry within the state." He believed that graduate students should comprise about one-third of the student body as "the balance needed to keep a strong undergraduate program." Administrators in 1969 projected graduate school enrollments of 3,320 in 1974 and 5,840 in 1979, "if graduate student support and facilities . . . (developed) as needed."

Despite Baker's best efforts, graduate enrollment failed to reach his optimistic projections. Still, there were accomplishments. He oversaw the establishment of the UMR Graduate Engineering Center in St. Louis in 1964. The center was designed to provide "a formalized educational program leading to M.S. degrees in those engineering areas academically based at Rolla. . " for the St. Louis area, and it soon had an enrollment of several hundred students. Dr. Anton deS. Brasunas was appointed director and served until 1979. In 1964, the Board of Curators formally established UMR's Graduate School. Two years later, Chancellor Baker reported that "an autonomous graduate faculty was established for the first time independent of its counterpart on the Columbia campus."

Baker took a personal interest in research. The old State Mining Experiment Station which had been founded in 1909 to investigate problems of the mineral industry, was changed into the Industrial Research Center. As such, it was responsible for keeping faculty members abreast of research opportunities available through governmental and industrial grants. The Board of Curators approved the name change in 1964. Three years later, Baker renamed it the Office of Research Coordination, only to change it to the Graduate School Research Office in 1970. Baker urged that certain departments apply for funds and encouraged those denied grants to revise and resubmit their applications. He often attached to his notes newspaper articles that described grants received by other schools asking, "If they can, why can't we?"

Among other centers established during Baker's administration that were still active in 1982 were: the Graduate Center for Materials Research (1964), the Rock Mechanics and Explosives Research Center (1964), the Environmental Research Center (1965), the Graduate Center for Cloud Physics Research (1966), the Transportation Institute (1967), and the Center for International Programs and Studies (1968). The centers sought outside funding to support research and served as vehicles for bringing together talented individuals who attacked difficult problems as research teams. The centers also provided support for graduate students, helping to stimulate graduate education at UMR.

The chancellor's encouragement, the center format, and faculty efforts proved successful in stimulating research. In fiscal 1972-1973 UMR received more than \$1.5 million in outside research funding and more than \$2 million in 1973-1974. The faculty published 700 articles and 21 books during the 1972-1973 academic year, and 554 articles and 12 books the next year.

#### Curricula

Curricular changes were at the core of the transformation of MSM into UMR. In graduate studies, the faculty developed M.S. degrees in geological engineering, geophysics, mathematics, nuclear engineering, and engineering mechanics. An M.S. in computer science became available through the mathematics department in the spring of 1964. At that time, students could earn doctorates in civil engineering and in chemistry as well as in the disciplines that had offered the degree earlier. During the 1960s, additional Ph.D.'s were established in mathematics and physics and mechanical, geological, petroleum, and nuclear engineering. In the early '70s the doctor of engineering degree was added in nine fields. The Board of Curators approved B.S. and M.S. degrees in aerospace engineering. The name of the department of mechanical engineering was changed to the department of mechanical and aerospace engineering in 1968.

The growth of the UMR graduate program was illustrated by the conferring of 335 master's degrees and 55 doctorates in May 1973.

Developments in the humanities and social sciences rivaled those in graduate study, as the campus made the transition from a School of Mines to a University. When Baker came to campus, 17 people taught in a combined humanities-social studies department. None of them held Ph.D. degrees. The North Central Association of Colleges and Secondary Schools, an accrediting agency, had advised the School that unless changes took place, accreditation would be withheld. Elmer Ellis instructed Baker to strengthen those areas. This complemented the new chancellor's desire to broaden the educational opportunities available at UMR.

By 1965, the humanities department had grown to 18 members, and the social sciences department had grown to 13 members. Pogue and Harris were still the only ones in those areas with completed Ph.D. degrees.

In the spring of 1967, the Board of Curators authorized B.A. degrees in English, history, psychology, and economics. The Engineers' Council for Professional Development praised the University for broadening its offerings in humanities and social sciences between 1965 and 1967. During those two years, the humanities department added 14 faculty members, and the social sciences added 10. Most of these new faculty members had or were completing doctoral degrees. The two developing departments received govern-

ment grants totaling \$50,000 to be spent acquiring audio-visual equipment, maps, and a language laboratory in 1967.

In 1968, the University created the Division of Liberal Arts which combined the humanities, social sciences, and physical education departments into an administrative unit. Chairmen of humanities and social sciences departments were to alternate as directors. Marvin R. Cain, who had become chairman of the social sciences department after the death of James G. Harris, became the division's first director. The *MSM Alumnus* said of this administrative development, "This new division is further recognition of the increasing role liberal arts must play in the academic and administrative structure of UMR, if it is to continue its stature of excellence and its growth as one of four University of Missouri campuses."

In 1970, the College of Arts and Sciences was organized combining the School of Science and Division of Liberal Arts. Chancellor Baker noted, "The arts and sciences are important in their own right, but, in addition, they are the foundation for a quality engineering program." Baker said that the University's goal should be "the education of the whole man." Dr. Harold Q Fuller became the first dean of the college.

As early as 1965, a cooperative program with UMC allowed students to earn teacher certification by earning degrees on the Rolla campus, taking education courses at UMC, and student teaching in the local area.

The Board of Curators approved the granting of bachelor of science degrees in economics and psychology in 1972.

# Computer Science and Engineering Management

Two new departments which were to grow significantly in the next decade were established during this era. They were the departments of computer science and engineering management. After approving an M.S. degree in computer science through the department of mathematics in 1964, the Board of Curators authorized the department of computer science and the B.S. degree in that area in 1966. In 1972-1973, the computer science department had 14 faculty members and conferred 67 bachelor's and 25 master's degrees. The Ph.D. became available in 1976.

In June 1965, the Board of Curators authorized the degree of M.S. in engineering administration. The degree required a B.S. degree in an engineering field and 36 additional hours in other disciplines, primarily the social sciences. James G. Harris, chairman of the social sciences department, coordinated the program. A year later, the Board of Curators approved a B.S. in engineering management, and, in 1967, Chancellor Baker hired Bernard R. Sarchet to develop a department. The first B.S. engineering management students graduated in May 1968, and the first M.S. student graduated in 1971. The Board had changed the M.S. in engineering administration to M.S. in engineering management in 1970. The Ph.D. was added in 1981.

A significant curricular change in undergraduate engineering during the Baker years took place in 1969. The School of Engineering reduced the number of hours required for bachelor of science degrees from 143 to 132 semester hours. Departments achieved that reduction by cutting the number of hours required in social sciences and humanities from 21 to 18 and by cutting two hours in physics. The other six hour reductions differed from curriculum to curriculum. Chemical engineering, for example, dropped a five-hour petroleum engineering course from its requirements. Civil engineering cut an hour from advanced surveying and a four-hour chemistry course.

#### Other Activities

Other changes included the establishment of a testing and counseling service in 1968, inauguration of Missouri Industry Day, also in 1968, the creation of an Academic Council in 1971, and the organization of the first Alumni, Student, Faculty Conference in April 1972.

The testing and counseling center expanded a service that began in 1964. The Academic Council provided an additional opportunity for faculty members to play a role in the governance of the University. It also provided a forum for the exchange of views between the faculty and the administration. Missouri Industry Day brought industrial firms to campus to display their operations for the students. The annual Alumni, Student, Faculty Conference brought those elements together so that the alumni might learn more about the current state of their University and so that they could provide constructive comments about how the University's curricula related to the world of work.

Organized by the board of directors of the Alumni Association, the conference illustrated the new vigor that infused the association during the late 1960s. In 1965, Baker began planning a campaign to raise \$69 million in state, federal, and private funds in conjunction with the University's 100th anniversary. Baker hired personnel to aid in the development effort and Frank Mackaman as field secretary of the alumni association to aid Ike Edwards in organizing that important source of campus support. The campaign, headed by prominent alumni, netted some \$500,000 in cash and another \$500,000 in pledges to help finance the new University Center, as one of the centennial projects.



Aerial view of the campus, 1968.

UMR became involved in higher education in South Vietnam under a contract with the federal Agency for International Development to create a quality engineering university in Saigon. Three professors and a secretary formed a team that went to Vietnam to develop curricula, prepare course material, and improve faculty in electrical, chemical, civil, and mechanical engineering. The University continued its work in Vietnam from 1969-1973.

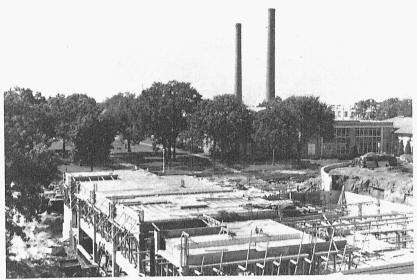
# Physical Changes

Public Information writer Winona C. Roberts asked her readers to "Come Walk With Me on the Campus" in an article published in the *Alumnus* in 1968. She observed, "In all directions there are modern new buildings—occupying the old sunken garden, the site of post World War II student apartments, the old drill field, the parking lot on the west side of campus. The sounds of even more construction echo around the campus."

The physical transformation that was under way when Mrs. Roberts wrote her article surpassed even the accomplishments of the late 1950s. Between 1966 and 1970, construction projects included four new buildings and two large additions. During the years 1972 through 1974, faculty and students occupied four more new structures. Other buildings such as Parker Hall received face lifts, and the quadrangle was completely redone. Financing for this building boom came from state appropriations, private donations, and federal funds. A portion of the money for the \$2 million library came from the \$230 million Higher Education Facilities Act of 1963.



A landmark falls—Jackling Gym being torn down.



Sign of growth—construction of the new library.

Baker's building program touched every facet of campus life. A men's dormitory opened in 1966. Research received a boost when the Materials Research Building (later named Martin Straumanis Hall) and the Physics Annex housed their first occupants in 1967. Workmen began razing Jackling Gymnasium in 1965, to provide a site for the new library that opened its doors in 1968. (In 1979, the library was dedicated as the Curtis Laws Wilson Library.) In 1969, physical education courses, although no longer required, resumed in the Gale Bullman Multi-Purpose Building. Also in 1969, the Mechanical Engineering Annex, equivalent to a new building, was completed. (The building's auditorium was named after Aaron Jefferson Miles.) In 1970, the humanities and social sciences departments moved into their new structure next to the library.

The need for a Humanities-Social Sciences Building was made even more acute when flames destroyed the venerable "Old Chem" Building on the evening of Oct. 19, 1969. The second-oldest building on campus, "Old Chem" had housed offices for some faculty members and graduate students. At the time of the fire, it contained six offices for the social sciences faculty and a few chemistry offices and research labs. The fire consumed many research materials, books, and other possessions. The campus had lost a landmark.

In 1972, three more building projects were completed. The Mathematics-Computer Science Building graced the mall across from the Humanities-Social Sciences Building. At the other end of the campus, the new portion of the University Center opened in December of that year. Students rushing from mathematics classes to the new center walked across a transformed quadrangle. The old benches and lights were gone. The changes included improved drainage, better lighting, attractive landscaping, and additional sidewalks.

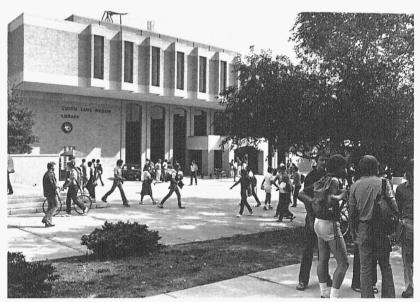
North of the old Student Center a round, concrete outdoor stage was constructed. Students immediately dubbed it the "hockey puck," and the campus had a new outdoor gathering point.

Two other buildings can be associated with the Baker years. The Engineering Research Laboratory opened in February 1973, and in April 1974, the campus dedicated the new Chemistry-Chemical Engineering Building that had been built on the spot once occupied by "Old Chem." It was later named after Dr. Walter T. Schrenk. A new section provided Chemistry/Chemical Engineering with an additional 85,163 square feet.

# Baker's Resignation

In October 1973, Baker resigned his position to join the staff of C. Brice Ratchford, president of the University of Missouri. In his last years as chancellor, Baker was faced with declining enrollments and reduced state appropriations. Enrollments went from 5,285 in 1970 to 4,017 in 1973 which reflected a change in both the economy and the draft laws.

During Baker's years, the size of the faculty almost doubled, the amount of outside funding increased more than five times, and the areas offering B.S. degrees rose from 12 to 18, M.S. degrees from 13 to 21, and Ph.D. degrees from seven to 16. The Board of Curators created a doctor of engineering degree and the University began offering B.A. degrees in five disciplines in the liberal arts. Nine new buildings and two major additions illustrated the physical changes. When a reporter asked Curtis Wilson what changes he saw when he visited the campus in July 1974, he answered, "Of course, the first thing that meets your eyes are the imposing new structures. They are beautiful. Then, I'm impressed with a number of the faculty members I've met."



Curtis Laws Wilson Library.

#### A New Chancellor

While a committee searched the country for a new leader, Dudley Thompson presided over the campus as acting chancellor. Thompson's many years of experience in key administrative posts allowed him to take the helm with little difficulty.

During the summer of 1974, University of Missouri President C. Brice Ratchford announced that Raymond L. Bisplinghoff was named UMR's chancellor. At that time, Bisplinghoff was deputy director of the National Science Foundation, a position he had held since 1970. For 20 years before assuming the NSF post, he had served as dean of engineering and department chairman and faculty member of the Massachusetts Institute of Technology. He had been an administrator for the National Aeronautics and Space Administration. His academic credentials included B.S. and M.S. degrees from the University of Cincinnati and a science doctorate from the Swiss Federal Institute of Technology. Bisplinghoff assumed his duties as chancellor Oct. 1.

After arriving on campus, Bisplinghoff appointed Dudley Thompson as vice chancellor and Jim C. Pogue provost and dean of faculties.

Thompson had made Pogue acting dean of faculties during his year in the chancellor's office. Bisplinghoff selected Paul E. Ponder dean of student affairs and created two new bodies: the Chancellor's Council and the Administrative Council. Charles Remington, professor of mechanical engineering, was appointed executive secretary of both groups.



Dudley Thompson, acting chancellor, 1973-74.

The new chancellor faced some serious difficulties. Enrollment sank to 3,899 students in the fall of 1974, reducing income from fees. In addition, faculty recruitment during the Baker years had been based on increasing enrollments. Bisplinghoff had to adjust the size of the staff to match student numbers. He came to Rolla just as the energy crisis was producing higher costs for that commodity and was fueling an inflationary spiral that affected every part of the economy. Meanwhile, state appropriations continued to fall below campus needs.

Bisplinghoff accepted these problems as challenges. When facing budget cuts during 1975, he told the Board of Curators:

If there were ever a time to sustain momentum at Rolla, it is now. We plan to keep Rolla moving by going to private and federal sources of funds during the next year, but the extent to which this will succeed is unknown. In summary, Mr. President, we can turn down the screws another year at Rolla, but we should all have some trouble sleeping at night as we survey the future. The universities, and especially technical universities like Rolla, will be presented with an opportunity to contribute to the state, and the nation, equal or greater than that of agricultural schools in the last century. The god of the twentieth century is energy. Without it, an industrial state, indeed an industrial and agricultural state, counts for absolutely nothing.

In addition to stating the case for more funds, Bisplinghoff sought to increase alumni and industry giving, while encouraging faculty members to seek federal funds for their research. He investigated the possibility of launching a major fund-raising campaign and, through the Development Office, initiated a deferred giving program in 1975 and an organized community support campaign in 1976. He attacked the problem of a large faculty by developing higher standards for promotion and tenure, which resulted in a smaller faculty with higher qualifications. The number of full-time faculty members declined from 354 in 1973-1974 to 332 in 1976-1977.



Raymond L. Bisplinghoff, chancellor, 1974-76.

# Accomplishments

Emphasizing energy research, the campus hosted a Conference on Energy in 1974, with the Governor's Missouri Energy Council sharing sponsorship. Its purpose was "to provide social scientists, scientists and engineers a means for rapid communication of their most recent research in the field of energy and to offer practical solutions to energy related problems for government and industry." The conference became an annual event until 1981, attracting scholars from around the world.

The Institute of River Studies also began during this time. Before the formalization of the Institute in 1976, UMR professors, funded by the U.S. Army Corps of Engineers, had conducted studies of the Missouri, Arkansas, and Mississippi rivers.

A combination of larger enrollments (4,246 in 1975 and 4,752 in 1976) and students seeking university housing because of the high costs of and low availability of private housing resulted in the University's purchase of the Thomas Jefferson Residence Hall in 1976. Built 10 years earlier by a private firm, TJ, as students called it, had closed its doors in 1973, when the student population dipped to 4,017. The University paid over \$1.1 million for the dormitory. Recognizing the need for housing and the value of the purchase, alumni and friends of UMR pledged more than \$250,000 toward the down payment and renovation costs. With the addition of T.J., the campus expanded its student housing to more than 1,000 spaces from just over 600.

# Resignation

Students had barely settled into their rooms in 1976 when on Nov. 17, Bisplinghoff announced his resignation as chancellor effective Jan. 1, 1977. A lucrative salary offer and the attraction of returning to the Boston area where his children lived, lured him away from Rolla. He accepted the post of vice president for research with Tyco Laboratories, Inc.

# Jim C. Pogue

Jim C. Pogue was chosen to serve as interim chancellor. Pogue had served as provost under Bisplinghoff and had been responsible for

many of the day-to-day operations of the campus while the chancellor raised funds and represented the University away from Rolla. University of Missouri President James C. Olson named a committee to search for a permanent chancellor.



Jim C. Pogue, interim chancellor, 1977-78.

Pogue served in the office for almost 19 months. During that time, he continued the direction of his predecessors. The alumni and development effort saw the creation of the Parents' Association and the founding of The Order of the Golden Shillelagh, the University's major gifts club. Both of these organizations came into existence in 1977. The engineering management department created the Center for Applied Engineering Management in 1977 with funding from the Small Business Administration and the United States Development Administration. More systematic affirmative action and tenure and promotion procedures were established. Enrollment increased to 4,836 in the fall of 1977, and faculty numbers declined to 317 in the same year.

# Joseph M. Marchello

The search for a chancellor ended during the summer of 1978 when Joseph M. Marchello was chosen. Marchello brought a wealth

of administrative experience to his new position. For five years, he had served as provost for the Division of Mathematics, Physical Sciences, and Engineering at the University of Maryland. That division had 5,000 students and 600 faculty and staff. Before becoming provost, Marchello had gone from assistant to full professor at Maryland between 1961 and 1967 and had served as chairman of the department of chemical engineering between 1968 and 1973. While in Maryland, he also served the state in a variety of advisory capacities. His academic credentials included a B.S. from the University of Illinois in 1955 and a Ph.D. from Carnegie-Mellon University in 1959. He taught at Oklahoma State University before going to Maryland.



Joseph M. Marchello, chancellor, 1978-.

Chancellor Marchello quickly made his mark on the campus. Within the first year he reorganized the administration, consolidating 10 units into six: School of Mines and Metallurgy, School of Engineering, College of Arts and Sciences, and the offices of chancellor, provost, and administrative services. Graduate studies, extension and continuing education, and student affairs came under the provost's office. The major functions of extension and continuing

education and graduate studies reverted to the academic units. Marchello separated the registrar and admissions offices and combined the alumni and development offices, placing them under the direction of Frank Mackaman.

The department of geology and geophysics moved from the College of Arts and Sciences to the School of Mines and Metallurgy.

Personnel changes accompanied the structural changes. Adrian Daane, who had served as dean of the College of Arts and Sciences since 1972, became dean of graduate studies, and Robert McFarland returned to teaching and assumed the post of director of institutional studies. Wayne Cogell, associate professor of philosophy and assistant dean of arts and sciences, became acting dean of the college. Robert L. Davis, professor of engineering mechanics and assistant dean of the School of Engineering, became acting dean when James E. Halligan resigned. Theodore J. Planje remained dean of the School of Mines and Metallurgy. B. Ken Robertson, associate professor of chemistry, accepted the post of dean of students, and Paul Ponder, the former dean, became registrar. Jim C. Pogue left the provost's position to return to teaching. During the fall of 1979 search and screening committees began looking for new deans of engineering and arts and sciences and a new provost.

The administrative staff was rounded out with selection of a provost and deans of engineering and arts and sciences. A nation-wide search for provost ended in the selection of Tomlinson Fort Jr. who had been chairman of the chemical engineering department at Carnegie-Mellon University. A similar search produced Marvin W. Barker for dean of the College of Arts and Sciences. Barker had been chairman of the chemistry department at Mississippi State University. The third search resulted in the selection of Robert L. Davis, who had served a year as acting dean of the School of Engineering.

Chancellor Marchello chose another dean. Theodore J. Planje, who had devoted his professional life to the University, died unexpectedly during the summer of 1980. Planje, who had been a teacher and researcher before becoming an administrator, engendered great respect and loyalty from faculty and students. Ernest M. Spokes, professor of mining engineering, served as acting dean until Don L. Warner, professor of geological engineering, was appointed the new dean in 1981.

Among innovations initiated by the new chancellor were an honors program for talented undergraduates and a visiting professor program to bring distinguished visitors to share their expertise with UMR students and faculty. One example of a faculty-student enrichment program is the Smurfit-Alton Packaging Fellowship, established by the Alton Packaging Corp. It supports the exchange of UMR faculty and students with their counterparts at University College Dublin in Ireland.

While these and other developments were significant during Marchello's early years, his most important contribution was giving the University more direction.

## Challenges

Marchello faced the continuing challenge of limited financial resources for the campus, a result of high inflation and economic recession. At the same time, enrollment grew.

As the demand for engineers, computer scientists, and other technologists increased, students flocked to university campuses that offered such instruction. UM-Rolla's enrollment climbed from 5,129 in 1978 to 6,904 in 1981. Most of the growth occurred in the School of Engineering (from 3,298 in 1978 to 4,467 in 1981), but the School of Mines and Metallurgy also increased from 879 to 1083, and the College of Arts and Sciences, from 903 to 1291. State appropriations failed to match those increases. Between 1978 and 1981 the state appropriated about \$16.6 million, \$18.5 million, \$20.6 million, and \$18.2 million, respectively. The proportion of the campus budget coming from the state decreased from 53.9 percent in 1978 to 40.9 percent in 1981 which forced the University to increase student contributions. Tuition and fees comprised 15.9 percent of the budget in 1978 and 20.3 percent in 1981. The proportion of the budget coming from housing and food services jumped from 8.9 percent to 13.5 percent. Private giving also helped make up the difference; it increased from 4.1 percent to 7.1 percent during those years.

Although student numbers increased by more than 1,700, the size of the faculty changed little, ranging from 331 full-time faculty members in 1978-1979 to 328 in 1980-1981. To teach the large numbers, faculty members accepted heavier class loads.

## **Buildings**

Even in the economic atmosphere of 1978-1982, Marchello succeeded in improving campus facilities. The Rolla Building, the oldest

building on campus, desperately needed the renovation it received because it had suffered long neglect. Renovation of the quadrangle dormitory complex and the older part of the Walter T. Schrenk Chemistry-Chemical Engineering Building kept workmen busy. An addition to the Thomas Jefferson Hall was begun in 1981 to help relieve housing pressure. Since 1979, the University had leased rooms from area motels, operating a shuttle bus between them and the campus. In keeping with preservation of old buildings, the exterior of the Chancellor's Residence was restored to its 1889 appearance.

In addition, plans came off drawing boards for three new buildings. A Mineral Engineering Building topped the list with a projected cost of \$18 million. Chancellor Marchello, Frank Mackaman, and development officer Howard Eloe began seeking the \$3.5 million that will be the University's contribution. Among major private donors to the building are Harry H. Kessler and his wife who gave UMR an interest in a producing mine valued at \$250,000. (Kessler, a prominent alumnus, gained fame not only in his profession of metallurgical engineering, but, also, as a boxing referee.) When completed, the building will house the departments of ceramic, geological, mining, metallurgical, and petroleum engineering, and geology and geophysics.

A new Engineering Management Building also is planned at a cost of \$2.5 million. In part, through the generosity of alumnus E.A. Smith, the University's \$500,000 contribution has already been raised. (Smith was a Tulsa oilman and executive.)

UMR also completed plans for an Auditorium-Music-Alumni Building, projected to cost \$5.5 million. It will help solve the problem of inadequate facilities for the performing arts and provide a gathering place for alumni. The University's contribution will require \$1.7 million. These additions will make campus facilities more suitable for the educational purposes of the University.

The "Old Met" Building was renamed the Engineering Mechanics Building, reflecting its current use.

#### Research

Research is important on the Rolla campus, much of it related to the needs of the people and industries of Missouri and to state and national problems such as energy, mineral resources, and environment. UMR's specialized research centers carry out investigations which are often joint ventures among different fields of engineering. Among these are the Graduate Center for Materials Research, Graduate Center for Cloud Physics Research, Transportation Institute, Environmental Research Center, Rock Mechanics and Explosives Research Center, Institute of River Studies, Center for Applied Engineering Management, Electronics Research Center, Institute for Chemical and Extractive Metallurgy, Renewable Resources Research Center, Missouri Mining and Mineral Resources Research Institute, and the Generic Mineral Technology Center for Pyrometallurgy. There is also a Center for International Programs and Studies and a Center for Aging Studies.

The Southern States Energy Board recognized the School of Mines and Metallurgy by making it a Regional Center for Nuclear Manpower Development.

#### Curators' Professors

The University of Missouri Board of Curators has recognized four UMR faculty members for their work by naming them Curators' Professors. Dr. Stig E. Friberg, professor of chemistry, received the designation in 1979. His research in colloidal and surface chemistry is concerned generally with systems of water, oil, and amphiphilic substances. A few months later, the Board afforded the same honor to Dr. David A. Summers, professor of mining engineering. Dr. Summers' research is in the vanguard of using water jets to mine coal and other minerals. In 1981, Dr. Delbert E. Day, professor of ceramic engineering, joined them in holding the title. An alumnus of the University, Dr. Day is involved in a wide range of research devoted to obtaining a better understanding of the relationship between the properties, structure, and chemical composition of glasses. In November 1982, Dr. Wei-Wen Yu became a Curators' Professor of Civil Engineering. Dr. Yu is an authority in structural engineering, particularly in the field of cold-formed steel structures.

UMR faculty awards are numerous. For instance, Dr. Laird D. Schearer, professor of physics, received the University of Missouri's Presidential Research Award in 1980-1981. The award of \$10,000 was granted to support his continuing research on the properties of electrical discharges in gaseous media. During 1981-1982, a University committee selected Dr. Douglas C. Wixson, Jr., associate profes-

sor of English, to receive the Thomas Jefferson Award. Wixson was the first member of the UMR community to receive the honor, one of the highest awards conferred by the University of Missouri system.

## Instruction: Computer Technology

In 1981, the campus purchased \$1.2 million in hardware to begin the integration of the most advanced computer graphics education into the undergraduate engineering curricula. Computer-Aided Design/Computer-Aided Manufacturing or CAD/CAM equipment enables students to produce in a short time, high quality and sophisticated engineering drawings at a computer terminal instead of at a drafting table. The next year, a robot was added to the CAD/CAM operation. A grant of \$250,000 from NSF directed by Dr. Thomas R. Faucett, professor of mechanical engineering, will aid in developing the full capabilities of the CAD/CAM system.

## Degrees and Departmentalization

Students enrolling at UMR in the fall of 1982 could select from more than 80 different degree programs. The liberal arts accounted for seven, all at the bachelor's level, while the sciences offered 16 programs ranging from B.S. through Ph.D. Engineering programs accounted for the rest and ranged from B.S. to Ph.D. and doctor of engineering degrees. The Board of Curators had approved a B.S. degree in life sciences in 1978 and Ph.D. degrees in engineering mechanics and engineering management in 1981.

Changes in departmentalization in the School of Mines and Metallurgy and College of Arts and Sciences become effective July 1, 1983. In the School of Mines and Metallurgy, the department of metallurgical and nuclear engineering will be discontinued and separate departments of metallurgical engineering and nuclear engineering will be established in its place. In the College of Arts and Sciences, the department of humanities and the department of social sciences will be discontinued and separate departments of psychology, philosophy, history and political science, English, economics, and applied arts and cultural studies will be created in their place. (The department of applied arts and cultural studies will include the music/art/theater program, speech and media studies, anthropology/

sociology, and foreign languages.) Life sciences will also be a separate department.

With its engineering management department the largest in the country, its computer science department ranked in the top eight percent, five of the departments in the School of Mines and Metallurgy ranked in the top 10 in the country, and most of its engineering departments among the country's largest, UMR blended the most advanced with the traditional in engineering education. It ranked eighth in undergraduate engineering enrollment in the country in 1981.

During its more than 100 years of life, the University educated individuals who led the way through the automotive age, the electronics age, and the nuclear age. It continued to educate those who will lead during the space and computer age. Since 1964, UMR had transformed itself into a modern university, and it faced the rapid pace of change that the future promised with confidence.

# "No School Is An Island" Student Life, 1963-1982

No campus during this period escaped the currents of life in America. Across the country, the women's and civil rights movements were creating change. The Vietnam war, drugs, and riotous behavior intruded on the tranquility of life. Meanwhile, the Rolla campus changed but lost neither traditions nor fundamental character.

#### The Arrival of Women

To some it was an invasion; to others it was the realization of long-held hopes. The arrival of women on campus in significant numbers began during the mid-1960s. Spurred by the women's rights movement that urged them to be anything they wanted to be, young women enrolled in engineering and science curricula. The expansion of liberal arts offerings with degree programs attracted other women to campus. What began as a trickle developed into a stream: in 1964, 57 women enrolled; in 1969, 261 became UM-Rolla students; in 1973, the figure reached 469, more than 10 percent of the student body.

Where to house the increasing number of co-eds was a challenge. In 1962, the University bought a private dwelling on State Street and converted it into a dormitory for 14 women. (Pansye Heimberger was UMR's first housemother in a women's dormitory.) Construction of the Thomas Jefferson Residence Hall in 1966, with one floor provided for women, relieved some of the pressure. Higher enrollments by 1969 prompted the University to purchase the old Stuart Apartments, more than doubling the space provided for women. In 1972, the University made McAnerney Hall, formerly a men's dormitory in the Quad Complex, into a women's facility. Now UMR had space for 112 women. That same year, UMR moved even more into the mainstream when an open-house policy was approved. If 70 percent of dormitory

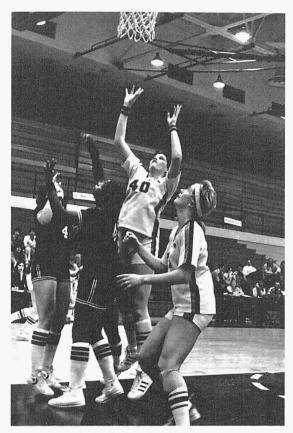
residents voted in favor of visitation, men and women could visit one another in University housing units. In 1973, officials initiated a "key policy" for residence hall women. If a parent signed a permission form, the women could come and go as they pleased.

Some of the male students felt threatened by the presence of women on campus. In recent years, however, women have become members of the Student Union Board, and in 1980, the board elected Sue Leach as its first woman president. In 1982, Mindy Woodill breached one of the last barriers by becoming a member of the St. Pat's Board.

Leach and Woodill represented only the most recent "firsts" for women on campus. Following the example of the literary clubs of the 1880s and 1890s and Pi Delta Chi, the 1940s sorority, co-eds established in 1963 an organization called Women Students at MSM Women cheerleaders appeared at homecoming in 1965, wearing sweaters donated by men, who led cheers the year before, and homemade skirts. In 1966, Myra Jane Wilson became the first student baton twirler in the 40-year history of the ROTC Band. In the same year, the Society of Women Engineers, which had been founded in 1960, reactivated, and a Women's Residence Hall Organization was established. The first national sorority on campus, Kappa Delta, received its charter in the fall of 1972, and Zeta Tau Alpha received its charter in the spring of 1973. In 1979, Chi Omega joined them, and, in 1981, Alpha Kappa Alpha received its charter. Gone were the days when an annual all-school mixer brought busloads of girls from various women's colleges for party weekends.

A larger number of women on campus and federal regulations that required some measure of parity for women's sports inspired the athletic department to develop a women's program. Women's intercollegiate athletics began in 1969 with track competition. Annette Caruso became the first women's coach at UMR, joining the staff in 1974. By 1982, with women's enrollment at over 1,400, varsity sports for women included: tennis, soccer, cross country, basketball, and softball.

A 1950 graduate returning for homecoming in 1970 would have noted the large number of co-eds on campus. He or she would have noted also the number of black students enrolled. (Lelia Thompson Flagg, who received a B.S. in civil engineering in 1960, was the first black woman to graduate from UMR.) The civil rights movement made blacks aware of possibilities in science and engineering and federal



Women's varsity basketball, late 1970s.

government support of integration made companies eager to recruit black employees. By 1965, black males on campus organized a chapter of Alpha Phi Alpha, the oldest Greek fraternity for black men in America. In 1969, Frank Winfield, a member of Alpha Phi Alpha and a football tackle who was named UMR's first Kodak All-American, led in organizing the Association For Black Students. The 30 members included both men and women. In 1970 they sponsored the first annual Black Culture Week. During the next decade, Black Culture Week brought to campus such important leaders as Charles Evers, Hosiah Williams, Julian Bond, and Eugene D. Jackson, UMR alumnus who created the first black-owned and-operated national radio network.

Sharon Warren, a Stephens College senior, was selected UMR homecoming queen in 1976. She was the first black to hold this honor.

In 1973, a group of faculty members and the Association for Black Students developed a plan to bring minority students to campus through a scholarship program supported by industry. It was named the Minority Engineering Program and was initiated during 1974. By fall of 1982, 63 students in the program had received degrees. In 1982, 80 minority scholars were a part of the program directed by Floyd Harris, who was one of its originators. There is also a Women in Engineering Program. Begun in 1975, as a scholarship program, the Women in Engineering Program had graduated 126 students by June 1982. In fall of 1982, 121 women involved with the program were on campus.



Sharon Warren, 1976 Homecoming Queen.

## Student Attitudes

If the 1950 graduates talked with students of 1970 about their attitudes, they might have been surprised about how little they differed from their own. A 1968 poll showed that UMR students preferred Richard Nixon as their first choice for President. Humphrey came in second, and Wallace made a strong showing in third place. About a third of those responding to the poll said that they were uncommitted. An editorial in a 1969 *Miner* proudly noted:

Here at the University of Missouri-Rolla we have no student strikes, no riots, no National Guard troops. The town lives and thrives with its college community. Relations between community and college and students are extremely good. Students collect for the March of Dimes, collect for Easter Seals, (and) provide labor when needed.

Two years later, an MSM Alumnus article reported that a survey by the American Council of Education revealed that 73 percent of UMR freshmen thought that colleges were too lax on protestors, and only 14.8 percent thought that they had a generation gap with their parents. Alumni Director Ike Edwards said, "Our students are serious in their pursuit of degrees and although they are vitally interested in what's going on in the world, they express their interest in constructive ways."



Gina Pruitt and Randy Donaldson, Minority Engineering Program students, mid-1970s.

School officials of that and earlier periods echoed that sentiment. Dudley Thompson said that he came to Rolla in the 1950s because at MSM there were teachers who wanted to teach and students who wanted to learn.

Ronald Corradin, a student at UMR between 1970 and 1974, explained student attitudes a bit differently. He generalized that the students were apolitical, but remembered that the military draft served as "the single most important influence on student life . . . The rules of the game were clear: stay in college and you'd stay out of the draft and out of Vietnam. Flunk out or quit school or not maintain full-time student status and there was a very good chance you'd be drafted and sent off to the war." Corradin observed, "It made for great scholastic motivation, but it was rough on the nerves."

The younger and older observers perceived campus life correctly; their positions in the system were simply different. The older observers also failed to note that at times the students were unruly.

In April 1964, 200 to 300 students assembled at Eighth and Rolla streets, blocking traffic and taunting policemen and passersby. Just past midnight, the crowd moved northward along Rolla Street, traveled east on Ninth and began stopping traffic on Pine. Next the mob hastened toward the high school. Rolla police and four state troopers intercepted it there, and the students retreated to the campus dispersing at 1:30 a.m. The next evening an estimated 600 Miners gathered on Highway 63 between Eighth and Ninth streets. They soaked a tractor tire with kerosene, set it on fire, and sent it rolling down the street. Next, they derailed a boxcar, tore down a goalpost, and damaged the stands at the high school before dispersing.

Two years later, the annual Halloween outhouse-burning got out-of-hand for no apparent reason. A crowd assembled in front of the Chancellor's Residence to watch the festivities. Suddenly, fireworks began exploding among the students, causing some injuries.

The only campus demonstration against the Vietnam War took place in protest against the invasion of Cambodia and the episode at Kent State. On a sunny day during the first week of May 1970, about 200 students and faculty members marched down the quadrangle after 10:30 classes. They carried signs of protest and sought to have the flag in front of the library lowered to half-mast as a sign of mourning for the dead in Indochina and at Kent State. Other students who disagreed with the protest formed a wall around the flag. Some

verbal combat between the groups allowed both sides to express their viewpoints. By 12:30 p.m. the protestors had more than 200 signatures on a petition requesting that the flag be lowered. Those who presented the petition to Dean Ponder were told that all petitions must be approved by the Student Council. By 1:30 the protest was over.



Burning the outhouse.

In the public's mind, opposition to the Vietnam War, youth rebellion, and drug use went together. At UMR, the level of drug use apparently matched the low level of participation in the other two movements. A flurry of community concern and arrests of students for possessing marijuana marred campus-community relationships during 1971. But the episode died as quickly as it had arisen.

Ronald Corradin explained why so few UM-Rolla students used marijuana and other drugs: "In part this was because UMR tended not to attract people who were into drugs: in part it was because it was impossible to pass the courses if you were stoned much of the time."

From time to time, students protested against conditions. For example, in 1967, students complained about jamming 152 people into a classroom in the Old Cafeteria. The room had poor ventila-

tion, a single exit, and a single blackboard that students had trouble seeing. Laboratories in the "Old Metallurgy Building" were said to be no better, as the foundry and mechanics laboratories were both outdated. Students complained that the chemical engineering laboratory was far too small and that the health services were inadequate.

By the mid '70s, the Miners had become a bit more "feisty," criticizing everything from the curricula to the hours of the Gale Bullman Multi-Purpose Building. The *Missouri Miner* published polls that revealed student attitudes on everything from the American presidency to sex. Student writer Kathryn Lancaster's weekly feature "The Androgynous Zone" drove students to their dictionaries and attracted readers of both sexes.

In 1977, the students selected Diane Speer, a UMR geological engineering major, as their homecoming queen and decided that only UMR co-eds should be candidates for that honor.

Even with the changes, a former Miner and long-time observer of students noted distinct characteristics that survived. Tom Beveridge wrote the following piece in the *Missouri Miner* in 1975, and, because of its timeless quality, it deserves reproduction.

## another faculty column!

# composite j. miner

This interim research report is not completely representative because it focuses on the male science-engineering student. Our coeds are slighted because their numerical (and only) inferiority has not permitted accumulation of sufficient data for an unbiased analysis. Data are sufficient to demonstrate that disparaging remarks pertaining to them in the MINER were obviously written by a hard-core misogynist; our coeds are intelligent, attractive, personable, and welcome part of the student body!

Composite comes from a middle class background and accordingly is not a social snob. He accepts fellow students for what they are regardless of their background. He somewhat conservative, thus as expected, would not fall prey to the doctrines of extremists such as the SDS, the John Birchers, or YAF. Because he is a democratic chap, his nature is informal, and the salutation "Hey Prof" may be somewhat of a shock to the young Ph. D. who calls himself Doctor.

Composite is slightly raunchy but tolerably clean. This axiom

is no longer applicable after the opening of interview season when he becomes refreshingly presentable, even to the point of wearing no headgear in class. His physical appearance and carriage suggest some athletic ability, but this characteristic is sometimes camouflaged by a bit of surplus fat, undoubtedly resulting from some flaw in his diet. Composite's suppleness is demonstrated by his ability to form either a straight-line profile in right-handed chairs or, at the other extreme, to drape like a Salvador Dali painting over the most angular seating devices.

If he is a varsity athlete, he is a good student, thus countering the cliches heard on other university campuses. Whether varsity athlete or not, he shows remarkable poise under pressure as he jaywalks between campus and room with complete lack of fear for Rolla traffic and no change in course or pace.

Composite is not perfect. His grammar leaves some room for improvement, although he does not always realize it, as demonstrated by two identical case histories in my file of freshman who were flunking English and expressed their surprise with the statements "....but I DONE REAL GOOD IN HIGH SCHOOL English." Spelling is also a bit casual, e.g. the windblown clay and silt deposit "loess" appeared as "lust" on one examination (Case no. 1359) and the "c" in "ascend" has been replaced by "s" (Case Histories 981 and 1031). Grafiti carved on desks are an exception to the poor spelling generalization, probably because the words are short, commonly only four letters long. An uncarved writing surface is to him as a tree is to a dog and he offers a challenge to materials technology as he scribes in material a tombstone scriber could not dent.

Even graduate school does not remove the apostrophe syndrome: The possessive "its" appears as "it's" in theses (case histories too numerous to cite by reference numbers).

Grade points have become an obsession to Composite and "C" is no longer average. He will dicker for extra points but is too proud to apple polish (in this case a cliche is slightly preferable to a less tasteful expression). Composite is honest - and human. If an examination is sloppily monitored he will recognize the situation and may react accordingly. His honesty is demonstrated by his excellent record of repaying modest, and in some cases, immodest loans from faculty surrogate parents.

Although his mathematical ability is well above that of the average college students, he backslides in some cases. An example is in projecting grade points. A dossier of case histories shows that an average midterm GPA of 2.133 which he projects to a semester GPA of 2.94 will result in an actual GPA of 1.98. Composite also errs in projection when he calculates that if 4 units of an alcoholic

beverage produce x units of euphoria, 8 units of the same concentration will produce 2x units of euphoria. His sense of time is poor to excellent; he will call the instructor at 11:27 p.m. regarding a question on tomorrow's exam, yet can rouse from a dormant stage in class exactly three minutes before bell time without referring to a timepiece.

Has he changed from the Miner of a few decades ago? Only in some minor mores. The pre-WW II Miner would not have been caught carrying an umbrella or a briefcase; today's Miner is more sensible

regarding precipitation and logistics. The typical Miner of yore was single; today's Miner may contribute to the campus decor with a wife who, in many cases is a useful addition to the campus staff, or a serious and good student. The morals of the Miner have not changed. In the past, he sinned covertly today he sins more openly.

Composite, despite his minor imperfections, is a pleasure to have in class and will not only do well in his profession, but will make some fortunate girl a near-perfect husband. After all, my wife married a Miner!

#### Greeks

While the Greek system eroded at colleges across the nation, it flourished at UM-Rolla. Between 1963 and 1972, one fraternity was reactivated and three others were chartered. Four sororities joined them in the 70's. In 1972, 19 fraternities pledged 331 freshmen or 49 percent of the class. Five new fraternity houses were built on "Fraternity Row" during that decade. Altogether, nine new houses and several additions increased the ability of the Greeks to accommodate their members. Fraternity life continued to manifest such vigor because of the freedom of self-government that University officials allowed the Greeks, according to a long-time fraternity advisor.

Little animosity existed between fraternity members and independents. They joined together in campus organizations and refused to divide politically along membership lines. The independents also organized and sponsored party weekends that differed little from those of the Greeks.

The six or seven party weekends during the year continued to be highlights. With the larger enrollment of women at UMR busloads of girls from other schools no longer arrived, but girls from hometowns and blind dates from various places flocked to Rolla on those special occasions. Between Friday afternoon and Sunday almost continuous parties entertained the Miners and their dates. Of course, St. Pat's remained the ultimate party.

Concerts by popular music groups highlighted those weekends. During 1967, for example, Jay and the Americans, The New Christy Minstrels, The Lettermen, and the Tina Turner Review appeared. The popularity of musical performances continued. In 1982, such groups as Dirt Band, Point Blank, and Missouri played for the Miners.

Besides popular concerts, the campus hosted a wide variety of programs. The Remmers Special Lecturer/Artist Series, inaugurated in 1979 with a fund donated by distinguished alumnus and renowned industrialist and metallurgist Walter E. Remmers and his wife, Miriam, appealed to the serious side of the Miners. Former President Gerald Ford appeared as the first Remmers lecturer. In succeeding years, the series has brought pianist Leonard Pennario, former secretary of state Dr. Henry Kissinger, and economist Louis Rukeyser.

Other campus cultural opportunities have grown with the expanded Campus Performing Arts Series. The 1979-80 school year, for example, included performances by the Canadian Brass, Texas Opera Theater, and others. In the 1981-1982 season, the Missouri and Arkansas Repertory Theatre troupes and a number of musical groups from across the country gave performances. UM-Rolla's own musicians presented 35 concerts and programs in 1981-82. These include



Madrigal Dinner performers.

the Madrigal Dinners presented each Christmas in recent years. Public radio KUMR-FM, located on campus, has brought additional cultural programs to south central Missouri since it went on the air in 1973.

## Organizations

While most campus organizations flourished between 1963 and 1982, eating clubs declined in number. At their peak in the late '60s, six eating clubs fed more than 1,000 members, about one-third of the students on campus. Financial difficulties and declining membership because of competition from the Thomas Jefferson Residence Hall, led the Shamrock Club to close its doors in 1972, leaving only the Campus, Engineers', and Tech Engine Clubs. In 1975, Tech Engine and the Engineers' Club merged, and only it and the Campus Club



UMR choir and orchestra in concert, 1980.

remained. Membership in the two clubs is about 300. Other organizations flourished. Both in 1968 and 1982 the campus recognized 106 scholastic, professional, service, social, and other associations and societies. In neither year did that figure include residence hall organizations, which numbered eight in 1968 and 31 in 1982. The range of organizations suggested the diversity and the variety of

student interests. Practically every discipline had a student professional club, and many had honor societies. Student organizations were heavily involved in service activities both locally and throughout the state.

In 1981-1982, more than 200 students played in the various musical organizations, and another 170 or so served on student governing boards. More than 2,000 students participated in 24 intramural sports. There also were the campus media. The *ROL-LAMO* recorded the happenings of the school year, while the *Missouri Miner* kept students informed on what was happening on campus. In 1963, a student-managed and -operated FM station called KMSM went on the air. The station name was later changed to KMNR.



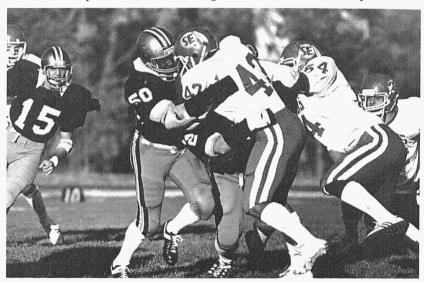
UMR Marching Miners at Mardi Gras, New Orleans, 1978.

#### **Athletics**

During Merl Baker's first year, he and Gale Bullman discussed dropping football from the program. Baker reported that he and Bullman agreed to give the football program a three-year trial period and to continue it if the students supported it. Only 35 men had played on the 1963 team which had won 2 and lost 7. Early in 1964, Baker appointed Bullman athletic director and Dewey Allgood, Bullman's erstwhile assistant and head basketball coach, to head the

football program. Billy Key was hired to coach basketball. Most important, athletic scholarships became available and along with other aspects of UM-Rolla in 1964 the athletic program was on the move.

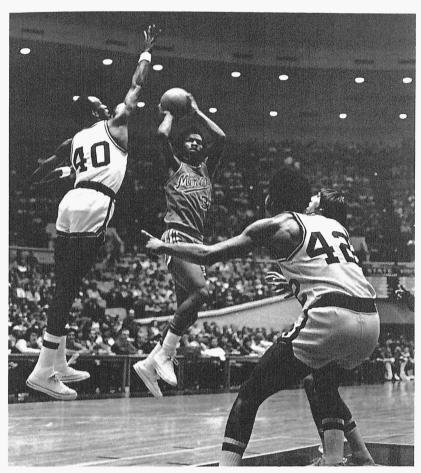
Rebuilding the football program reaped rewards in 1969, when Allgood's team won 7 and lost only 2. In January 1972, Billy Key, having replaced the retiring Gale Bullman as athletic director, named Charles Finley head coach. During the next decade, Finley-coached



Miner football, 1980, undefeated MIAA champions.

teams compiled a winning record highlighted by sharing a conference title in 1977 and a 10-0 performance in 1980. Rivaling the great 1914 team in accomplishment, the 1980 Miners won the conference, led the nation in rushing defense and finished 10th nationally in the NCAA Division II ratings. Finley was named MIAA Coach of the Year and Kodak District VI College Coach of the Year, and Miner safety Bill Grantham was named to the Kodak All-American team.

In the period 1964-1982, an impressive basketball program evolved. Billy Key compiled records of 11-8 in 1965-1966, 11-11 in 1966-1967, and 13-10 in 1967-1968. The basketball program reached a milestone when the 1974-1975 team finished second in the MIAA with an 8-4 conference record and 16-9 overall. This performance led to an invitation to play in an NCAA post-season tournament, a first

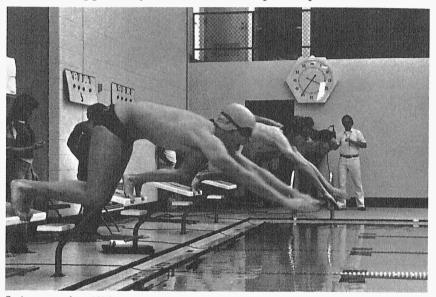


Men's basketball, 1973.

for a Miner basketball team. In 1975-76, the Miners won the conference for the first time, compiling an 18-9 record and receiving another NCAA post-season tournament invitation. The next year, Key's players finished 18-8. Since 1977, the basketball Miners have played competitively and at times have surprised a favored opponent.

Of the various athletic teams, the swimming team has compiled the most consistent record of success. Burr Van Nostrand served as coach during the 1950s and most of the 1960s, and in 1967 was cited by the College Swimming Coaches of America for "his outstanding contributions to collegiate swimming." During his 15 years at the helm, his teams compiled a dual meet record of 72 wins and 36 losses and produced 11 winning seasons.

The swimming team lost its home when workmen demolished Jackling Gymnasium in 1965. With the opening of the Gale Bullman Multi-Purpose Building in 1969, a new pool welcomed a new coach, Robert Pease. Under Pease, Miner swimmers dominated the MIAA during the 1970s; his teams won six conference championships and 24 of his swimmers between 1970 and 1982 won the title of All-American. In addition, Pease's water polo teams won four consecutive Mississippi Valley Conference Championships.



Swim meet, late 1970s.

Intercollegiate wrestling began in 1969, but Miner teams succeeded in compiling more wins than losses in dual meets in only four seasons. Miner wrestlers, however, have participated in the national tournament as individuals five times. Track and field and cross country varsity teams have continued to compete, but have seldom compiled winning records as teams. Individuals, however, have captured conference titles and represented UMR at nationals. Golf has been a successful program. The 1969 team won the conference and finished 11th in the national tournament. On four occasions, the Miner team produced the conference individual medalist and indi-



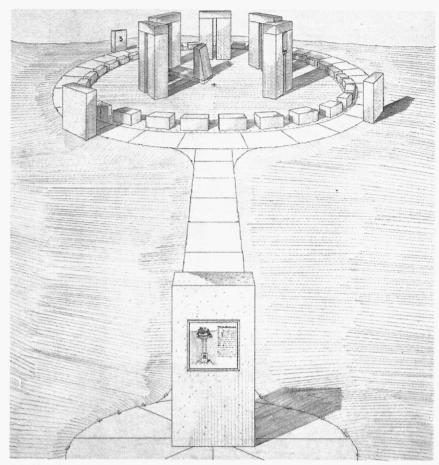
Miner baseball, early 1970s.

viduals have often represented UMR at the national meet. The UMR Rifle team, coached by an ROTC instructor, has often been among the national leaders. Tennis teams coached by geology professor Ray Morgan played competitively throughout this era. Paul McNally became the tennis coach at UMR in 1980.

Baseball was renewed in 1964 as a part of the new emphasis on athletics. The first year of conference play, in 1967, the Miners won the MIAA. They won again in the early 1970s. Soccer, the newest varsity sport, established winning records of 10-5-1 in 1980, 11-7-1 in 1981 and 11-7-3 in 1982. A new soccer field, national ranking during a portion of the season and a second-place finish in the MIAA made 1982 the best season yet for UMR soccer, coached by Paul McNally.

## Conclusion

There is a saying, "The more things change, the more they stay the same." At first glance the University of Missouri-Rolla appears to have little in common with the old University of Missouri School of Mines and Metallurgy. The phrase seems inappropriate. In 1982, there are more than 7,000 students on campus, many of them



A half-scale partial reconstruction of Stonehenge will grace the campus in 1983.

living in dormitories, apartments, rooming houses, and motels. Buses shuttle them through the busy streets of Rolla from their residences to the 87 buildings on the 70-acre campus. Current students major in academic areas ranging from aerospace engineering to psychology. Women make up 18 percent of the student body, and most of them major in engineering. To today's engineering students at UMR, the computer is almost as indispensable as the slide rule was to their fathers.

But wait. The Campus and Tech-Engine Clubs of today are descendants of those fabled eating clubs of the past. The Rolla

Building and other structures have been restored and stand amidst the new buildings to remind the observer of the University's rich tradition that reaches back into the nineteenth century.

Miners of the 1980s still burn an outhouse on Halloween and eagerly anticipate the coming of spring as they participate in St. Patrick's Day celebrations.

And, although others have replaced the likes of George E. Ladd, Curtis Laws Wilson, George Dean, "Boots" Clayton, Sam Lloyd, Clair Mann, Tom Beveridge, and others of the past, their spirit and wisdom remain; their words and wit reverberate through the halls, offices, laboratories and classrooms. They are still with us.

If one requires further proof of the University's links to the past, consider this statement from an MSM "Student Life" pamphlet of 1919:

Considering the cost in time and money, no better investment can be made for a young man [or in 1982, a young woman] than a four-year course in the Missouri School of Mines. It means a larger opportunity in life for service, a better chance for advancement, and it opens the way to the highest salaried positions in business and industry.

The more things change, the more they stay the same.

ROLLAMO '78



The more things change...



...the more they stay the same.

ROLLAMO '59

## Epilogue

This book records highlights of the Rolla campus and the activities of its people. MSM/UMR has been an active participant in 112 years of history. UM-Rolla's tradition of excellence, as evidenced by its long line of successful graduates, ensures a bright future for the campus, and its alumni, students, faculty, and staff will continue to make significant contributions to the affairs of the state, nation, and world.

In many ways the University of Missouri-Rolla exemplifies the character of the state's adopted son, Thomas Jefferson. Graduates of UMR have made major contributions to all areas of science, technology and society; they have been enthusiastic participants in every aspect of life. The campus has contributed to the growth of the nation in the finest Jeffersonian tradition.

One may speculate on the future of the Rolla campus, secure in the knowledge that history repeats itself. A university that has grown and developed through good and bad times and participated in scientific and industrial revolutions certainly can face the future with enthusiasm and optimism.

The University of Missouri-Rolla today is more than a mining and engineering school; it is a university. While retaining its excellent reputation in science and technology, the campus in recent years has evolved into the university for south central Missouri. Its programs in the Fort Leonard Wood area and in St. Louis extend the campus across Missouri, and its international activities ensure worldwide awareness.

The continued and growing needs of the nation for energy and mineral resources virtually assure the sustained importance of our Schools of Mines and Metallurgy and Engineering. They can be expected to contribute in the future, as in the past, an important outpouring of new knowledge and graduates. These alumni will be well-versed in the latest theories and techniques and will have firsthand working knowledge of the equipment and methods of their profession.

Perhaps the most important aspects of the future decades will be the pervasiveness of the microelectronics and microbiological revolutions begun in recent years. No branch of industry or facet of life will escape. The microprocessor is already evident in new industrial systems, such as instruments, sensors and robots, and it is entering the office and home.

Microprocessing technology is reordering the nature of engineering practice. And, UMR is a leader in these changes. During the past few

years the campus has provided engineering educational leadership with its computer graphics, computer-assisted design and manufacturing, and robotics courses and research. No doubt at the beginning of the 21st century campus historians will look back with pride on UMR's part in this revolution.

The College of Arts and Sciences will grow and contribute in many areas. The strong applied mathematics and computer science programs nicely complement the engineering programs and will play an important role in the information society we are entering. The sciences, in their own right and jointly with engineering, have much to offer. The programs in the humanities and social sciences can be expected to contribute, particularly at the sociotechnical interface that will be so important in the future.

The campus master plan provides for continued maintenance and renovation of UMR's buildings. It also provides for completion of several buildings and the addition of three new buildings. The plan has the endorsement of the Board of Curators, and it will be carried out as funds become available.

The hallmark of the master plan is the development of an impressive entrance to the campus at 14th Street and Bishop Avenue. The proposed Mineral Engineering Building on the northeast corner of this intersection will set off this entrance. Just east will be the proposed Engineering Management Building providing a focal point for the intersection of 14th and State streets. The new Auditorium with a performing arts theater, music facilities and alumni office will be located on the southeast corner of 11th and State streets. These new buildings, with other improvements, should provide attractive and appropriate facilities for the campus as it enters the 21st century.

It is not expected that enrollment will change greatly during the 1980s. While the college-age population will decline, the attractiveness of UMR should provide a counterbalance. In the 1990s, when the college-age population begins to grow, UMR can expect enrollment increases, possibly at a greater rate than the population. This would be particularly true if the new buildings are completed.

It is far easier to speculate on the future of science and engineering than on student life, and a prudent person would not go too far in this area. Campus life has changed greatly over the years and no doubt will continue to evolve. Many of the fine traditions, such as St. Pat's and Homecoming, will continue and others will probably be introduced.

In summary, the future of UMR is bright. Its faculty, students and alumni have worked hard, played hard, made many fine contributions and enjoyed significant success. There is every reason to believe they will continue to do so.

## Appendix

(All UMR honors are too numerous to be included in this volume. The appendix, however, does contain several lists of accomplishments. These lists have been supplied by the various departments which help coordinate the respective activities.)

## Academic Council Chairpersons Since 1971

William A. Andrews Otto H. Hill James H. Tracey B. Ken Robertson James W. Johnson P. Darrell Ownby Wayne C. Cogell Delbert E. Day Thomas B. Baird Paul D. Stigall Robert V. Wolf A. Glen Haddock Jerry R. Bayless Carol Ann Smith

## Academy of Civil Engineers

Robert W. Abbett William C. Alsmeyer James S. Anderson Chester H. Baker Donald S. Ballard Robert D. Bay Col. Robert G. Bening Robert K. Boyd Cov L. Breuer Harold G. Butzer Edward L. Calcaterra Paul F. Carlton W. Dale Carney Harold R. Crane Eugene J. Daily Donald L. Dean Stanley Dolecki John G. Duba Wayne S. Frame

Vernon A. Gevecker **James Glover** Thomas A. Herrmann Leroy H. Jackson Vernon T. Jones Raymond O. Kasten Robert J. Kemper Daniel Kennedy Ronald M. Kingsbury Dale Klohr Donald J. Kozeny Joseph F. Krispin Fred S. Kummer Col. Harley W. Ladd Harvey Leaver Robert G. Livingston Joel F. Loveridge Francis D. Lyons Peter F. Mattei James B. McGrath

Garth G. McKinney Arthur R. Meenen Paul R. Munger E.L. Perry I. Kent Roberts Kenneth W. Schoeneberg Joseph H. Senne, Jr. J. Russell Snowden John P. Soult Neil Stueck Otis H. Taylor John C. Theiss Vester B. Unsell Robert E. Vansant Ernest A. Weinel Warren R. Wieland Russell H. Wiethop Carl I. Weis William L. Wisch

## Academy of Electrical Engineers

Wayne J. Bennetsen Charles E. Boulson

Herman Fritschen Jr.

Charles E. Brinkmann Phillip O. Brown

Frederick B. Burns W. James Carr, Jr. Thomas O. English Fred W. Finley C. James Grimm R.C. Hansen J. Stuart Johnson Vernon R. Lawson Edwin W. Logan Israel H. Lovett Elmer L. Luehring Fred M. Mueller William F. Oberschelp Joseph W. Rittenhouse William A. Rutledge James J. Skiles Gabriel G. Skitek Harry B. Smith Hueston Smith Leroy E. Smith P. Gene Smith Lawrence A. Spanier James W. Stephens William A. Wundrack

## Academy of Engineering Managers

Robert S. Bruce Robert Burton Wilbur Feagan Gilbert Fuller Dennis Hanlon Larry Johnson Samuel LaPresta Norris Perry Kenneth D. Pohlig Thomas Owens Ralph Ozorkiewicz S. Kent Roberts Howard Stine Michael Svoboda Daniel Wilson

#### Alumni Association Past Directors

Rex Alford Frank C. Appleyard Bill L. Atchley Albert E. Barnard Allen G. Behring Thomas R. Beveridge Daniel W. Blaylock William H. Burgin Horace H. Clark Charles Y. Clayton Ernest A. Crawford Robert P. Cummins George J. Decker George A. Easley Francis C. Edwards J. Craig Ellis Edward W. Engelmann Eugene C. Fadler Larry E. Farmer C. Stuart Ferrell James O. Ferrell William B. Fletcher H. William Flood David L. Forrester Charles A. Freeman Herman A. Fritschen, Jr. Theodore C. Gerber August W. Gleason Ralph C. Graham

Donald N. Griffin David P. Hale, Jr. Herbert R. Hanley Henry H. Hartzell James L. Head Frederick W. Heiser Leon Hershkowitz Bennett D. Howell Noel Hubbard Daniel C. Jackling Gunnard E. Johnson Oliver W. Kamper Howard M. Katz William O. Keeling Mervin J. Kelly Karl K. Kershner A. James Kiesler Leonard C. Kirberg William E.H. Knight Harold W. Kosten Harold A. Krueger Allan H. LaPlante Samuel H. Lloyd Vernon T. Loesing Belding H. McCurdy Gilbert F. Metz Benton F. Murphy James J. Murphy Enoch R. Needles

Barney Nuell Clarence C. Palmer Jerome D. Patterson William E. Patterson Harry S. Pence E.L. Roy Perry C.J. Potter Richard G. Prough Ray F. Rucker Waldemar P. Ruemmler Julius C. Salmon, Ir. R. Michael Salmon Joseph E. Scalley George R. Schillinger E. Murray Schmidt Robert F. Schmidt Hans E. Schmoldt Carl G. Stifel S. Allan Stone Clifford C. Tanquary Bruce E. Tarantola Howard J. Teas Harvey L. Tedrow Martin H. Thornberry Edward N. Thurmond George D. Tomazi John B. Toomey Louis A. Turnbull Herman F. Valentine

Claude N. Valerius Robert P. Vienhage James A. Vincent Rolla T. Wade John A. Walker John W. Wallace John K. Walsh Joseph M. Wanenmacher Edwin J. Werner Rex Z. Williams John O. Wilms Walter C. Zeuch Henry E. Zoller

#### Alumni Awardees

David I. Allen William W. Andrews Bill L. Atchlev Nolan B. Aughenbaugh Keith E. Bailey Merl Baker Robert L. Banks Albert E. Barnard Richard H. Bauer Jerry R. Bayless Milo N. Bedell Elmer W. Belew Wayne J. Bennetsen Hugh R. Berry Jerome T. Berry J. Robert Betten Thomas R. Beveridge Raymond L. Bisplinghoff James T. Blair, Jr. Jack R. Bodine John H. Bowles Robert K. Boyd Alfred A. Boyle Anton deS. Brasunas Matthew P. Brazill, Ir. John M. Brewer William Brewer Guy Brown, Ir. John S. Brown Gale Bullman Mrs. Gale Bullman William H. Burgin William D. Busch Joe B. Butler E. Taylor Campbell Ernest W. Carlton Elmond L. Claridge Charles Y. Clayton

Benjamin H. Cody

William W. Collins

Carl H. Cotterill G. Robert Couch Clyde L. Cowan, Jr. John M. Dalton Delbert E. Day Donald G. DeBolt Paul T. Dowling Rov H. Dunham Donnell W. Dutton George A. Easley Francis C. Edwards Mrs. Francis C. Edwards Robert L. Ehrlich Farouk E.S. El-Baz F. Stillman Elfred, Jr. Elmer Ellis J. Craig Ellis Edward W. Engelmann Thomas O. English Durward E. Fagan Thomas R. Faucett David L. Fenton Oliver B. Ferguson James O. Ferrell Armin F. Fick Lester E. Fields James Finch, Jr. Morris M. Fine Fred W. Finley Virgil J. Flanigan David J. Flesh William B. Fletcher Ragan Ford George E. Fort Wayne S. Frame Charles A. Freeman Edward S. Fris Herman A. Fritschen, Jr. Harold O Fuller Elmer Gammeter

Steven M. Gardner August J. Garver Thor Gjelsteen Roscoe B. Goslin David S. Gould John P. Govier Allen P. Green, Jr. Sidney J. Green Eva Hirdler Greene Harvey H. Grice H.M. Griffith C. James Grimm Alden G. Hacker A. Glen Haddock Herbert R. Hanley Peter G. Hansen Karl F. Hasselmann Frederick W. Heiser Leon Hershkowitz Thomas A. Holmes Anthony Homyk, Jr. Bert F. Hoover Edward E. Hornsey Noel Hubbard Russell W. Hunt John C. Ingram Daniel C. Jackling William I. James Gunnard E. Johnson Billy R. Jones Vernon T. Jones Oliver W. Kamper James L. Kassner, Ir. Raymond O. Kasten Mervin J. Kelly Mrs. Mervin J. Kelly Daniel Kennedy John R. Kenney William D. Kent Harry H. Kessler

James C. Kirkpatrick William T. Kratzer Joseph J. Krebs Frederick S. Kummer Harley W. Ladd Jennings R. Lambeth Mark B. Layne Mrs. Thomas Witt Leach Harvey B. Leaver Walter P. Leber Robert B. Lewis Roy A. Lindgren Mrs. Samuel H. Lloyd Samuel H. Lloyd Walter F. Lottman Joel F. Loveridge Israel H. Lovett Edward D. Lynton John H. Lyons Edwin G. Machin Frank Mackaman Frank C. Mann Peter F. Mattei Kenneth G. Mayhan Ray McBrian Jerry E. McBride Martha McCormick Vernon T. McGhee James M. McKelvev John H. McKinley Mrs. V.H. McNutt Allen McReynolds Gilbert F. Metz Hilbert F. Michel Frederick A. Middlebush Aaron J. Miles Henry D. Monsch R. Gill Montgomery Bob L. Mornin Karlheinz C. Muhlbauer Garrett A. Muilenburg Paul R. Munger James J. Murphy Enoch R. Needles Leonard C. Nelson James A. Neustaedter Marvin E. Nevins, Jr.

Melvin E. Nickel Al Nilges Barney Nuell Thomas J. O'Keefe Iames C. Olson Sylvester J. Pagano Clarence C. Palmer James F. Patterson James R. Paul Harry S. Pence Mrs. Harry Pence E.L. Roy Perry Robert C. Perry Theodore J.M. Planje Josef Podzimek Jim C. Pogue John R. Post C.I. Potter Herbert L. Prange Earl J. Randolph Rolfe M. Rankin C. Brice Ratchford Victor Reef Joseph H. Reid Charles R. Remington, Jr. Walter E. Remmers Lloyd E. Reuss A.E. Rhodes Vernon W. Rieke W. Robert Riggs Joseph W. Rittenhouse J. Kent Roberts B. Ken Robertson William A. Rutledge Julius C. Salmon, Jr. Bernard R. Sarchet Rodney A. Schaefer Robert P. Schafer John A. Schlensker Hans E. Schmoldt Fred C. Schneeberger Walter T. Schrenk Leonard L. Schuler, Ir. Edwin K. Schuman John M. Schuman William K. Schweickhardt Gordon L. Scofield

James J. Scott John W. Scott Gabriel G. Skitek Edward A. Smith Harry B. Smith Tom K. Smith William J. Smothers Charles A. Sorrell John P. Soult J. Victor Spalding Charles H. Sparks Jesse H. Steinmesch James W. Stephens Carl G. Stifel S. Allan Stone C.F.P. Stueck David A. Summers Ronald A. Tappmeyer Otis H. Taylor Harvey L. Tedrow Edgar J. Telthorst Arthur D. Terrell Harold D. Thomas Dudley Thompson Jack H. Thompson Martin H. Thornberry John B. Toomey Frank E. Townsend James H. Tracey Mrs. Louise S. Tucker A.G. Unklesbay Claude N. Valerius John A. Walker Joseph M. Wanenmacher John C. Weaver William H. Webb Melvin P. Weigel Carl J. Weis Wilfred W. Westerfeld Russell H. Wiethop Rex Z. Williams Curtis L. Wilson Joseph M. Wilson Bobby G. Wixson Joseph J. Yancik Wei-Wen Yu Henry E. Zoller

#### Chancellor Medal

#### Rex Z. Williams, Dec. 19, 1982

The first UMR Chancellor Medal was awarded to Rolla businessman Rex Z. Williams during winter commencement, Dec. 19, 1982.

The UMR Chancellor Medal was established in 1982 under the auspices of UM-Rolla Chancellor Joseph M. Marchello to honor individuals who have contributed to the well-being, growth and development of UMR.

The award is authorized and sponsored by the MSM-UMR Alumni Association, University of Missouri-Rolla.

Williams received a B.S. in metallurgical engineering (1931) and a B.S. in civil engineering (1935) from UM-Rolla. He also holds an M.S. in engineering mechanics from the University of Wisconsin (1936) and attended the University

sity of Michigan.

He joined the UMR faculty in 1931 as an instructor of mechanics and later became professor of mechanics and chairman of the department of mechanics. He was associate dean of UM-Rolla (at that time the number-two administrative position on campus) in 1952 when he resigned to become executive vice president of the Rolla State Bank (now Centerre Bank). He had been a member of the bank's board of directors since 1944. He became president of the bank in 1960 and chairman of the board in 1975.

In 1934 Williams developed iron pyrites in Phelps County while operating under the name Thomas & Williams Mining Company. The operation continued until 1939 at which time it was Missouri's largest producer of

pyrites.

Williams began serving a six-year term on the University of Missouri Board of Curators in 1975 and served as the Board's president for one year. In addition, he served as treasurer of UM-Rolla for nine years and was a director of the MSM-UMR Alumni Association for 19 years.

He is a member of Tau Beta Pi and Phi Kappa Phi honor societies, Theta Tau professional engineering fraternity and Lambda Chi Alpha social frater-

nity.

In community organizations, Williams has served on the Rolla Board of Aldermen and the Board of Trustees for Phelps County Regional Medical Center. He also has been president and a member of the board of directors of the Rolla Area Chamber of Commerce, a director of the Rolla Police Board and a commissioner on the Rolla Housing Authority. In addition, he is a past president of the Rolla Rotary Club and a past district governor of Rotary International.

The primary visual elements in the UMR Chancellor Medal are the intertwined initials "UMR," the word "Rolla," a circle and a triangle. These elements symbolize the excellence of the institution and its completeness, continuity and stability.

The initials indicate the closeness of the relationships that exist between the University, the state of Missouri and the Rolla community. "Rolla" indicates the identification of the word and town with UMR since its founding as the University of Missouri School of Mines and Metallurgy in 1870. The circle circumscribes the University's completeness and continuity, while the triangle, which ties all of the other elements together and which traditionally has been an engineering symbol, represents the mission of the University (education, public service and research) and UM-Rolla's three academic units (Arts and Sciences, Engineering and Mines and Metallurgy).

The medal was designed and executed by Robert V. Wolf, assistant dean of the School of Mines and Metallurgy and acting chairman of the mining engineering department at UMR.

#### Commission on Modification of Activities

James S. Anderson, President Anderson Engineering

Vernon G. Berkey, President Midwestern Steel Division, Armco, Inc.

Allan K. Booth, President AMAX Lead and Zinc Co., Inc.

Alfred J. Buescher, Director Design Engineering/Ralston Purina

Harold R. Crane, President Crane & Fleming

Wesley K. Haisty, President Detroit Tool Engineering Co.

S. Allen Heininger, Vice President Corporate Plans and Business Development Monsanto Company

William A. Rutledge, Vice Chairman Emerson Electric

George H. Taylor, Executive Vice President Wellsville Fire Brick Company

Robert E. Vansant, Partner Black & Veatch

Merton G. Walker, Corporate Director, Technical Administration McDonnell-Douglas Corporation

Rex Z. Williams, Chairman of the Board Centerre Bank of Rolla

## Deans, Department Chairmen and Administrators as of 1982

#### Chancellor

Chancellor: Dr. Joseph M. Marchello

Provost

Provost: Dr. Bobby G. Wixson, acting provost

Deans

School of Mines and Metallurgy: Dr. Don L. Warner, dean Robert V. Wolf, assistant dean

School of Engineering: Dr. Robert L. Davis, dean

Dr. D. Ronald Fannin, assistant dean Dr. William Tranter, assistant dean

College of Arts and Sciences: Dr. Marvin Barker, dean

Dr. Wayne Cogell, associate dean

Continuing Education and Public Service: Dr. G. Edwin Lorey, dean

Graduate Study Office: Dr. Adrian Daane, dean

Dean of Students Office: Dr. B. Ken Robertson, dean

## Department Chairmen and Section Heads

Aerospace Studies (Air Force ROTC): Lt. Col. Lynn Ralston, chairman

Ceramic Engineering: Dr. Robert Moore, chairman

Chemical Engineering: Dr. James Johnson, chairman

Chemistry: Dr. Oliver Manuel, chairman

Civil Engineering: Dr. Joseph Senne, chairman

Computer Science: Dr. Arlan DeKock, acting chairman

Economics: Dr. Curtis Adams, head

Electrical Engineering: Dr. J. Derald Morgan, chairman

Engineering Graphics: Lyman Francis, head

Engineering Management: Dr. Henry Sineath, chairman

Engineering Mechanics: Dr. Peter Hansen, chairman

English: Dr. Michael Patrick, head

Foreign Languages: Alvin C. Steinbach, head

Geological Engineering: Dr. John Rockaway, chairman Geology and Geophysics: Dr. Gerald Rupert, chairman

History and Political Science: Dr. Lawrence O. Christensen, head

Humanities: Dr. James Wise, chairman

Life Sciences: Dr. Nord Gale, professor-in-charge

Mathematics and Statistics: Dr. Louis Grimm, chairman

Mechanical and Aerospace Engineering: Dr. Walter Eversman, chairman Metallurgical and Nuclear Engineering: Dr. Harry Weart, chairman

Military Science (Army ROTC): Lt. Col. Thomas Bryson, chairman

Mining Engineering: Robert Wolf, acting chairman Music/Art/Theater: Dr. David Oakley, professor-in-charge Nuclear Engineering: Dr. Nicholas Tsoulfanidis, head Petroleum Engineering: Dr. Herbert Harvey, chairman

Philosophy: Dr. Robert Oakes, head Physical Education: Billy Key, chairman Physics: Dr. John Park, chairman Psychology: Dr. John Fletcher, head

Social Sciences: Dr. Harry Eisenman, chairman Sociology/Anthropology: Dr. John S. Thomas, head

#### Research Center Directors

Graduate Center for Materials Research: Dr. William James, acting director Graduate Center for Cloud Physics Research: Dr. James Kassner, director

Transportation Institute: Dr. Charles Dare, director

Environmental Research Center: Dr. Ju-Chang Huang, director

Rock Mechanics and Explosives Research Center: Dr. David Summers, director

Institute of River Studies: Dr. Paul Munger, director

Center for Applied Engineering Management: Dr. John Amos, director

Electronics Research Center: Dr. J.R. Betten, director

Missouri Mining and Mineral Resources Research Institute: Dr. David Barr, director Generic Mineral Technology Center for Pyrometallurgy: Dr. Arthur Morris, principal investigator

Center for International Programs and Studies: Dr. Edward C. Bertnolli, acting director

Center for Aging Studies: Dr. W. Nicholas Knight, director

Institute for Chemical and Extractive Metallurgy: Dr. Thomas O'Keefe, director

Engineering Research Laboratory: Dr. Robert L. Davis, director

## Directors

Administrative Data Processing: Art Brooks, director

Administrative Planning: John C. Vaughn, director

Administrative Services: Joseph D. Wollard, executive director

Admissions: Robert B. Lewis, director

Alumni/Development: Frank Mackaman, director

Development Fund: Howard W. Eloe, director

Special Development Projects: Dudley Cress, director

Auxiliary Services: Jess Zink, director

Business Services: Neil K. Smith, director

Career Development: Charles R. Remington, director

College of Arts and Sciences Educational Services: Stephen A. Douglas, director

Computer Center: David Dearth, director

Computing and Information Systems: Otho R. Plummer, director

Counseling and Testing Center: George Schowengerdt, director

Health Services (Infirmary): James M. Myers, M.D., director

Institutional Analysis and Planning: Paul Ponder, director

International Programs and Studies: Edward C. Bertnolli, acting director

Library and Learning Resources Center: Ronald G. Bohley, director

Minority Engineering Program: Floyd Harris, director

Nuclear Reactor: Albert Bolon, director Personnel Services: John R. Molchan, director Physical Plant: Bob L. Marlow, director Public Information: Lynn Waggoner, director

Purchasing: Neal L. Kietzer, director

Radio Station KUMR-FM: Jeffrey R. Stoll, acting general manager

Registrar: Myron G. Parry, acting registrar

School of Engineering Continuing Education: Walter Ries, director

School of Mines and Metallurgy Continuing Education: Frank Haston, director

Student Financial Aid: Robert W. Whites, director UMR Engineering Center: Edward C. Bertnolli, director

University Police: Richard Boulware, chief

University Public Relations and Affirmative Action: Catherine G. Jenks, director Western Historical Manuscript Collection: Mark Stauter, associate director

### Degrees Available—1982

Aerospace Engineering: Bachelor of Science, Master of Science, Professional Development Degree

Ceramic Engineering: Bachelor of Science, Master of Science, Doctor of Philosophy, Doctor of Engineering, Professional Development Degree

Chemical Engineering: Bachelor of Science, Master of Science; Doctor of Philosophy, Doctor of Engineering, Professional Development Degree

Chemistry: Bachelor of Science, Master of Science; Master of Science for Teachers, Doctor of Philosophy

(Emphasis area at bachelor of science level in biochemistry.)

Civil Engineering: Bachelor of Science, Master of Science, Doctor of Philosophy, Doctor of Engineering, Professional Development Degree

(Emphasis areas at all levels in construction, fluid mechanics and hydraulics, environmental and sanitary engineering, geotechnical engineering, structural analysis and design, transportation, and planning. There is a public works emphasis area at the master of science level. A master's is offered in environmental and planning engineering.)

Computer Science: Bachelor of Science, Master of Science, Doctor of Philosophy

(Emphasis areas at the master of science level in operations research, computer systems and language, numerical analysis, computer organization, and information systems.)

Economics: Bachelor of Science, Bachelor of Arts

(Emphasis area in economics/business at the bachelor of science level.)

Electrical Engineering: Bachelor of Science, Master of Science, Doctor of Philosophy, Doctor of Engineering, Professional Development Degree

(Emphasis areas at all levels in circuits, communications-signal processing, computer

engineering, control, electromagnetics, electronics, and power. A master's is offered in solar energy.)

Engineering Management: Bachelor of Science, Master of Science, Doctor of Philosophy, Professional Development Degree

A master's is offered in public works.

Engineering Mechanics: Bachelor of Science, Master of Science, Doctor of Philosophy, Professional Development Degree

English: Bachelor of Arts

Geological Engineering: Bachelor of Science, Master of Science, Doctor of Philosophy, Doctor of Engineering, Professional Development Degree

*Geology and Geophysics*: Bachelor of Science, Master of Science, Doctor of Philosophy (Emphasis areas at all levels in exploration geophysics and exploration geochemistry. Master of science for teachers degree offered in earth sciences.)

History: Bachelor of Arts

Life Sciences: Bachelor of Science

Mathematics and Statistics: Bachelor of Science (applied mathematics), Master of Science (applied mathematics), Master of Science for Teachers, Doctor of Philosophy

(Emphasis areas at the bachelor of science and master of science levels of applied mathematics in applied analysis, algebra, statistics, and computational mathematics. Emphasis areas at the doctor of philosophy level of mathematics in analysis, differential and functional equations, and statistics.)

Mechanical Engineering: Bachelor of Science, Master of Science, Doctor of Philosophy, Doctor of Engineering, Professional Development Degree

(Emphasis areas at all levels in energy conversion, control systems, environmental systems, instrumentation, mechanical design and analysis, materials science, manufacturing processes, and thermal science. There is an aerospace engineering emphasis area at the doctor of philosophy and doctor of engineering levels.)

Metallurgical Engineering: Bachelor of Science, Master of Science, Doctor of Philosophy, Professional Development Degree

(Emphasis areas at the bachelor of science level in extractive metallurgy, metals processing, and physical metallurgy.)

Mining Engineering: Bachelor of Science, Master of Science, Doctor of Philosophy, Doctor of Engineering, Professional Development Degree

Nuclear Engineering: Bachelor of Science, Master of Science, Doctor of Philosophy, Doctor of Engineering, Professional Development Degree

Petroleum Engineering: Bachelor of Science, Master of Science, Doctor of Philosophy, Doctor of Engineering, Professional Development Degree

(Emphasis area at the bachelor of science level in drilling engineering.)

Philosophy: Bachelor of Arts

Physics: Bachelor of Science, Master of Science, Master of Science for Teachers, Doctor of Philosophy

(Emphasis areas at the bachelor of science level in applied physics, biophysics, geophysics, reactor physics, technical administration, and environmental administration.)

Psychology: Bachelor of Science, Bachelor of Arts

## Honorary Degree Recipients

William M. Akin John B. Arthur Hector J. Boza Henry A. Buehler Francis Cameron Russel B. Caples Clyde L. Cowan, Jr. Clinton H. Crane E. Jefferson Crum Paul T. Dowling Charles S. Draper George A. Easley F. Stillman Elfred, Jr. Edward W. Engelmann Thomas O. English Armin F. Fick Andrew Fletcher John S. Foster, Jr. Donald N. Frey John A. Garcia James P. Gill William B. Given, Jr. Allen P. Green Frederick W. Green Herbert R. Hanley

John W. Hanley Robert C. Hansen Karl F. Hasselmann Henry A. Hill Thomas A. Holmes Clark Hungerford Walter R. Ingalls Emerson C. Itschner Daniel C. Jackling Mervin J. Kelly Daniel Kennedy Charles B. Kentnor, Jr. Harry H. Kessler William J. Kroll Jennings R. Lambeth William S. Lowe John H. Lyons Eugene McAuliffe James S. McDonnell Mrs. V.H. McNutt Bob L. Mornin George E. Mueller James J. Murphy Enoch R. Needles George E. Pake

E.L. Roy Perry Wallace R. Persons C.J. Potter Robert H. Quenon Dixy Lee Ray Walter E. Remmers Lloyd E. Reuss Lawrason Riggs, III John E. Schork Gilbert R. Shockley John P. Soult James W. Stephens H. Guyford Stever Leif J. Sverdrup U. Clifton Tainton Charles A. Thomas Carl Tolman Anton J. Tomasek Nathan T. Veatch Charles C. Whittelsey Leon E. Woodman DeMarquis D. Wyatt Howard I. Young Lewis E. Young

### Honorary Knights of St. Patrick

- 1968 Chancellor Merl Baker, Hon. Richard Ichord, Mayor Eugene Northern, James J. Murphy, Hon. J.F. Patterson, Prof. A. Vern Kilpatrick
- 1969 Gov. Warren E. Hearnes, Dr. John C. Weaver, Prof. Samuel H. Lloyd, Gene Sally, Homer Tucker, Prof. Robert V. Wolf, Dr. Harry H. Kessler, Col. Gerald L. Lowther, Col. H.P. Montgomery
- 1970 Coach Gale Bullman, Prof. Karl Moulder, Ray Kasten, William Kratzer, Dr. F. Stillman Elfred, Col. Edward A. Owsley
- 1971 Hon. Stuart Symington (1st Honorary St. Pat), Dr. C. Brice Ratchford, Dr. G. Edwin Lorey, Dr. Bill Atchley, Rudolph Torrini, Robert L. Burnes, John Tryon, Mayor Curtis W. Logan, Edward W. Sowers
- 1972 Hon. James C. Kirkpatrick, Dr. Aaron J. Miles, Dr. E.E. Feind, Francis C. Edwards

- 1973 Hon. Thomas F. Eagleton (Honorary St. Pat), Dr. J. Stuart Johnson, Jerome T. Berry, Peter Mattei
- 1974 Dr. Dudley Thompson, Theodore McNeal, Victor W. Lomax, James McGrath, Hon. Robert Brady, Dr. Thomas O'Keefe
- 1975 Gov. Christopher S. Bond (Honorary St. Pat), Chancellor Raymond L. Bisplinghoff, Elizabeth T. Lorey, Mayor Herald Barnes, Robert Schuchardt
- 1976 Gov. Christopher S. Bond, Hon. Jerry E. McBride, Dr. Theodore J. Planje, Margaret Lloyd, Hans E. Schmoldt, James S. Trainer
- 1977 Hon. James C. Kirkpatrick (Honorary St. Pat), Mrs. V.H. McNutt, Dr. Paul T. Dowling, Ed A. Smith, Dr. Jim C. Pogue, Dr. David L. Oakley, Rev. Joseph W. Carlo, Russell Perry
- 1978 Sen. John C. Danforth (Honorary St. Pat), Prof. C. James Grimm, Dr. Virgil J. Flanigan, Robert M. Brackbill, Dean Adrian H. Daane, Pres. James C. Olson, John D. Powell, Mrs. Marie M. Sidener
- 1979 Hon. Phillip Barry, Dr. James Halligan, Chancellor Joseph Marchello, Mr. J.C. Alexander, Mr. Richard Bauer, Mrs. Faye Tracey
- 1980 John M. (Jack) Keane, Robert McKune, Bob L. Mornin, B. Ken Robertson, Sen. Ralph Uthlaut Jr., Sally White, Rev. James L. Weiberg
- 1981 Mrs. Mary Williams, Joseph W. Mooney, Frank H. Mackaman, John Joseph Kelly, State Treas. Melvin E. Carnahan, Harold E. Atwell, Dewey Allgood
- 1982 Leonard Koederitz, James B. Malloy, Mrs. Joseph M. (Louise) Marchello, Dr. Thomas Murphy, Rep. Al Nilges, David Simily

### MIAA Awardees

UMR athletic records courtesy of Jerome T. Berry, '49 Since the Miners joined the MIAA in 1935, complete records have been kept, conferencewide, in football and basketball. The following men have represented MSM/UMR on these prestigious teams throughout the decades.

#### FOOTBALL: First Team So

| First | Team Selections:   | 1947 | Neal Wood         | 1951 | Jim Tietjens     |  |
|-------|--------------------|------|-------------------|------|------------------|--|
| 1936  | Frank Appleyard    |      | Ralph Stallman    |      | Leland Beverage  |  |
| 1937  | Richard Prough     |      | Jim McGrath       |      | Gene Huffman     |  |
| 1938  | James Wilson       | 1948 | Luther Steele     | 1952 | Walter Smith     |  |
|       | Joe Spafford       |      | Jim McGrath       |      | Parker Bennett   |  |
|       | Harley Ladd        | 1949 | Fred Eckert       |      | Bill Roemerman   |  |
| 1939  | Harley Ladd        |      | Roy Shourd        | 1953 | Parker Bennett   |  |
|       | Joe Spafford       |      | Bill Coolbaugh    |      | Dick Hampel      |  |
| 1940  | Richard Cunningham |      | Art Schmidt       |      | Bill Roemerman   |  |
| 1941  | Ed Kromka          |      | Dick Whitney      | 1954 | John McCarthy    |  |
|       | Paul Fullop        | 1950 | Leland Beverage   |      | Keith Smith      |  |
| 1942  | Meredith Kiburz    |      | Richard Roemerman | 1955 | James Murphy     |  |
| 1946  | Gale Fulghum       |      | Gene Huffman      |      | Val Gene Gribble |  |
|       | Paul Fullop        |      | Ed Kwadas         |      |                  |  |

Morris Hervey

1956 Don Roth Fred White James Wright Ed Hanstein Tom Herrick Darrell McAllister 1971 Bob Somerville Roger Feaster Bob Helm Steve Kutska 1957 Don Agers Dennis Smith Bill Englehardt Bruce Stone Bill Varga 1972 Gary McAlpin Perry Allison Bruce Stone Ray Parker 1973 Merle Dillow 1958 Bobby Ingram Steve Suellentrop Bill Wheeler Jim White Ray Parker 1974 Merle Dillow Tom Cooper Stu Dunlop 1959 Louis Meisenheimer Greg Haug Charles McCaw Mike Keeler Tom Cooper Don Angell 1961 Pat O'Mealy 1976 Terry Ryan Paul Wiegard Kevin Wolf 1962 Terry Wargo Mark Mastrioanni 1967 Larry Oliver Herb Herman 1977 Andy Cox 1968 Larry Oliver Eddie Lane Ken Vaughn Ed Hanstein Terry Ryan 1969 Larry Oliver Greg Elzie Frank Winfield Kevin Wolf Leonard Stout 1978 Dave Hall Ed Hanstein Steve Curran Fred White Terry Ryan Eddie Lane Greg Elzie 1970 Bob Berry Bill Grantham Bob Somerville Craig Heath Steve Kutska 1979 Brian Tepper Bruce Williams Jeff Wozek

Kevin Wolf Craig Heath Bill Grantham 1980 Jim Lee **Bob Sonntag** Bill Grantham Hal Tharp Paul Suellentrop Morris Hervey Steve Bridgman 1981 Paul Suellentrop 1982 Mike Schafer Bob Pressly Paul Demzik Randy Hauser BASKETBALL: First Team Selections: 1935-36 Herman Pfeifer 1957-58 John Sturm 1958-59 John Sturm 1961-62 Norm Schuchman 1963-64 Ralph Farber 1966-67 Randy Vessell 1967-68 Randy Vessell 1971-72 Rich Peters 1972-73 Rich Peters 1973-74 Ken Stalling 1974-75 Bob Stanley 1976-77 Ross Klie **Bob Stanley** 1979-80 Derek Nesbitt 1981-82 Rickie Cannon

### Named Funds

Academy of Civil Engineers Fund Academy of Electrical Engineers Fund Alcoa

Alcoa Fellowship-Ceramics
Alcoa Foundation Scholarship
Alcoa Research Fund-Materials Research Center
A.W. Allen Scholarship Fund
The All American Swimming Scholarship
American Smelting and Refining Company Scholarship
American Society of Mining Engineers Loan Fund
AMAX

AMAX Coal Scholarships
American Metal Climax Foundation Fellowship
AMAX Missouri Lead Scholarship
AMAX Missouri Lead Scholarship-Metallurgy

### 248 / Appendix

Climax Molybdenum Undergraduate Scholarship Climax Undergraduate Programs-Mining Engineering

**AMOCO** 

AMOCO Foundation Incorporated

AMOCO-Geological Engineering

AMOCO Production Foundation Scholarships-Geophysics

Anaconda Aluminum Scholarship

A.P. Green

A.P. Green Brick Company Award

A.P. Green Fire Bricks Company Fellowship

A.P. Green Refractories Scholarship

Robert A. Armstrong Loan Fund

J.B. Arthur & Family

Loan Fund

Scholarship Fund

ASARCO Foundation

Athletic High Ability Out of State Scholarship

Atlantic Richfield-Strunk

Walter E. Baily Scholarship

Chester S. Barnard Loan Fund

Jerome T. and Robert T. Berry Endowment Fund for Athletics

Thomas R. Beveridge Loan Fund

Jack Bobbitt Student Emergency Loan Fund

Boeing Scholarship Fund

Black and Veatch Scholarships

Blackwell Zinc Fund

Dr. Wouter Bosch Surface Coating Scholarship Fund

Blanche and John H. Bowles Scholarship Fund

Jack K. Boyd Memorial Fund Award

Donald L. Branson Memorial Loan Fund

Wayne R. Broaddus Sr. Scholarship Fund

Robert F. Bruzewski Loan Fund

Gale Bullman Athletic Fund

Joe B. Butler Memorial Award

Campus Vending Scholastic Award

Campus Veterans Association Loan Fund

Donald L. Castleman Scholarship Fund

Caterpillar Company Scholarship CDF

Chancellor's Scholarship Fund

Chancellor's Fellowship Fund

Charles Christian Memorial Achievement Award in Civil Engineering

Captain Carl G. Christie Memorial Fund

Class of 1929 Fund

Class of 1939 Loan Fund

Class of 1940 Fund

Cleveland Cliffs Iron Company Scholarships

Andy & Toni Cochran Scholarship

Combustion Engineering (CE Refractories) Scholarship

#### CONOCO

CONOCO Fellowships-Mines and Metallurgy CONOCO Scholarship-Mines and Metallurgy

Consolidation Coal Company Scholarships

Dr. Frank H. Conrad Loan Fund

Nick Cooksey Memorial Scholarship

R.L. Cooper Scholarship Loan

Coterie Development Fund

Donald G. Crecelius Scholarship Fund

Eben R. Crum Student Loan Fund

G. Raymond Cuthbertson Challenge Fund

C.L. Dake-John S. Brown Library Acquisition Fund

Robert F. Davidson Memorial Loan Fund

Falkland H. Dearing Educational Scholarship Fund

Detroit Edison Power Fellowship Fund

John Herman Dougherty Library of Mines and Metallurgy

Pauline B. and John J. Doyle Loan Fund

**DuPont Grant-Chemical Engineering** 

Dynasil Corporation of America Fund

Robert Emmett Dye Scholarship

Lura and George Easley Scholarship Fund

Eastman Kodak

Eastman Kodak Scholarship Fund

Eastman Kodak Fellowship in Chemical Engineering

Ecodyne Corporation Scholarship

Francis C. Edwards Memorial Fund

Electrical Engineering Loan Fund

F. Stillman Elfred Memorial Scholarship Fund

Emerson Electric Professor of Electrical Engineering

Thomas English Scholarship Fund

Ensign-Bickford Fund

**EXXON-Monterey Mining Engineering Fund** 

**EXXON Teaching Fellowship** 

Ferro Corporation Award in Ceramic Engineering

Steven Feder Memorial Scholarship Fund

Al Fields Memorial Scholarship

Fred Finley Scholarship in Electrical Engineering

Fred Fisher Memorial Loan Fund

J.L. Flebbe Memorial Scholarship Fund

C.R. Freeman Fund

Foundation in Refractories Education Fund

Foundry Educational Foundation Fund

Harold Q Fuller Scholarship

Charles T. Galloway Memorial Loan Fund

General Motors Scholarship

Getty Oil Company

Getty Geological Engineering Fund

Getty Mining Engineering Fund

### 250 / Appendix

Getty Mining Scholarships
A. Frank Golick Memorial Award in Metallurgy
O.R. Grawe Memorial Fund
Glenn and Ruth Graham Scholarship
Harvey H. Grice Scholarship Fund
C. James Grimm Scholarship Fund
Gulf Oil

Gulf Oil Corporation Honors Scholarships Gulf Extractive Metallurgy Research Gift Gulf Oil-Pittsburgh and Midway Coal Scholarship

Clyde W. Hall Scholarship

H.R. Hanley Scholarship Fund

Albert Happy Scholarship-Civil Engineering

Harbison-Walker Charity Fund Scholarship

John P. Harmon Loan Fund

James G. Harris Memorial Scholarship

Henry H. Hartzell Loan Fund

Karl F. Hasselmann Scholarship Fund

Karl F. Hasselmann Loan Fund

Hercules Powder Company-Chemical Engineering

Troy Don Hicks Memorial Scholarship Loan Fund

Lawrence R. Hinken Loan Fund

Anthony Homyk Fund

H.H. Hoppock Scholarship Fund

Monty M. Horst Memorial Scholarship Fund

Hughes Aircraft-Anderson

Russell Hunt Memorial Scholarship

Richard H. Ichord Loan Fund

Illinois Mining Institute Scholarship

Imperial Chemicals Industries Fellowship

Ingersoll-Rand Scholarships-Mining-Geological Engineering

Inland Steel-Ryerson Foundation Mining Engineering

Institute of Extractive Metals Development Fund

Institute of Paper Chemistry Fellowship

Lucy Wortham James Scholarship Loan Fund

Jackling Educational Fund

Jackling Loan Fund

Jackling Summer Institute Fund

Kaiser Aluminum

Kaiser Aluminum Scholarship Fund

Kaiser Scholarship Fund-Ceramic Engineering

Mervin J. Kelly Scholarship Fund

Daniel Kennedy Essay Awards

Harry Kessler Scholarship

Steven Kessler Scholarship

King, Carver, Joplin Museum/Minority Loan Fund

Martin L. King Memorial Scholarship Loan Fund

Robert B. Koplar Professor of Engineering Management Fund

Laclede Steel Emergency Loan Fund

Larkin and Associates Scholarship Fund

Mark B. Layne Scholarship

John H. & Eilyeen B. Livingston Loan Fund

I. Lovett Electrical Engineering Fund

Floy Maurine Macklin Memorial Fund

"M" Club Loan Fund

Magmont Mining

Maytag Scholarship in Mechanical Engineering

Martha McCormick Transfer Scholarship

V.H. McNutt Memorial Scholarships

V.H. McNutt Memorial Fellowships

Gilbert F. Metz Scholarship-Mining & Metallurgy

Aaron J. Miles Memorial Scholarship Fund

Burke Miller Memorial Scholarship

The Minerals Industry Educational Foundation Scholarships

Minnesota Mining and Manufacturing Scholarship

Missouri Electrochemical Gift-Metallurgy

Missouri Society of Professional Engineers, Women's Auxiliary Loan Fund

Missouri Utilities Fellowship Fund

Monsanto Chemical Company-Chemical Engineering

MSM-UMR Alumni Association Scholarship Funds

MSM-UMR Alumni Association Loan Fund

Murphy Company Mechanical Contracting Engineering Scholarship

National Steel Corporation Fellowship

Enoch R. Needles

Enoch R. Needles Speech Award

Enoch R. Needles Scholarship in Civil Engineering

Bob Nevins-Wisconsin Centrifugal, Inc., Scholarship in Metallurgical Engineering

Newmont Mining Scholarship-Metallurgy

Donald Paul Odom Memorial Scholarship

Old Ben Coal Corporation Scholarships

Olin Summer Project Grant-Metallurgical Engineering

Colonel (Retired) and Mrs. Ed Owsley Scholarship

Ozark Lead Company Scholarship

John W. Page Scholarship Fund-Mining

Clarence C. Palmer Memorial Scholarship Fund

Peabody Coal Fellowship

Petro Lewis Corporation Scholarship

Phelps County-City Panhellenic Scholarship Fund

Phi Kappa Phi Loan Fund

Roy Perry Scholarship Fund

Peter H. Pietsch Memorial Scholarship-Chemistry

Theodore J. Planje Sr. Scholarship Fund

Arthur L. Pollard

Arthur L. Pollard Memorial Scholarship Fund

Arthur L. Pollard Trust Fund

### 252 / Appendix

Harry W.L. Porth Distinguished Lecture Series in Engineering

Portland Cement Scholarship

H.L. Prange Loan Fund

Procter and Gamble Fellowship

Public Service Company of Oklahoma Scholarships

J.A. Redding Scholarship

Stephen P. Reed Scholarship

Thomas H. Reese, Jr., Memorial Scholarship

The Refractories Institute

TRI Fellowship-Ceramics

Refractories Institute-FIRE Scholarships

Walter E. Remmers Special Lecture-Artist Fund

Rochester and Pittsburgh Coal Fellowship

Rolla Lions Club Loan Fund

Rolla Rotary Club Loan Fund

Saint Joseph Lead Company Fellowship

Saint Joseph Light and Power Fellowship

Saint Joseph Minerals Corporation Scholarship

Schlumberger Collegiate Award

Schmoldt Engineering Services Scholarship

D.R. Schooler Memorial Loan Fund

Walter T. Schrenk Loan Fund

U.B. Senter Scholarship Fund

Shell

Shell Fellowship in Chemical Engineering

Shell Company Foundation Scholarship in Geological Engineering

Shell Companies Foundation Scholars-Mining

Sheridan Enterprises Scholarships

L.T. Sicka Scholarship Fund

Duncan S. Smith Scholarship

Smurfit-Alton Packaging Corporation Fellowship

Walter, Venita and Shirley Snelson Scholarship

Society of Women Engineers Scholarship

John P. Soult Fund

Standard Oil of California Scholarship Fund

Mr. and Mrs. Norman A. Stockett Scholarship Fund

Bruce B. Strang Memorial Fund

Mailand R. Strunk Scholarship Fund

John R. Stubbins Loan Fund

Stupp Brothers Gift Fund

Jules H. Subow Memorial Scholarship Loan Fund, Emergency Loan Fund

Sunstrand Fund Scholarship

Sverdrup and Parcel Scholarship Fund

Harvey L. Tedrow Fund

Teledyne VISA Fellowship

Tenneco Scholarships-Geological Engineering

Texaco Fellowship in Chemical Engineering

H.D. "Tommy" Thomas Grant

Carlos and Joan Tiernon Scholarship Fund

Frank E. Townsend Loan Fund

UMR Academy of Civil Engineers, Fruin-Colnon Scholarship

UMR Band Fund

UMR Parents' Association Fund

Union Electric-Culp Fund

Union Pacific Foundation Scholarships

Burr R. Van Nostrand Memorial Scholarship

Edwin W. Waggoner Loan Fund

Harbison Walker Scholarship

William Hamlet Webb Endowed Scholarship Fund

Western Electric Loan Fund

Westvaco Fellowship

Charles and Anna Wiese Loan Fund

Clark Wilson UMR Scholarship Award

Curtis L. Wilson Loan Fund

L.E. Woodman Memorial Scholarship Fund

Lewis E. Young Scholarship Fund

Marvin Zeid Scholarship

Zeigler Coal Company

H.E. Zoller Loan Fund for Engineering Fees

### Order of the Golden Shillelagh

Mr. & Mrs. Robert W. Abbett

Mrs. Marguerite C. Anderson

Mr. & Mrs. Jerome T. Berry Mr. & Mrs. Phillip J. Boyer

Mr. & Mrs. Robert M. Brackbill

John Stratford Brown

Mr. & Mrs. Donald L. Castleman

Mr. & Mrs. G. Robert Couch

Mr. & Mrs. E. Jefferson Crum

Mr. & Mrs. Paul T. Dowling

Dr. & Mrs. Charles S. Draper

Mr. & Mrs. Thomas O. English

Mr. & Mrs. Wilbur S. Feagan

Mr. & Mrs. Fred W. Finley

Mr. & Mrs. James M. Forgotson

Mr. & Mrs. Charles A. Freeman

Mr. & Mrs. John A. Gordon Jr.

C. James Grimm

Mr. & Mrs. Alden G. Hacker

Mr. & Mrs. John P. Harmon

Mrs. Karl Hasselmann

Mr. & Mrs. Jack B. Haydon

Mr. & Mrs. Thomas A. Holmes

Mr. & Mrs. Bert F. Hoover

Harland H. Hoppock

Mr. & Mrs. Vernon T. Jones

Mrs. Mervin J. Kelly

Mrs. Charles B. Kentnor Jr.

Mr. & Mrs. Harry H. Kessler

Mr. & Mrs. Fred Kisslinger Mr. & Mrs. Harold Koplar

Will de Wils. Harold Roplar

Mr. & Mrs. Frederick S. Kummer

Mr. & Mrs. Jennings R. Lambeth

Mr. & Mrs. Allan H. LaPlante Mr. & Mrs. John H. Livingston

Mrs. Floyd S. Macklin

Mrs. Roy W. McBride

Mr. & Mrs. Belding H. McCurdy

Mr. & Mrs. Ralph E. McKelvey

Mrs. V.H. McNutt

Frank H. Mentz, Jr.

Dr. & Mrs. George E. Mueller

Mrs. James J. Murphy

Mr. & Mrs. Marvin E. "Bob" Nevins Jr.

Mr. & Mrs. John K. Olsen

Mr. & Mrs. Murray J. Paul

Mr. & Mrs. Harry R. Pearson Jr.

Mr. & Mrs. E.L. "Roy" Perry

C.I. Potter

Mr. & Mrs. James A. Redding

### 254 / Appendix

Mr. & Mrs. Harvey J. Reed
Mr. & Mrs. Charles Remington
Mr. & Mrs. Edward G. Remmers
Mr. & Mrs. Thomas A. Remmers
Mr. & Mrs. Walter E. Remmers
Mr. & Mrs. Rodman St. Clair
Mr. & Mrs. Bernard R. Sarchet
Mr. & Mrs. Hans E. Schmoldt
Mr. & Mrs. John E. Schork
Mrs. Walter T. Schrenk
Mr. & Mrs. James J. Scott

Mr. & Mrs. Joseph G. Sevick

Mr. & Mrs. Gabriel G. Skitek
Mrs. Edward A. Smith
Mr. & Mrs. Walter Snelson
Mr. & Mrs. John P. Soult
Mr. & Mrs. Lawrence A. Spanier
Mr. & Mrs. Thomas J. Stewart Jr.
Mr. & Mrs. S. Allan Stone
Mr. & Mrs. John B. Toomey
Virgil L. Whitworth
Rex Z. Williams
Mr. & Mrs. DeMarquis D. Wyatt
Mr. & Mrs. Marvin C. Zeid

### Professional Degree Recipients

William Y. Bean

Robert W. Abbett George E. Abernathy Bernard W. Adams Joseph T. Adams Gabriel I. Alberici Maurice M. Albertson Curtis Alexander Rafael C. Alexander Thompson Alexander Rex Alford John O. Ambler David O. Anderson Hector G.S. Anderson Frank C. Appleyard Emmett L. Arnold Joseph C. Arundale William H. Backer Marion S. Badollet Arthur G. Baebler Keith E. Bailey Edward A. Ballman Robert L. Banks Clarence E. Bardsley Hubert S. Barger Edward P. Barrett Edwin H. Barsachs Albert B. Bartlett Joseph C. Barton Robert A. Barton David A. Bash Kasmir A. Batubara Richard H. Bauer Robert D. Bay

Robert H. Bedford Leland F. Belew Ralph R. Benedict Wayne J. Bennetsen Gerald W. Bersett Paulo R. Bittencourt Norman D. Blair True W. Blake Jack R. Bodine John W. Bodman Frank C. Bolles Harry C. Bolon Lawrence H. Borgerding Harry F. Bossert L. James Boucher Charles E. Boulson John H. Bowles James I. Bowman B. Degen Boyd Robert K. Boyd George H. Boyer Alfred A. Boyle Hector J. Boza Robert M. Brackbill Harold F. Brady Matthew P. Brazill, Jr. Francis V. Breeze Donald R. Brinkley Robert R. Brookshire John S. Brown Joseph J. Brown, Ir. Phillip O. Brown

Robert N. Brown Wilton R. Brown Bertie L. Browning Harold J. Bruegging Jean P. Bryan John K. Bryan Russell A. Bryant Charles A. Burdick Robert S. Burg Stephen M. Burke, Jr. Edgar C.M. Burkhart William H. Bush Evans W. Buskett Henry R.B. Butler Joe B. Butler Myron D. Calkins Fulton H. Campbell Ernest W. Carlton Paul F. Carlton Thomas S. Carnahan W. Dale Carney Arthur C. Carson Walter E. Casey Lawrence W. Casteel Ernst L. Chamberlain Harry C. Chamberlain Robert T. Chapman Raul Chavez Carl R. Christiansen Dennis A. Clark Edward L. Clark, Jr. George C. Clark Horace H. Clark

John W. Clark William M. Claypool Charles Y. Clayton Roy T. Clayton George W. Cole Richard E. Cole Iames W. Collins Cairy C. Conover Ralph A. Conrads Paul R. Cook Iames M. Coonce, Jr. Durward Copeland Lindsay L. Coppedge Carl H. Cotterill G. Robert Couch Herman C. Cowen Delbert R. Cox Guy H. Cox William R. Cox Joseph D. Crites Arthur H. Cronk Jay C. Cullings Lister M. Cummings Wayne G. Custead Robert J. Dacey Eugene J. Daily Floyd Davis George W. Dean Reginald S. Dean Donald G. Debolt Kurt H. DeCousser Francis J. Deegan Lewis A. Delano Philip H. Delano Theodore S. Delay Powell A. Dennie Earl G. Deutman Lee H. Dewald Robert O. Dietz Warwick L. Doll Phillips B. Dolman William E. Donaldson Glenn A. Dooley James J. Dowd Paul T. Dowling James C. Draper Charles H. Dresbach Fred E. Dreste, Jr.

John G. Duba Boyd Dudley Lee D. Dumm Gustavus A. Duncan Theodore S. Dunn Donnell W. Dutton Robert E. Dve Garvin H. Dyer Temple Dver Thomas E. Eagan George A. Easley Ralph A. Ecoff, Jr. Robert L. Ehrlich F. Stillman Elfred, Ir. Carlos E. Elmore Cyrus H. Emerson Thomas O. English John O. Englund Artelius V. Eulich Donald L. Evans Donald H. Falkingham John O. Farmer Willard Farrar Irwing F. Fausek Albert H. Fay Wilbur S. Feagan A. Daniel Fentzke Abraham L. Ferendez Arturo C. Fernandez Joseph C. Finagin, Jr. Fred W. Finley H. William Flood Frank J. Flynn Frank L. Flynt George E. Fort Charles T. Foster Lee J. Foster Isaac P. Fraizer Charles A. Freeman Herman A. Fritschen, Jr. James E. Fulcher Philip C. Gallaher Willard A. Gallemore Elmer Gammeter Erwin Gammeter Walter Gammeter William H. Gammon John A. Garcia

Harvey O. Garst Oden C. Garst Oscar E. Garvens Robert A. Garvey Floyd A. Gerard Warren R. Gettler Robert V. Gevecker Vernon A.C. Gevecker Frank W. Gibb William R. Gibbs James P. Gill John H. Gill Thor Gjelsteen Jack R. Glatthaar John D. Greason Paul E. Green George E. Gregg James A. Gregory Richard D. Grimm Harry A. Grine John G. Grohskopf Henry E. Gross Frederick Grotts Claude D. Grove Glen N. Hackmann Robert E. Hackmann Abner D. Hahn Wesley K. Haisty Samuel P. Halcomb David P. Hale, Jr. George A. Hale Wilbur A. Haley Clyde W. Hall Jack A. Halpern Neal Ham Richard J. Hampel Risdon W. Hankinson Herbert R. Hanley Robert L. Hanna Knud F. Hansen Kenneth O. Hanson Lynn Harbison Rolland L. Hardy Almon W. Hare John P. Harmon George W. Harris Hugo L. Harrod William V. Hartman

Robert F. Hartmann Karl F. Hasselmann Paul C. Hatmaker Frederick Hauenstein Dale I. Haves John B. Heagler, Ir. Richard B. Heagler Elmer C. Heck Frederick W. Heiser Arthur W. Helwig Ramsev C. Henschel Charles F. Herbert George W. Herdman Leon Hershkowitz Alfred H. Hesse Eugene F. Hill James L. Hill Lawrence R. Hinken Van Buren Hinsch Howard Histed Horace W. Hodges John L. Hodges Erwin C. Hoeman Frederick W. Hoertel, Ir. Ray E. Hoffman William C. Hogoboom Homer A. Hollingshead Harold R. Hollmann Oliver W. Holmes Thomas A. Holmes Frederic H. Holt **James Hopkins** Preston K. Horner Earl R. Householder Rudolph C. Hover Harlan K. Hoyt Julian G. Huckins Ellsworth W. Hudgens Daniel E. Huffman, Ir. Marvin L. Hughen Harry H. Hughes, Jr. Victor H. Hughes J. Richard Hunt Joseph O. Hunt Lamar H. Hunt Russell W. Hunt Francis K.M. Hunter Edmund C. Hunze

Frederick W. Hurd Alfred N. Hurst Henry W. Hurst Dibrell P. Hynes Douglas C. Iden Alexis X. Illinski John C. Ingram Joseph S. Irwin H. Clay Iten Daniel C. Jackling Lerov H. Jackson Iames H. Iacobs Favette A. Iones Vernon T. Iones Kenneth R. Joynt William M. Kahlbaum Thomas E. Kalin Herbert S. Kalish William H. Kamp Rudolph G. Kasel Raymond O. Kasten William W. Kav William O. Keeling William Q. Kehr Daniel Kennedy William D. Kent Felix J. Kerstling Harry H. Kessler Richard P. Ketter Ronald A. Kibler A. James Kiesler Donald T. King Dale L. Kingsley John E. Kirkham Harry F. Kirkpatrick Harry A. Kluge Iames L. Knearem Ray G. Knickerbocker Alvin W. Knoerr Charles O. Koch Joseph J. Krebs Harold A. Krueger Cornelius W. Kruse Donald L. Kummer Charles O. Kunz Jennings R. Lambeth Eugene A. Lang Allan H. LaPlante

Albert C. Laun Harvey B. Leaver Walter P. Leber John L.G. Lehman Harold Lewin Walter E. Lewis Roy A. Lindgren John J. Livingston Robert G. Livingston Samuel H. Lloyd Edwin W. Logan Harry W. Lohman Edgar C. Long Joel F. Loveridge Israel H. Lovett German G. Lozano Elmer L. Luehring George E. Lyman Shirley A. Lynch Edward D. Lynton Francis D. Lyons Ronald Mabrey Edward K. MacFarlane George MacZura Arnold W. Maddox Horace T. Mann Iusto G. Martinez Phillip F. Martyn Peter F. Mattei Lvle E. Matthews Norbert W. Maurer Earl H. McAlpine Edgar S. McCandliss William A. McCanless William H. McCartney John E. McCauley Robert F. McCaw Belding H. McCurdy Iames F. McDonald William McElroy Vernon T. McGhee Iames B. McGrath John E. McGrath Ralph E. McKelvey Earl J. McNely Vachel H. McNutt George E. Mellow Edmund L. Mengel

Gilbert F. Metz Waring Mikell Edwin L. Miller, Jr. John C. Miller Carl E. Millikan Thomas H. Millsap Osborne Milton William C. Minger Robert B. Mitchell R. Gill Montgomery Joseph W. Mooney Stanley R. Moore Ernest Moran Glenn B. Morgan Bob L. Mornin Frederick G. Moses Frederick M. Mueller Garrett A. Muilenburg Herbert W. Mundt James J. Murphy Edwin P. Murray Herman J. Mutz, Jr. Arch W. Naylor Albert B. Needham Enoch R. Needles William F. Netzeband Ralph L. Neubert Arthur Neustaedter Marvin E. Nevins, Jr. Melvin E. Nickel Oscar D. Niedermeyer Jorges C. Nieto James J. Offutt A.H. Ohmann-Dumesnil Norman L. Ohnsorg Edgar Oliphant Robert G. O'Meara John J. O'Neill, Jr. Felipe B. Ore John R.D. Owen Iames A. Pack John W. Pack Ralph C. Padfield William R. Painter Clarence C. Palmer Richard A. Parker Edward W. Parsons James L. Pasley

Edward P. Patterson I. Robert Patterson Ierome D. Patterson Robert J. Paulette Wesley E. Peel David J. Peery Harry S. Pence Robert E. Peppers Edwin T. Perkins Robert C. Perry Clarence E. Peterson Gerald H. Pett Walter I. Phillips Colwell A. Pierce R. David Plank Neil Plummer Harry W.L. Porth Reginald B. Potashnick Walbridge H. Powell William R. Quilliam Matthew V. Quinn Gerald F. Rackett Donald H. Radcliff Jaime Ramirez Stanley E. Rand John P. Rasor Edgar A. Rassinier George A. Rees James S. Reger Joseph H. Reid Sidney K. Reid John H.G. Reilly Walter E. Remmers Llovd E. Reuss A.E. Rhodes Peter P. Ribotto Walter C. Richards James K. Richardson George L. Richert W. Robert Riggs Kenneth G. Riley Joseph W. Rittenhouse Thomas C. Robson Dale L. Rockwell Charles C. Rodd Lawrence A. Roe Herbert A. Roesler Frederick H. Roever

John A. Rogers Erich Rolaff Rolf W. Roley William H. Rollman Don V. Roloff Rulof T. Rolufs Charles K. Rose Beauregard Ross Allen L. Rouse Richard O. Rouse Richard A. Rousos Booker H. Rucker, Jr. Donald A. Rueter William A. Rutledge Robert J. Ryan Lawrence H. Sanderson Willard A. Schaeffer, Jr. Robert P. Schafer Fred Scharf Randall A. Scheer E. Robert Schmidt, Jr. Joseph B. Schmitt Hans E. Schmoldt Fred C. Schneeberger Samuel J. Schneider Durward R. Schooler Ashuah B. Schrantz Robert E. Schuchardt Louis H. Schuette Herman O. Schulze Arthur S. Schwarz William K. Schweickhardt Guy R. Scott Harry S. Scott I. Walter Scott Frank H. Seamon Theodore O. Seiberling George A. Sellers Andrew J. Seltzer Joseph G. Sevick Walter J. Shaffer William T. Sharp Frederick P. Shayes Wilbur E. Sheldon William M. Shepard Homer K. Sherry Gilbert R. Shockley R. Ray Shockley

S. Dean Shopher John A. Short Roy R. Shourd Robert G. Sickly O. Morris Sievert Merton I. Signer Michael F. Simmons Thomas A. Simpson Rilev M. Simrall James P. Sloss Edward A. Smith Harry B. Smith Harvey E. Smith Hueston M. Smith James A. Smith Loren X. Smith P. Gene Smith R. Thomas Smith Van H. Smith Norwood L. Snowden Byron I. Snyder Russell C. Solomon John P. Soult Donald E. Spackler Lawrence A. Spanier Clifton B. Spencer Irvin C. Spotte Horace R. Stahl Richard J. Stegemeier Frank C. Steimke, Ir. Jesse H. Steinmesch Iames W. Stephens Billy Stevens Gerald L. Stevenson Arthur I. Stewart Fraizer M. Stewart Thomas J. Stewart, Jr. Wilbert F. Stoecker S. Allan Stone Robert A. Strain Harold E. Straub Richard J. Stroup Robert K. Stroup

C.F.P. Stueck Allan I. Summers Edward B. Summers Ronald O. Swavze Ierry D. Swearingen Ronald A. Tappmeyer Howard I. Teas Harvey L. Tedrow W. Kedzie Teller Edgar I. Telthorst Charles C. Tevis Thomas A. Theobald Steve Theodore Thomas R. Thomas Martin H. Thornberry Edwin B. Thornhill John M. Thorp Carlos H. Tiernon Radon Tolman George D. Tomazi John B. Toomey Robert L. Topper Albert L. Trent Arthur F. Truex Tsik C. Tseung Edward F. Tuck M.J. Turnipseed Lauren P. Tuttle Frank L. Tyrell Ierrold R. Underwood Donald F. Updike Herman N. Vandevander Philip R. Vanfrank Robert E. Vansant Joseph E. Vollmar, Jr. Rolla T. Wade Arthur W. Walker John A. Walker William D. Walker John K. Walsh Ernest Wander Kung-Ping Wang Ronald D. Ward

Edwin R. Wash Iames A. Wash John W. Waters Samuel C. Weaver Royal S. Webster William M. Weigel William W. Weigel Theodore S. Weissmann Gary E. Welch Roy C. Werner Walter A. Werner Virgil L. Whitworth Michael A. Wicklund Warren R. Wieland Randall H. Wightman Larson E. Wile George B. Wiles Arthur J. Williams, Jr. John C. Williams Albert D. Wilson Francis W. Wilson Frank L.L. Wilson Freemont C. Wilson Joseph M. Wilson Paul D. Windsor Robert A. Winkel Charles F. Winters Walter W. Wishon Michael Witunski Edgar I. Wolf Leonard C. Wolff George Woodhall Eugene H. Woodman Joseph Worley Harold R. Wright Ira L. Wright John C. Wright Wilford S. Wright William A. Wundrack Merritt W. Yeater Walter C. Zeuch Henry E. Zoller Lawrence J. Zoller

### St. Pat through the Years

1908—George Menefee 1909—W.M. "Windy" Holmes 1910—"Red Forrester" 1911—W.A. Hackwood 1912-Harry H. Nolan 1913-A.F. Truex 1914—Frank L. Johnson 1915-J.J. Doyle 1916-J.G. "Pat" Reilly 1917-H. Smith Clark 1918—Meryl McCarthy 1919-Eric K. "Toots" Schuman 1920—Albert B. Needham 1921—Jasper E. Jewell 1922—David F. Walsh 1923-C.E. Stover 1924-W.S. Stack 1925—Ray Kollar 1926—Ralph Hilpert 1927—Gerald A. Roberts 1928—B.L. Ballard 1929—James K. Richardson 1930—A.J. Tiefenbrun 1931—James J. Offutt 1932—Richard Parker 1933-M.H. Murray 1934-John C. Settle 1935—Frederick W. Arnold 1936—Walter L. Holz 1937-Roger C. Tittel 1938—John R. Post 1939—Samuel A. Kurtz 1940—Robert S. Dorsey 1941—John H. Lyons 1942—John A. Mazzoni 1943—Raymond O. Kasten 1944—Celebration suspended because

1947—Harold C. Brehe 1948—James B. McGrath 1949—Donald E. Spackler 1950—Robert Schuchardt 1951—Joseph H. Geers 1952—Richard Hampel 1953—James A. Gerard 1954—Frederick J. Smith 1955—James M. Murphy 1956-Donald R. McGovern 1957—Warren I. Carroll 1958—Ronald H. Huseman 1959—Grover J. Murphy 1960—Don J. Gunther 1961—Harvey G. Martin 1962—Robert C. Tooke 1963—Charles P. Becker Jr. 1964—Keith E. Bailey 1965—Clyde A. Vandivort 1966-John H. Henry 1967—William C. Castle 1968—Charles J. Fehlig 1969—John J. Moll 1970—Eric D. Dunning 1971—Kenny C. Hilterbrand 1972-Daniel F. Mullen 1973—Roger L. Kramer 1974—Roger L. VanDeven 1975-Bernard H. Scheer III 1976—Gerald L. Meyr 1977—James E. Grelle 1978—Russell Goldammer 1979—Gary Underwood 1980—Brian Wagner 1981—Wayne V. Schmidt 1982—Michael Avery

### Queens of St. Patrick

1915—Helen James Baysinger 1916—Mary McCrae (Anderson) 1917—Olive Scott (Morris) 1918—Mrs. Frederick Gardner 1919—Edna Kiel 1920—Nancy Love

of World War II

of World War II 1946—Robert T. White

1921—Hazel Dent (Crutcher) 1922—Mrs. Margaret Salley (Eulich)

1945—Celebration suspended because

1923—Mrs. Curtis Edward Stover
1924 — Eva Underwood
1925—Helen Bernice Underwood (Ledford)
1926—Dorothy Keisler (Rushmore)
1927—Mrs. Lorraine Love (Brickner)
1928—Lucy Keisler (McCaw)
1929—Elizabeth Long (Pence)

### 260 / Appendix

1954—June Lange

1955—Shirley Marie Brueggman

1930—Madge Lenox (Clemmons) 1956—Virginia Graham 1931-Marion McKinley 1957—Marilyn Goodnight 1932—Emily McCaw (Jacobs) 1958-Joline See 1933—Sybil Powell (Lange) 1959—Linda Fitzgerald 1934—Mildred "Mickey" Coffman 1960—Phyllis Tucci 1935—Dorothy Fort 1961—Sharon Anstedt 1936—Jean Campbell 1962—Joyce Logan 1937-Mildred Brown 1963—Mary Martin 1938-Mary Louise Breuer (Nickel) 1964—Mrs. Vickie Harwell 1939-Mary McCrae 1965—Diane Bowers 1940—Rosemary Sue Crumpler 1966—Sharon Sievers (Murphy) 1967—Susan Price 1941—Lucille Stimson (Daniels) 1968—Joy Zumbehl 1942—Agnes Houlahan (Finley) 1969—Anita McLaughlin 1943---Adele Katz 1970—Mary Beth Riggari (Ortwerth) 1944\_\_\_ 1971—Betty Foland (Harting) 1945-1972-Mrs. Nancy Benesh 1946-Lenore Jones (Morris) 1973-Marilee Robinson 1947—Louise Freeman 1974—Cathie Wilhelm 1948-Sue Gleason 1975—Marilyn Weintz 1949—Paula Fite 1976—Tammy Young 1950-Marilee Drake 1977—Mary Lapinski 1951—Alice Walthall 1978—Nancy Hinrichs 1952—Barbara Barner 1979—Laura Tryon 1953-Mrs. Joan Christian 1980—Ellen Tierney

### Silver and Gold Club

Mr. and Mrs. Harry Allen Mr. and Mrs. J. Lewis Andrews Mr. and Mrs. Frank C. Appleyard Ashland Oil Foundation Mr. and Mrs. Jack Atkins Mr. and Mrs. M.R. Avery Mr. and Mrs. Jerry Bayless Mr. and Mrs. C.P. Bennett Mr. and Mrs. Jerome T. Berry Mr. and Mrs. Dan Birdsong Mr. and Mrs. Lucien M. Bolon, Jr. Mr. and Mrs. Robert E. Brandt Stephen A. Bridgman Mr. and Mrs. James B. Chaney Continental Bank Foundation Mr. and Mrs. Jack W. Cooke Mr. and Mrs. Terry Cossette Mr. and Mrs. Dudley Cress

Iim Dawson Memorial Mr. and Mrs. David Dearth Mr. and Mrs. Jim Estey Mr. and Mrs. Mike Estey Mr. and Mrs. Wilbert Falke Dr. Earl Feind Dr. and Mrs. James Felts Mr. and Mrs. Charles Finley Bill Flentje Mr. and Mrs. Jack D. Fore Mr. and Mrs. George E. Fort Mr. and Mrs. William H. Gammon Mr. and Mrs. William Gillam Goodyear Tire & Rubber Co. Dr. and Mrs. H. Neal Grannemann Mr. and Mrs. Harvey Grice

C. James Grimm Donald E. Hare

1981—Janet Pearce

1982—Dana Stricker

Mr. and Mrs. Eddie Herrman Mr. and Mrs. Marvin Hogan Mr. and Mrs. Kenton Hupp Dr. and Mrs. Randall Huss Mr. and Mrs. Darrell Jackson Mr. and Mrs. Bill Jenks, Jr. Mr. and Mrs. Bill Jenks III Mr. and Mrs. Daniel Kennedy Mr. and Mrs. Billy A. Key Mr. and Mrs. Terry King Charles L. Kitchen Mr. and Mrs. Dick Klingbeil Mr. and Mrs. Harold A. Krueger Ken Lanning Mr. and Mrs. Joel Loveridge Mr. and Mrs. Frank Mackaman Chancellor and Mrs. Joseph Marchello Donald D. Matson Mr. and Mrs. Bob McKune Missouri Golf Association Judge and Mrs. Weldon Moore Mr. and Mrs. Joe Morgan MSM-UMR Alumni Association Mr. and Mrs. Roy O'Haver Mr. and Mrs. Ralph L. Ozorkiwiecz Mr. and Mrs. John L. Painter Herman J. Pfeifer Mr. and Mrs. Bill Phipps Mr. and Mrs. J.E. Rakaskas Mr. and Mrs. C.R. Remington Mr. and Mrs. Robert P. Rhoades

Mr. and Mrs. Tim Rupp Dr. and Mrs. James I. Scott Mr. and Mrs. John Shephard Mr. and Mrs. Sam Smart Dr. and Mrs. Ted Smith Mr. and Mrs. Jim Sowers Mr. and Mrs. Steve Sowers Mr. and Mrs. Tom Sowers Mr. and Mrs. William H. Stewart Mr. and Mrs. Bill Stoltz Mr. and Mrs. Ron Tappmeyer Mr. and Mrs. Otis Taylor Mr. and Mrs. Tom Thomas Mr. and Mrs. Armin I. Tucker United Telephone Company of Missouri Lynn H. Waggoner Mr. and Mrs. Dain Ward Dr. and Mrs. Don L. Warner Mr. and Mrs. C.M. Wattenbarger Rick Weaver Dave Weinbaum Mr. and Mrs. Mel Weinbaum Mr. and Mrs. R. Dalton Welsh Mr. and Mrs. Richard Wieker Mr. and Mrs. Floyd Wills Mr. and Mrs. Bobby G. Wixson Mr. and Mrs. Joseph Wollard Mr. and Mrs. Jim Woods Mr. and Mrs. M.C. Zeid Mr. and Mrs. Jess Zink

### Special Facilities

Computer Center Nuclear Reactor Astronomical Observatory Experimental Mine Library and Learning Resources Center Mineral Museum

## Stonehenge Replica At UM-Rolla—1983

Stonehenge, the ancient megalith located on Salisbury Plain 75 miles southwest of London, represents one of man's oldest and most sophisticated computers, according to Dr. Joseph Senne, chairman of the University of Missouri-Rolla civil engineering department, and an astronomer.

"The original Stonehenge was built in three stages beginning about 2800 B.C. and ending about 1800 B.C.," Senne explained. "The people who constructed it stored a great deal of knowledge about the sun and moon in it.

"The entire array is so oriented that the rising sun at the summer solstice (June 21) could be observed through the central trilithon aligned with the 'heel stone' outside the ring," he continued. "The 19 sarsen stones following the one-half size stone indicates that Stonehenge's builders were aware of the 19-year eclipse cycle, while the 291/2 sarsen stones represented the lunar month.

"Consequently, it could be used to predict seasonal changes, eclipses and moon phases, making it a sophisticated computer for the ages," he added.

The original Stonehenge also can be classified as one of the world's outstanding engineering projects.

"To put the construction of Stonehenge in the proper perspective it must be remembered that it was built about 4,000 years ago and that stones weighing tons were cut, shaped, transported great distances and raised and placed with tremendous accuracy using only primitive technology," said Dr. David Summers, UMR Curators' Professor of Mining Engineering and director of the UMR Rock Mechanics and Explosives Research Center.

The proposed construction of a one-half-scale partial reconstruction of Stonehenge at UM-Rolla, a monument which will be known as UMR-

Stonehenge, will offer an interesting juxtaposition.

"The monument will be located at 14th Street and Bishop Avenue adjacent to the site of the planned new Mineral Engineering Building. It will place a simulation of an ancient computer in close proximity to UMR's modern computer facilities in the Mathematics-Computer Science Building," said Joseph D. Wollard, UMR executive director of administrative services and chairman of the UMR-Stonehenge committee.

"Given UM-Rolla's emphasis on engineering and the sciences it was felt that a monument such as UMR-Stonehenge would be a particularly appropri-

ate and valuable addition to campus," he added.

Planning for UMR-Stonehenge has been a long-term project. "UMR-Stonehenge has been a feature of the campus master plan for the last three years and fits in with the concept of architectural landscaping for the campus," Wollard said. "It also has been included in all of the architectural drawings for the Mineral Engineering Building."

A marker bearing the inscription "UMR-Stonehenge" has been placed in the center of the monument. This marker identifies the spot as an official triangulation point in the National Geodetic Survey's North American Triangulation Network. (Such points are used for mapping and control

purposes.)

The timetable for construction of the replica is flexible. "All UMR personnel who are involved in the project will work on it only as their schedules permit," Wollard said. "UMR-Stonehenge will be built with funds and materials that have been donated specifically for the project. No state money will be used."

UM-Rolla's replica of Stonehenge will incorporate many of the features of the original in its design. It also will include two capabilities that the original did not possess.

It will feature a 50-foot-in-diameter ring of 29½ sarsen stones around a horseshoe of five trilithons through which various sightings of sunrise and sunset can be made. The sarsen stones will be  $1\frac{1}{2}$  feet high, while each of the trilithons will measure  $13\frac{1}{4}$  feet from the ground to the top of its lintel. There also will be a "heel stone," four compass markers and low-level lighting for night use.

On June 21 (summer solstice), the summer sunrise will be located between the inner faces of the southwest trilithon and above the heel stone 145 feet to the northeast, while the summer sunset will be visible through the inner faces of the northwest trilithon. On Dec. 21 (winter solstice), the winter sunrise will be located between the inner faces of the southeast trilithon, and the winter sunset will be visible between the inner faces of the southwest trilithon.

The south-facing trilithon will be provided with an aperture for an analemma. During the year, the noon sun shining through this opening will describe a figure "8" on the horizontal and vertical stones at the base of the trilithon. At noon each day, the analemma can be used to determine the date from the location of the sun's image on the figure "8."

The north-facing trilithon will be equipped with a "Polaris window" through which the North Star can be viewed. Both this feature and the analemma were not part of the original Stonehenge.

"While UMR-Stonehenge is based on astronomical principles, it can be used and enjoyed by everyone," Wollard said. "The polaris window and the analemma were added because we wanted the monument to be something that people could use every day, both at night and during the day.

About 160 tons of granite will be used in the monument. The rock will be cut to the proper dimensions by UMR's Rock Mechanics and Explosives Research Center, using water jet techniques.

Because UMR-Stonehenge is a part-time project for those involved and because of "certain specific construction problems" in the project, an exact date for its completion has not been set. It is hoped, however, that it can be completed in time for summer solstice (June 21, 1983). The preliminary design phase of the project has been completed and rock for the sarsen stones has arrived.

"Accuracy in the placement of the various elements of the monument is of paramount importance," Wollard said. "There is absolutely no room for error, and this increases the time needed to complete the project.

"For example, the bases for the trilithons, which measure 15 feet by 2 feet by 3½ feet and weigh over eight tons, must be placed absolutely perpendicular to the ground and then be anchored so that they remain so," he added.

"In addition, the weather also will be a factor in how quickly the project is completed."

In addition to Wollard, other members of the committee are: Senne: Summers; John Brown of Charlotte, N.C.; June Kummer of St. Louis; John Vaughn, UM-Rolla director of administrative planning; and Jimmie Schmoldt of Bartlesville, Okla.

### Missouri Society of Professional Engineers

The Missouri Society of Professional Engineers was "born" on the UMR campus. Two UMR civil engineering professors, Joe B. Butler, PE, and E.W. "Skip" Carlton, PE, were directly responsible for the creation of the MSPE. The Society was informally organized Jan. 9, 1937, when a group of engineers from throughout the state met on the Rolla campus. The Society ratified its constitution and elected officers July 10, 1937, at Jefferson City. Butler and Carlton served as the first two presidents and were influential in getting the engineering licensing law approved. J. Kent Roberts, PE, UMR professor of civil engineering, served as state president in 1965-66. Among the UMReducated past presidents are Thomas A. Herrmann, PE; P.F. Mattei, PE; R.D. Plank, PE; and H.J. Bruegging, PE.

### Student Organizations

Honor Societies:

Alpha Sigma Mu Chi Epsilon Eta Kappa Nu

Kappa Mu Epsilon Nuclear Engineering and

Science Honor Society Omega Chi Epsilon Phi Eta Sigma

Phi Kappa Phi Pi Epsilon Tau Pi Tau Sigma Psi Chi

Sigma Gamma Epsilon Sigma Gamma Tau

Sigma Pi Sigma Sigma Xi Tau Beta Pi

Service Groups:

Alpha Phi Omega

Upsilon Pi Epsilon

Beta Chi Sigma Blue Key

Circle K

Gamma Alpha Delta Intercollegiate Knights

Social Organizations:

Independents Fraternities:

Acacia

Alpha Epsilon Pi

Alpha Phi Alpha Beta Sigma Psi Delta Sigma Phi

Delta Tau Delta Kappa Alpha Kappa Alpha Psi

Kappa Sigma Lambda Chi Alpha

Phi Kappa Theta Pi Kappa Alpha

Pi Kappa Phi

Sigma Chi Mu Sigma Nu Sigma Phi Epsilon Sigma Pi Sigma Tau Gamma Tau Kappa Epsilon Theta Xi Triangle Sororities: Chi Omega Kappa Delta Zeta Tau Alpha Alpha Kappa Alpha Little Sister Organizations: Crescents of Lambda Chi Daughters of Diana (Tau Kappa Epsilon) White Roses of Sigma Tau Gamma Daughters of the Nile (Delta Sigma Phi) Daughters of Lee (Kappa Alpha) Little Sisters of the Golden Heart (Sigma Phi Epsilon) Little Sisters of Pi Kappa Alpha Little Sisters of the White Star (Sigma Nu) Order of the Sun (Phi Kappa Theta) Sisters of Alpha Epsilon Pi Stardusters of Kappa Sigma Sisters of the Gold Rose (Beta Sigma Psi)

#### Music Activities: Kappa Kap

Kappa Kappa Psi Tau Beta Sigma Honorary Band Sorority

#### Inter-Cultural Groups:

Association for Black Students Chinese Student Association Federation of Latin American Students Hong Kong Club India Association International Students Club Iranian Students Association Korean Students Association Organization of Arab Students Thai Students Association Turkish Students Association Venezuelan Students Association Vietnam Association

### Professional Fraternities: Alpha Chi Sigma Keramos

Theta Tau Omega

Student Chapter Engineering and Scientific Organizations:

American Academy of Mechanics American Ceramics Society American Foundrymen's Society American Institute of Aeronautics and Astronautics American Institute of Chemical

Engineers American Institute of Electrical and Electronics Engineers

American Institute of Mining, Metallurgical and Petroleum Engineers

American Nuclear Society American Society of Civil Engineers

American Society of Engineering Management

American Society of Heating, Refrigeration and Air-Conditioning Engineers American Society of Mechanical Engineers

American Society of Mining Engineers

American Society of Petroleum Engineers

Association for Computing Machinery

Association for Microcomputers Association of Engineering

Geologists
C.L. Dake Geological Society
Institute of Transportation
Engineers

### 266 / Appendix

Metallurgical Society
National Society of Black Engineers
Society of Automotive Engineers
Society of Exploration
Geophysicists
Society of Hispanic Professional
Engineers
Society of Women Engineers
W.T. Schrenk Society

Special Events Organizations: St. Pat's Board Student Union Board

#### Special Interest Groups:

Association of Married Students Association of Women Students College Bowl League Chess Club Climbing Club Cooperative Education Association Cycling Club **Economics Club** Flying Disc Society Forensic Club Gymnastics Club Helix HP-41C User's Club Karate Club M Club Motorcycling Club Photography Club Radio Club Radio Station KMNR-FM Raiders Rugby Club Scuba Club Southwinds Spelunkers Club Sport Parachute Club Sports Car Club St. Pat's Board Table Tennis Club Target Pistol Club Theatre Guild Trap and Skeet Club War Games Association

Waterpolo Club Women's Council at UMR Women's Soccer Club

#### Publications:

The "Miner" The "ROLLAMO"

#### Cooperatives:

The Campus Club Tech-Engine Club

#### Housing Associations:

Motel Housing Association Residence Hall Association Thomas Jefferson Hall Association

#### Religious Groups:

The Baptist Student Union
Christian Campus House
Intervarsity Christian Fellowship
Liahona Fellowship
Newman Club
Wesley Foundation
J.O.Y.
International Muslim Student's
Association

#### Student Governing Organizations:

Council of Graduate Students
Interfraternity Council
Intramural Managers' Association
Panhellenic Association
Student Council

# Capsule Information on Departments

(Submitted by the respective offices.)

### Administrative Services

In 1978, reorganization established new functions and realigned existing functions to better perform the administrative support mission of the campus.

Prior to 1965, the business manager performed the business services for the campus. The primary emphasis was budget and plant operations. The expansion of activities brought about by university status in 1965 resulted in the addition of Personnel Services and Grants and Contract Services. The title of business manager was changed to business officer to reflect the increased scope of services rendered.

The new administrative support functions initiated in 1978 included Business Services and Administrative Planning. Under the former, were Personnel Services, Budgets, Finance, and Purchasing. The latter consolidated financial planning, space utilization, and safety and risk management under a

single director.

The present day structure of Administrative Services consists of the director of administrative planning, John C. Vaughn; the director of business services, Neil K. Smith; the director of physical plant, Bob L. Marlow; and the director of university police, Richard J. Boulware. In addition, the director of auxiliary services, Jess Zink, is responsible for activities in his area. The executive director and supervisor for all Administrative Services is Joseph D. Wollard, who has held this position since 1978, and who also served as business officer from 1966 through 1977.

### Admissions

When the University of Missouri School of Mines and Metallurgy was established, one of its first offices was that of Admissions, Registration and Records. Student applications and records in the early history of this institution were kept in large ledgers without the benefit of electronic data processing such as that which exists today.

The early responsibility of the Admissions, Registration and Records office included public relations, school photography, alumni relations, financial aid, foreign student affairs, veterans benefits, campus historian, and other related

activities.

Henry H. Armsby was appointed registrar in 1923 and served until 1941. Noel Hubbard, who had been assistant registrar since 1923, succeeded him

and served until 1958 when he was appointed assistant dean. At that time Paul Ponder was made registrar and director of admissions. In 1960 when Hubbard retired, Ponder became assistant dean and Robert B. Lewis became registrar and director of admissions. Louise Tucker was office manager and supervisor of personnel for a number of years.

Recently the office of the Director of Admissions and Registrar was split into two separate functions with Lewis serving as director of admissions and Ponder serving as registrar. In August of 1982 Dr. Myron Parry of engineering

mechanics was made acting registrar.

## Aerospace Studies

In August 1981, UMR applied for an Air Force ROTC charter, in competition with over 100 similar requests from colleges and universities throughout the nation. UMR was one of only four awarded because of its quality academic programs, quality students and strong student interest.

Two officers, two non-commissioned officers and one secretary were assigned as the initial staff. Lt. Col. Lynn B. Ralston was assigned in April 1982, as the commander and professor of aerospace studies. Capt. Robert S. Buck was assigned in July 1982, as the commandant of cadets, flight instruction program coordinator and instructor of the professional corps. Tech. Sgt. Tom M. Troudt was assigned in February 1982, as the NCO in charge of personnel actions and cadet records. Staff Sgt. Robert A. Warren was assigned in February 1982, as chief of administration for detachment management activities. Terri L. Gillespie was selected for the executive secretarial position in July 1982.

Over 70 students enrolled in the program during the 1982-83 academic year.

Fourteen students received scholarships during the fall semester.

The Air Force also assigned 12 active duty personnel to undergraduate and graduate programs through the Air Force Institute of Technology (AFIT). This program will be expanded to approximately 40 students for fall 83-84.

The Air Force ROTC program was first established on the UMR campus in 1971, but was deactivated in 1976 after the campus experienced a drop in

enrollment.

## Alumni-Development

The first informal MSM alumni meeting took place in the late summer of 1874 on the site of the Boyd Smelter near Boulder, Colo., where the first three graduates of the new institution, G.A. Duncan, J.H. Gill and J.W. Pack, were employed.

Later attempts to form an alumni association in 1882, 1896-97, and 1915, were short-lived. However, on the occasion of the celebration of MSM's 50th anniversary, Nov. 4, 1921, (they chose to commemorate the opening of the

School rather than the founding) the current national alumni association was formed and became a permanent organization largely through the efforts of George R. Dean, '90, MSM faculty member and secretary of the association.

Around the same time, alumni sections were organized in Tulsa (1920); St. Louis (1921); New York (1923); Chicago (1923); Los Angeles (1925); and a Tri-State Section (Missouri-Kansas-Oklahoma) in Joplin.

The MSM Alumnus, edited by the Registrar's Office under the direction of Noel Hubbard, registrar, came into existence and was printed and distributed for the first time in September 1926.

In 1946, the Alumni Association was incorporated and the new constitution and by-laws provided for the establishment of an alumni office on the campus. On Nov. 1, 1953, a full-time executive secretary, Francis C. "Ike" Edwards, was employed, and he served the association in that capacity until his death in 1975. He opened the first Alumni office, on the third floor of the Old Metallurgy Building.

The current head of the association office, Frank H. Mackaman, came to the campus in 1968 as a field secretary for the association. He was given the title executive vice president of the MSM-UMR Alumni Association in 1975.

The development office began its existence as the Centennial Committee Task Force in 1965 with its purpose being to raise money for an addition to the Student Union. General (Ret.) L.R. Cochran (head of the office of public information) was named chairman of the Centennial Working Committee in 1966, and Robert Sutton, who served originally as a consultant to the committee, was named full-time director of the Centennial Challenge Program in 1967. Sutton served in that capacity until his death in 1972.

Following observance of the institution's centennial in 1970, a Chancellor's Council (today called Development Council) was formed to continue fund raising efforts. In May 1973, Howard Eloe joined the UMR administrative staff as director of the development fund to work with the council.

In 1975, the development office, the alumni office and the office of public information, became units with the coordination by the director of external affairs, B.R. Sarchet, who also served as professor and chairman of engineering management.

Further reorganization in 1978, combined the development office with the alumni office under the direction of Frank Mackaman, who serves as director of the office of alumni/development as well as executive vice president of the alumni association. Eloe is director of the development fund.

Today's Development Council has the following divisions represented: corporation and foundation executives, parents association, alumni, community support program, faculty-staff program, major gifts, planned gifts, and entrepreneurs.

The first year in which private fund contributions passed the million dollar mark was 1977, and in 1982 private contributions reached the \$2.9 million level.

### **Athletics**

The significant academic development at UMR has been rounded out in the growth of UMR intercollegiate and intramural athletics.

The UMR athletic department was organized in 1909 when F.E. Dennie became the first coach employed primarily for that purpose. Before Dennie came, the football coach (E.F. Boland was the first) was paid out of the proceeds from the games and from contributions from the faculty and townspeople.

Before that, in 1888, students began to form informal teams for relaxation between classes. Three years later, an athletic association was organized to promote an interest in various sports. It was during 1891 that a field was

enclosed and graded for future sports activity.

This groundwork led to the first intercollegiate contest in Missouri School of Mines' history, when MSM lost to Drury College 8-6 in the fall of 1893. Things were indeed different in those days, as expenses of the 15 men making the trip to Springfield were paid by the home team. And it is also interesting to note that Harry K. Landis, then a professor of mining and metallurgy, played right end in that game.

There was apparently no objection to coaches or members of the faculty

lending a hand in those early contests.

From those first days of MSM sports history, athletics continued to develop with the construction of old Jackling Field in 1912 and the Jackling Gymnasium in 1915.

The famous 1914 football team established a record which will no doubt stand forever as a goal and inspiration to all Miners. The squad finished 8-0 and outscored all opponents 540-0 during the course of the season. They followed this with a 27-6 win over Christian Brothers College in post-season play to finish out the fantasy-like campaign. Under modern rating systems, the Miners would have ranked among the best in the nation.

Sixty-four years later, a talented group of Miners again made national attention, finishing the 1980 season 10-0. In addition, the UMR squad ranked tenth in the final NCAA Division II poll, ranked first in the nation in rushing defense and third in the nation in total defense.

Talented programs like this were joined by intercollegiate women's sports in 1974, as basketball and volleyball teams hit the scene. Though volleyball was dropped in 1978, the expansion continued with softball in 1979, tennis in 1980

and soccer and cross country in 1982.

At present, UM-Rolla offers the women's sports listed above, as well as men's activities in football, basketball, baseball, soccer, swimming, cross country, track and field, golf, rifle, wrestling and tennis. One of the landmarks in athletics at UM-Rolla was the completion of New Jackling Field football stadium and the Gale Bullman Multi-Purpose Building in 1968.

These two facilities rank among the best in the Missouri Intercollegiate

Athletic Association, a conference the Miners joined in 1935 and of which they are still members.

The famed coach, for whom the building was named, Gale Bullman, served as athletic director from 1937 to 1968. (He was posthumously named to the National Association of Collegiate Directors of Athletics Hall of Fame.) Billy Key has served as athletic director from 1968 to the present.

## **Auxiliary Services**

The department of auxiliary enterprises, later changed to auxiliary services, originated as a campus service department in August 1972. The department was developed under the administration of Jess Zink. The original umbrella of operations involved University housing, University Center, and University food service operations.

The department developed rapidly between 1972-82 assuming other responsibilities in campus vending; in the acquisition of the Thomas Jefferson Residence Hall in 1976; in a campus Bookstore created in 1978, with Dan Klingenberg as the first manager; and in leased motels and private residence halls which finally housed 430 students during the 1978-82 period, thus creating the need for an addition to the Thomas Jefferson Hall which will open in 1983 and will provide housing for 410 students. Contract food service was adopted in 1978, with Gary Welty named the campus liaison administrator to manage this program. Renovation and programs developed rapidly under the supervision of the housing staff and the leadership of Jack Bennett. Golf Course operations were assigned to the department in 1979. The department offers electronic message boards, computer terminals and innovative student programs.

The department is now self-supporting through the efforts of student leaders, dedicated staff members, and friends. The department objective of co-curricular programs, services, and facility administration have served the needs of constituents during the 10-year period.

The University Center is the site for numerous social functions. Certain groups, such as alumni, can, with special permission, serve alcoholic beverages at gatherings in the University Center.

### Career Development

The Career Development Office was established in September 1982, and combines both placement and co-op programs, under the direction of C.R. Remington.

A placement program to assist graduates in finding employment, began on this campus in 1923 under the direction of Noel Hubbard, assistant registrar. The responsibility for directing placement activities was transferred to assistant dean Rex Z. Williams in 1944, and it was under his administration that potential employers were invited to the campus to interview prospective

graduates. The program grew to the point where it would no longer be handled out of Parker Hall and it was moved to the top floor of the Buehler Building in 1963.

The co-op training program began in 1956 and was directed by a committee composed of Dr. A.J. Miles, coordinator, Professor C.W. Grate, secretary (similar to director), and faculty members Bruzewski, Conrad, Frad, Muir, Planje, Skitek, and Hubbard. Initially, 13 companies and 99 students were participating in the fall of 1957. (Thirty-six students worked with the Missouri Highway Department and 39 students with McDonnell Aircraft Co.) Under this program, beginning in the sophomore year, students alternate work periods in industry with semesters on campus in order to gain experience in industry and help finance their education. At its peak, in the fall of 1981, 53 companies and 400 students were participating in the program.

In addition to Hubbard and Williams, directors of placement have included Donald Dean, V.A.C. Gevecker, Leon Hershkowitz, and L.R. Nuss. George E. Vaughn followed Grate as director of the co-op program and, in

turn, was followed by Remington.

## Center for Aging Studies

The UMR Center for Aging Studies was established Oct. 1, 1981, as part of the Missouri Gerontology Institute of the University of Missouri and Lincoln University. The center's activities include gerontological research and senior adult education, especially in the humanities and arts, the psychology of aging, the economics of aging, computers and transportation and management. The center also offers instruction for older adults in languages, literature, and linguistics and assists and coordinates the obtaining of grants for work on the aging. Dr. W. Nicholas Knight, UM-Rolla professor of English, is the center's director.

# Center for Applied Engineering Management

The Center for Applied Engineering Management was established in 1978. Dr. John Amos, professor of engineering management, was instrumental in the center's creation and serves as its director. The center's primary mission is to provide applied research and technical engineering counseling to Missouri's industries. It fulfills this mission through applied research, counseling, short courses, educational conferences, publications and projects. In providing these services, the center coordinates and makes accessible the activities of other academic department, trade associations, and many state and federal agencies.

During its first four years the center has worked with over 2,000 firms, provided 87 short courses and conferences, and has supplied an infinite number of publications. The center is the recipient of grants from state and federal agencies. Many research projects have been conducted by the center staff members who represent various disciplines at UM-Rolla.

## Ceramic Engineering

Representatives of the Missouri Refractories Association and the Missouri Clay Association met in Rolla on Dec. 1, 1925 for the purpose of requesting the School of Mines and Metallurgy to establish a chair of ceramic engineering. It was pointed out that Missouri ranked high among the states in ceramic products. Unfortunately the industry had to go outside of the state for trained engineers and, more unfortunately, Missouri young men desiring to study ceramic engineering were having to go to other states. Also, research problems relating to Missouri clays were being neglected. By year's end, the authorities announced that a ceramic "school" would open in the fall of 1926. Dr. Major E. Holmes was selected to head the new department of ceramic engineering. During the summer of 1927, Charles M. Dodd was added to the faculty resulting in a staff of two full-time and one half-time instructors. The enrollment for this second year was 28.

The Missouri Clay Testing and Research Laboratory, the research arm of the ceramic activity, began operation during the fall of 1927. This unit was also under the direction of Dr. Holmes and three staff members, a chemist, a petrographer and a ceramic engineer. The ceramic engineer was Austin J. Paul.

Over the years the department has grown in keeping with and to fulfill the technological and economic needs of the area and the nation. It has assumed an international flavor more than many of the ceramic engineering departments of the country. This has come about through faculty and postdoctoral appointments.

Department Heads have included: Major E. Holmes, 1926-1931; Charles M. Dodd, 1931-1939; Paul G. Herold, 1939-1955; Theodore J. Planje, 1955-1963; and Robert E. Moore, 1963-date.

## Chemical Engineering

The Missouri School of Mines had a curriculum in chemical engineering as early as 1889, but students were awarded the degree of bachelor of philosophy or the mine engineering degree for the work they did in chemistry. The department of chemical engineering was authorized by a bill of the General Assembly of the State of Missouri in 1915. The first degree in chemical engineering was conferred in 1917.

Dr. Victor Hugo Gottschalk served as head of the department from 1915 until 1918. Dr. William DeGarmo Turner was chairman of the department from 1918 until 1928.

Dr. Walter T. Schrenk, after whom the Chemistry-Chemical Engineering Building is named, was the chairman from 1928 until 1956. Dr. Dudley Thompson served as department chairman from 1956 until 1964.

In 1964 the department was separated from the chemistry section, and the two became independent departments.

Dr. Mailand Strunk served as the chairman of the new department from 1964 until his retirement in 1979. Since then Dr. James W. Johnson has served as chairman.

### Chemistry

Chemistry was one of the initial programs on the MSM campus as the department of metallurgy and chemistry. Dr. Charles P. Williams, the first director of MSM, was a professor of chemistry from 1871-77. Chemistry and metallurgy were separated in 1893 and a department of chemistry was formed. In 1916, the name was changed to the department of chemical engineering. Dr. William DeGarmo Turner was chairman of the department from 1918-28, Dr. Walter T. Schrenk served from 1928-56, and Dr. Dudley Thompson served from 1956-64.

The B.S. degree in general science with a chemistry major was first offered in 1931, and the B.S. degree in chemistry was offered beginning in 1942. In 1960 the name of the department was changed to the department of chemistry and chemical engineering. Chemistry and chemical engineering were separated into two departments in 1964 and a Ph.D. program in chemistry was initiated. Dr. William H. Webb was the first chairman of the chemistry department. He was followed by Dr. Stig Friberg and Dr. Vincent Roach. The present chairman of the department is Dr. Oliver K. Manuel.

### Civil Engineering

Civil engineering was one of the initial programs on the MSM campus, as two of the three graduates at the first commencement in 1874 received the degree of civil engineer. The civil engineering department was organized in 1897 under Professor Elmo Golightly Harris, who served as chairman until his retirement in 1931. Harris was widely known for his work in compressible flow and the development of an air flow pump.

Professor Joe Beaty Butler served as department chairman from 1931 until his death in 1955. He was a major force nationally in the evolution of engineering as a profession.

Professor Ernest W. Carlton, department chairman from 1955-1965, was instrumental in obtaining a new civil engineering building and developing the largest undergraduate program in the United States.

Dr. Joseph H. Senne has served as department chairman from 1965 to the present time (1982). Under his leadership, the department has greatly increased its activities in research, graduate studies, continuing education and public service.

### College of Arts and Sciences

The formation of the College of Arts and Sciences was approved in September 1970. The original departments of the College were chemistry,

computer science, geology, humanities, mathematics, physical education, physics and social sciences plus Air Force and Army ROTC.

The first dean of the College of Arts and Sciences was Dr. Harold Q Fuller, professor of physics and chairman of the department of physics. In 1972 Dr. Adrian H. Daane became the second dean of the college. He served in that capacity until 1980 when he was promoted to the position of dean of the Graduate School. He was succeeded by Dr. Marvin W. Barker.

The college has grown significantly in number of students served, in number of majors, and in the number of areas of instruction. Among the new areas of instruction are speech and media studies, life sciences, art, and theater. Other changes from 1970 through 1982 include the transfer of geology to the School of Mines and Metallurgy, the transfer of radio station KUMR-FM from University Relations to the college, the loss and eventual regaining of aerospace studies, and the transfer of the arts and sciences continuing education program to the office of the dean of the college.

As a result of these changes, the office of the dean of the College of Arts and Sciences will be responsible effective July 1, 1983 for the programs in the departments of applied arts and cultural studies, chemistry, computer science, economics, history, life sciences, mathematics and statistics, philosophy, physical education, physics, psychology, English, aerospace studies and military science along with the continuing education activities and radio station KUMR-FM.

### Computer Science

The University of Missouri-Rolla introduced the first course in computer science in 1957 and added extensive course offerings in computer science at both the graduate and undergraduate level before the master of science degree in computer science was authorized in 1964. The B.S. degree in computer science was authorized in 1966 and the Ph.D. degree in mathematics with emphasis in computer science became available in 1967. The Ph.D. degree in computer science was approved and became effective in fall 1976. Dr. Billy Gillett was the department's first chairman.

## Computing and Information Systems

Computing came to UMR as an "identifiable entity" in 1960 with the founding of the Computer Center by Professor Ralph E. Lee, who served as its director until 1980. While primarily supporting the academic programs of the campus, various administrative services were provided until the Office of Administrative Data Processing was formed in 1979. The Computer Center and Administrative Data Processing were merged in 1981 into a division of Computing and Information Systems. At the present time, Arthur B. Brooks is director of administrative data processing, David W. Dearth is director of the Computer Center, and Otho R. Plummer is director of Computing and Information Systems.

While fulfilling a wide variety of missions, the centerpiece of UMR computing activity is in the area of computer graphics, especially in support of computer aided design and manufacturing programs in the School of Engineering.

## Continuing Education and Public Service

The UM-Rolla Extension Division was established on July 1, 1964, as part of the four campus reorganization of the University of Missouri. John E. Senne was hired as director. One year later, Dr. G. Edwin Lorey, professor of ceramic engineering, became the director, and the next year his title was changed to dean, a position he holds to date.

Concurrent with the start of the Extension Division, Dr. Anton deS. Brasunas, professor of metallurgical engineering, was hired as director of the UMR Engineering Center in St. Louis. The center, offering evening courses for engineers and scientists in the St. Louis area, started with two M.S. programs. Today there are 10 M.S. programs in computer science and nine disciplines of engineering with 1,096 degrees having been granted through the summer of 1982.

UM-Rolla continuing education courses are offered in arts and sciences, engineering and mines and metallurgy.

Since 1968, the M.S. in engineering management has been offered at Fort Leonard Wood, and this same degree has been presented in the Springfield-Joplin area and in Jefferson City. Credit courses on request, mostly in the liberal arts area, are presented off campus in the general vicinity of Rolla.

In the early years of continuing education at Rolla, there was a greater emphasis upon credit courses than non-credit. Today the non-credit program, tailored to fit the specific needs of the clientele, is considerably larger than the credit program. UM-Rolla has developed a national and international reputation in non-credit continuing education for engineers and scientists. Most of the short courses and conferences are held in either Rolla or St. Louis, but at the request of local or national professional societies, some of these short courses are held in various locations throughout the United States. In addition, in-house programs have been developed for many industries in Missouri and outside the state.

Other non-credit activities included programs specifically developed for the community of Rolla and for youth in the state of Missouri relative to career opportunities, music programs and physical education activities.

The School of Engineering has a cooperative extension program which supplies technical assistance and problem solving for small communities, counties and small businesses in the state. The purpose of the program is to improve the engineering services of rural Missouri and the management capabilities of small businesses.

For 1981-82, the student full-time equivalents for credit and non-credit courses were 265 and 634 with respective enrollments of 1,590 and 10,132.

# Counseling and Testing Center

The UMR Counseling and Testing Center was established in the late 1960s by Dr. Lynn Martin. Individual counseling was provided for students, campus testing activities were consolidated, and the summer orientation program for new students was initiated as basic functions of the center.

Dr. Robert Barefield was appointed director of the center in 1971 and held that position for 10 years. The primary focus for the center during this period continued to be on direct service to the University community. The Minority Engineering Program was established through the counseling center in 1975 and the center's services were formally extended to faculty and staff in 1977

with the establishment of the Faculty-Staff Assistance Program.

The responsibility for directing the center's activities was assumed by Dr. George Schowengerdt in 1981. The center continues to provide a broad range of professional services with an emphasis on developmental activities that will increase the effectiveness of the campus's human resources. These efforts provide the basis for the Personal Resource Development Programs, a series of workshops, presentations, and group activities offered each semester by the counseling center staff, in addition to outreach activities to campus living units and presentations to freshman classes.

### Dean of Students Office

The office of student adviser, the forerunner of the dean of students, was created in 1921 during the Fulton administration. Henry Horton Armsby, professor of civil engineering, served as the first student adviser, and, in the 1923-24 academic year, was appointed registrar as well.

The two offices functioned under one director until Rex Z. Williams became assistant dean in 1946 and assumed the responsibilities of student adviser as part of his office. He retired as associate dean in 1952, and was succeeded by Donald L. Dean, who served one year as assistant to the dean. Vernon A.C. Gevecker served as assistant dean from 1953 to 1959. Leon Hershkowitz was named to that post in 1959 and became assistant dean-placement in 1967.

During those years, the assistant dean handled such things as placement, student organizations and discipline. In 1958, Noel Hubbard, who had been registrar since the 1940s, was appointed assistant dean, and at that time, scholarships and financial aid were moved from Dean Curtis Wilson's office to the office of assistant dean.

When Hubbard retired in 1960, Paul E. Ponder was named assistant dean. He handled the duties of "student adviser" under various titles, including

dean of student affairs, until 1979 when the present dean of students, Dr. B. Ken Robertson, was appointed.

### Electrical Engineering

The electrical engineering department, as now constituted, was separated from the physics department in 1924, although the bachelor of science degree in electrical engineering had been awarded in May, 1918, to at least one person. Professors Frame and Lovett had set up an electrical engineering curriculum in 1921. The original courses were in the areas of power and telephony/telegraphy. A radio course was added in the spring 1930 semester, the forerunner of the extensive electronics courses offered today.

Enrollment in the department was very small until after World War II. The first graduating class in 1923 numbered three. The 1930 class lists 10 bachelor of science degrees in electrical engineering. In 1950, the number reached over 200. A decrease followed, but, from 1950 on, enrollment steadily increased and now (1982) numbers over 1,230.

The bachelor of science degree in electrical engineering, first offered about 1918, was followed by the master of science degree in electrical engineering in 1930 and the Ph.D. degree in electrical engineering was first awarded to John Komo in 1966.

The teaching staff, beginning with two in 1921 has grown to 32 today. The department moved from Norwood Hall to the present Electrical Engineering Building in 1959.

### **Engineering Graphics**

Engineering graphics was taught at the Missouri School of Mines and Metallurgy as early as 1871. From 1873-1877 it had its own department and was headed by Col. James W. Abert. For the next several decades, it was, at different times, a part of the departments of engineering, civil engineering and mechanical engineering as well as a separate department. From the 1920s, until it became a part of the mechanical engineering department in the mid-60s, engineering graphics was a separate department. Its name was varied, but in recent times, it has been known as the engineering drawing department, the engineering graphics department, and the engineering graphics. In keeping with its tradition of excellence, UMR has become a leader in educational computer graphics, with comprehensive capabilities in computer-aided design and computer-aided manufacture (CAD/CAM).

## **Engineering Management**

Bernard R. Sarchet joined the UMR faculty in 1967 as professor-in-charge of engineering management in the department of social sciences. In 1968, the

Board of Curators approved the creation of a separate department of engineering management, and Sarchet was named chairman. The first students to receive B.S. degrees in engineering management graduated in May 1968. The M.S. in engineering management, which had been the M.S. in engineering administration, was approved in 1968, and a Ph.D. program was implemented in 1981.

In 1977 the Center for Applied Engineering Management was established with Dr. John Amos as director. The center assists small businesses throughout Missouri. In addition, the department conducts short courses to assist engineers in making the transition to managerial positions. In the fall of 1979 the department provided the leadership for the formation of the American Society of Engineering Management. UMR alumnus E.A. Smith of Tulsa, Okla., established a trust fund in 1978 to help in providing the private funding for a new engineering management building.

Sarchet retired as chairman in the fall of 1981, and Dr. Henry Sineath was appointed to replace him. He continues in that position today.

# **Engineering Mechanics**

The mechanics department was established on the campus of the then University of Missouri School of Mines and Metallurgy in 1916. Before that time the mechanics courses were taught in the mathematics department. The first chairman of the department was Professor L.E. Garrett who was an MSM graduate, class of 1901. Professor Garrett was an associate professor of mathematics and had also been the director of the School from June 1913 to December 1914. The mechanics department served as a service department until January 1964 when the master of science degree in mechanics was approved. In September 1965 the name of the department was changed to engineering mechanics and in September 1966 the bachelor of science and the professional development degree in engineering mechanics were approved. In September 1981 the department was authorized to offer the Ph.D. degree and effective October 1981 the undergraduate program was accredited by ABET.

#### Environmental Research Center

The Environmental Research Center was established in 1965. Dr. S.G. Grigoropoulos, professor of civil engineering, served as director until 1979. He was succeeded by Dr. Ju-Chang Huang, professor of civil engineering and environmental health. Research projects undertaken by the Center have been concerned with such problems as water supply, water pollution control, air pollution control, and solid waste management. The largest single project has been a long-term study of the environment of the New Lead Belt directed by Dr. Bobby G. Wixson. In addition to Huang and Wixson, members of the Environmental Research Center staff in 1982 are Dr. Purush TerKonda, Dr.

Donald Modesitt, Professor J. Kent Roberts, Dr. Shoou-Yuh Chang and Dr. Brian Dempsey, all civil engineering faculty members.

# Experimental Mine

The first land for the Experimental Mine (7.08 acres) was purchased in 1914 from Edwin Long for \$350. An additional 9.69-acre parcel of land was purchased from A.E. Long in 1949. The mine is now used as an undergraduate laboratory by approximately 100 students each semester in geological and mining engineering and geology. It also is used for rock mechanics research and other research by graduate students in mining engineering.

# Generic Mineral Technology Center for Pyrometallurgy

The Generic Mineral Technology Center for Pyrometallurgy was established at the University of Missouri-Rolla in July 1982 as part of the Missouri Mining and Mineral Resources Research Institute in the School of Mines and Metallurgy.

The center, which conducts research on the improvement of high-temperature processes that are used to obtain and purify metals from ore, was funded by a three-year \$1,003,000 grant from the U.S. Bureau of Mines. The center's principal investigator is Dr. Arthur E. Morris, UM-Rolla professor of metallurgical engineering. Other UM-Rolla faculty members serving as research investigators in the center are: Dr. Thomas O'Keefe, professor of metallurgical engineering; Dr. Don Askeland, professor of metallurgical engineering; and Dr. Robert E. Moore, professor and chairman of ceramic engineering. UM-Rolla students also are involved in the research conducted at the center. In addition, an off-campus advisory board composed of experts in the field assists the center's researchers.

In conducting its research, the center's primary emphasis areas are: smelting, refining, roasting, oxidation, innovative approaches such as plasma processing, combined computer modeling and smelting and information exchange. The center's researchers also hope to touch upon such matters as the decreasing quality of ore, concentrate and other feed-stock materials; more exacting specifications for refined metal; lowering of emissions levels for toxic substances in the workplace and the environment; dependence on foreign sources for certain metals; and the increasing cost of energy. UMR is being assisted in its efforts by affiliated mineral institutes at Purdue University and the Michigan Technological Institute.

# Geological Engineering

The department of geological engineering was organized in 1963 through the efforts of Dr. Tom Beveridge as part of the department of geology and geological engineering. Dr. Nolan Aughenbaugh was the first full-time geological engineering faculty member and served as its first professor-incharge. The first degrees in geological engineering were awarded in 1967.

In 1970, the department was separated from the geology department and was joined with the department of mining, petroleum and geological engineering. This was done so that the department would be within the School of Mines and Metallurgy and could receive engineering accreditation. Enrollment and faculty grew steadily over the next decade and in 1980 the department was separated from the department of mining, petroleum and geological engineering to form a separate geological engineering department. At this time, the department had five full-time faculty members and an enrollment of 180 undergraduates and 20 graduate students.

# Geology and Geophysics

Before 1899, courses in the field were taught in the department of mining and metallurgy. In 1899, the department was separated from mining and metallurgy and was known as the department of mining and geology. By 1904 it had taken on the official designation of the department of geology and mineralogy. George Ladd was the first geologist to be department head. In 1961 the department was renamed the department of geological engineering and geology and granted undergraduate and graduate degrees in both fields. In 1970 the department of geological engineering and the department of geology and geophysics were created.

Eleven chairmen have headed the department since its founding. Housed first in the Rolla Building with the Missouri Geological Survey and U.S. Geological Survey, the department was later located in Norwood Hall where it remains today. A mineral museum containing several thousand minerals and special collections of the famous Tri-State and Lead Belt Districts, a paleontological collection of similar size, and a federal-state map repository are important adjuncts of the department. Graduates of the department have become highly successful geologists in government, industry and academia.

# Graduate Center for Cloud Physics Research

The Graduate Center for Cloud Physics Research was initiated on a trial basis in September 1966 as part of the Space Sciences Research Center of the University of Missouri. Dr. James L. Kassner, Jr. was the founder. The departments of physics, chemistry, mechanical and aerospace engineering, and electrical engineering were participants. The center was granted formal status in 1968 and Dr. Kassner was named director. The center acquired the first THEMIS grant to be awarded to the UMR campus in the fall of 1968. This gave the center's research program considerable impetus. The center also participated in the Departmental Development Grant awarded to the physics department in 1967. The center's highly coordinated research program

developed around the laboratory simulation of cloud microphysical phenomena. The construction of a cloud simulation chamber facility was supported by a five-year \$1,300,000 contract from the DOD in June 1979. The center's primary work continues to revolve around cloud microphysics and aerosol science. A large theoretical program emphasizes molecular level modeling of nucleation phenomena and surface of ice in addition to cloud and aerosol modeling.

#### Graduate Center for Materials Research

The Graduate Center for Materials Research was established in 1964 as the first division of the University's Space Science Research Center. The first director and one of the founding members was Prof. William J. James of the department of chemistry.

Initially, the center was made up of four research professors from the departments of ceramic engineering, metallurgical engineering, chemistry, and physics. This senior staff was assisted by a secretary, technician, four research associates, and 10 graduate students housed in the Buehler Building.

With the assistance of federal funds provided by HEW and a state appropriation, a 30,000 square foot building was completed and dedicated in 1967. The dedication was marked by the center's first national symposium on materials science. The center was expanded to six participating departments with the addition of the departments of chemical and electrical engineering.

In 1968, the center initiated a push into three areas of study: biomedical materials science, permanent magnetic materials, and surface science. In 1968, an international cooperative exchange program in the study of magnetic structures of materials was established with the Laboratoire de Magnetisme of the CNRS, Centre des Études Nucléares de Grenoble, France. The laboratory was then headed by Professor L. Néel, distinguished Nobel physicist. The exchange of staff between the two groups has resulted in several jointly published papers and has made available to the center one of the finest magnetic laboratories in the world. The exchange program continues to be active and is officially supported by the International Exchange Division of the National Science Foundation and in part by the Army Research Office and the CNRS of France.

As a consequence of the promising work of senior and associate professors of the department of physics, the center received in 1969 a four-year grant of \$680,000 from the Air Force Office of Scientific Research to accelerate its program of surface studies of electronic materials. The first international conference on "Surface Waves" held on the Rolla campus in June 1972 was an outgrowth of support provided by NSF and the AFOSR. Since that time, four international research conferences have been sponsored by the center, the most recent being the 15th International Rare Earth Research Conference held on the campus in June of 1981.

In 1969, the center initiated a collaborative research program in the use of biomedical polymers with the medical school and the SSRC at Columbia. The group at Rolla was originally headed by Dr. Ken Mayhan. His colleagues at Columbia were Drs. Carl Almond and Earl Simmons of the Thoracic and Cardiovascular Division of the Medical School and Drs. A. Hahn and R. Barr of the SSRC. This program continued to grow and at this time is supported by the National Institutes of Health with Drs. Yasuda and James heading the group at Rolla.

In 1973, the Straumanis Electrochemical Laboratory was established to honor Dr. Martin E. Straumanis, an outstanding scientist of international stature and one of the first senior investigators of the Center. This laboratory is among the five largest to be found in a university and during the last decade, it has generated over 50 refereed publications which have contributed significantly to the understanding of electrokinetics as it is influenced by interfacial conditions at the electrode surface. In April 1978, the Center was named Straumanis Hall.

In 1975, Professor James resigned as director and was succeeded by Prof. Leonard Levenson. Professor Levenson resigned his post in 1981. Professor James has served since that time as acting director.

### Graduate Study

Prior to 1965, graduate study at the University of Missouri-Rolla was directly under the graduate dean at the University of Missouri-Columbia.

In 1964 the Graduate School at UMR was established and the first meeting of the Graduate Faculty was held on Oct. 21, 1965.

Dr. Wouter Bosch, professor of chemistry, was appointed dean of the Graduate School, and he served in that position until 1969. Dr. Robert H. McFarland was appointed dean of the Graduate School in 1969 and served in that position until 1979. He is currently professor of physics at UMR. In 1979 graduate activity at UMR was reorganized and Dr. Adrian H. Daane was appointed dean of the Office of Graduate Study.

#### Humanities

Courses in English have been taught at UMR since at least June 1872. An English or preparatory department was established in 1873, and John MacGuire was awarded a certificate of proficiency in English and chemistry in 1875.

From time to time during MSM's first seven decades, English was one of the majors available for a B.S. in general science and also, for a time, for the M.S. in general science. In 1937, Director Chedsey eliminated English as a major for the general science degrees.

Before 1912, there were separate departments of English and modern languages. At that time, the two were merged, but they were made separate

departments again in 1930. In the 1940s, all humanities programs and social studies programs were merged into a single department. This grouping continued until 1964 when the separate departments of humanities and social sciences were established.

The growth of the various disciplines in the humanities and social sciences departments during the 1960s and 1970s resulted in the re-establishment of separate departments for those areas in the early 1980s. Effective July 1, 1983, the following departments will replace the humanities and social sciences departments: English, economics, history/political science, philosophy, psychology, and, for the non-degree areas, applied arts and cultural studies.

# Infirmary

Dr. S.L. Baysinger became director of the Student Health Department in 1926. He operated the facility from his own office. At that time there were 408 students on campus.

In 1936, the School purchased the old Shaw residence on the corner of 10th and State and renovated it as a student health facility. Mrs. Timmerman, a registered nurse, was hired and the student health facility was started. Dr. Baysinger resigned in 1937 and Dr. E.E. Feind became health director. The facility was maintained by two part-time physicians and three nurses for the next 20 years.

In 1959 Mrs. Timmerman resigned as head nurse and Mrs. Starliper became head nurse. This lasted only a short time because of illness. Mrs. Starliper resigned in 1962 and Mrs. Nations became chief nurse.

The Health Facility moved again in 1955 to its present location at 1111 State St. As the student population increased the nursing staff also increased. Over the past 15 years it has been maintained at five full-time nurses and one part-time nurse.

Dr. E.E. Feind resigned as director in 1968 and was succeeded by Dr. J.M. Myers with the operation of the health facility continuing along its same course.

Mrs. Melba Read became head nurse in 1981 as Mrs. Nations retired.

At present the infirmary is staffed by Dr. J. Myers as director with Dr. Matsuda and Dr. Bartlett as staff physicians. Mrs. Read is head nurse, assisted by Mrs. Iva Purtee, Mrs. Eleanor Higley, Mrs. Sue Franklin, Mrs. Frances Berg, plus Mrs. Nancy Myers. The cook is Mrs. Pearl Maxwell.

#### Institute of River Studies

The Institute of River Studies originated in February 1972 when a study on environmental aspects of the Missouri River was undertaken by a group of faculty. It was officially established as a unit on the UMR campus Jan. 1, 1976. The Institute of River Studies investigates problems and conducts research in all water and water-related areas. These include, among others, water

resources planning and surface and groundwater supplies (their adequacy and quality). Many of the areas of investigation are interdisciplinary in nature.

Director of the Institute of River Studies is Dr. Paul R. Munger, professor of civil engineering. He has held the position since the official establishment of the institute in 1976.

# International Programs and Studies

In 1968 UMR further recognized the need for international technical training when the Center for International Programs and Studies (CIPAS) was established. Initially, leadership was provided by Dr. Robert Carlile (full-time director).

The philosophy developed by CIPAS states: A University cannot be what it professes to be unless it embraces cultures other than its own, pursues the continuum of truth which knows no boundaries, and welcomes scholars and ideas from around the world.

Project experience to date has included the offering of short courses, institutional development projects, intensive seminars, cooperative research projects, and a degree program out-of-country. All projects have been externally funded.

# Library

The library opened with the School, and its first librarian was one of the three in the first graduating class, John Holt Gill.

From 1874 to 1894, the library grew to about 3,000 volumes. It was located in a southwest, second-floor room of the Rolla Building and was open from 8 a.m. to 4 p.m. The library was crowded into Norwood Hall from 1904 to 1912. Then it was moved to the second floor of Parker Hall.

Until 1912, the library had been operated part-time by faculty or students. Jesse Cunningham became the first full-time librarian and served until 1915. Earl J. Randolph served as librarian from 1946-75 and planned the move, in 1968, to the new library on the site of the old Jackling Gymnasium.

The new library was named in memory of Curtis Laws Wilson in 1979, and housed more than 330,000 volumes by 1982. That building also houses radio station KUMR, the University Archives, the Western Historical Manuscript Collection and Audiovisual Services. Ronald G. Bohley, is director of library and learning resources. He was appointed to that position in 1976. The late 1970s and early 1980s saw the introduction of online computer cataloging, computerized literature searching, and the introduction of a University-wide online library catalog.

Past librarians have included: 1871-74, John Holt Gill; 1874-78, V.C. Yantis; 1878-80, Edwin J. Jolley; 1880-81, Thomas G. Thomas; 1881-84, Geordie Z. Whitney; 1884-87, W.G. Clark; 1887-91, E.A. Drake; 1891-96, Thomas L. Rubey; 1896-99, Paul J. Wilkins; 1899-1900, Maude B. Mitchell; 1900-03, J.D. Carpenter;

1903-06, L.E. Garrett; 1906-07, Jesse Heller; 1909-12, Ida Stevens Garrett; 1912-16, Jesse Cunningham; 1916-21, Harold Leslie Wheeler; 1921-23, H.O. Norville; 1923-29, Edith Carrington Jones; 1929-32, John Herman Dougherty; 1933-38, Paul Howard; 1939-46, Gilbert Lewis Campbell; 1946-75, Earl J. Randolph; 1975-76, Bryan M. Williams; and 1976-, Ronald G. Bohley.

#### Life Sciences

The life sciences program at UM-Rolla began in 1970 as an "emphasis area" of the chemistry department. In December of 1977, the program was separated from the chemistry department and established as a separate entity, and UMR was authorized to award a bachelor of science degree in life sciences.

The degree program is a basic program in the biological sciences. The program at UM-Rolla specializes in molecular biology and microbiology. Graduates of the program have distinguished themselves in industry, graduate schools and professional programs.

Dr. Nord Gale, professor of life sciences, has directed the program since its inception.

#### Mathematics and Statistics

The department of mathematics has served the campus since the School opened. Most of the early development took place under George R. Dean, who served as department head from 1897 to 1930, and continued to teach in the department until 1935. Dean was an outstanding teacher and scholar with wide technical interests. While on the Rolla faculty, he did consulting work in the General Electric Laboratories of C.P. Steinmetz. He published research in physics and electrical engineering as well as mathematics, and had worked for several years as a pharmacist before completing his B.S. degree at MSM in 1891.

The first M.S. graduate from the department was Aaron J. Miles, who wrote his thesis under Professor Dean in 1931. Miles also taught briefly in the department of mathematics before moving to the department of mechanical engineering, where he taught and served as department chairman before being named the first dean of the School of Engineering in 1964.

Since Professor Dean's time, the department has continued its emphasis on applied mathematics. With the growth of the graduate programs, the breadth of the course offerings and research has increased. Over the past 20 years, the faculty and graduates of the department have achieved prominence for their teaching, research, and professional activities. In 1981, to reflect the departmental strength in theoretical and applied statistics, the name of the department was changed to department of mathematics and statistics.

# Mechanical and Aerospace Engineering

Beginning in the fall of 1916, work leading to the B.S. degree in mechanical engineering was given. These courses had been added by virtue of a legislative act, the Buford Act, sustained by a Supreme Court decision.

Prior to that time, instruction in that field had been called shopwork and drawing and was under the direction of Professor Joseph Henry Bowen. In 1916, Harold Shields Dickerson became the first head of the newly established department. The department grew rapidly after 1920, and new courses were added in refrigeration and air-conditioning as early as 1924. A course in heating and ventilation had been approved in the early 1920s. In 1931, a course in welding was added, and, by 1938, aeronautical engineering was given recognition when aerodynamics and airplane structures were taught.

Robert Lee Rhoads headed the department for the 1920-21 year. From 1921 to 1942, Professor R.O. Jackson was head of the department. He was succeeded by Dr. Aaron J. Miles, who served until 1964 when he became dean of the School of Engineering. Thomas R. Faucett succeeded him and served until 1978 when Walter Eversman became chairman.

In the mid-60s, engineering technology was added to the department. In 1968, the name of the department was changed to mechanical and aerospace engineering.

# Metallurgical and Nuclear Engineering

Although metallurgy has been a part of the educational offerings since MSM was founded, formal recognition did not come until a baccalaureate degree in chemistry and metallurgy was awarded in 1892, when Cuthbert P. Conrad was department chairman. Physical metallurgy was added in 1908 to the extractive metallurgy curriculum. The three chairmen who have led the department for 54 of the 62 years since 1920 have sustained this unusual breadth in the curriculum, which encompasses the entire field of metallurgy.

Graduate education began expanding with the M.S. in 1920 and the doctorate in 1933. This education, together with research efforts (which began shortly after World War II), occupied over a third of the faculty's collective time by the mid-1960s.

Between 1956 and 1983, the education of nuclear engineers through the doctorate degree was the responsibility of the department. This new engineering field warranted a separate degree status in 1968 and will have separate departmental status on July 1, 1983. At this time, the department of metallurgical and nuclear engineering will become the department of metallurgical engineering and the department of nuclear engineering.

# Military Science

The first military unit at MSM, Company G of the University Battalion, was organized in January 1873, and disbanded in 1877. From 1877, until 1917, due to military budget constraints, the Army was unable to fund Army sponsored ROTC. During this time, the department of military science was continued by previous active duty officers on the MSM faculty until full-funded support was regained from the Army in 1917.

Army sponsored training has been continuous at the School since April 1917. In January 1919, the program was reorganized and an Engineer Unit of the Reserve Officers' Training Corps was established. The first cadet was commissioned in July 1919, and since that time, over 2,000 cadets have received commissions in the Regular Army and the United States Army Reserve.

In 1965, the UMR Army ROTC program was changed to the general military science curriculum in lieu of the corps of engineers course. This made possible the selection of any branch of the Army by the ROTC graduates. At this time, ROTC at UMR became an elective for freshmen and sophomores.

In 1973, women students at UMR became eligible for enrollment in the

program. The first female was commissioned in May 1976.

The department of military science has been in existence for 110 continuous years. Today, there are over 800 students enrolled in Army ROTC, a 14-year high. The military science program at UMR ranks in the top 10 of all Army ROTC programs in the United States. UMR students continue to out perform other ROTC students at advanced camp and distinguish themselves at their officer branch basic course when they enter active duty. Forty-three students enrolled in ROTC attend UMR on full, Army ROTC Scholarships.

# Mining Engineering

As serving the educational interests of Missouri's mining industry was the primary goal to be accomplished by the fledgling School of Mines and Metallurgy in 1870, mining education has always played a significant role in the MSM/UMR educational program. Over the years, the mining department developed a number of specialities that evolved into separate curricula, and these "offspring" programs have grown to be successful and renowned departments.

The mining engineering department of today has retained all of its fine tradition of the past but continuously breaks with tradition to advance mining technology and methods. Its faculty members have always included persons of national and international reputation and its graduates have become both the leadership and the backbone of mining industry worldwide.

#### Minority Engineering Program

In 1973, a group of UMR professors and student representatives from the Association for Black Students developed a plan to bring more minority students to UMR through a scholarship program supported by industry. This plan resulted in the Minority Engineering Program, which was initiated in 1974. It combines vigorous recruitment efforts with an intensive prefreshman seven-week summer program which includes interaction with minority engineers from industry, plant visits, tutorial assistance and counseling services. These services, along with a financial aid package that covers all necessary expenses during the freshman year, are continued throughout the

student's stay at UMR. The program also provides employment services for summer or co-op engineering jobs.

By the end of 1982, more than 275 students had participated and 75 had received their B.S. degrees in some field of engineering. Funding has come from more than 50 corporations. Dr. Jacques L. Zakin served as director until 1977 and was succeeded by Floyd Harris.

# Music/Art/Theater/Speech and Media Studies

Music and theater at UMR had their beginnings as clubs. An MSM band is recorded as having played for the dedication of the School and numerous bands and orchestras were in existence from the start of the School. The MSM ROTC band founded in 1926 by John W. Scott is the oldest continuous unit, followed by the MSM Glee Club and the MSM Players which were established in the 1930s.

In 1960 the band became a regular class. At present there are eight band units, two orchestras, a Renaissance band, three choral groups, theater and musical theater. Classes are offered in music, art, film, theater, and speech and media studies to more than 800 undergraduate students per semester. UMR student groups have performed throughout the nation, combining their majors in engineering, science, or liberal arts with the broadening experiences in the arts.

The curriculum minor in speech and media studies is one of the most innovative.

#### Nuclear Reactor

Through the efforts of several faculty members and administrators—chiefly Daniel S. Eppelsheimer, professor emeritus of metallurgical and nuclear engineering; Harold Q Fuller, dean emeritus of the College of Arts and Sciences and professor of physics; William H. Webb, professor emeritus of chemistry; and the late T.J. Planje and Aaron J. Miles, respectively dean of the School of Mines and Metallurgy and dean emeritus of the School of Engineering, federal grants were obtained in 1960 to build the first nuclear reactor in Missouri on the campus of the University of Missouri School of Mines and Metallurgy.

"It was on Dec. 9, 1961, during the administration of Dean Curtis Wilson, that the reactor first 'went critical' and achieved a self-sustained, nuclear chain reaction," said Dr. Albert E. Bolon, reactor director and associate professor of nuclear engineering in 1982. "Since that time the reactor has played a prominent role in the education and training of hundreds of nuclear engineering and other UMR students, as well as utility nuclear power plant operators.

"It also has been used for research in a number of areas ranging from moon rocks and meteorites to studying pollutants in Missouri's rivers and streams."

The first director of the reactor (1961-1963, part-time) was Dr. Franklin B. Pauls, professor emeritus of physics, and the first full-time director (1963-1981) was Dr. D. Ray Edwards, professor of nuclear engineering.

#### Personnel Services

Personnel Services began in 1965, under the Business Office. John Freehill was director.

Today, Personnel Services is under the Office of Business Services. It is directed by John Molchan.

# Petroleum Engineering

In 1921, petroleum engineering was added to the list of options in mining engineering, when Carroll R. Forbes was head of the department.

In 1966, the department of mining engineering became the department of mining and petroleum engineering. Petroleum engineering became a separate department in 1980. Dr. Leonard F. Koederitz was acting chairman of the department during its first year; Dr. A. Herbert Harvey became chairman in 1981.

### **Physics**

In 1890-91 physics was taught in the department of science. The department of physics, as such, was first listed in the 1892 catalog under the guidance of Professor Austin Lee McRae. In 1917 the department title became physics and electrical engineering. The two disciplines were combined in a single department until 1925.

In 1960 the Ph.D. degree in engineering physics was approved. In 1966, the doctorate was approved in physics. The engineering physics degree was dropped in the late 1970s.

During the 90 years as the department of physics there have been three individuals who have served as chairman of the department for long periods and, as a result, have had strong influences on the character of the department of physics. They are Austin Lee McRae, Leon E. Woodman, and Harold Q Fuller.

The physics department has a long tradition of innovative teaching and research. While research has always been encouraged, the research program developed rapidly in 1964-67 with the aid of an NSF departmental development grant.

The physics department has developed national and international recognition for research in atomic and molecular physics, cloud physics, and solid state physics. The physics faculty includes six Fellows of the American Physical Society. The level of federal funding now exceeds a million dollars per year.

#### Power Plant

For the School's first 14 years, 1871-1885, the Rolla Building was the only building on campus, and stoves burning wood or coal were the original sources of heat. The same applied to the Old Chemistry Building and the Chancellor's Residence—the second and third buildings on campus. There was no electricity at MSM until the early 1900s.

The first steam engine to be used for power purposes was installed in the basement of the Rolla Building in late 1891 or early 1892. It was moved after 1893 to a building known as the Mining and Metallurgy Lab where one room had been designated as a steam plant. As more buildings were added, the one-room steam plant expanded and the building became known as the power plant. It was under the supervision of the mechanical engineering department. "Stoking the furnace in the power plant was the duty of those students taking mechanical engineering lab," says professor emeritus of electrical engineering, C. James Grimm (a veteran of the stoking duties in the late 1920s).

The current power plant was built in 1945 and contained two boilers with chain-grate stokers, each capable of producing 18,000 pounds of steam per hour. Another boiler with stoker was installed in 1957, with a capacity of 35,000 pounds of steam per hour, and a fourth boiler (46,000 pounds of steam per hour) was added in 1962.

After a short period during World War II, when the power plant was under the jurisdiction of the Columbia campus, supervision of the facility was delegated to the building and grounds department—now called physical plant.

The power plant is open 24-hours, seven days a week, 12 months a year. It supplies all steam for heating and air-conditioning systems on campus and a portion of the electrical power. The power plant supplied campus electricity until 1973 when rising costs made it more practical to buy most of the electricity.

An addition to the current power plant will be completed in 1983. A new dual-fuel boiler (50,000 pounds of steam per hour capacity) which burns a combination of two parts wood to one part Missouri coal has been installed. This will cost less than burning low-sulfur coal from out-of-state, and the sulfur dioxide emissions will be within the Department of Natural Resources air quality standards.

The new addition also will contain improved coal and wood storage and conveyer systems, water treating system, and ash handling facilities. It also has a new bag house which collects fly ash in compliance with clean air regulations.

#### Radio KUMR-FM

On Aug. 31, 1973, KUMR-FM, a 100,000 watt stereo radio station, signed on the air, marking the beginning of public radio in South Central Missouri.

William Devine, III served as KUMR's first station manager. Devine, along with news director Richard Holwill, music director Mike Morgan, producer Tim Jones and announcers Doug Mooney and Ann Gminski were on hand at 6 a.m. on the first day of operation.

Analog was the name of the morning program that greeted listeners that

very first day.

The first National Public Radio (NPR) program carried by KUMR is still NPR's most popular, "All Things Considered." It is still the longest continuous running network program carried by KUMR. The longest continuous running local program aired over KUMR is the bluegrass show, which, since the first Saturday night of the first week, has become a Saturday evening tradition.

KUMR's tower and transmitters are located near Lecoma, MO and the studios and offices are in the Curtis Laws Wilson Library on the UMR campus.

# Registrar

For most of the history of MSM/UMR, the functions of registrar and admissions were combined. Until 1923, MSM operated without a full-time registrar. Director Williams performed the functions of those offices during MSM's first year, and after that, records were taken care of by the faculty. Professor George R. Dean was appointed registrar in the fall of 1920. At the beginning of the 1922-23 academic year, Prof. Henry H. Armsby, who had been student adviser since 1921-22, became full-time registrar and student adviser. Noel Hubbard was appointed assistant registrar in 1923 and succeeded Armsby in 1941. In 1958, Hubbard was appointed assistant dean and Paul Ponder was made registrar and director of admissions. When Hubbard retired in 1960, Ponder became assistant dean and Robert B. Lewis became registrar and director of admissions. In 1979, the offices of admissions and registrar were separated. Lewis continued as director of admissions and Ponder was appointed registrar. In August 1982, Dr. Myron Parry, associate professor of engineering mechanics, was named acting registrar.

# Rock Mechanics and Explosives Research Center

The Rock Mechanics and Explosives Research Center was established as the Rock Mechanics Research Group in 1964. The founder and first director was Dr. George B. Clark, professor of mining engineering, who came to MSM in 1954. The establishment of the research center was an outgrowth of active promotion by Dr. Clark of research in rock mechanics and explosives within the mining department. The initial staff consisted of two new assistant professors, a secretary, and a machinist. Space was shared in the Mining Building.

As the level of activity grew, more space was needed. The center was moved to the Buehler Building in 1967, and then, in 1976, to its present location in the Rock Mechanics Facility. Other research facilities used during the period 1970 to 1982 were the temporary research laboratory, a quarry near Graniteville, and an explosive test site at Fort Leonard Wood. Project THEMIS was a major multifaceted research activity from 1969-1973 directed by Dr. Clark. Other major funded projects involved rock bolt research by Dr. Charles J. Haas from 1972-1978 and the "Hydrominer" longwall water-jet coal mining machine directed by Dr. David A. Summers from 1971 to 1978.

#### School of Engineering

Although engineering degrees have been granted on the MSM-UMR campus for many years, the School of Engineering was not formally organized until 1964 when the campus became part of the four campus University of Missouri system. Dr. Dudley Thompson served as director of the new school while a search was conducted for a dean.

In 1965, Dr. Aaron J. Miles, who had had a long association with the campus, was named the first dean of engineering. Following Dr. Miles' retirement in 1967, Dr. J. Stuart Johnson was appointed to the position and served in that capacity until his retirement in 1977. During this period, the school showed growth in all areas of academic endeavor, including student enrollment and research and the development of a significant extension effort. Dr. James E. Halligan served as dean from 1977 to 1979. Dr. Robert L. Davis was appointed dean of engineering in 1980 following a national search, and the school continues to grow under his leadership.

A significant milestone was reached during 1982 when Ph.D. programs were instituted in engineering mechanics and engineering management. With the addition of these two programs, the School of Engineering is able to offer degrees at all levels in the six departments constituting the School of Engineering.

#### School of Mines and Metallurgy

When established, the School of Mines and Metallurgy included the departments of ceramic, metallurgical and mining engineering. Petroleum engineering was an option in mining engineering. Geological engineering degrees were granted by the School of Mines and Metallurgy, but the geological engineering program was administered with the department of geology and geophysics in the School of Science. Organizational changes after 1964 included: 1966—the department of mining engineering became the department of mining and petroleum engineering; 1968—the department of metallurgical engineering became the department of metallurgical and nuclear engineering; 1970—the department of mining and petroleum engineering

became the department of mining, petroleum and geological engineering; 1980—the department of mining, petroleum and geological engineering was divided into three separate departments; and 1983—the department of metallurgical and nuclear engineering will become two separate departments.

As of July 1983, the School of Mines and Metallurgy will have seven departments: ceramic, geological, metallurgical, mining, nuclear, and petro-

leum engineering, and geology and geophysics.

Dr. Theodore J. Planje was the first dean of the School and served until his death in July 1980. Dr. Ernest M. Spokes served as acting dean from August 1980 until June 1981 when Dr. Don L. Warner was appointed dean.

#### Social Sciences

In the fall of 1964, when MSM became the University of Missouri at Rolla, the department of humanities and social studies was separated into two departments and the department of social sciences was born. Dr. James Harris, historian, served as the new department's first chairman and assumed those duties in January of 1965.

Composed of the disciplines of economics, history, management, political science, psychology, and sociology, the department began offering B.A. degrees in economics, history, and psychology in 1967 and B.S. degrees in economics and psychology a few years later. By that time the management program had been given its own department and anthropology was added to the disciplines within social sciences.

Varying in size between 25 and 30 faculty, the department has offered undergraduate programs for its majors and courses for students from other curricula on campus. On July 1, 1983, the Department of Social Sciences will be replaced by smaller-sized departments for the disciplines of economics, history/political science, and psychology.

#### Student Financial Aid

Prior to 1958 UMR's student financial aid program was administered through the dean's office. In 1958 Noel Hubbard was appointed assistant dean and one of his responsibilities was to administer the financial aid program with the aid of a faculty committee. The financial aid program continued to grow, and in the mid-1960s, Ray Pendergrass, a member of UMR's history faculty, was appointed director of student financial aid. Pendergrass left the position early in 1981. Bob Whites was appointed acting director and was named director in the summer of 1982.

# UMR Engineering Center in St. Louis

The center was started in 1964 at the request of St. Louis industry and with the encouragement of local industries. Dr. Anton deS. Brasunas served as director of the center from its inception until 1978. Dr. Edward C. Bertnolli is the current director.

The center offers master's programs in computer science, engineering management, engineering mechanics, and in aerospace, chemical, civil, electrical, environmental, and mechanical engineering.

The center is located on the UMSL campus. It also offers area and national non-credit short courses and in-company credit and non-credit courses. Enrollment during the fall semester 1982 is 693. Over the past 18 years a total of 1,127 persons have been granted degrees through the center.

## University Police

The University Police Department was founded in 1965. The department consisted of two policemen, one of whom, John Tryon, acted as chief of police.

Around 1966, the watch force (13 in number) was transferred from the physical plant to the newly-formed police department.

The department now consists of nine policemen, seven security guards, four dispatchers and two clerical staff members. Richard Boulware is the department director.

# Western Historical Manuscript Collection

The UMR office of the University of Missouri Western Historical Manuscript Collection—State Historical Society of Missouri Manuscripts (Joint Collection) opened on Jan. 2, 1980. It is part of a network of historical manuscript repositories on each campus of the University of Missouri system. The associate director in charge of the Rolla office is Dr. Mark C. Stauter, and the manuscript specialist is John F. Bradbury, Jr. (UMR '74). The UMR office collects letters, diaries, business records, and other unpublished historical material from throughout southern Missouri, with a special interest in the history of the mining industry. The office is in the Curtis Laws Wilson Library.

# Notes on Sources

Rather than appending footnotes and a full bibliography to the text, the authors have chosen to list only the most essential sources used in writing this book. Any study of UM-Rolla must begin with the Phelps County Historical Society-edited The History of Missouri School of Mines and Metallurgy (Jefferson City: Mid-State Printing Company, 1941). Usually referred to as "C.V. Mann's History," it is a compilation of primary sources with a historical narrative woven in. The editors collected newspaper articles, letters from faculty and alumni, the text of laws, and other important items. Clarence N. Roberts' History of the University of Missouri School of Mines and Metallurgy, 1871-1946 (Rolla, Missouri, 1946) is a record of events. Both books aided the authors of this volume. Two general histories of the University of Missouri provided perspective. Jonas Viles' et al. The University of Missouri, a Centennial History (Columbia, Missouri, 1939) contained an essay by Samuel Lloyd on the history of MSM besides a general treatment of the University. Frank F. Stephens' A History of the University of Missouri (Columbia, Missouri: University of Missouri Press, 1962) is the latest general study of the University. It focuses on administrative and organizational development. In addition, William Switzler's "Manuscript History of the University of Missouri" is an abstract of Board of Curators' minutes from 1871 through 1903.

Switzler's abstracts are supplemented by the full proceedings of the Board of Curators and various reports of the Board. Its early actions are contained in bound volumes labeled *Record of the Board of Curators of the University of Missouri*. Before the end of the 19th century, the designation changed to *Board of Curators' Minutes*. These records are maintained in the Board of Curators' Office, University Hall, Columbia, Missouri, and were made available to the authors by Catherine L. Hunt, secretary to the Board. Summaries of Board actions are contained in *Reports of the Board of Curators* to various General Assemblies. Until 1954, a committee of the full Board administered the Rolla campus on a month-to-month basis. The committee's proceedings are contained in *Minutes of the Executive* 

Committee of the School of Mines and Metallurgy and Biennial Reports of the Executive Board of the Missouri School of Mines and Metallurgy to the General Assembly. Catalogues of the University of Missouri School of Mines and Metallurgy carry various titles over the years and are sources of material from the beginning of the School to the present. Other official documents include "Annual Reports" from the campus to the University Central Administration, reports to accrediting agencies, and compilations submitted to government agencies.

Collections in the University of Missouri-Rolla archives that proved helpful included the Clair V. Mann collection, the Frank B. Powell papers, the Merl Baker papers, and the J.W. Koenig collection. The writing of this history resulted in important additions to the archives. Alumni Ronald Corradin and Fred Hauenstein contributed important reminiscences. Fred C. Schneeberger, T.W. Hunt, W.W. Westerfeld, T.J. Stewart, Harry Kessler, Wallace B. Howe, Lois Russow and Mrs. John G. Roy either wrote down memories or contributed documents and photographs that increased our understanding. John Powell gave the archives an important file of material relating to the separation issue. Gene Green provided the authors with athletic records. All of these materials, the correspondence with alumni and the interview tapes and notes are available in the University of Missouri-Rolla archives. Representatives of the various departments on campus provided material for the Appendix. Those who were interviewed are listed in the Acknowledgments.

Newspapers consulted included the Rolla Advertiser, Rolla Herald, Rolla New Era, Rolla Daily News, Rolla Daily Herald, St. Louis Post-Dispatch, St. Louis Globe-Democrat, and St. Louis Republic. The Missouri Miner proved invaluable. A fraternity paper, Alpha Kappa Kapers, provided student material. The Pi Kappa Alpha fraternity made its collection of the paper available to the authors.

Other valuable campus publications included the MSM Alumnus, 1921-present, Interface and UMR Digest. The ROLLAMO, 1907-present, served as an important record of student life particularly during its first 50 years of publication, when it summarized a variety of student activities from the various trips to a detailed description of St. Pat's.

Various groups on campus supplied the authors with histories of their organizations. B.R. Sarchet contributed a "History of the Engineering Management Department: The First Fourteen Years," 1982; The Alumni/Development Office wrote "History of Alumni/ Development at the University of Missouri-Rolla," 1982; military science provided "A History of the Department of Military Science," 1964; Jack Koenig wrote "Graduate School Research Office," 1981; Larry Nuss wrote a history of "Placement Activities" and a pamphlet produced by the musical Miners entitled "57 Years of Musical Miners," 1965, gave the authors insight.

The following list of secondary works suggest only the most important consulted. Books include: Burton J. Bledstein, The Culture of Professionalism: The Middle Class and the Development of Higher Education in America (New York: W.W. Norton and Co., Inc., 1976); David V. Bruce, 1877: Year of Violence (Chicago: Quadrangle Books, 1970); R.A. Campbell, Campbell's Gazetteer of Missouri (St. Louis: R.A. Campbell Publisher, 1874); George S. Emmerson, Engineering Education: A Social History (Devon: David and Charles Limited, 1973); Samuel Rezneck, Education for a Technological Society (Troy: Rensselaer Polytechnic Institute Press, 1968); Robert M. Sawyer, The Gaines Case: Its Background and Influence on the University of Missouri and Lincoln University, 1936-1950 (Ann Arbor: University Microfilms, 1966); Clark C. Spence, Mining Engineers and the American West: The Lace Boot Brigade, 1849-1933 (New Haven: Yale University Press, 1970); Sally White, ed., Clair V. Mann, The Story of Rolla (Rolla Bicentennial Commission, 1975). Articles included: Harry J. Eisenman, "Origins of Engineering Education in Missouri," Missouri Historical Review, (July, 1969); Lawrence P. Grayson, "A Brief History of Engineering Education in the United States," Engineering Education (December, 1977); T.H. Richard, "The Education of a Mining Engineer," Mining and Scientific Press (December 10, 1921). The Missouri Supreme Court case that settled the issue of whether MSM could offer degrees in mechanical, electrical and chemical engineering was state ex rel. Harry T. Heimberger V. Board of Curators of University of Missouri et. al., Supreme Court, State of Missouri, October term, 1915. Finally, an unpublished manuscript by C.V. Mann, "We Got Accreditation and M.E. Lab Building," 1967, proved useful.

# Index

#### Alpha Phi Alpha, 215 Α Alsmeyer, William C., 235 Abbett, Robert W., Mr. and Mrs., 253 Altman, William, 163 Abbett, Robert W., 235, 254 Alton Packaging Corporation, 208 Abernathy, George E., 254 Alumni and Development, 207, 268 Abert, James W., 14, 15, 19, 24, 74, 278 Alumni Association, 106, 156, 197, 261, Academic Council, 196, 235 Alumni Association Past Directors, 236 Academy of Civil Engineers, 235 Alumni Awardees, 237 Academy of Civil Engineers Fund, 247 AMAX, 247 Academy of Electrical Engineers, 235 Ambler, John O., 254 Academy of Electrical Engineers Fund, American Smelting and Refining Company, 247 Academy of Engineering Managers, American Society of Mining Engineers 236 Loan Fund, 247 Adams, Bernard W., 254 AMOCO, 248 Adams, Curtis, 241 Amos, John, 242, 272, 279 Adams, Joseph T., 254 Anaconda Aluminum, 248 Administrative Council, 202 Anderson, David O., 254 Administrative Services, 267 Anderson, Hector G.S., 254 Admissions, 207, 267 Anderson, James S., 235, 240 Aerospace Engineering, 243 Anderson, Marguerite C., 253 Andrews, J. Lewis, Mr. and Mrs., 260 Aerospace Studies, 268 Agers, Don, 247 Andrews, William A., 235 Andrews, William W., 237 Akin, William M., 245 Alberici, Gabriel J., 254 Angell, Don, 247 Albertson, Maurice M., 254 Anstedt, Sharon, 260 ALCOA, 247 Anthropology/Sociology, 211, 212 Alexander, Curtis, 254 Antle, Charles, 191 Appleyard, Frank C., Mr. and Mrs., Alexander, J.C., 246 Alexander, Rafael C., 254 Appleyard, Frank C., 236, 246, 254 Alexander, Thompson, 254 Applied Arts and Cultural Studies, 211 Alford, Rex, 236, 254 Armsby, Henry H., 117, 157, 267, 277, All American Swimming Scholarship, 247 Allen, A.W., 247 Armstrong, Robert A., 248 Allen, David J., 237 Arnold, Emmett L., 254 Arnold, Frederick W., 259 Allen, Eugene T., 40, 54 Arthur, John B., 245, 248 Allen, Harry, Mr. and Mrs., 260 Allen, Nelson W., 5, 12, 15 Arundale, Joseph C., 254 ASARCO Foundation, 248 Allgood, Dewey, 225, 246 Ashland Oil Foundation, 260 Allison, H.F., 102 Allison, Emery, 136, 144, 172, 173 Askeland, Don, 280 Allison, Perry, 247 Askew, Walter H., 82

Alpha Kappa Alpha, 214

Association for Black Students, 215

Astronomical Observatory, 261
Atchley, Bill L., 236, 237, 245
Athletic High Ability Out of State
Scholarship, 248
Athletics, 270
Atkins, Jack, Mr. and Mrs., 260
Atlantic Richfield, 248
Atwell, Harold E., 246
Auditorium-Music-Alumni Building, 209
Aughenbaugh, Nolan B., 237, 281
Auxiliary Services, 271
Avery, Michael, 259
Avery, M.R., Mr. and Mrs., 260

#### В

Bachelor of Arts, 243, 245 Bachelor of Science, 243, 244 Backer, William H., 254 Badollet, Marion S., 254 Baebler, Arthur G., 254 Bailey, Keith E., 237, 254, 259 Baily, Walter E., 248 Baird, Thomas B., 235 Baker, Chester H., 235 Baker, Merl, x, 185, 186, 187, 188, 190, 191, 192, 193, 194, 195, 196, 197, 225, 237, 245 Ballard, B.L., 259 Ballard, Donald S., 235 Ballman, Edward A., 254 Banks, Robert L., 237, 254 Bardsley, Clarence E., 254 Barefield, Robert, 277 Barger, Hubert S., 254 Barker, Marvin W., 207, 241, 275 Barley, Joseph, 73 Barnard, Albert E., 236, 237 Barnard, Chester S., 248 Barner, Barbara, 260 Barnes, Herold, 246 Barnett, George I., 9, 13 Barr, David, 242 Barr, Jo W., x, 150 Barrett, Edward P., 254 Barry, Phillip, 246 Barsachs, Edwin H., 254 Bartlett, Albert B., 254 Bartlett, Hugh, 284 Barton, Joseph C., 254 Barton, Robert A., 254 Bash, David A., 254

Batubara, Kasmir A., 254 Bauer, Richard H., 237, 246, 254 Bay, Robert D., 235, 254 Bayless, Jerry R., 235, 237 Bayless, Jerry, Mr. and Mrs., 260 Baysinger, Helen J., 92, 259 Baysinger, S.L., 69, 70, 71, 92, 124, Bean, William Y., 254 Becker, Charles P., Jr., 259 Bedell, Milo N., 237 Bedford, Robert H., 254 Behring, Allen G., 236 Belew, Elmer W., 237 Belew, Leland F., 254 Bell, Elmer, Jr., 167 Benedict, Ralph R., 254 Benesh, Nancy, 260 Bening, Robert G., 235 Bennetsen, Wayne J., 235, 237, 254 Bennett, C.P., Mr. and Mrs., 260 Bennett, Jack, 271 Bennett, Parker, 246 Benton, M.E., 51 Berg, Frances, 284 Berkey, Vernon G., 240 Berry, Hugh R., 237 Berry, Jerome T., Mr. and Mrs., 253, 260 Berry, Jerome T., x, 177, 237, 245, 248 Berry, Robert, 247 Bersett, Gerald W., 254 Bertnolli, Edward C., 242, 243, 295 Betten, J. Robert, 191, 237, 242 Beverage, Leland, 246 Beveridge, Thomas R., 174, 175, 190, 220, 231, 236, 237, 248, 280 Biology, 103 Birdsong, Dan, Mr. and Mrs., 260 Bishop, E.W., 28 Bishop, Jennie and Julia, 12 Bisplinghoff, Raymond L., 201, 202, 203, 204, 237, 246 Bittencourt, Paulo R., 254 Black and Veatch, 248 Blackwell Zinc, 248 Blair, James T., Jr., 237 Blair, Norman D., 254 Blair, Sam C., 167 Blake, F.O., 88 Blake, True W., 254 Bland, C.C., 51 Bland, Pitt, 82

Blaylock, Daniel W., 236 Blow, Henry T., 18 Blow, Peter, 18 Bobbitt, Jack, 248 Bodine, Jack R., 237, 254 Bodman, John W., 254 Boeing, 248 Bohley, Ronald G., ix, 243, 285, 286 Boland, E.F., 79, 270 Bolles, Frank C., 254 Bolon, Albert E., 243, 289 Bolon, Harry C., 254 Bolon, Lucien M., Jr., Mr. and Mrs., Bond, Christopher, 246 Booth, Allan K., 240 Borgerding, Lawrence H., 254 Bosch, Wouter, 154, 188, 190, 248, 283 Bossert, Harry F., 254 Boucher, L. James, 254 Boulson, Charles E., 235, 254 Boulware, Richard J., 243, 267, 295 Bowen, Joseph Henry, 62, 63, 108, 287 Bowers, Diane, 260 Bowles, Blanche and John H., 248 Bowles, John, 92 Bowles, John H., 237, 254 Bowman, James I., 254 Boyd, B. Degen, 254 Boyd, Jack, 248 Boyd, Robert K., 235, 237, 254 Boyer, George H., 254 Boyer, Phillip J., Mr. and Mrs., 253 Boyle, Alfred A., 237, 254 Boyle, W.H., 82 Boza, Hector J., 245, 254 Brackbill, Robert M., Mr. and Mrs., Brackbill, Robert M., 246, 253, 254 Bradbury, John F., Jr., 295 Bradford, Llyn, 142 Brady, Harold F., 254 Brady, Robert, 246 Brandenberger, W.O., 82 Brandt, Robert E., Mr. and Mrs., 260 Branson, Donald L., 248 Brasunas, Anton DeS., 193, 237, 276, Brazill, Matthew P., Jr., 237, 254 Breeze, Francis V., 254 Brehe, Harold C., 259 Breuer, Coy L., 235 Breuer, Mary Louise (Nickel), 260

Brewer, John M., 158, 237 Brewer, William, 237 Bridgman, Stephen A., 260 Bridgman, Steve, 247 Brinkley, Donald R., 254 Brinkmann, Charles E., 235 Broaddus, Wayne R., 248 Brooks, Art, 242, 275 Brookshire, Robert R., 254 Brown, Guy, Jr., 237 Brown, John S., 237, 249, 253, 254, 264 Brown, Joseph J., Jr., 254 Brown, Mildred, 260 Brown, Phillip O., 235, 254 Brown, Robert N., 254 Brown, Wilton R., 254 Browning, Bertie L., 254 Bruce, Robert S., 236 Bruegging, Harold J., 254, 264 Brueggman, Shirley Marie, 260 Bruzewski, Robert F., 158, 248, 272 Bryan, Jean P., 254 Bryan, John K., 254 Bryant, Russell A., 254 Bryson, Thomas, 241 Buck, Robert S., 268 Buckley, E.R., 58 Buehler, Henry A., 105, 245 Buerstatte, William, 62 Buescher, Alfred J., 240 Buford, Carter, 69 Bullman, Gale, Mrs., x, 237 Bullman, Gale, 157, 177, 178, 179, 180, 199, 220, 225, 226, 228, 237, 245, 248, Bumpass, Oliver, 19 Burdick, Charles A., 254 Burg, Robert S., 254 Burgher, Sylvia, 42 Burgin, William H., 236, 237 Burke, Stephen M., Jr., 254 Burkhart, Edgar C.M., 254 Burnes, Robert L., 245 Burns, Frederick B., 235 Burton, Robert, 236 Busch, William D., 237 Bush, William H., 254 Buskett, Evans W., 254 Buskett, Mary Page, 42 Butler, Henry R.B., 254 Butler, Joe B., 107, 157, 158, 237, 248, 254, 264, 274 Butzer, Harold G., 235

CCAD/CAM, 211 Cain, Marvin K., 195 Calcaterra, Edward L., 235 Calkins, Myron D., 254 Cameron, Francis, 245 Campbell, E. Taylor, 237 Campbell, Fulton H., 254 Campbell, Gilbert Lewis, 286 Campbell, Jean, 260 Campbell, John O., Jr., x Campus Club, 224, 230 Campus Vending, 248 Campus Veterans Association, 248 Cannon, Rickie, 247 Caples, Russel B., 245 Career Development, 271 Carlile, Robert, 285 Carlo, Joseph W., 246 Carlton, E.W., "Skip", 107, 157, 190, 237, 254, 264, 274 Carlton, Paul F., 235, 254 Carnahan, Melvin E., 246 Carnahan, Thomas S., 254 Carney, Rowe, 175 Carney, W. Dale, 235, 254 Carpenter, J.D., 285 Carr, W. James, Jr., 235 Carroll, Warren J., 259 Carson, Arthur C., 254 Caruso, Annette, 214 Casey, Walter E., 254 Casteel, Lawrence W., 254 Castle, William C., 259 Castleman, Donald L., Mr. and Mrs., 248, 253 Caterpillar Company, 248 Center for Aging Studies, 210, 272 Center for Applied Engineering Management, 205, 210, 272, 279 Center for International Programs and Studies, 193, 210 Ceramic Engineering, 110, 154, 156, 190, 243, 273 Chamberlain, Ernst L., 254 Chamberlain, Harry C., 254 Chancellor Medal, 239 Chancellor, 241 Chancellor's Council, 202

Chancellor's Fellowship Fund, 248 Chancellor's Scholarship Fund, 248

Chaney, James B., Mr. and Mrs., 260

Chang, Shoou-Yuh, 280 Chapman, Robert T., 254 Chavez, Raul, 254 Chedsey, William R., 108, 110, 111, 131, 135, 136, 137, 138, 283 Chemical Engineering, 114, 132, 273 Chemistry-Chemical Engineering, 200, 209 Chemistry, 32, 156, 190, 243, 274 Chi Omega, 214 Christensen, Lawrence O., x, 241 Christian, Charles, 248 Christian, Joan, 260 Christiansen, Carl R., 254 Christianson, Lloyd, 158, 190 Christie, Carl G., 248 Civil Engineering, 161, 162, 163, 190, 214, 243, 274 Claridge, Elmond L., 237 Clark, Dennis A., 254 Clark, Edward L., Jr., 254 Clark, George B., 292 Clark, George C., 254 Clark, H. Smith, 259 Clark, Horace H., 236, 254 Clark, John W., 255 Clark, W.G., 285 Class of 1929, 248 Class of 1939, 248 Class of 1940, 248 Claypool, William M., 255 Clayton, Charles Y. "Boots", 75, 108, 128, 157, 231, 236, 237, 255 Clayton, Roy T., x, 255 Cleveland Cliffs Iron Company, 248 Cochran, Andy and Toni, 248 Cochran, L.R., 269 Cody, Benjamin H., 237 Coffman, Mildred "Mickey", 260 Cogell, Wayne, 207, 235, 241 Coil, Benjamin, x Cole, George W., 255 Cole, J.B., 82 Cole, Richard E., 255 College of Arts and Sciences, 195, 206, 207, 208, 211, 274 Collins, James W., 255 Collins, William W., 237 Combustion Engineering, 248 Commission on Modification of Activities, 240 Computer Center, 152, 261

Computer Science, 195, 211, 212, 243, Computer-Aided Design, 211 Computer-Aided Manufacturing, 211 Computing and Information Systems, Conant, A.J., 7, 9 Conkling, Virginia G., 30 CONOCO, 249 Conover, Cairy C., 255 Conrad, Cuthbert P., 36, 272, 287 Conrad, Frank H., 108, 249, 272 Conrads, Ralph A., 255 Consolidation Coal Company, 249 Continental Bank Foundation, 260 Continuing Education and Public Service, 276 Cooch, William, 5, 12, 15 Cook, Paul R., 255 Cooke, Jack W., Mr. and Mrs., 260 Cooksey, Nick, 249 Coolbaugh, Bill, 246 Coonce, James M., Jr., 255 Cooper, R.L., 249 Cooper, Tom, 247 Copeland, Durward, 54, 62, 63, 68, 69, 70, 255 Copley, Charles F., 81, 82 Coppedge, Lindsay L., 255 Corey, G.W., 62 Corradin, Ronald, x, 218, 219 Cossette, Terry, Mr. and Mrs., 260 Coterie, 249 Cotterill, Carl H., 237, 255 Couch, G. Robert, Mr. and Mrs., 253 Couch, G. Robert, 237, 255 Counseling and Testing Center, 277 Cowan, Clyde L., Jr., 237, 245 Cowen, Herman C., 255 Cox, Andy, 247 Cox, Delbert R., 255 Cox, Guy H., 62, 255 Cox, William R., 255 Crane, Clinton H., 245 Crane, Harold R., 235, 240 Crawford, Ernest A., 236 Crecelius, Donald G., 249 Cress, Dudley, Mr. and Mrs., 260 Cress, Dudley, 242 Crites, Joseph D., 255 Crittenden, T.T., 28, 29 Cronk, Arthur H., 255 Crum, E. Jefferson, Mr. and Mrs., 253

Crum, E. Jefferson, x, 245
Crum, Eben R., 249
Crumpler, Rosemary Sue (Murphy), 260
Cullings, Jay C., 255
Cummings, Lister M., 255
Cummins, Robert P., 236
Cunningham, G.C., 158
Cunningham, Jesse, 65, 285, 286
Cunningham, Richard, 246
Curators' Professors, 210
Curran, Steve, 247
Custead, Wayne G., 255
Cuthbertson, G. Raymond, 249

#### D

Daane, Adrian, 207, 241, 246, 274, 275, 283 Dacey, Robert J., 255 Daily, Eugene J., 235, 255 Dake, C.L., 107, 157, 249 Dalton, John M., 237 Danforth, John C., 246 Dare, Charles, 242 Davidson, Robert F., 190, 191, 249 Davis, Floyd, 42, 88, 255 Davis, Robert L., 207, 241, 242, 293 Dawson, Jim, Memorial, 260 Dawson, Tom, 82 Day, Delbert E., 210, 235, 237 Dean, Donald L., 235, 272, 277 Dean, George R., 33, 36, 42, 53, 54, 55, 63, 68, 69, 88, 103, 107, 124, 157, 231, 269, 286, 292 Dean, George W., 255 Dean of Students Office, 277 Dean, Reginald S., 255 Deans, Department Chairmen, Administrators, 241 Dearing, Falkland H., 249 Dearth, David, Mr. and Mrs., 260 Dearth, David W., 242, 275 Debolt, Donald G., 237, 255 Decker, George J., 236 Deegan, Francis J., 255 Degrees Available, 243 DeKalb, Courtenay, 39, 41 DeKock, Arlan, 241 Delano, Lewis A., 255 Delano, Philip H., 255 Delay, Theodore S., 255 Dempsey, Bryan, 280

Demzik, Paul, 247 Dennie, F.E., 62, 79, 80, 82, 270 Dennie, Powell A., 255 Dent, Hazel (Crutcher), 259 Department Chairmen, 241 Departments, 267 Detroit Edison Power, 249 Deutman, Earl G., 255 Devine, William, III, 292 Dewald, Lee H., 255 DeCousser, Kurt H., 255 Dickerson, Harold Shields, 287 Dietz, Robert O., 255 Dillow, Merle, 247 Directors, 242 Division of Liberal Arts, 195 Dockery, Alexander, 50, 51 Doctor of Engineering, 243, 244 Doctor of Philosophy, 243, 244 Dodd, Charles, 273 Dolecki, Stanley, 235 Doll, Warwick L., 255 Dolman, Phillips B., 255 Donaldson, Randy, 217 Donaldson, William E., 255 Donnelly, Phil, 141 Dooley, Glenn A., 255 Dorsey, Robert S., 259 Dougherty, John H., 249, 286 Douglas, Stephen A., 242 Douthat, R.W., 15, 24, 25, 26, 27, 28, 29, 30 Dover, F.L., 82 Dowd, James J., 255 Dowling, Paul T., Mr. and Mrs., 253 Dowling, Paul T., 237, 245, 246, 255 Doyle, J.J., 259 Doyle, Pauline B., and John J., 249 Drake, E.A., 30, 32, 33, 36, 285 Drake, Marilee, 260 Draper, Charles S., Dr. and Mrs., 253 Draper, Charles S., 245 Draper, James C., 58, 60, 255 Dresbach, Charles H., 255 Dreste, Fred E., Jr., 255 Duba, John G., 235, 255 Dudley, Boyd, 62, 255 Dumm, Lee D., 255 Duncan, Gustavus A., 17, 18, 87, 255, Dunham, Roy H., 237 Dunlop, Stu, 247 Dunn, J.H., 138

Dunn, Theodore S., 255 Dunning, Eric D., 259 Dupont, 249 Dutton, Donnell W., 237, 255 Dye, A.E., 13 Dye, Robert E., 157, 249, 255 Dyer, Garvin H., 255 Dyer, Temple, 255 Dynasil Corporation, 249

#### E

Eagan, Thomas E., 255 Eagleton, Thomas F., 246 Easley, George A., 236, 237, 245, 255 Easley, Lura and George, 249 Eastman Kodak, 249 Eaton, E.D.W., 30 Ebmeyer, G., 73 Echols, William H., 31, 32, 33, 34, 35, 36, 53, 85 Eckert, Fred, 246 Ecodyne Corporation, 249 Ecoff, Ralph A., Jr., 255 Economics, 103, 211, 243 Edwards, D. Ray, 290 Edwards, Francis C., 157, 197, 217, 236, 237, 245, 249, 269 Edwards, Francis, Mrs., 237 Ehrlich, Robert L., 237, 255 Eisenman, Harry, 242 El-Baz, Farouk É.S., 237 Electrical Engineering, 161, 162, 163, 190, 243, 278 Electrical Engineering Loan Fund, 249 Electronics Research Center, 210 Elfred, F. Stillman, Jr., 237, 245, 249, 255 Ellis, Elmer, x, 155, 164, 185, 187, 188, 192, 194, 237 Ellis, J. Craig, 236, 237 Elmore, Carlos E., 255 Eloe, Howard W., 209, 242, 269 Elzie, Greg, 247 Emerson, Cyrus H., 255 Emerson Electric, 249 Emerson, George D., 14, 15, 19, 24, 26, 27, 28, 31, 74, 75, 87 Engelmann, Edward W., 236, 237, 245 Engineering Graphics, 190, 278 Engineering Management, 195, 205, 209, 211, 212, 244, 278

Engineering Mechanics, 190, 191, 209, 244, 279 Engineers' Club, 127, 224 Engineers' Council for Professional Development, 99 Englehardt, Bill, 247 English, Thomas O., Mr. and Mrs., English, Thomas O., 211, 236, 237, 245, 249, 255 English, 211, 244 Englund, John O., 255 Ensign-Frickford Fund, 249 Environmental Research Center, 210, Eppelsheimer, Daniel S., 158, 289 Erkiletian, Dickran H., 158 Estey, Jim, Mr. and Mrs., 260 Estey, Mike, Mr. and Mrs., 260 Eulich, Artelius V., 255 Evans, Donald L., 255 Eversman, Walter, 241, 287 Experimental Mine, 261, 280

#### F

Exxon, 249

Fadler, Eugene C., 236 Fagan, Durward E., 237 Falke, Wilbert, Mr. and Mrs., 260 Falkingham, Donald H., 255 Fannin, D. Ronald, 241 Farber, Ralph, 247 Farmer, John O., 255 Farmer, Larry E., 236 Farrar, Willard, 255 Farrar, William, 163 Farris, Frank, 51, 69 Faucett, Thomas R., 190, 211, 237, 287 Faulkner, Millard, 18 Fausek, Irwing F., 255 Fay, Albert H., 255 Feagan, Wilbur S., Mr. and Mrs., 253 Feagan, Wilbur S., 236, 255 Feaster, Roger, 247 Feder, Steven, 249 Fehlig, Charles J., 259 Feind, Earl, 158, 245, 260, 284 Felts, James, Dr. and Mrs., 260 Fenton, David L., 237 Fentzke, A. Daniel, 255 Ferendez, Abraham L., 255 Ferguson, Oliver B., 237

Fernandez, Arturo C., 255 Ferrell, C. Stuart, 236 Ferrell, James O., 236, 237 Ferro Corporation, 249 Fick, Armin F., 237, 245 Fields, Al, 249 Fields, Lester E., 237 Finagin, Joseph C., Jr., 255 Finch, James, Jr., 237 Fine, Morris M., 237 Finley, Charles, Mr. and Mrs., 260 Finley, Charles, 226 Finley, Fred W., Mr. and Mrs., 253 Finley, Fred W., x, 120, 236, 237, 249, 255 Fisher, Fred, 249 Fite, Paula, 260 Fitzgerald, Linda, 260 Flagg, Lelia T., 214 Flanigan, Virgil J., 237, 246 Flebbe, J.L., 249 Flentje, Bill, 260 Flesh, David J., 237 Fletcher, Andrew, 245 Fletcher, John, 242 Fletcher, William B., 236, 237 Flood, H. William, 236, 255 Flynn, Frank J., 255 Flynt, Frank L., 255 Foland, Betty (Harting), 260 Folk, Joseph W., 59, 60 Foote, J.R., 191 Forbes, C.R., 87, 108, 290 Ford, Ragan, 237 Fore, Jack D., Mr. and Mrs., 260 Foreign Languages, 212 Forgotson, James M., Mr. and Mrs., Forrester, David L., 236 Forrester, J. Donald, 157, 158 Forrester, Red, 258 Fort, Dorothy, 260 Fort, George E., Mr. and Mrs., 260 Fort, George E., 237, 255 Fort, Tomlinson, Jr., 207 Foster, Charles T., 255 Foster, John S., Jr., 245 Foster, Lee J., 255 Foundation in Refractories, 249 Foundry Educational Foundation, 249 Fox, James, x, 125 Frad, W.A., 272 Fraizer, Isaac P., 255

Frame, Floyd H., 108, 140, 158, 278 Frame, Wayne S., 235, 237 Francis, David R., 66, 71 Francis, Lyman, 241, 278 Franklin, Sue, 284 Freehill, John, 290 Freeman, C.R., 249 Freeman, Charles A., Mr. and Mrs., Freeman, Charles A., 236, 237, 255 Freeman, Earl, 82 Freeman, Louise, 260 Frey, Donald N., 245 Frey, Muir, x Friberg, Stig E., 210, 274 Fris, Edward S., 237 Fritschen, Herman A., Jr., 235, 236, 237, 255 Fulcher, James E., 255 Fulghum, Gale, 246 Fuller, Gilbert, 236 Fuller, Harold Q, x, 155, 158, 159, 190, 195, 237, 249, 275, 289, 290 Fullop, Paul, 246 Fulton, Charles H., 107, 109, 110, 277

#### G

Gale, Nord, 241, 286 Gallaher, Pet, 74 Gallaher, Philip C., 255 Gallemore, Willard A., 255 Galloway, Charles T., 249 Gammeter, Elmer, x, 237, 255 Gammeter, Erwin, 255 Gammeter, Walter, 255 Gammon, William H., Mr. and Mrs., 260 Gammon, William H., 255 Garcia, John A., 245, 255 Gardner, Frederick, Mrs., 92, 259 Gardner, Steven M., 237 Garrett, Ida Stevens, 286 Garrett, Leon E., 53, 54, 62, 66, 67, 68, 70, 81, 108, 279, 286 Garst, Harvey O., 255 Garst, Oden C., 255 Garvens, Oscar E., 255 Garver, August J., 237 Garvey, Robert A., 255 Geers, Joseph H., 259 General Motors, 249

Generic Mineral Technology Center for Pyrometallurgy, 210, 280 Geological Engineering, 244, 280 Geology and Geophysics, 207, 244, 281 Geology, 32, 154, 190 Gerard, Floyd A., 255 Gerard, James A., 259 Gerber, Theodore C., 236 Gettler, Warren R., 255 Getty Oil Company, 249 Gevecker, Robert V., 255 Gevecker, Vernon A.C., 158, 235, 255, 272, 277 Gibb, Frank W., 88, 255 Gibbs, William R., 255 Gilchrist, K.P., 80 Gill, James P., 245, 255 Gill, John H., 17, 255, 268, 285 Gillam, William, Mr. and Mrs., 260 Gillespie, Terri L., 268 Gillett, Billy, 275 Given, William B., Jr., 245 Gjelsteen, Thor, 237, 255 Glatthaar, Jack R., 255 Gleason, August W., 83, 236 Gleason, Sue, 260 Glenn, W.E., 74 Glover, James, 235 Gminski, Ann, 292 Goldammer, Russell, 259 Goldman, L.H., 138 Golick, Frank A., 250 Goodnight, Marilyn, 260 Goodyear Tire & Rubber Co., 260 Gordon, John A., Jr., Mr. and Mrs., 253 Goslin, Roscoe B., 237 Gottschalk, Victor H., 54, 62, 77, 273 Gould, David S., 237 Govier, John P., 237 Grabill, L.R., 21, 88 Graduate Center for Cloud Physics Research, 193, 210, 281 Graduate Center for Materials Research, 210, 282 Graduate Studies, 207 Graduate Study, 283 Graham, Glenn & Ruth, 250 Graham, Ralph C., 236 Graham, Virginia, 260 Grannemann, H. Neal, Dr. and Mrs., Grantham, Bill, 226, 247

Grate, Clarence W., 151, 272 Grawe, O.R., 108, 157, 158, 249 Greason, John D., 255 Green, A.P., 105, 245, 248 Green, Allen P., Ir., 237 Green, Frederick W., 245 Green, Paul E., 255 Green, Sidney I., 237 Greene, Eva E. Hirdler, 93, 94, 237 Gregg, George E., 255 Gregg, H.H., 58 Gregory, James A., 255 Grelle, James E., 259 Gribble, Val Gene, 246 Grice, Harvey H., Mr. and Mrs., 260 Grice, Harvey H., 237, 250 Griffin, Donald N., 236 Griffith, H.M., 237 Grigoropoulos, S.G., 279 Grimm, C. James, x, 158, 236, 237, 246, 250, 253, 260, 291 Grimm, Louis I., 191, 241 Grimm, Richard D., 255 Grine, Harry A., 255 Griswold, Leon S., 59, 62 Grohskopf, John G., 255 Gross, Henry E., 255 Grotts, Frederick, 84, 255 Grove, Claude D., 255 Gulf Oil, 250 Gunther, Don J., 259

#### H

Haas, Charles I., 293 Hacker, Alden G., Mr. and Mrs., 253 Hacker, Alden G., 237 Hackmann, Glen N., 255 Hackmann, Robert E., 255 Hackwood, W.A., 258 Haddock, A. Glen, 191, 235, 237 Hahn, Abner D., 255 Haisty, Wesley K., 240, 255 Halcomb, Samuel P., 255 Hale, David P., Jr., 236, 255 Hale, George A., 255 Haley, Wilbur A., 255 Hall, Clyde W., 250, 255 Hall, Dave, 247 Halligan, James E., 207, 246, 293 Halpern, Jack A., 255 Ham, Neal, 255 Hampel, Richard J., 246, 255, 259

Hankinson, Risdon W., 255 Hanley, Herbert R., 102, 108, 142, 236, 237, 245, 250, 255 Hanley, John W., 245 Hanlon, Dennis, 236 Hanna, Robert L., 255 Hansen, Knud F., 255 Hansen, Peter G., 191, 237, 241 Hansen, Robert C., 236, 245 Hanson, Kenneth O., 255 Hanstein, Ed. 247 Happy, Albert, 250 Harbison-Walker, 250 Harbison, Lynn, 255 Hardin, C.H., 20 Hardy, Rolland L., 255 Hare, Almon W., 17, 88, 255 Hare, Donald E., 260 Harmon, John P., Mr. and Mrs., 253 Harmon, John P., 250, 255 Harris, Elmo G., 35, 36, 37, 39, 41, 43, 45, 47, 53, 55, 62, 63, 107, 132, 157, Harris, Floyd, 194, 216, 243, 289 Harris, George W., 255 Harris, James G., 190, 194, 195, 196, 250, 294 Harrison, James B., 19, 51 Harrod, Hugo L., 255 Hartman, William V., 255 Hartmann, Robert F., 256 Hartzell, Henry H., 236, 250 Harvey, A. Herbert, 242, 290 Harvey, Berna, x Harwell, Vickie, 260 Hasselmann, Karl F., 141, 158, 237, 245, 250, 256 Hasselmann, Karl, Mrs., 253 Haston, Frank, 243 Hatfield, Charles, 190, 191 Hatmaker, Paul C., 256 Hauenstein, Frederick, x, 55, 256 Haug, Greg, 247 Hauser, Randy, 247 Haydon, Jack B., Mr. and Mrs., 253 Hayes, Dale I., 256 Head, James L., 84, 158, 236 Headlee, S.H., 40 Heagler, John B., Jr., 256 Heagler, Richard B., 256 Hearnes, Warren E., 245 Heath, Craig, 247 Heck, Elmer C., 256

Holmes, Major E., 273 Heimberger, Harry T., 71 Holmes, Oliver W., 256 Heimberger, Pansye, 213 Holmes, Thomas A., Mr. and Mrs., Heininger, S. Allen, 240 Heiser, Frederick W., 236, 237, 256 Holmes, Thomas A., 237, 245, 256 Heiser, Ted, x Holmes, W.M. "Windy", 258 Heller, Jesse, 286 Holt, Frederic H., 256 Hellmuth, George, 65, 66 Holtman, Orvid J., 163 Helm, Bob, 247 Holwill, Richard, 292 Helwig, Arthur W., 256 Holz, Walter L., 259 Henning, Oscar A., 108, 140 Homyk, Anthony, Jr., 237, 250 Henry, John H., 259 Honorary Degree Recipients, 245 Henschel, Ramsey C., 256 Honorary Knights of St. Patrick, 245 Herbert, Charles F., 256 Hoover, Bert F., Mr. and Mrs., 253 Hercules Powder Company, 250 Hoover, Bert F., 237 Herdman, George W., 256 Hopkins, James, 256 Herman, Herb, 247 Hoppock, Harland H., 253 Herman, Ted, 122 Horne, George E., 167 Herold, Paul G., 158, 273 Horner, Preston K., 256 Herrick, Tom, 247 Hornsey, Edward E., 237 Herrman, Eddie, Mr. and Mrs., 261 Horst, Monty M., 250 Herrmann, Thomas A., 235, 264 Hoskinson, Fannie, 88 Hershkowitz, Leon, 158, 236, 237, 256, Houlahan, Agnes (Finley), 260 272, 277 Householder, Earl R., 256 Hervey, Morris, 247 Houston, Doug, 82 Hesse, Alfred H., 256 Houston, H., 82 Hicks, Troy Don, 250 Howard, Paul, 286 Hielscher, J.A., 94 Howe, Wallace B., x, 298 Higley, Eleanor, 284 Howell, Bennett D., 236 Hill, Albert R., 68, 69 Hoyer, Rudolph C., 256 Hill, Eugene F., 256 Hoyt, Harlan K., 256 Hill, Henry A., 245 Huang, Ju-Chang, 242, 279 Hill, James L., 256 Hubbard, Noel, 106, 149, 157, 236, Hill, Otto H., 235 237, 267, 268, 269, 271, 272, 277, 292, Hilpert, Ralph, 259 294 Hilterbrand, Kenny C., 259 Huckins, Julian G., 256 Hinken, Lawrence R., 250, 256 Hudgens, Ellsworth W., 256 Hinrichs, Nancy, 260 Hinsch, Van Buren, 108, 256 Huff, Billy M., x Huffman, Daniel E., Jr., 256 Histed, Howard, 256 Huffman, Gene, 246 History, 103, 211, 244 Hodges, Horace W., 256 Hughen, Marvin L., 256 Hughes Aircraft, 250 Hodges, John L., 256 Hoeman, Erwin C., 256 Hughes, Harry H., Jr., 256 Hoertel, Frederick W., Jr., 256 Hughes, Victor H., 256 Humanities & Social Sciences, 190, Hoffman, Ray E., 256 Hofman, Heinrich R., 54, 55 194, 199 Humanities and Social Studies, 149, Hogan, Marvin, Mr. and Mrs., 261 Hogoboom, William C., 256 151, 194 Humanities, 190, 194, 199, 200, 211, Hohenschild, Henry, 30, 33, 36, 38, 39, 41, 47, 48, 58, 59, 60, 66, 67 Hungerford, Clark, 245 Hollingshead, Homer A., 256 Hunt, J. Richard, 256 Hollmann, Harold R., 256 Hunt, Joseph O., 256 Holmes, J.O., 51

Hunt, Lamar H., 256
Hunt, Russell W., 237, 250, 256
Hunt, T.W., x, 298
Hunter, Francis K.M., 256
Hunze, Edmund C., 256
Hupp, Kenton, Mr. and Mrs., 261
Hurd, Frederick W., 256
Hurst, Alfred N., 256
Hurst, Henry W., 256
Huseman, Ronald H., 259
Huss, Randall, Dr. and Mrs., 261
Hygiene and Student Health, 103
Hynes, Dibrell P., 256

#### Ĭ

Ichord, Richard, 245, 250 Iden, Douglas C., 256 Ihlseng, M.H., 38 Illinois Mining Institute Scholarship, 250 Illinski, Alexis X., 256 Imlay, John Logan, 81, 82 Imlay, S.D., 81 Imperial Chemicals, 250 Infirmary, 284 Ingalls, Walter R., 245 Ingersoll-Rand, 250 Ingram, Bobby, 247 Ingram, John C., 237, 256 Inland Steel-Ryerson, 250 Institute for Chemical and Extractive Metallurgy, 210, 250 Institute of Paper Chemistry, 250 Institute of River Studies, 204, 210, 284 International Programs and Studies, Irwin, Joseph S., 256 Iten, H. Clay, 256 Itschner, Emerson C., 108, 245

#### T

Jackling, Daniel C., 42, 43, 53, 64, 66, 84, 102, 105, 136, 140, 142, 157, 236, 237, 245, 256

Jackling, Daniel Foundation, 105, 250

Jackling Loan Fund, 105, 156

Jackson, Darrell, Mr. and Mrs., 261

Jackson, Eugene D., 215

Jackson, Leroy H., 235, 256

Jackson, R.O., 108, 287

Jacobs, James H., 256

James, Lucy Wortham, 250 James, William J., 13, 14 James, William J., Prof., 156, 237, 242, 282, 283 Jenks, Bill, III, Mr. and Mrs., 261 Jenks, Bill, Jr., Mr. and Mrs., 261 Jenks, Catherine G., ix, x, 243 Jensen, William, 157 Jesse, Richard H., 49, 68 Jewell, Jasper E., 259 Johnson, Charles A., 158 Johnson, Frank L., 259 Johnson, Gunnard E., 84, 236, 237 Johnson, J. Stuart, 190, 236, 246, 293 Johnson, James W., 235, 241, 274 Johnson, Larry, 236 Jolley, Edwin J., 285 Jones, Billy R., 237 Jones, Edith Carrington, 286 Jones, Fayette A., 256 Jones, Lenore (Morris), 260 Jones, Tim, 292 Jones, Vernon T., Mr. and Mrs., 253 Jones, Vernon T., 235, 237, 253, 256 Joynt, Kenneth R., 256

#### K

Kahlbaum, William M., 256 Kaiser Aluminum, 250 Kalin, Thomas E., 256 Kalish, Herbert S., 256 Kamp, William H., 256 Kamper, Oliver W., 236, 237 Kappa Alpha, 76 Kappa Delta, 214 Kappa Sigma, 76 Kasel, Rudolph G., 256 Kassner, James L., 237, 242, 281 Kasten, Raymond O., 235, 237, 245, 256, 259 Katz, Adele, 260 Katz, Howard M., 236 Kay, William W., x, 256 Keane, John M., 246 Keeler, Mike, 247 Keeling, William O., 141, 236, 256 Kehr, William Q., 256 Keisler, Dorothy (Rushmore), 259 Keisler, Lucy (McCaw), 259 Kelly, John Joseph, 246 Kelly, Mervin J., 136, 141, 142, 158, 236, 237, 245, 250, 253

Kelly, Mervin J., Mrs., 237, 253 Kelly, Thomas W., 81, 82, 163 Kemper, Robert J., 235 Keniston, C.W., 77 Kennedy, Daniel, Mr. and Mrs., 261 Kennedy, Daniel, x, 235, 237, 245, 250, Kenney, John R., 237 Kent, William D., 237, 256 Kentnor, Charles B., Jr., Mrs., 253 Kentnor, Charles B., Jr., x, 245, 253 Kerr, R.H., 158 Kershner, Karl K., 108, 128, 140, 236 Kerstling, Felix J., 256 Kessler, Harry H., Mr. and Mrs., 253 Kessler, Harry H., x, 209, 237, 245, 250, 256 Kessler, Steven, 250 Ketter, Richard P., 256 Key, Billy A., Mr. and Mrs., 261 Key, Billy, 226, 227, 242, 271 Kibler, Ronald A., 256 Kiburz, Meredith, 246 Kiel, Edna, 259 Kiesler, A. James, 236, 256 Kietzer, Neal L., 243 Kilpatrick, A. Vern, 108, 245 King, Carver, Joplin Museum/Minority Loan Fund, 250 King, Donald T., 256 King, Martin L., 250 King, Terry, Mr. and Mrs., 261 Kingsbury, Ronald M., 235 Kingsley, Dale L., 256 Kirberg, Leonard C., 236 Kirkham, John E., 256 Kirkpatrick, Harry F., 256 Kirkpatrick, James C., 238, 245, 246 Kiskaddon, W.W., 82 Kisslinger, Fred, Mr. and Mrs., 253 Kitchen, Charles L., 261 Klepel, Yaro, 82 Klie, Ross, 247 Kline, H.D., 82 Klingbeil, Dick, Mr. and Mrs., 261 Klingenberg, Dan, x, 271 Klohr, Dale, 235 Kluge, Harry A., 256 KMNR, 225 KMSM, 225 Knearem, James L., 256 Knickerbocker, Ray G., 80, 256 Knight, W. Nicholas, 242, 272

Knight, William E.H., 236 Knoerr, Alvin W., 256 Koch, Charles O., 256 Koederitz, Leonard, 246, 290 Koenig, J.W., x, 298 Kollar, Ray, 259 Komo, John, 278 Koplar, Harold, Mr. and Mrs., 253 Koplar, Robert B., 250 Kosten, Harold W., 236 Kozeny, Donald J., 235 Kramer, Roger L., 259 Kratzer, William T., 238, 245 Krebs, Joseph J., 238, 256 Krispine, Joseph F., 235 Kroll, William J., 245 Kromka, Ed, 246 Krueger, Harold A., 236, 256 Krueger, Harold A., Mr. and Mrs., 261 Kruse, Cornelius W., 256 Kublin, George, 82 Kummer, Donald L., 256 Kummer, Frederick S., Mr. and Mrs., Kummer, Frederick S., 235, 238 Kummer, June, 264 KUMR-FM, 224 Kunz, Charles O., 256 Kurtz, Peter, Jr., x Kurtz, Samuel A., 259 Kutska, Steve, 247 Kwadas, Ed, 246

#### L

Laclede Steel, 251 Ladd, George E., 43, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 63, 64, 69, 79, 85, 90, 135, 231, 281 Ladd, Harley W., 235, 238, 246 Lambda Chi Alpha, 76 Lambeth, Jennings R., Mr. and Mrs., Lambeth, Jennings R., 238, 245, 256 Lancaster, Kathryn, 220 Landis, Harry K., 38, 39, 78, 270 Lane, Eddie, 247 Lang, Eugene A., 256 Lange, June, 260 Lanning, Ken, 261 Lapinski, Mary, 260

LaPlante, Allan H., Mr. and Mrs., 253 LaPlante, Allan H., 236, 256 Lapresta, Samuel, 236 Larkin and Associates, 251 Laun, Albert C., 74, 256 Laws, Samuel S., 24, 28 Lawson, Vernon R., 236 Layne, Mark B., 238, 251 Leach, Sue, 214 Leach, Thomas Witt, Mrs., 238 Leaver, Harvey B., 235, 238, 256 Leber, Walter P., 115, 238, 256 Lee, Jim, 247 Lee, Ralph E., 187, 275 Lehman, John L.G., 256 Lenox, Madge (Clemmons), 260 Levenson, Leonard, 283 Lever, Walter P., 115 Lewin, Harold, 256 Lewis, Robert B., 238, 242, 268, 292 Lewis, Walter E., 256 Liberal Arts, 195 Library and Learning Resources Center, 261, 285 Life Sciences, 211, 244, 286 Lindgren, Roy A., 238, 256 Livesay, John, 18 Livingston, John H., Mr. and Mrs., 251, 253 Livingston, John, x, 119 Livingston, John J., 256 Livingston, Robert G., 235, 256 Lloyd, Margaret McCaw, 171, 238, 246 Lloyd, Samuel H., 107, 108, 151, 157, 171, 190, 231, 236, 238, 245, 256 Loesing, Vernon T., 236 Logan, Curtis W., 245 Logan, Edwin W., 236, 256 Logan, Joyce, 260 Lohman, Harry W., 256 Lomax, Victor W., 246 Long, A.E., 280 Long, Edgar C., 256 Long, Edwin, 82, 132, 280 Long, Elizabeth (Pence), 259 Lorey, Elizabeth R., 246 Lorey, G. Edwin, 188, 241, 245, 276 Lottman, Walter F., 238 Love, George, 18 Love, Lorraine (Brickner), Mrs., 259 Love, Nancy, 259 Loveridge, Joel F., Mr. and Mrs., 261 Loveridge, Joel F., 235, 238, 256

Lovett, Israel H., 157, 236, 238, 251, 256, 278
Lowe, William.S., 245
Lowther, Gerald L., 245
Lozano, German G., 256
Luehring, Elmer L., 236, 256
Lyman, George E., 256
Lynch, Shirley A., 256
Lynton, Edward D., 238, 256
Lyons, Francis D., 235, 256
Lyons, John H., x, 238, 245, 259

#### M

M Club Loan Fund, 251 Mabrey, Ronald, 256 Machin, Edwin G., 238 Mackaman, Frank, Mr. and Mrs., 261 Mackaman, Frank, ix, x, 197, 207, 209, 238, 242, 246, 269 Macklin, Floyd S., Mrs., 251, 253 MacFarlane, Edward K., 256 MacGuire, John, 283 MacZura, George, 256 Maddox, Arnold W., 256 Magmont, 251 Major, Elliott W., 66, 70 Malcolm, D.W., 28 Malloy, James B., 246 Mann, Clair V., x, 108, 136, 139, 142, 144, 231 Mann, Frank C., 141, 238 Mann, Horace T., 62, 76, 256 Manuel, Oliver K., 241, 274 Maramec Iron Works, 13 Marchello, Joseph M., Chancellor and Mrs., 261 Marchello, Joseph M., ix, 205, 206, 207, 208, 209, 239, 241, 246 Marchello, Louise, 246 Marlow, Bob L., 243, 267 Martin, Harvey G., 259 Martin, Lynn, 277 Martin, Mary, 260 Martin, Robert, x Martinez, Justo G., 256 Martyn, Phillip F., 256 Massey, B., 82 Master of Science, 243, 244 Mastrioanni, Mark, 247 Mathematics, 32, 190, 194, 195, 200 Mathematics and Statistics, 244, 286 Mathematics-Computer Science, 200

Matson, Donald D., 261 Matsuda, Gordon, 284 Mattei, Peter F., 235, 238, 246, 256, 264 Matthews, Lyle E., 256 Maurer, Norbert W., 256 Maxwell, Pearl, 284 Mayhan, Kenneth G., 238, 283 Maytag, 251 Mazzoni, John A., 259 McAllister, Darrell, 247 McAlpin, Gary, 247 McAlpine, Earl H., 256 McAnerney, John M., 163 McAuliffe, Eugene, 245 McBrian, Ray, 238 McBride, Jerry E., 238, 246 McBride, Roy W., Mrs., 253 McCandliss, Edgar S., 256 McCanless, William A., 256 McCarthy, John, 246 McCarthy, Meryl, 259 McCartney, William H., x, 75, 82, 256 McCauley, John E., 256 McCaw, Charles, 247 McCaw, Emily (Jacobs), 260 McCaw, Robert F., 39, 256 McCleary, E.H., 80, 81 McClurg, Joseph W., 6 McCormick, Martha, 238, 251 McCown, John, 18 McCrae, Mary (Anderson), 259 McCrae, Mary, 260 McCurdy, Belding H., Mr. and Mrs., McCurdy, Belding H., 236, 256 McDonald, James F., 256 McDonnell, James S., 245 McElroy, William, 256 McFarland, Robert H., 190, 207, 283 McGhee, Vernon T., 238, 256 McGovern, Donald R., 259 McGrady, Charles, x McGrath, James B., 235, 246, 256, 259 McGrath, John E., 19, 256 McKelvey, James M., 238 McKelvey, Ralph E., 256 McKelvey, Ralph, Mr. and Mrs., 253 McKinley, John H., 238 McKinley, Marion, 260 McKinney, Garth G., 235 McKune, Robert, Mr. and Mrs., 261 McKune, Robert, 246

McLaughlin, Anita, 260 McMillan, D.A., 51, 60 McNally, Paul, 229 McNeal, Theodore, 246 McNely, Earl J., 256 McNutt, V.H., Memorial Foundation, McNutt, V.H., Mrs., x, 157, 238, 245, McNutt, Vachel H., 94, 95, 156, 251, McRae, Austin L., 36, 40, 43, 54, 55, 62, 63, 71, 73, 78, 84, 109, 290 McReynolds, Allen, 238 McTighe, William, 76 McVey, A., 51 Mechanical and Aerospace Engineering, 194, 286 Mechanical Engineering, 141, 143, 161, 163, 190, 194, 199, 244 Mechanics, 239 Meenen, Arthur R., 235 Meisenheimer, Louis, 247 Mellow, George E., 158, 256 Menefee, George, 92, 259 Mengel, Edmund L., 256 Mentz, Frank H., Jr., 253 Metallurgical and Nuclear Engineering, 211, 287 Metallurgical Engineering, 154, 156, 211, 244 Metallurgy, 18, 32 Metz, Gilbert F., 236, 238, 251, 257 Meyr, Gerald L., 259 MIAA Awardees, 246 Michel, Hilbert F., 238 Middlebush, Frederick, 135, 136, 137, 138, 141, 163, 238 Mikell, Waring, 257 Miles, Aaron J., 108, 151, 157, 158, 159, 187, 188, 190, 199, 238, 245, 251, 272, 286, 287, 289, 293 Military Science, 287 Millar, C.J., Mrs., x, 108 Millard, Sally E., 42, 88 Miller, Burke, 251 Miller, Edwin L., Jr., 257 Miller, John C., 257 Millikan, Carl E., 257 Millsap, Thomas H., 257 Milton, Osborne, 257 Mineral Engineering Building, 209 Mineral Museum, 261

Mineralogy and Geology, 32 Minerals Industry Educational Foundation Scholarships, 251 Minger, William C., 257 Mining Engineering, 154, 161, 190, 244, 288 Minnesota Mining and Manufacturing, 251 Minority Engineering Program, 215, 216, 217, 288 Missouri Electrochemical, 251 Missouri Golf Association, 261 Missouri Miner, 73, 83, 84, 85, 86, 101, 103, 105, 106, 108, 112, 120, 123, 127, 128, 130, 131, 132, 133, 138, 225 Missouri Mining and Mineral Resources Research Institute, 210 Missouri Society of Professional Engineers, 251, 264 Missouri Utilities, 251 Mitchell, E.Y., 37 Mitchell, Maude B., 285 Mitchell, Robert B., 257 Modesitt, Donald, 280 Molchan, John R., 243, 290 Moll, John J., 259 Monroe, Clarence J., 141 Monsanto Chemical, 251 Monsch, Henry D., 238 Montgomery, H.P., 245 Montgomery, R. Gill, 238, 257 Mooney, Doug, 292 Mooney, Joseph W., 246, 257 Moore, J.T., 51 Moore, Robert E., x, 190, 241, 273, 280 Moore, Stanley R., 257 Moore, Weldon, Judge and Mrs., 261 Moran, Ernest, 257 Morgan, Glenn B., 257 Morgan, J. Derald, 241 Morgan, Joe, Mr. and Mrs., 261 Morgan, Mike, 292 Morgan, Ray, 229 Mornin, Bob L., 238, 245, 246, 257 Morrill Act, 5, 6, 12 Morris, Arthur E., 242, 280 Morris, C.L., 138 Morris, J.M., 30 Moses, Frederick G., 257 Moulder, Karl, 245 Mountjoy, R.L., 82 MSM Alumnus, 158

MSM-UMR Alumni Association, 106, 156, 197, 251, 261 Mueller, Frederick M., 236, 257 Mueller, George E., Dr. and Mrs., 253 Mueller, George E., 146, 155, 245 Muhlbauer, Karlheinz C., 238 Muilenburg, Garrett A., 108, 141, 238, 257 Muir, Clifford, 272 Mullen, Daniel F., 259 Mundt, Herbert W., 257 Munger, Paul R., 235, 238, 242, 285 Murphy, Benton F., 236 Murphy Company, 251 Murphy, Grover J., 259 Murphy, James J., Mrs., 253 Murphy, James J., 142, 236, 238, 245, 246, 257, 259 Murphy, Thomas, 246 Murray, Edwin P., 257 Murray, M.H., 259 Music/Art/Theater, 211, 289 Mussey, C.E., Mrs., 88 Mussey, Nellie, 88 Mutz, Herman J., Jr., 257 Myers, James M., 242, 284 Myers, Nancy, 284

## N

Nalle, William N., 6 Named Funds, 247 National Steel, 251 Nations, Jessie, 284 Naylor, Arch W., 257 Needham, Albert B., 257, 259 Needles, Enoch R., 63, 80, 91, 236, 238, 245, 251, 257 Nelson, Leonard C., 238 Nesbitt, Derek, 247 Netzeband, William F., 257 Neubert, Ralph L., 257 Neustaedter, Arthur, 257 Neustaedter, James A., 238 Nevins, Marvin E. "Bob," Jr., Mr. and Mrs., 253 Nevins, Marvin E. "Bob," Jr., 238, 251, Newmont Mining, 251 Nichols, B.G., 142 Nickel, Melvin E., 238, 257 Niedermeyer, Oscar D., 257 Nieto, Jorges C., 257

Nilges, Al, 238, 246 Nolan, Harry H., 259 Nolte, Roger, 190, 191 Northcutt, B.F., 7 Northern, Eugene, 142, 245 Norville, H.O., 286 Norwood, J.G., 52 Nuclear Engineering, 211, 244 Nuclear Reactor, 155, 161, 163, 261, 289 Nuell, Barney, 158, 236, 238 Nuss, L.R., x, 272

#### $\cap$

O'Haver, Roy, Mr. and Mrs., 261 O'Keefe, Thomas J., 238, 242, 246, 280 O'Mealy, Pat, 247 O'Meara, Robert G., 257 O'Neill, John J., Jr., 257 Oakes, Robert, 242 Oakley, David, 242, 246 Oberschelp, William F., 236 Odom, Donald Paul, 251 Offutt, James J., 257, 259 Ohmann-Dumesnil, A.H., 257 Ohnsorg, Norman L., 257 Old Ben Coal, 251 Olin, 251 Oliphant, Edgar, 257 Oliver, Larry, 247 Olsen, John K., Mr. and Mrs., 253 Olson, James C., 205, 238, 246 Order of the Golden Shillelagh, 205, 253 Ore, Felipe B., 257 Orrick, W.W., 7 Orten, M.D., 108 Owen, John R.D., 257 Owens, Thomas, 236 Ownby, P. Darrell, 235 Owsley, Edward A., 245, 251 Ozark Lead, 251 Ozorkiewicz, Ralph L., Mr. and Mrs., Ozorkiewicz, Ralph L., 236

#### P

Pack, James A., 257
Pack, John W., 17, 87, 88, 257, 268
Padfield, Ralph C., 257
Pagano, Sylvester J., 238

Page, John W., 251 Painter, John L., Mr. and Mrs., 261 Painter, W.R., 88, 257 Pake, George E., 245 Palmer, Chase, 33 Palmer, Clarence C., 236, 238, 251, 257 Parents' Association, 205 Park, John, 242 Parker, Luman F., 51, 59, 60, 64 Parker, Ray, 247 Parker, Richard A., 257, 259 Parry, Myron G., 243, 268, 292 Parsons, Edward W., 257 Pasley, James L., 257 Patrick, Michael, 241 Patterson, Edward P., 257 Patterson, J. Robert, 257 Patterson, James F., 238, 245 Patterson, Jerome D., 236, 257 Patterson, William E., 236 Paul, Austin J., 273 Paul, James R., 238 Paul, Murry J., Mr. and Mrs., 253 Paulette, Robert J., 257 Pauls, Franklin B., 290 Peabody Coal, 251 Pearce, Janet, 260 Pearson, Harry R., Jr., Mr. and Mrs., 253 Pease, Robert, 228 Peebles, Byron E., 115 Peel, Wesley E., 257 Peery, David J., 257 Pence, Harry S., Mrs., 238 Pence, Harry S., 138, 142, 158, 236, 238, 257 Pendergrass, Ray, 294 Peppers, Robert E., 257 Performing Arts Series, 223 Perkins, Edwin T., 257 Perry, E.L. "Roy," Mr. and Mrs., 253 Perry, E.L. "Roy," 235, 236, 238, 245, 251 Perry, Norris, 236 Perry, Robert C., 238, 257 Perry, Russell, 246 Personnel Services, 290 Persons, Wallace R., 245 Peters, Rich, 247 Peterson, Clarence E., 257 Petro Lewis Corporation, 251 Petroleum Engineering, 244, 290 Pett, Gerald H., 257 Pfeifer, Herman J., x, 247, 261

Phelps County-City Panhellenic Scholarship, 251 Phi Kappa Phi, 251 Phillips, Walter I., 257 Philosophy, 211, 244 Phipps, Bill, Mr. and Mrs., 261 Physics, 32, 156, 161, 162, 190, 199, 244, 290 Pi Delta Chi, 126, 214 Pi Kappa Alpha, 76 Pierce, Colwell A., 257 Pietsch, Peter H., 251 Planje, Theodore J.M., 155, 158, 159, 187, 188, 190, 207, 238, 246, 272, 273, 289, 294 Plank, R. David, 257, 264 Plummer, Neil, 257 Plummer, Otho R., 242, 275 Podzimek, Josef, 238 Pogue, Jim C., x, 190, 194, 201, 202, 204, 205, 207, 233, 246 Pohlig, Kenneth D., 236 Political Science, 211 Pollard, Arthur L., 251 Ponder, Paul E., 188, 202, 207, 219, 242, 268, 277, 292 Porth, Harry W.L., 252, 257 Portland Cement, 252 Post, John R., x, 238, 259 Potashnick, Reginald B., 257 Potter, C.J., 236, 238, 245, 253 Powell, Frank B., x, 42, 136, 142 Powell, John D., x, 142, 246 Powell, Sybil (Lange), 260 Powell, W.J., 28 Powell, Walbridge H., 257 Prange, Herbert L., 238, 252 Presidential Research Award, 210 Pressly, Bob, 247 Price, John T., 76 Price, Susan, 260 Procter and Gamble, 252 Proctor, Paul D., 188, 190 Professional Degree Recipients, 254 Professional Development Degree, 243, 244 Prough, Richard G., 158, 236, 246 Pruitt, Gina, 217 Psychology, 103, 211, 245 Public Service Company of Oklahoma, 252 Purtee, Iva, 284

# Q

Queens of St. Patrick, 259 Quenon, Robert H., 245 Quilliam, William R., 257 Quinn, Matthew V., 257

## R

Rackett, Gerald F., 257 Radcliff, Donald H., 257 Radio KUMR-FM, 291 Radovich, Arizona Pete, 89 Rakaskas, J.E., Mr. and Mrs., 261 Ralston, Lynn B., 241, 268 Ramirez, Jaime, 257 Rand, Stanley E., 257 Randolph, Earl J., 238, 285, 286 Rankin, Rolfe M., 108, 157, 238 Rasor, John P., 257 Rassinier, Edgar A., 257 Ratchford, C. Brice, 200, 201, 238, 245 Ray, Dixy L., 245 Rayl, John W., 163 Read, Daniel, 8, 9, 10 Read, Melba, 284 Redding, James A., Mr. and Mrs., 252, Reed, Harvey J., Mr. and Mrs., 254 Reed, O.S., 7 Reed, Stephen P., 252 Reef, Victor, 238 Rees, George A., 257 Reese, Thomas H., 252 Refractories Institute, 252 Reger, James S., 257 Regional Center for Nuclear Manpower Development, 210 Registrar, 110, 207, 292 Reid, Joseph H., 238, 257 Reid, Sidney K., 257 Reilly, John H.G., 257, 259 Remington, Charles R., Mr. and Mrs., 254, 261 Remington, Charles R., x, 158, 202, 238, 242, 271, 272 Remmers Special Lecturer Artist Series, 223 Remmers, Edward G., Mr. and Mrs., Remmers, Miriam, 223 Remmers, Thomas A., Mr. and Mrs., 254

Remmers, Walter E., Mr. and Mrs., Remmers, Walter E., x, 223, 238, 245, 252, 254, 257 Renewable Resources Research Center, Research Center Directors, 242 Reuss, Lloyd E., 238, 245, 257 Rhoades, Robert, Mr. and Mrs., 261 Rhoads, Robert Lee, 287 Rhodes, A.E., 238, 257 Ribotto, Peter P., 257 Richards, Robert H., 54, 55 Richards, Walter B., 33, 36, 37, 38, 39, 40, 41, 43, 45, 85 Richards, Walter C., 257 Richardson, Grace, 42 Richardson, James K., 257, 259 Richert, George L., 257 Rieke, Vernon W., 238 Ries, Walter, 243 Riggari, Mary Beth (Ortwerth), 260 Riggs, Lawrason, III, 245 Riggs, W. Robert, 238, 257 Riley, Kenneth G., 257 Rittenhouse, Joseph W., 236, 238, 257 Roach, Vincent, 274 Roberts, Gerald A., 259 Roberts, J. Kent, x, 158, 159, 235, 238, 264, 280 Roberts, S. Kent, 236 Roberts, Winona C., 198 Robertson, B. Ken, x, 207, 235, 238, 241, 246, 278 Robinson, Marilee, 260 Robson, Thomas C., 257 Rochester and Pittsburgh Coal, 252 Rock Mechanics and Explosives Research Center, 210, 292 Rockaway, John, 241 Rockwell, Dale L., 257 Rodd, Charles C., 257 Roe, Lawrence A., 257 Roemerman, Bill, 246 Roemerman, Richard, 246 Roesler, Herbert A., 257 Roever, Frederick H., 257 Rogers, John A., 257 Rogers, R.W., 82 Rolaff, Erich, 257 Roley, Rolf W., 257 Rolla Advertiser, 139 Rolla Daily New Era, 132

Rolla Daily News, 298 Rolla Herald, 8, 26, 27, 28, 51, 52, 69, 83, 172 Rolla Lions Club, 252 Rolla Rotary Club, 252 ROLLAMO, 53, 54, 63, 74, 76, 83, 84, 85, 89, 92, 101, 127, 131, 225 Rollins, James S., 6, 7 Rollman, William H., 257 Roloff, Don V., 257 Rolufs, Rulof T., 257 Rose, Charles K., 257 Ross, Beauregard, 257 ROTC, 111 Roth, Don, 247 Rouse, Allen L., 257 Rouse, Richard O., 257 Rousos, Richard A., 257 Rowe, S.B., 28 Roy, John G., x, 298 Rubey, Thomas L., 36, 41, 43, 285 Rucker, Booker H., 51, 59, 69, 71, 136, 139, 140, 142, 144, 257 Rucker, Ray F., 76, 138, 236 Ruemmler, Waldemar P., 236 Rueter, Donald A., 257 Rupert, Gerald, 241 Rupp, Tim, Mr. and Mrs., 261 Russell, F.T., 7 Russow, Lois, x, 298 Rutledge, William A., 236, 238, 240, 257 Ryan, Robert J., 257 Ryan, Terry, 247

# S

Salley, Margaret (Eulich), 259 Sally, Gene, 245 Salmon, Julius C., Jr., 236, 238 Salmon, R. Michael, 236 Salts, W.J., 59 Sanderson, Lawrence H., 257 Sarchet, Bernard R., Mr. and Mrs., 254 Sarchet, Bernard R., x, 196, 238, 269, 278, 279 Saunders, Coach, 82 Scalley, Joseph E., 236 Schaefer, Rodney A., 158, 238 Schaeffer, Willard A., Jr., 257 Schafer, Mike, 247 Schafer, Robert P., 238, 257 Scharf, Fred, 257

Schearer, Laird D., 210 Scott, Luella, 74 Scheer, Bernard H., III, 259 Scott, Olive (Morris), 259 Scheer, Randall A., 257 Seamon, Frank H., 257 Schillinger, George R., 236 Seamon, W.H., 32, 36, 37, 38, 39, 43 Schlechten, Albert W., 155, 158 See, Joline, 260 Schlensker, John A., 238 Seiberling, Theodore O., 257 Schlumberger Collegiate Award, 252 Sellers, George A., 257 Schmidt, Art, 246 Seltzer, Andrew J., 257 Schmidt, E. Murray, 236 Senne, John E., 276 Schmidt, E. Robert, Jr., 257 Senne, Joseph H., Jr., 187, 190, 235, Schmidt, Robert F., 236 241, 261, 264, 274 Senter, U.B., 252 Settle, John C., 259 Schmidt, Wayne V., 259 Schmitt, Joseph B., 257 Schmoldt Engineering Services, 252 Sevick, Joseph G., Mr. and Mrs., 254 Schmoldt, Hans E., Mr. and Mrs., 254 Sevick, Joseph G., 257 Schmoldt, Hans E., 236, 238, 246, 257 Shaffer, Walter J., 257 Schmoldt, Jimmie, 264 Shamrock Club, 127, 224 Schneeberger, Fred C., x, 142, 158, Sharp, William T., 257 238, 257 Shaw, Frederick W., 103 Schneider, Samuel J., 257 Shaw, Lola, 19, 74 Schockley, Gilbert R., 245 Shayes, Frederick P., 257 Schoeneberg, Kenneth W., 235 Sheldon, Wilbur E., 257 School of Engineering, 188, 196, 206, Shell, 252 207, 208, 211, 293 Shepard, William M., 257 School of Mines and Metallurgy, 188, Shephard, John, Mr. and Mrs., 261 206, 207, 208, 211, 229, 293 Sheridan Enterprises, 252 School of Science, 195, 293 Sherry, Homer K., 257 Schooler, Durward R., 252, 257 Shockley, Gilbert R., 245, 257 Schork, John E., Mr. and Mrs., 254 Shockley, R. Ray, 257 Schork, John E., 245 Shopher, S. Dean, 258 Schowengerdt, George, 242, 277 Short, John A., 258 Schrantz, Ashuah B., 257 Shourd, Roy R., 246, 258 Schrenk, Walter T., Mrs., 254 Shriver, R.O., 82 Schrenk, Walter T., 108, 128, 157, 158, Sicka, L.T., 252 200, 209, 238, 252, 273, 274 Sickly, Robert G., 258 Schuchardt, Robert E., 246, 257, 259 Sidener, Marie M., 246 Schuchman, Norm, 247 Sievers, Sharon, 260 Schuette, Louis H., 257 Sievert, O. Morris, 258 Schuler, Leonard L., Jr., 238 Sigma Nu, 75 Schulze, Herman O., 257 Sigma Pi, 126 Schuman, Edwin K., 238 Signer, Merton I., 258 Schuman, Eric K. "Toots", 259 Silver and Gold Club, 260 Schuman, John M., 238 Simily, David, 246 Schwarz, Arthur S., 257 Simmons, Michael F., 258 Schweickhardt, William K., 238, 257 Simpson, Thomas A., 258 Scofield, Gordon L., 238 Simrall, Riley M., 258 Sineath, Henry, 241, 279 Skiles, James J., 236 Scott, Guy R., 176, 257 Scott, Harry S., 257 Scott, J.B., 53, 55, 62, 63 Skitek, Gabriel G., Mr. and Mrs., 254 Scott, J. Walter, 257 Skitek, Gabriel G., 158, 236, 238, 272 Sloss, James P., 258 Scott, James J., Dr. and Mrs., 254, 261 Scott, James J., 238 Smart, Sam, Mr. and Mrs., 261 Scott, John W., 127, 173, 176, 238, 289 Smith, Carol A., 235

Smith, Dennis, 247 Spanier, Lawrence A., 236, 258 Smith, Duncan S., 252 Sparks, Charles H., 238 Smith, E.S., 62 Speech & Media Studies, 211, 289 Smith, Edward A., Mrs., 254 Speer, Diane, 220 Smith, Edward A., 209, 238, 246, 258, Spencer, Clifton B., 258 Spokes, Ernest M., 190, 207, 294 Smith, Frederick J., 259 Spotte, Irvin C., 258 Smith, Harry B., 236, 238, 258 St. Clair, Rodman, Mr. and Mrs., 254 Smith, Harvey E., 258 St. Joseph Lead Company, 252 Smith, Hueston, 236, 258 St. Joseph Light and Power, 252 Smith, James A., 258 St. Joseph Minerals Corporation, 252 Smith, Keith, 246 St. Pat's, 74, 88, 92, 124, 127, 128, 133, Smith, L.X., 88 134, 167, 170, 222, 231, 258 Smith, Leroy E., 236 Stack, W.S., 259 Smith, Loren X., 258 Stahl, Horace R., 258 Smith, Neil K., x, 242, 267 Stalling, Ken, 247 Smith, P. Gene, 236, 258 Stallman, Ralph, 246 Smith, Pat, 17 Standard Oil of California, 252 Smith, R. Thomas, 258 Stanley, Bob, 247 Smith, Ted, Dr. and Mrs., 261 Stark, Gov., 136 Smith, Tom K., 238 Starliper, 284 Smith, Van H., 258 Stauter, Mark C., 243, 295 Smith, Walter, 246 Steele, Luther, 246 Smothers, William J., 154, 238 Stegemeier, Richard J., 258 Smurfit-Alton Packaging Fellowship, Steimke, Frank C., Jr., 258 208, 252 Steinbach, Alvin C., 241 Snelson, Venita, Walter, and Shirley Steinmesch, Jesse H., 238, 258 Scholarship, 252 Stephens, James W., 236, 238, 245, 258 Snelson, Walter, Mr. and Mrs., 254 Stephens, Lon, 41, 51 Snowden, J. Russell, 235 Stevens, Billy, 258 Snowden, Norwood L., 258 Stevenson, Gerald L., 258 Snyder, Byron J., 258 Stever, H. Guyford, 245 Social Sciences, 194, 195, 196, 211, 294 Stewart, Arthur J., 258 Social Studies, 190, 194 Stewart, Fraizer M., x, 258 Society of Women Engineers, 214, 252 Stewart, T.J., x, 298 Solomon, Russell C., 258 Stewart, Thomas J., Jr., Mr. & Mrs., Somerville, Bob, 247 Sonntag, Bob, 247 Stewart, Thomas J., Jr., 258 Sontag, Jack, 176 Stewart, William H., Mr. and Mrs., Sorrell, Charles A., 238 Soult, John P., Mr. and Mrs., 254 Stifel, Carl B., 142, 236, 238 Soult, John P., 119, 235, 238, 245, 252, Stigall, Paul D., 235 Stimson, Lucille (Daniels), 260 Southgate, W.W., 28 Stine, Howard, 236 Sowers, Edward W., 132, 245 Stockett, Norman A., Mr. and Mrs., Sowers, Jim, Mr. and Mrs., 261 252 Sowers, Steve, Mr. and Mrs., 261 Stoecker, Wilbert F., 258 Sowers, Tom, Mr. and Mrs., 261 Stoll, Jeffrey R., 243 Spackler, Donald E., 258, 259 Stoltz, Bill, Mr. and Mrs., 261 Spafford, Joe, 246 Stone, Bruce, 247 Spalding, J. Victor, 238 Stone, S. Allan, Mr. & Mrs., 254 Spanier, Lawrence A., Mr. and Mrs., Stone, S. Allan, 236, 238, 258 254 Stonehenge, 230, 261

Stout, Leonard, 247 Stover, C.E., 259 Stover, Curtis Edward, Mrs., 259 Strain, Robert A., 258 Strang, Bruce B., 252 Straub, Harold E., 258 Straumanis, Martin, 156, 199, 283 Stricker, Dana, 260 Stroup, Richard J., 258 Stroup, Robert K., 258 Strunk, Mailand R., 190, 252, 274 Stubbins, John R., 252 Student Financial Aid, 294 Student Organizations, 264 Stueck, C.F.P., 235, 238, 258 Stupp Brothers, 252 Sturm, John, 247 Subow, Jules H., 252 Suellentrop, Paul, 247 Suellentrop, Steve, 247 Summers, Allan J., 258 Summers, David A., 210, 238, 242, 262, 264, 293 Summers, Edward B., 258 Sunstrand Fund, 252 Sutton, Robert, 269 Sverdrup and Parcel, 252 Sverdrup, Leif J., 245 Svoboda, Michael, 236 Swayze, Ronald O., 258 Swearingen, Jerry D., 258 Symington, Stuart, 245

#### T

Tainton, U. Clifton, 245 Tanquary, Clifford C., 236 Tappmeyer, Ronald A., Mr. and Mrs., Tappmeyer, Ronald A., 238, 258 Tarantola, Bruce E., 236 Tau Beta Pi, 77 Taylor, George H., 240 Taylor, Otis H., 235, 238 Taylor, Otis, Mr. and Mrs., 261 Teas, Howard J., 236, 258 Tech Club, 127 Tech Engine Club, 224, 230 Tedrow, Harvey L., 236, 238, 252, 258 Teledyne VISA, 252 Teller, W. Kedzie, 258 Telthorst, Edgar J., 238, 258 Tenneco Scholarships, 252

Tepper, Brian, 247 Terrell, Arthur D., 238 TerKonda, Purush, 279 Test, Louis A., 62 Tevis, Charles C., 258 Texaco, 252 Tharp, Hal, 247 Theiss, John C., 235 Theobald, Thomas A., 258 Theodore, Steve, 258 Theta Tau, 77 Thomas Jefferson Award, 211 Thomas, Charles A., 245 Thomas, H.D. "Tommy," 252 Thomas, Harold D., 238 Thomas, John S., 242 Thomas, Thomas G., 285 Thomas, Thomas R., 258 Thomas, Tom, Mr. and Mrs., 261 Thomas, W.S., 102 Thompson, Dudley, x, 155, 187, 188, 201, 202, 218, 238, 246, 273, 274, 293, Thompson, Jack H., 238 Thompson, R.C., 62 Thornberry, Martin H., 236, 238, 258 Thornhill, Edwin B., 258 Thorp, John M., 258 Thurman, B.G., 51, 60 Thurmond, Martin H., 236 Tiefenbrun, A.J., 259 Tierney, Ellen, 260 Tiernon, Carlos and Joan, 253 Tiernon, Carlos H., 258 Tietjens, Jim, 246 Timmerman, Arthur H., 40 Timmerman, 284 Tittel, Roger C., 259 Tolman, Carl, 245 Tolman, Radon, 258 Tomasek, Anton J., 245 Tomazi, George D., 236, 258 Tooke, Robert C., 259 Toomey, John B., Mr. and Mrs., 254 Toomey, John B., 236, 238, 258 Topper, Robert L., 258 Torrini, Rudolph, 245 Townsend, Frank E., 238, 253 Tracey, Faye, 246 Tracey, James H., 235, 238 Trainer, James S., 246 Transportation Institute, 193, 210 Tranter, William, 241 Trent, Albert L., 258

Triangle, 126 Troudt, Tom M., 268 Truex, A.F., 258, 259 Tryon, John, 245, 295 Tryon, Laura, 260 Tseung, Tsik C., 258 Tsoulfanidis, Nicholas, 242 Tucci, Phyllis, 260 Tuck, Edward F., 258 Tucker, Armin, x Tucker, Armin J., Mr. and Mrs., 261 Tucker, Homer, 245 Tucker, Louise S., 238, 268 Tucker, Norman, x Turnbull, Louis A., 236 Turner, William DeGarmo, 273, 274 Turnipseed, M.J., 258 Tuttle, Lauren P., 258 Tyrell, Frank L., 258

#### U

UMR Academy of Civil Engineers, Fruin-Colnon, 253 UMR Band Fund, 253 UMR Engineering Center in St. Louis, 193, 294 UMR Parents' Association, 253 Underwood, Eva, 259 Underwood, Gary, 259 Underwood, Helen Bernice (Ledford), 259 Underwood, Jerrold R., 258 Union Electric, 253 Union Pacific Foundation, 253 United Telephone Company of Missouri, 261 University College Dublin, 208 University Police, 295 Unklesbay, A.G., 238 Unsell, Vester B., 235 Updike, Donald F., 258

# V

Valentine, Herman F., 236 Valerius, Claude N., 237, 238 Van Nostrand, Burr, 227, 253 Van Nostrand, Robert, x, 125 Vandevander, Herman N., 258 Vandeven, Roger L., 259 Vandivort, Clyde A., 259

Uthlaut, Ralph, Jr., 246

Vanfrank, Philip R., 258
Vansant, Robert E., 235, 240, 258
Varga, Bill, 247
Vaughn, George E., 272
Vaughn, John C., 242, 264, 267
Vaughn, Ken, 247
Veatch, Nathan T., 245
Vessell, Randy, 247
Via, Jessie, 42
Vienhage, Robert P., 237
Vincent, James A., 237
Vincil, John D., 48, 52, 59, 60
Vogel, H., 82
Vollmar, Joseph E., Jr., 258

# W

Wade, Rolla T., 237, 258 Waggoner, Edwin W., 253 Waggoner, Lynn H., 243, 261 Wagner, Brian, 259 Wait, Charles E., 23, 24, 26, 27, 29, 30, 31, 32, 37, 74, 84, 85 Walker, Arthur W., 258 Walker, John A., 237, 238, 258 Walker, Merton G., 240 Walker, Taris, 76 Walker, William D., 258 Wallace, John W., 237 Walsh, David F., 259 Walsh, John K., 142, 237, 253 Waltenspiel, A.B., x Walthall, Alice, 260 Wander, Ernest, 258 Wanenmacher, Joseph M., 158, 237, 238 Wang, Kung-Ping, 258 Ward, Dain, Mr. and Mrs., 261 Ward, Ronald D., 258 Wargo, Terry, 247 Warner, Don L., Mr. and Mrs., 261 Warner, Don L., 207, 241, 294 Warren, Robert A., 268 Warren, Sharon, 216 Wash, Edwin R., 258 Wash, James A., 258 Waters, John W., 258 Wattenbarger, C.M., Mr. and Mrs., 261 Weart, Harry, 190, 241 Weaver, John C., 192, 238, 245 Weaver, Rick, 261 Weaver, Samuel C., 258

Webb, William H., 190, 238, 253, 274, Williams, Bryan M., 286 289 Williams, Charles P., 5, 7, 8, 9, 10, 11, Webster, Royal S., 258 12, 14, 15, 19, 20, 21, 23, 31, 87, 135, Weiberg, James L., 246 274, 292 Weigel, Melvin P., 238 Williams, Hillary, 17 Weigel, Robert C., 158 Williams, John C., 258 Weigel, William M., 258 Williams, Mary, 246 Weigel, William W., 258 Williams, Rex Z., x, 157, 237, 238, 239, Weinbaum, Dave, 261 240, 254, 271, 272, 277 Weinbaum, Mel, Mr. and Mrs., 261 Williams, Samuel G., 8 Weinel, Ernest A., 235 Williams, Walter, 52 Weintz, Marilyn, 260 Wills, Floyd, Mr. and Mrs., 261 Weis, Carl J., 235, 238 Wilms, John O., 237 Weissmann, Theodore S., 258 Wilson, Albert D., 258 Welch, Gary E., 258 Wilson, Clark, 253 Welsh, R. Dalton, Mr. and Mrs., 261 Wilson, Curtis Laws, 109, 111, 112, Welty, Gary, 271 132, 136, 138, 139, 140, 149, 150, 153, Werner, Edwin J., 237 154, 156, 157, 158, 160, 161, 163, 164, Werner, Roy C., 258 167, 172, 173, 181, 188, 199, 200, 201, Werner, Walter A., 258 231, 238, 277, 285, 289 Westerfeld, Wilfred W., x, 238 Wilson, Daniel, 236 Western Electric, 253 Wilson, Francis W., 258 Western Historical Manuscript Wilson, Frank L.L., 258 Collection, 295 Wilson, Freemont C., 258 Westvaco, 253 Wilson, J.G., 82 Wheeler, Bill, 247 Wilson, James, 119, 246 Wheeler, Harold Leslie, 286 Wilson, Joseph M., 82, 238, 258 White, Fred, 247 Wilson, Myra J., 214 White, Jim, 247 Windsor, Paul D., 258 White, Robert T., 259 Winfield, Frank, 215, 247 White, Sally, 246 Winkel, Robert A., 258 Whites, Robert W., 243, 294 Winters, Charles F., 258 Whiting, Florence, 27, 30 Wisch, William L., 235 Whitney, Dick, 246 Wise, James, 241 Whitney, Geordie Z., 26, 27, 28, 30, Wishon, Emma, 88 285 Wishon, Emory, 79 Whittelsey, Charles C., 245 Wishon, Walter W., 88, 258 Whitworth, Virgil L., x, 254, 258 Witunski, Michael, 258 Wicklund, Michael A., 258 Wixson, Bobby G., Mr. and Mrs., 261 Wixson, Bobby G., x, 238, 241, 279 Wiegard, Paul, 247 Wieker, Richard, Mr. and Mrs., 261 Wixson, Douglas C., Jr., 210, 211 Wieland, Warren R., 235, 258 Wolf, Edgar J., 258 Wiese, Charles and Anna, 253 Wolf, Kevin, 247 Wiethop, Russell H., 235, 238 Wolf, Robert V., x, 235, 240, 241, 242, Wightman, Randall H., 258 245 Wile, Larson E., 258 Wolff, Henry, 9 Wiles, George B., 258 Wolff, Leonard C., 258 Wilhelm, Cathie, 260 Wollard, Joseph D., Mr. and Mrs., 261 Wilkins, Elinor, 42 Wollard, Joseph D., 242, 262, 263, 267 Wilkins, Paul J., 33, 36, 43, 53, 55, 62, Women in Engineering Program, 216 63, 285 Wood, Neal, 246 Williams, Arthur J., Jr., 258 Woodhall, George, 258 Williams, Bruce, 247 Woodill, Mindy, 214

Woodman, Eugene H., 258
Woodman, Leon E., 108, 245, 253, 290
Woods, Charles L., 51, 59, 60, 69
Woods, Jim, Mr. and Mrs., 261
Worley, Joseph, 258
Wozek, Jeff, 247
Wright, Harold R., 258
Wright, Ira L., 258
Wright, James, 247
Wright, John C., 258
Wright, Wilford S., 258
Wundrack, William A., 236, 258
Wyatt, DeMarquis D., Mr. and Mrs., 254
Wyatt, DeMarquis D., 146, 155, 245

#### Y

Yancik, Joseph J., 238 Yantis, Van Court, 15, 24, 285 Yasuda, H.K., 283 Yeater, Merritt W., 258 Young, Howard I., 245 Young, Lewis E., 61, 62, 63, 64, 65, 66, 69, 79, 92, 245, 253 Young, Reagan H., 108 Young, Tammy, 260 Yu, Wei-Wen, 210, 238

### 7

Zagata, John, 125
Zakin, Jacques L., 289
Zeid, Marvin C., Mr. and Mrs., 254, 261
Zeid, Marvin, 253
Zeigler Coal Company, 253
Zeta Tau Alpha, 214
Zeuch, Walter C., 237, 258
Zink, Jess, Mr. and Mrs., 261
Zink, Jess, 242, 267, 271
Zoller, Henry E., 158, 237, 238, 258
Zoller, Jacques, x
Zoller, Lawrence J., 258
Zumbehl, Joy, 260
Zvanut, Frank J., 124

# **About The Authors**

Lawrence O. Christensen is a professor of history at the University of Missouri-Rolla. He holds B.S. and M.A. degrees from Northeast Missouri State University and a Ph.D. degree from the University of Missouri-Columbia.

Jack B. Ridley is an associate professor of history at the University of Missouri-Rolla. He holds an A.B. degree from Southwestern Oklahoma State University, an M.A. degree from the University of South Dakota, and a Ph.D. degree from the University of Oklahoma.