



Missouri S&T Magazine, December 15, 1929

Miner Alumni Association

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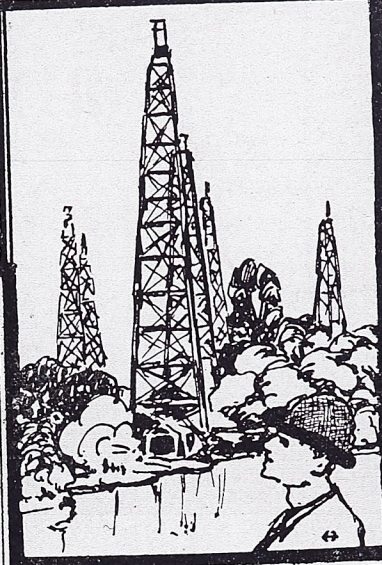
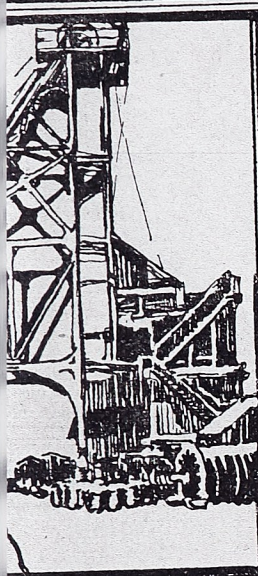
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MSM ALUMNUS



Merry
Christmas



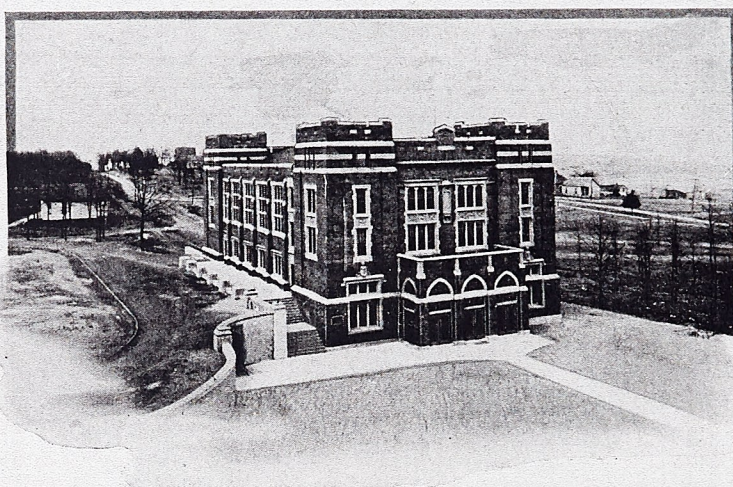
Volume
Four

December 15, 1929

Number
Two

SCHOOL of MINES and METALLURGY

University of Missouri
ROLLA, MISSOURI



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SCHOOL of MINES and METALLURGY
ROLLA, MISSOURI

MSM ALUMNUS

ALUMNI ASSOCIATION, SCHOOL OF MINES AND METALLURGY, ROLLA, MISSOURI

Volume Four

DECEMBER 15, 1929

Number Two

The Engineer and Politics

Speech of Hon. Wm. R. Painter, '82, Delivered at MSM on November 21st. 1929



I want to say, ladies and gentlemen, that I am here under false pretenses, or if not under false pretenses, at least my presence was secured under false pretenses. I do not know anything about giving a lecture. I never lectured to anybody in my life, and the only lectures I have ever listened to came from my wife to me, and I wouldn't dare repeat them to this audience. So I want to have the audience understand the situation as we start out, so that you won't get up and go out on me before I get through.

I am mighty glad to be in Rolla. About 51 or 52 years ago I came to Rolla just about Christmas time, and you see that probably I know more about old Rolla than do about new Rolla. Another generation has come since the first time I came to this city.

A new city has been born. We had a School of Mines when I came here, and it occupied what was known as the "Rolla Building." I got mad when I came to Rolla and viewed the School of Mines as it is now, for I realize that the State of Missouri did not treat me fairly fifty years ago, because they did not have the same things here then that they have now. If they had, I might have secured a better education in engineering.

I have never been sorry, although I followed engineering for only ten years, that I had an engineering education. We do not stop, possibly to think that that one word engineering means. Really, an engineer is one who takes matter and makes something out of it. Engineering has become so diversified that practically everybody now is more or less an engineer of some kind. I learned only three things in engineering when I was at the School of Mines. Those three things were as follows:

I learned that the shortest distance between two points is a straight line.

I learned that a circumference is a ring drawn around a central point equally distant from that central point at every point of the circle.

I learned that you could go from one point to another by going in a crooked or zigzag line.

These things may not have been very important, but I have found them the great controlling principles of life. The man in this world who travels the straight line and makes the shortest distance between two points is a man

(Continued on Page 11).

The Industrial Program and The Engineer

An Address by Dr. L. E. Young, former Director of MSM and now Vice-President of the Pittsburgh Coal Company, Delivered at Mass Meeting, October 25th

In 1828 civil engineering was defined in the charter of the Institution of Civil Engineers of London as the art of directing the great sources of power in nature for the use and convenience of man. In later years engineering has been defined (New International Encyclopedia) as the practical application of science and scientific methods to industry. In some of the more recent works on special fields of engineering the commercial or economic aspects have been given great prominence. One eminent engineer says that engineering is "the art of doing well with one dollar what any bungler can do with two dollars after a fashion."

It is proposed to show that in our industrial program the field of the engineer will be increasingly broader. Industrial research has opened new fields. The engineer may

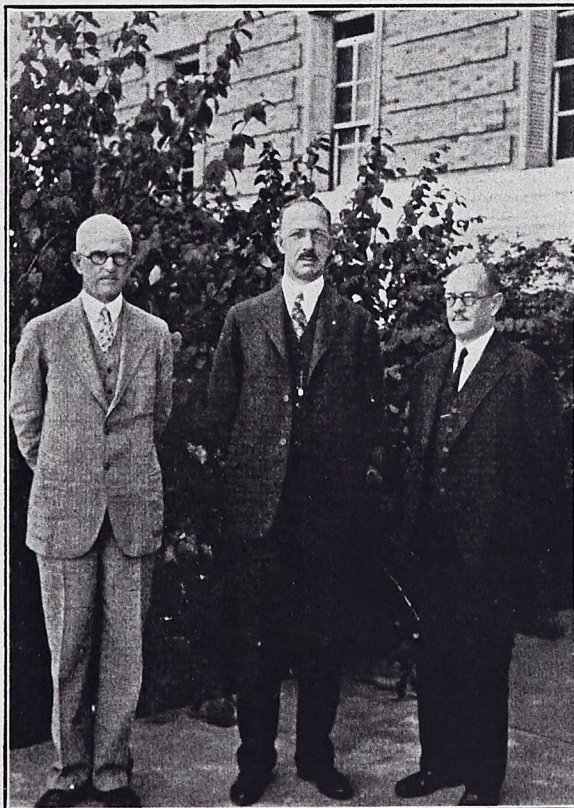
be asked not only to find new methods of producing goods but may be challenged to find new uses for products, to find substitutes, to determine costs of production, and to study the human elements involved in such industrial problems.

The economist has pointed out that in the great march of progress the all-powerful, driving motive in life is the desire to satisfy human wants. One of the world's greatest thinkers said: "The incentives of progress are the desires inherent in human nature—the desire to gratify the wants of the animal nature, the wants of the intellectual nature, and the wants of the sympathetic nature—desires that, short of infinity, can never be satisfied, as they grow by what they feed on."

If we refer to the old definition of engineering we note that we, as engineers, are working to satisfy some of these wants and we know that these wants are changing and are increasing in number. Industries are being transformed continually due to change in the markets or, in other words, due to our changing wants. Sometimes these changes are only in quantity and sometimes in quality and design.

In order to meet these changing conditions it is important that the men who plan industries and direct business operation have a broad view of the factors that enter into these movements. If a survey of industry were to be made we would want to know what the present situation is, how this situation was developed, what the program or policy for the future is, and what

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Prof. C. R. Forbes, Dr. L. E. Young and Dr. C. H. Fulton

MSM ALUMNUS

Issued quarterly, in the interest of the graduates and former students of the School of Mines and Metallurgy. Subscription price 50 cents, included in Alumni dues.

Entered as second-class matter October 7, 1926, at Post Office at Rolla, Missouri, under the Act of March 3, 1879.

Officers of the Association

| | |
|---------------------|-----------------|
| H. H. Hartzell..... | President |
| D. W. Blaylock..... | Vice-President |
| C. Y. Clayton..... | Treasurer |
| K. K. Kershner..... | Secretary |
| Noel Hubbard..... | Alumni Recorder |

Editors

| | |
|---------------|--------------|
| C. Y. Clayton | Noel Hubbard |
|---------------|--------------|

St. Louis Section To Establish A Scholarship

Reported by Barney Nudelman, Secretary

The semi-annual dinner meeting of the St. Louis Section of the Alumni was held at the American Annex, Friday evening, October 11th. A smaller crowd than usual was present, but what was lacking in numbers was made up in the interest of those present concerning several matters that were discussed.

A report was submitted by the secretary showing the income of various middle western states and the amount appropriated by them for their state universities. It was surprising to some to know that the State of Missouri was very low on the list, only the states of Arkansas and South Dakota making a poorer showing. Ways and means were discussed of remedying this condition.

The chief matter discussed during the evening, as announced in the notice of the meeting, was a proposal to establish a scholarship. On motion of Jake Walsh, seconded by Mickey Brazill, the St. Louis Section went on record as favoring the establishment of a scholarship, the funds to be raised by voluntary contributions. The details as to the method of selecting the recipient of the scholarship are to be worked out later, but the consensus of opinion among those present seemed to be that the man be selected on the basis of all-round qualifications, such as govern the selection of Rhodes' Scholars. It was felt that careful consideration should be given to the applicant's financial need, scholastic standing, and athletic ability, and that no one factor alone should make a man eligible, but rather a well balanced proportion of the three. It was suggested that a suitable committee to make the award would be the director of the school, a representative of the Chamber of Commerce of Rolla to be selected by them, a representative of the Alumni of the school residing in Rolla, and one representative from the St. Louis Section. From the pledges of those present at the meeting and those who were unable to be present but gave assurance of their support, we feel that we can raise at least \$200.00 as a starter.

Homecoming was also advertised, and quite a few of those present indicated an intention of attending.

Those present were:

| | |
|-----------------|-------------------|
| Blaylock, D. W. | Livingston, J. J. |
| Brazill, M. P. | Lottman, W. F. |
| Burke, S. M. | Morris, J. M. |
| Cook, E. H. | Nichols, B. G. |
| Durning, Wm. | Nudelman, B. |
| Hellmuth, G. W. | Powell, W. C. |
| Hippard, C. W. | Richards, W. C. |
| Kraft, N. O. | Walsh, J. K. |
| Laun, A. C. | Weigel, M. P. |

Ward, R. D.

Results of Election of Alumni Association Officers

The closing of the polls in the last election of alumni officers found H. H. Hartzell, '06, of the Tri-State Section elected president; D. W. Blaylock, '15, of the St. Louis Section elected vice-president; and K. Kershner, '20 and C. Y. Clayton, '13, both of Rolla, Mo., elected secretary and treasurer respectively.

The total vote cast was somewhat below that of the 1927 election. This was somewhat disappointing as it was hoped that the stamped, self-addressed ballots would gradually tend to increase the number of voters. In a turn for 1093 ballots sent out we received a total of 400 or about 28%, while in the 1927 election we had a return of 33%. Below is the total vote:

FOR PRESIDENT:

| | |
|-----------------------|-----|
| H. H. Hartzell..... | 177 |
| Frederick Grotts..... | 122 |

FOR VICE-PRESIDENT:

| | |
|---------------------|-----|
| D. W. Blaylock..... | 189 |
| E. D. Lynton..... | 108 |

FOR SECRETARY:

| | |
|------------------|-----|
| K. Kershner..... | 310 |
|------------------|-----|

FOR TREASURER:

| | |
|--------------------|-----|
| C. Y. Clayton..... | 310 |
|--------------------|-----|

School Of Mines At Rolla Enrollment 1928-29 - 530

Report of the Missouri State Survey Commission

The Missouri School of Mines and Metallurgy was established at Rolla in 1870. Its establishment was ratified by the terms of the Constitution in 1875, and was further defined by the so-called Buford Act of the Legislature in 1915. The constitutionality of this Act was affirmed by the Supreme Court of Missouri in the case of Heimberger vs. Board of Curators, 268 Mo. page 598. We mention these facts because the suggestion occurs from time to time that this school should be consolidated with the University. We do not think this is an open question.

Dr. Harry Hammond in the Strayer-Engelhardt report makes the following comment upon this problem:

"The two schools, the University and the School of Mines, maintain rather characteristically different types of programs, suited to somewhat different ends. The University offers a broad, general type of engineering curriculum. The several courses, Agricultural, Chemical, Civil, Electrical and Mechanical Engineering differ but slightly in content. In fact, differentiation of the three major curricula, Civil, Electrical and Mechanical does not take place until the Junior year, and even after that there is a considerable content of subject matter common to the three. The courses at the School of Mines, on the other hand, are of a quite highly "professional" type and are quite sharply differentiated distinction of curricula beginning at the end of the Freshman year. Both of these types of program have their place in engineering education, and both are in use elsewhere in the country, serving somewhat different ends with about equal effectiveness. Differentiation of types of program of the various engineering schools is one of the recommendations made as the result of the nation-wide study of engineering education to which reference has already been made. In this important particular, it is believed that consolidation of the two schools would not lead to satisfactory results. The effort to merge them and their faculties would probably lead at best to an unsatisfactory compromise type of program, having the outstanding merits of neither. (It is to be noted in this connection that this factor was undoubtedly one of the fundamental reasons why the proposed merger of the Armour Institute of Technology and the College of Engineering of Northwestern University failed of consummation.)"

(Continued on Page 14)

Cosmic Rays

*A Lecture by Dr. Robert A. Millikan**Reviewed by Dr. C. J. Monroe*

"Cosmic Rays" was the title of a lecture given at Parker Hall November 25, by Dr. Robert Andrews Millikan, chairman of the board and director of the Norman Bridge Laboratory for Physics of the California Institute of Technology, recipient of numerous medals and honorary degrees, and 1923 Nobel prize winner in physics for his measurement of the charge of an electron and investigations in the ultraviolet.

Millikan presented the evidence as to the formation of these rays in interplanetary space during the formation there of helium, nitrogen, oxygen and silicon from elementary hydrogen.

McLennan and Rutherford observed in 1903 that an electroscope in an air-tight metal box lost its charge slowly; Hess and Kolhorster in 1912, that it lost its charge several times as fast at an altitude of several miles, indicating a radiation coming from outside the earth. Millikan started work, in 1914, on the construction of an electroscope, barometer, and thermometer, using a photographic film and driving mechanism to get an automatic, continuous record of all three. This instrument, of a total weight of only seven ounces, was carried in a flight in 1922 to a height of ten miles and temperature of -60°C . in 115 minutes by two balloons, each of 18 inches diameter deflated. At this height one balloon burst, the other enabling the descent to earth to be made safely in 76 minutes. The discharge rate of the electroscope was much greater at high altitudes than at the earth's surface, although only one-fourth that expected from Kolhorster's results. Experiments in captive balloons and airplanes in 1922 and 1923 and on several mountains showed there was a variation in the intensity of the radiation with altitude only.

Millikan next performed a series of experiments in snow-fed lakes at high altitudes. As 10.3 meters of water has the same absorbing capacity as the earth's atmosphere, he obtained data at the equivalent of a number of different altitudes by immersion of the electroscope to different depths in these lakes, which, being snow-fed, are not radioactive. Data obtained at Muir Lake, 11,800 ft. altitude, and Arrowhead Lake, 5,100 ft., in California, and at two different lakes in the mountains in the Andes, and in the balloons and airplanes, when compared at the same altitudes, agreed nicely, indicating the cosmic rays are independent of the geographical location of the testing apparatus. As readings taken when the radiation was coming from the plane of or normal to the plane of the Milky Way were the same, and the readings were the same in the day as at night, the startling fact came out that the cosmic rays were not produced in suns but were produced uniformly in interplanetary space, where the temperature is very low and the density of matter minute.

In going through the atmosphere, the equivalent in absorbing power of 10.3 meters of water, the intensity of the radiation was reduced .22 each time it went through enough atmosphere to be equivalent in absorbing power to one meter of water, while in going down one meter more the absorption coefficient suddenly dropped to .11, and, on going through three more meters of water, it dropped to .05. The sudden change in absorption coefficient to .11 indicated that at that point a band of long wave length, of relatively large absorption coefficient, cosmic rays, have been about completely absorbed, and, as the rays left cause a relatively slow fall in the electroscope leaves, practically all of the cosmic ray energy is concentrated in the long wave length bands. The data indicate three bands of cosmic rays, of absorption coefficients .35, .08 and .04 from which the physics student can calculate the shortest wave length to be 8×10^{-13} cm., which may be compared to 10^{-10} for the gamma rays from radioactive disintegrations, 10^{-8} for X-rays, and 10^{-4} for visible light.

Four times the atomic weight of hydrogen is .029 grams more than that of helium; this number multiplied by the

square of the velocity of light gives the energy into which this mass has been converted, according to the well tested equation of Einstein; this divided by the number of atoms in one atomic weight may be equated to the quantum constant h times the frequency of the emitted energy, from which the frequency, and therefore the absorption coefficient u of the rays may be calculated to be .30, agreeing quite well with the experimental value of .35. The building of an oxygen atom from 16 H atoms would give cosmic rays of u .074 and in building N from 14 H would give u .086, the mean of these being in exact coincidence with the u of .08 found. The spectroscopy shows the presence of these elements throughout interplanetary space. Creation of O from 4 He would give rise to a gamma radiation detectable in the upper atmosphere, somewhat indicated by the high balloon-flight data. Combination of 28 H to give one silicon atom would give a ray of u .041, agreeing with the experimental value of .04. The formation of iron atoms in interstellar space was indicated also. As the building of Ca and K would give rays of u only a little different than that for the rays from the formation of Si, which would be also less intense due to their relative abundancies being less, and the formation of carbon from hydrogen would similarly just slightly affect the .08 value, and the relative abundancies of other atoms in the heavens is small, evidence as to the formation of He, N, O, Si and Fe in interplanetary space is rather good. The building up of an atom by addition of a hydrogen or helium nucleus to the nucleus of another atom, as in formation of carbon from boron or oxygen from carbon would not liberate these highly penetrating rays, but gamma rays, so that Millikan's evidence is against the probability of occurrence in space of this atom-construction process. Millikan points out that, as atomic hydrogen is being used up in interstellar space in forming these atoms, the condensation of radiant energy into the positive and negative electrons, (and combination of a pos. with a neg. electron to form a hydrogen atom) apparently occurs in space, as otherwise long ago this hydrogen would have been used up. So we have the conversion of matter in a star into radiation, maintaining the temperature of the star, and the conversion of radiation back into matter in space.

Cosmic rays, detected even below 58 meters (190 ft.) of water, are extremely penetrating compared with X-rays and the gamma rays from radioactive material as radium, which are stopped by a few meters of water. All possess the property of ionizing material they come in contact with, as, for example, the cosmic rays ionized the air surrounding the leaves of Millikan's electroscope, causing discharge and falling together of the leaves. The medical effects of X-rays and gamma rays, which are due to their ionizing characteristics, are well known. Similar effects of the cosmic rays would be expected, although the intensity of such radiations is extremely small compared with those near an X-ray bulb. The total energy of the cosmic rays coming into the earth is nearly exactly one-tenth the total energy (light and heat) of starlight. The effect of continuous exposure to these rays, (and the possibility they may have penetrated to the earth's surface at times in the past with a greater intensity, taken in connection with experiments as Muller's on the change in type of flies on exposure to X-rays) may have been important on the development of animal and plant life in our world.

The reader desiring further information is referred in particular to a series of papers by Millikan and co-workers in the Physical Review.

Register Of Graduates

Through unavoidable delays the register of graduates is not yet in the printer's hands. However, it should be available for distribution within the next six weeks. There will be many alumni listed where the information given will be entirely inadequate, but it is the best the alumni officials can do with the information they have been able to secure. The register will be mailed out as soon as it is received from the printer.

Homecoming A Successful One

The continued increase in interest in the Homecoming was manifested this year by a splendid attendance—perhaps the best of any Homecoming the school has held in a number of years. The old grads, taking advantage of the splendid road system which has been developed through this section, showed up to greater extent than they have in a long time.

The morning of October 19 was spent in visiting old acquaintances and making new acquaintances on the campus. At 2:30 in the afternoon the alumni met at Jackling Field to watch the Miner football team take McKendree into camp to the tune of 73 to 0. The evening of October 19 was spent at a very enjoyable banquet held at the new Pierce-Pennant Terminal. After the banquet, with Pem Gordon acting as toastmaster, many of the old grads displayed their forensic ability for the delight and edification of the visitors. Among the orators of the occasion were President J. K. Walsh, '17, Webster Groves; Robert Lyons, ex '17, Kansas City; V. H. McNutt, '10, San Antonio; Chas. Y. Clayton, '13, Rolla; M. P. Brazill, '20, St. Louis; M. H. Thornberry, '12, Rolla; W. C. Powell, '21, Valley Park; L. E. Garrett, '01, Rolla; Barney Nudelman, '21, St. Louis; L. A. Delano, '04, Bonne Terre; Earl Guy, '23, Elgin, Ill.; John W. Scott, ex '02, Rolla; A. L. Cairns, '21, and D. F. Walsh, '23, of Rolla.

Among the good wishes received from absent ones was a radio greeting sent from Manila, Philippine Islands, by Captain T. C. Gerber, '28, E. H. Sanguinet, ex '14, and Lt. George Zeller, '23.

Those attending the Homecoming for next year may find accommodations in the new Pierce-Pennant Hotel recently opened alongside Highways 63 and 66 north of Rolla. This splendid hotel offers excellent accommodations for visiting guests.

Those attending the banquet at the Homecoming were P. D. Windsor, '22, Belleville, Ill.; L. A. Delano, '04, Bonne Terre; R. A. Scheer, '27, St. Louis; L. E. Davidson, '21, Edwardsville, Ill.; M. L. Clark, '29, St. Francois; J. P. Gordon, '23, Fort Worth, Tex.; E. R. Sievers, '27, Wister, Okla.; A. A. Boyle, '25, St. Louis; Joe Williamson, Jr., '29, University City; H. H. Kessler, '24, St. Louis; C. F. Herbert, '28, Vincennes, Ind.; R. D. Ward, '25, Maplewood; H. M. Katz, '13, Rolla; H. Clay Halley, ex '18, St. Louis; E. R. Tragitt, '23, Desloge; W. J. Finlay, '20, Kirkwood; O. H. Gotsch, '18, St. Louis; B. L. Ashdown, '16, St. Louis; W. E. H. Knight, '27, East St. Louis, Ill.; V. H. McNutt, '10, San Antonio, Tex.; M. W. Shanfeld, '18, St. Louis; B. G. Nichols, '19, St. Louis; M. A. Ledford, '26, Ft. Worth, Tex.; A. A. Peugnet, '27, St. Louis; M. P. Brazill, '20, St. Louis; H. D. McKibben, ex '09, Collinsville, Okla.; Roy Gunther, '27, Leadwood; M. N. BeDell, '23, Alton, Ill.; M. E. Suhre, ex '28, Wynne, Ark.; H. A. Hollingshead, '21, Springfield, Ill.; Barney Nudelman, '21, St. Louis; G. C. Gabler, '24, Rolla; J. E. Weber, '28, Leadwood; G. T. McCrorey, '29, Iron Mountain; W. W. Weigle, '20, Leadwood; J. K. Walsh, '17, Webster Groves; E. T. Campbell, '23, St. Francois; H. G. Mesloh, ex '17, St. Louis; R. P. Lyons, ex '17, Kansas City; E. M. Guÿ, '23, Elgin, Ill.; A. B. Watts, ex '23, Jonesboro, Ark.; W. C. Powell, '21, Valley Park; J. F. Gage, '28, St. Louis; A. E. Barnard, '27, Oakland City, Ind.; M. H. Thornberry, '12, E. W. Carlton, '26, Frederick Clearman, '27, Frank Powell, '26, D. B. Followill, '06, L. E. Garrett, '01, G. R. Dean, '90, W. C. Zeuch, '18, K. K. Kershner, '20, D. F. Walsh, '23, A. L. Cairns, '21, J. B. Butler, '24, Chas. Y. Clayton, '13, C. J. Potter, '29, J. M. Willson, '29, A. J. Miles, '29, R. D. Duff, '29, James F. Orr, '30, B. L. Ballard, '30, E. A. Ellis, '29, H. W. Mundt, '21, A. C. Adolph, '30, Harry Trowbridge, ex '15, of Rolla, and W. C. Durning, ex '19, St. Louis.

Coke Salesman Wanted

A large Southern fuel and iron company has asked for applicants for a position as salesman for Beehive Foundry Coke. They wish to employ an energetic young man of good address, who has had actual foundry experience. Any alumnus interested apply through the alumni recorder.

Dr. Fulton Visits The Union Pacific Coal Company Works At Rock Springs, Wyoming

Early in the fall Dr. Eugene McAuliffe, President of the Union Pacific Coal Company, extended an invitation to the Director to come to Rock Springs and make an address to high school students, parents and citizens of Rock Springs and vicinity to place before them the advantages of a high school education as a preliminary for further collegiate and technical training. The Union Pacific Coal Company has established two scholarships, the incumbents being sent to a mining school for training as a mining engineer. One of the scholarship men is Michael Griffin who entered the Missouri School of Mines in September, 1928; another scholarship man is attending the Colorado School of Mines.

Dr. Fulton addressed a large audience on the afternoon of October sixteenth in Old Timers' Hall. That same evening Dr. Eugene McAuliffe gave a dinner to the members of the engineering staff of the Coal Company at which the following M. S. M. men were present: W. H. Weimer, R. V. Cammack, M. S. Sharpe, D. Zimmerman, and G. W. Frotscher. That same evening Dr. Fulton addressed the teachers of Rock Springs and neighboring towns on "The Place of the State University in Higher Education."

Director Fulton states that Dr. Eugene McAuliffe, who is an honorary alumnus of M. S. M., has created at Rock Springs one of the best and most forward looking coal mining communities in the United States. A remarkable change has come over the community of Rock Springs in the last six years. The town of Rock Springs and neighboring villages are clean, sanitary and up-to-date communities. All of the work has been done with no sacrifice of business efficiency; rather, the contrary. The number of days of employment per year and the average annual income of the employees has been raised. Dr. McAuliffe is sincerely to be congratulated upon the success of his efforts. He has an able staff of managers and technical assistants headed by Vice President George B. Pryde and General Superintendent A. W. Dickinson.

..

Reginald S. Dean Heads Metallurgical Division of U. S. Bureau of Mines

Reginald S. Dean, son of Professor George R. Dean, head of the mathematics department of MSM, has just been appointed chief metallurgist of the United States Bureau of Mines with headquarters in Washington, D. C.

Dean graduated from the School of Mines in 1915, being at that time only 18 years old, the youngest student ever graduated at the school. After graduation he did post-graduate work at Harvard, University of Chicago, University of Pittsburgh, and Armour Institute of Technology. For the past ten years he has been doing metallurgical work with the Western Electric Company at their Hawthorne plant in Chicago, being at the time of his resignation in charge of metallurgical research for this company. It was in connection with his work there that he developed a process for hardening lead, an achievement that at once attracted national attention, and later won for him the gold medal of the American Institute of Mining and Metallurgical Engineers.

In connection with his research work, Dean has published many articles in the technical press. His work in the Bureau of Mines will cover the supervision of the extensive metallurgical research work conducted by the Bureau, both in Washington and in the various mining experiment stations located throughout the country, including the Mississippi Valley Experiment Station of the Bureau situated on the campus of MSM. Dean is now but 33 years old. His new appointment was effective November 1.

The Industrial Program and The Engineer

(Continued from Page 3)

means are to be taken to carry out such policies.

Several years ago Glenn Frank pointed out that it was necessary "to choose whether the development of American life in the next few critical years shall be the outcome of a planless drift, touched here and there by the hastily drawn policy of some compromise, or the result of intelligent foresight expressed through social invention, business statesmanship, and political creativeness."

During the last few years more and more attention has been paid to the development of national industrial policies and as you all know, the engineering profession has played an important part in this development.

Sometimes our personal view of industry is very individualistic. We should endeavor to take a broad view and grasp the true relation of the factors in national industry. Let us note a few striking illustrations of progress of industrial programs as recorded in history, for several countries have given serious consideration to industrial problems on a national scale. This approach to national economics comprises real industrial statesmanship.

When we think of the industrial achievements of modern Germany we can hardly believe it was in that country that Frederick the Great met with opposition from the peasants when he endeavored to improve farming conditions by introducing new crops which were adapted to the soil and the climate. When he distributed clover seed, they refused to sow it; when ordered to sow it, they boiled it first to keep it from sprouting. When given seed potatoes they also boiled them before putting them in the ground. Nearly two centuries have passed and scientific agriculture has worked wonders in Germany, for the stubbornness of the people gave way when they realized that their leaders were striving for the common good. In Germany, following the Franco-Prussian war, there came to the national leaders a vision of what Germany might become, limited though her natural resources were. In order to achieve these ends a far-sighted program was undertaken; this included general and technical education, thorough discipline, recognition of labor and social problems, and intensive research directed to utilize the natural resources in and adjacent to Germany. Although Germany was misguided by Militarists, the industrial policy formulated half a century ago is now bringing results that astonish her neighbors.

An eminent French sociologist said: "It is technical education, patiently pursued, conscientiously assimilated, which has been for Germany an arm more powerful than the spirit of enterprise of the English and the artistic feeling of the French. She owes to it her admirable commercial and industrial advance."

Recently Dr. H. C. Parmelee, Editorial Director of the McGraw-Hill Publishing Company, called attention to the organization in Germany since the war of the "I. G." or the Interessens Gemeinschaft which means "community of interests". This corporation had its origin in the close interrelation of a group of chemical industries. He says that the finished product of one plant often becomes the raw material for another while its product may in turn be useful to a third plant. "This common interest in materials, processes, and products has led to the establishment of a mammoth industry capable of supplying 35 per cent of the world's needs for dyes and synthetic fertilizer materials."

In other fields as well, evidence is available to show to what extent the community of interests,—in fact the national industrial welfare is being considered in Germany.

In 1853, Commodore Perry went to Japan and presented messages to the rulers with the outcome that in 1854 he went back with proposals for trade and intercourse which resulted in a treaty that marked the beginning of the civilization of Japan. From the culture of mediaeval people she has progressed until in 1929 the World Congress of Engineers at Tokio marks the climax of a period of national development that probably represents the most rapid transition in the history of mankind. The leaders

of Japan had a vision for their country,—they approached their problems on a national basis.

In our own land some of our industrial and economic problems were considered from the national viewpoint by the leaders of the early periods. If time were available it would be worth while to review our national policy with regard to the disposition of lands of the public domain, with the land grants to railroads, public schools and colleges, and the sale of tracts to individuals at nominal prices; the development of our immigration policy which permitted practically unlimited admission originally and has restricted admission in recent years; our policy in regard to public work to relieve unemployment; the tariff system and the subsidizing of industries. With all of these you are more or less familiar.

The platforms of the leading political parties have set up specific programs which if enacted into legislation would constitute an actual industrial policy. Normally legislation represents a compromise and is based upon conditions that have developed. As engineers we are interested in designing, if you please, programs and policies which should be forerunners of legislation. While we are interested in looking forward we can work successfully only as we use advantageously the experience of this and other generations.

There has been published within the last few months a two-volume work entitled "Recent Economic Changes in the United States." A reviewer says: "In the swelling tide of literature about American life and industry we know of no more concise and comprehensive statement than here appears." The work is an outgrowth of the President's Conference on Unemployment of 1921 which was responsible for several national surveys including those on unemployment, business cycles, and seasonal operation in the construction industries. The survey of recent economic changes, begun in January 1928, is described as an "analysis of post-war developments in American economic life, particularly those since the depression of 1920-1921."

Undoubtedly your instructors on many occasions will refer you to these authoritative volumes and certain of the chapters should be read and discussed by the upper classmen. The title "Recent Economic Changes" suggests two questions—first,—“What changes other than economic may occur?” and second—“What great economic changes have occurred that have not been recent?” In contrast with economic changes there have been social, political and religious changes. Probably you have read a great deal about the so-called Industrial Revolution which followed the first use of steam as a motive power. As we review the epochs of world history the period beginning with the Industrial Revolution stands out as one of great changes for it introduced the civilization or culture of power and machinery.

Beginning with the civilizations of the Egyptians and of the Babylonians, we find that for at least 4000 years practically every great contribution in the form of structures, highways, art, literature, etc., came about because of conquest, slavery, and the subjugation of peoples. Leisure and prosperity of one class always meant the slavery and degradation of the remainder of society. The building of the pyramids was possible only on account of the manual labor of slaves; the Greek philosophers called the workman a living machine, he was literally a machine and he was generally a slave; Aristotle defended slavery describing the slave as an animated tool and claiming that slavery was necessary in order that the ruling class might have leisure for statecraft, art, and literature. The construction of the great temples and the building of the Roman highways and aqueducts were the result of slave labor; the feudal system, with its attendant subjugation of labor likewise made possible many beautiful buildings in Europe. Prior to this present industrial age the poets, the artists, and others made their contributions to civilization because leisure was made possible by the cheap labor of slaves and peasants. The hours of labor were long and the standards of living for this labor were low—unbelievably low as compared with those of today.

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With the development of the factory system late in the eighteenth century many evils came, but these were abolished largely with the application of power-driven machinery. Today the great contributions to culture and civilization are cumulatively improving the conditions of the worker, raising all the standards of living, and freeing people from the severe labor which characterized the life of the workers prior to the advent of steam. H. G. Wells says that the mechanical revolution was responsible for popular education in the Westernized World. Apparently regardless of social conditions it really brought about the complete abolition of a totally illiterate class.

Moreover, the use of machinery has made it possible to produce the same goods or the same result at a lower cost, and therefore more people are able to purchase these goods or services. Standards of living have been improved and, in spite of hardships that occasionally may develop for a brief time following the introduction of new machines and new methods, the readjustments that have resulted have always brought about general improvements.

It is interesting to note that in 1889 an American economist wrote a book on the subject "Recent Economic Changes." He stated that the quarter century ended in 1889 was a "period of profound economic changes unquestionably more important and varied than during any former corresponding period of the World's history." The 1928 Committee pointed out that each generation has felt that it has been on the verge of a new economic era but that in fact most of the developments now noted have occurred before. The recent changes have not been in structure and type but in speed and spread.

Such a wealth of material is included in the 1929 report that even a brief summary is impossible in the time afforded. One novel thing about the period is the fact that we are making an attempt to observe and study what is going on. This may seem the natural thing to thinking people of this generation, for the spirit of our times is to demand the reason for things and to attempt to correct wrong conditions. The revolution that the automobile is bringing about is evident to all, and its effects may be contrasted with those cited in a passage in H. G. Wells' "Outline of History": "The economic revolution of the Roman republic had never been clearly apprehended by the common people of Rome. The ordinary Roman citizen never saw the changes through which he lived, clearly and comprehensively as we see them. But the Industrial Revolution, as it went on towards the end of the eighteenth century, was more and more distinctly seen as one whole process by the common people it was affecting, because presently they could read and discuss and communicate, and because they went about and saw things as no commonalty had ever done before." The very words of this quotation suggest what is going on today; not only can the people read but the radio has brought to them information that never would have reached them otherwise. The automobile has been a wonderful educational factor, for with the building of good roads it has been possible for all classes of people to travel about and acquaint themselves with the country, both as to geography and living conditions. We are actually seeing about us changes which are largely the result of our industrial program, but do we understand their significance?

From certain quarters we hear continued criticism of the present industrial civilization. One of our economists says "a good working definition of civilization is the art of living together comfortably in large numbers." On this basis our civilization should rank higher than others on account of the comforts the average man enjoys. But Garet Garrett in his recent book "The American Omen" says: "Machine civilization with its standards and methods of mass production is sunk in idolatry of a fabulous materialism, power, wealth, success. Where is culture in this vulgar scheme?" In contrast with this, Dr. Carver of Harvard says: "If one who rhapsodizes over the glories of the mediaeval town, etc., were forced to live there, he would soon be disillusioned." One writer contrasts the artistic

setting of Ruth of Biblical lore gathering grain in the fields with that of an American girl working in a rayon factory to the discredit of the American girl. In reply some one hastens to contrast the great unwashed masses of the Orient with the factory hands in America who probably are not illiterate, and who have a higher standard of living than the laboring class of any previous generation.

When we are confronted with the accusations of the sordidness of this industrial generation we may take comfort in many of the achievements of engineering, particularly as they have ministered to the health and happiness of the common man. The pages of history are filled with the accounts of recurring pestilence, plague, and famine, in 701 B. C. Sennacherib's entire army was destroyed by pestilence. A great plague extended through the Roman Empire in the reign of Marcus Aurelius for sixteen years (164-180 A. D.) and also devastated China. Nine great pestilences are recorded between that time and the Black Death. In one of these ten thousand people died in one day in Constantinople. H. G. Wells says the Black Death came nearer to the extinction of mankind than any other evil had ever done. It swept from Central Asia around the Mediterranean and reached England in 1348. Two thirds of the students at Oxford died. It is estimated that 25 millions died in Europe and 13 millions in Asia. Cultivation of fields was impossible, labor was scarce, and there was a shortage of goods. Such recurring plagues were due primarily to poor water supply and unsanitary conditions. We wonder on what basis the critics can measure civilization when they decry the progress of this age and glorify the old days.

We have made contributions to all phases of civilization but particularly have we reduced drudgery, poverty, and disease and have lowered the death rate. Herbert Hoover said "The finer flowers of civilization do not grow from the cellars of poverty any more than they thrive in the palace of extravagance. They grow from the bettering comfort and well-being of the whole of great peoples."

The industrial program of this generation means then the use of science and engineering for the benefit of the people in a very practical way by the improvement of standards in lives of widening vision.

In considering industrial changes and the policies of this generation, if we search for beginnings and causes, we must note the start here in the United States of a movement which, together with another to be mentioned later, have had world-wide influences. After fifteen years of study and experimentation the late Frederick W. Taylor announced in June 1895 the first principles of what we now call "scientific management." In June 1903 he published his complete system. You are more or less familiar with the objectives of the system and the success secured by its intelligent use. In order to have better cooperation between capital and labor and to secure maximum efficiency of labor, Mr. Taylor endeavored to stimulate the individual to work rather than to "soldier" with the incentive a share in the savings resulting from increased output.

The British economist, Marshall, said the greatest loss to the world is that of latent talent of the uneducated who go to the grave without the opportunity of education and development. To this great loss to society may properly be added that arising from deliberate shirking and the half-hearted work of wage-earners employed under systems which do not spur them to give to society the best and the most they can contribute. Probably the greatest perishable asset in the world is the time of human beings. Lost time is irretrievable. In other words, just as we hope for the harnessing of the power in streams on behalf of national economy, so we may plead that men may work at their best and not simply to satisfy their personal wants, giving as little as they can and wasting a large part of their powers deliberately through lack of effort. Scientific management should go far toward overcoming the likelihood of large losses continuing along such lines.

Any picture of the industrial situation must include all phases of our economic life,—consumption as well as production and distribution. The picture must be broad enough to take in the market situation. When the Ford Company

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startled the industrial world in 1914 with the announcement of a minimum wage that seemed to be impractical, there was surprise and amusement in some quarters. This announcement came, not on account of a strike or labor difficulties, but as the result of a decision to attract to the industry men who were good workers and who were ambitious to earn more money and thus improve their standard of living; and also because Mr. Ford realized that the greatest undeveloped market for automobiles in the United States was the wage-earning group.

It has been said that "fortune will await him who can tap the new reservoirs of spending money by producing and selling what the masses will buy. All our new conspicuous fortunes are built up in this way and not by catering to the rich. In this country the power to buy is in the pockets of the masses." Ford realized that if there was to be mass production there must be a sales program adequate to move the output.

The effect of the Ford wage policy has been national in its scope and with a reduction in the number working hours per week and the revision of the budget of many families there has been an increased demand for low-priced cars. The ambition of the Ford Company to provide "Economic Transportation for All the People" apparently is now extended to include the French and other Europeans.

In a recent editorial in the Philadelphia Press the statement is made that France is indignant because Henry Ford, planning to establish factories in Europe, has asked the International Labor Office of the League of Nations to investigate living costs in the cities, so that he may know how much to pay his workers on a scale equivalent to that which holds in his American plants, in terms of "real" wage. The Industrial Journal of Paris resents our "industrial imperialism". In reply the editor of the Philadelphia Press says: "The fast turnover of money and goods in America means a high level of living for all. Invited to a place on an American-plan payroll, the workers of other countries will be devoted indeed to their old nationalism if they show preference for homeland culture at a cost of foregoing the cheap and abundant products of mass production. The French economists are not fighting American industrial ingenuity alone. They are trying to stave off the universal desire for the most comfort and pleasure for the least money."

Having succeeded not only in making people here want low-priced cars but in making it possible for them to buy cars, Mr. Ford shrewdly appears to have taken the first steps towards saying to European labor "if you will buy Ford cars, I will help you get wages sufficient to permit you to own and operate a car."

It should not be inferred that our manufacturers can go into European countries and magically revolutionize European markets and labor conditions. L. D. Ricketts in a recent address said: "If American capital should buy and establish a European enterprise could it at once introduce our methods and through capital investment dispense with half or more of the labor formerly employed? Surely not until an outlet could be provided for the labor liberated lest it be destroyed. Surely first, or at least in parallel, must come increased demand and the establishment of new industries to absorb the liberated labor. Improvement in efficiency in Europe must come more slowly and the consuming capacity or the power to purchase the increased output must move in parallel with an increase in labor efficiency. The maintenance and increase of average output per man is all-important to the attainment of our material comfort because it is a measure of the material comfort of the average individual."

Without doubt the movement to improve the standard of living of the working class in the United States received its first and greatest impetus from Henry Ford. Not only has he had the courage of his convictions but he has demonstrated the soundness of his doctrine. In January 1929 he gave employment to 130,131 men at the River Rouge, Highland Park, and Lincoln plants. To this army of men and their dependents he has brought in many cases a new

and larger opportunity in life and a higher standard of living. According to Mr. Ford "the family life is healthier, workmen go out-of-doors, go on picnics, have time to see their children and play with them. They have time to see more, do more,—and, incidentally, buy more. This stimulates business and increases prosperity, and in general economic cycle the money passes through the industry again and back into the workman's pocket." Moreover, the methods established by his Company have resulted in many changes in American industry. So many times we think of it all as a wonderful manufacturing process in the production of a good car. It includes this of course, but the outstanding thing that is causing a revolution which may be called properly the "standard of living revolution" is the far-sighted policy in establishing an industrial system that is aimed to wipe out poverty and improve standards of living.

It should be kept in mind that this movement was started by Ford in 1914. The World War stimulated it in two ways,—first by the tremendous demand for goods, the increased use of machinery, and higher wages for the time, and second,—because some of the men who entered the service had created in them a desire for a higher standard of living due in part to facilities placed at their disposal at training camps, partly to the actual training at these camps, and partly on account of association with men accustomed to a higher standard of living than they themselves had enjoyed previously.

The purchase of automobiles, gasoline, and tires has not impoverished the country. Mr. A. R. Erskine, President of the Studebaker Corporation, stated recently that in the period between 1921 and 1927, when automobiles increased registry from 10,463,000 to 23,226,000 the savings deposits rose from \$4,726,000,000 to \$24,096,000,000, with building and loan association assets jumping from \$1,137,000,000 to \$6,334,000,000, and ordinary and industrial insurance advancing from a total of \$20,520,000,000 to \$74,492,000,000.

Some of our statisticians point with fear to the number of units of this or that device we are installing and warn producers that there is a "saturation point". In "Recent Economic Changes" the statement is made that "we seem only to have touched the fringe of our potentialities" for in 1928 apparently a large percentage of the homes wired for electricity had electric flat-irons; less than one-third had washing machines; slightly over one-third had vacuum cleaners; less than 5 per cent had electrical refrigerators. On January 1, 1928 there were 7,500,000 radio sets in use, yet about 70 per cent of American homes are still without the radio. The saturation point is still far off in many lines and human demands are increasing every day.

The Commerce Yearbook points out that in our advancing industrial efficiency are largely human factors, as distinguished from natural factors, and enumerates among these human factors education and research, machinery and power, mass production, elimination of waste, high wages, and the attitude of labor. With the foundation now being laid at Washington for sympathetic and intelligent cooperation between government and business the industrial outlook is brighter than ever.

The engineer is playing an important part in the industrial world today. In any national program that may be undertaken, the procedure of getting the facts, analyzing the data, formulating a plan, and then executing it in a forceful, logical way will be followed. In his book on the "New Leadership in Industry", Lewisohn refers to the "industrial melodrama". From the engineer's point of view there is much less of melodrama in industry than formerly; there are well-established principles and laws in science and engineering, there are well-ordered plans of business procedure, and there are recognized principles of management. The engineering profession has done much to organize industry. The studies in scientific management and of waste in industry, the budgeting and scheduling of construction and production, are contributions of the highest type and have established engineering firmly in the industrial world.

A serious problem that confronts us is that growing out of revolutionary doctrines regarding the fundamentals of

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government, the organization of industry and the right of the individual to own property. At the present time our workmen are receiving communistic literature from various sources. The following quotations are from the constitution of an organization which is soliciting membership among American workers:

"We feel the need of a powerful, militant, and class-conscious organization that will embrace every wage earner. Our organization declares that the interests of the employers and those of the workers have nothing in common but are diametrically opposed to one another. The history of all of the workers of the country, is that of an incessant struggle between these two classes—the class struggle. This organization rejects the policy of collaboration with the bosses and will pursue a policy of militant struggle to attain its objects. This organization shall affiliate with the class-conscious labor movement of the world, and declare adherence to the program, principles, and statutes of the Red International of Labor Unions. All members shall recognize May Day (first of May) as International Labor Day, and shall celebrate this day with the class-conscious world proletariat."

These doctrines have been imported from Europe where so-called class-consciousness has been developed. They must be heard and answered thoughtfully. In this country with limited immigration there is a decreasing likelihood that the conditions which brought about the present situation in certain countries in Europe can ever develop here.

One of our leading business journals carries the following at the top of its editorial column:

"All the wild ideas of unbalanced agitators the world over in their ignorant and pitiable quest for happiness through revolution, confiscation of property, and crime, cannot overthrow the eternal truth that the one route to happiness through property or government is over the broad and open highway of service. And service always means industry, thrift, respect for authority, and recognition of the rights of others."

Generally we subscribe to this sound advice. The thinking citizen believes that liberty and prosperity can be perpetuated only by the loyal support of our government, laws, and institutions.

The idea that everything must be reformed is losing its popularity in this country and revolutionary doctrines are not meeting with a general response for three very important reasons; (1) the American workman and the farmer are homeowners, and any who are not hope to be, (2) in recent years the policy of encouraging employees to own stock in a corporation has resulted in developing a spirit of kindly interest in the management problems of a corporation instead of indifference or hostility, and (3) the cheapening of goods through mass production has made it possible for the lowest paid workman to improve his standard of living.

During the World War as a result of cooperation of the leaders of industry and the workers with the government astounding increases were made in productivity. Whereas previously there may have been a holding back of some of the factors in production, when the appeal was made on the basis of patriotism the workers at home gave their best efforts just the same as the men at the front gave theirs. All previous records of production per man were exceeded and after the war it seemed very illogical to permit the productive capacity of plants and individuals to decline. More than ever there was an effort on the part of industrial leaders to secure the best results of labor. For several years there was much talk about the eventual return to normalcy. But it was agreed shortly that we as an industrial people did not want to return to pre-war

conditions. In some way we had found ourselves industrially. W. J. Lauck says that representative leaders of industry and public opinion, supported by the organized labor movement itself indorsed a new policy and practice program for American industry in which the fundamentals are—increased productivity of labor and industry, advancing wages, higher living standards, and greater consumer or purchasing power.

To review the situation, it should be noted that our national program has changed with the years and we now face problems which require cooperation of various agencies. Our federal government is showing commendable leadership in organizing such cooperation. Given the factors of cheap raw materials, limited but intelligent labor supply, ample capital, and a good domestic market, our industrial policy has as its chief objectives the improvement of the standard of living and the elimination of drudgery through the use of capital in mass production, the elimination of waste in industry, and the marketing abroad of those articles which can be produced here at an advantageous cost.

The engineer who proposes to take an active part in the industrial program must be trained thoroughly in the fundamentals of engineering, but he should be versed also in business practice and the theories of economics and industry in order that he may take his place in the ranks of the profession not simply as another man on the pay-roll but as one who expects to contribute something in the great march of progress.

An eminent European statesman said many years ago: "But by material means alone a nation can neither maintain its place in the world nor advance it. Physical, moral, and mental health are still the greatest national riches. A state is not a commercial company,—it must subordinate its economic policy to national policy as a whole, must act so that not only the present industrial welfare of the nation is increased, but that, above all, the future sound development of the nation is assured."

The engineers have played an important part in formulating the industrial policies of this generation. You have chosen to enter the engineering profession when the whole world is expecting from it leadership of the highest type; you are to be congratulated on your choice and on your opportunity.



The death of Juan Rafael Casanovas occurred in February, 1929, according to word just received from his parents. Casanovas was injured while playing ball but thought little of the injury at the time. Later when pain developed he believed it was due to indigestion. When the gravity of his malady was realized an operation was performed but too late to save his life. He graduated from MSM in 1920, and was a member of the Prospectors and the Athletic Association. After graduation he returned to his home in Baracoa, Oriente, Cuba.

Word has been received of the death of Carroll Harrison at Oakland, California, on July 19, 1929. Mr. Harrison grew to manhood in Rolla and spent the years '96, '97 and '98 at MSM. The family later moved to California and Mr. Harrison had resided there since that time.

Word has been received of the death of Mrs. W. H. Kamp, which occurred in Kansas City on November 21, 1929. She was before her marriage to W. H. Kamp '17, Miss Roby Singleton of Kansas and frequently visited Rolla. She is survived by her husband and two small sons, the younger being but ten days old. Mr. Kamp is superintendent of the Ralston-Purina Company in Kansas City.

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worth your while. The man who follows the circumference of a circle and is always the same distance from that central point does not amount to very much because he does not stand for anything in the world. And the fellow who travels that zigzag line is just as crooked as it is, and the less you have to do with him, the better off you are.

I have applied these principles to politics. The politician who goes along the shortest line between two points is one in whom you can put your trust. The politician who follows the circumference you had better let alone, and of course, the fellow who follows the zigzag line is very liable to be put in Jefferson City at the other end of Capitol Avenue from the Capitol, before he gets through. So the man in politics must be somewhat of an engineer in order to find out just exactly how to keep away from the circumference and to dodge the crooked line. People talk about politicians and they say that it is a term we use in a derogatory way. Politicians are just as essential to this world as engineers. If we did not have any politicians we would not have any politics, and if we had no politics, we would not have any government. The better the politics, the more interest each of us takes in politics, and the more honest effort we put into politics, the better things come out of it in the shape of government for the people.

You know they generally talk about an engineer as a man who surveys things. Everything in the world now has come to be surveyed. You survey your girl before you marry her, and you survey how far you can keep away from home after you marry her. The fact of the matter is it keeps you busy all the time surveying something.

Unfortunately for me, the Governor appointed me on the Commission that he called the Survey Commission. I never could imagine why he appointed me except that he needed an engineer, and some fellow told him that I was an engineer. That is the only way I have been able to figure out how I got on. We have been surveying ever since I got on that Commission. We surveyed the School of Mines, the State University, the Teachers Colleges, the eleemosynary institutions and the penal institutions. We have surveyed 26 institutions in the State of Missouri, and I am afraid tonight that if I would tell you the result of that survey in some of these institutions, you would blush with shame because you are Missourians and love Missouri. I am going to give you just a few little instances in that survey.

At St. Joseph, we have State Hospital, Number Two. There are 2200 people in that hospital. The hospital was built to accommodate 1500 people. These poor unfortunates cannot help themselves. They are put there, and if those in charge keep crowding more and more into the rooms, they cannot protest because if they do, nobody would hear them. The only thing they can do is do the very best they can. We pride ourselves that we are the greatest state in the union, and yet that condition exists in Missouri.

There are nurses sleeping in the basement of that hospital in places that if you had an old-time "Champ Clark" hound dog, and he was worth \$50, you wouldn't let him sleep in those rooms. These are real facts. I see a gentlemen in this audience, who, I believe could corroborate these statements. There is the same condition at the Fulton asylum, and at Nevada and Farmington. When our loved ones happen to go to one of these asylums they are just about locked up for life. They tell me that about thirty per cent of these cases are curable, but Missouri does not spend one dollar to try to cure these unfortunates who are sent there. The state survey showed that and other things I might call to your attention that are equally bad.

The gentleman who has charge of that particular part of the survey was before his appointment never in one of these asylums in his life, but he is one of the prominent business men in St. Louis. He owns an equity in the Famous-Barr building in St. Louis. He was shocked. He said, "Why didn't I know this years ago?" It is not my

fault and it is not yours that he did not know it. He was awakened to this fact, that Missouri, with all her wealth should provide some way so that our loved ones thus afflicted could be placed under the observation of doctors who desire to cure them and return them to their homes, instead of keeping them all their lives. We are going to propose two hospital buildings, one on the east and one on the west, and an effort will be made on the part of Missouri to cure and return these people to their homes. We are told that about thirty per cent of these cases are caused from some bodily defect that might be cured. They cannot pay any attention to this at St. Joseph or Fulton, and little at Farmington and Nevada. They are doing the best they can. Somebody else is at fault. Four doctors have charge of 2200 patients at St. Joseph. Out of that comes the Superintendent, who has charge of the business of the institution.

You know, if you talk to Dr. Fulton a little while, he will talk to you about the needs of this institution. I have heard it so much that the Doctor thought I thought it was an old story about his troubles. He does not look at it with the same eyes I do. I look at what they have now and what they had when I was here. I say that it is so much better than when I was here, but the Doctor and I do not look at things just alike. The Doctor says he does not talk much, but he has talked to me so much he has talked me into believing what he believes, and I am trying to picture the School of Mines as it will be ten years from now—one of the greatest institutions of learning in the United States. I want to see it really stand up at the top, and this Survey Commission has recommended a lot of good things that will come to the School of Mines if their program is carried out.

One of the great things the commission is studying is an equal opportunity to every boy and girl in the state to secure a fair education. Some people say that we ought to give every boy and girl an equal opportunity. We cannot give the boy in the country the same opportunity as the boy in the town of Rolla, or the City of St. Louis, because these schools are built on a higher plane and the people are paying out great sums of money to make them better. Rolla does not stand on the same scale as St. Louis, and Kansas City is hardly on the same plane as St. Louis, yet these cities are doing everything they can. In Kansas City, five million dollars worth of bonds were voted a few days ago. Kansas City is growing so fast that they can't build buildings fast enough to take care of the new children who are coming in.

Here is Missouri starving the University, Teachers Colleges and the School of Mines—holding them down to the lowest notch. Dr. Brooks, President of the University, is worrying about how he can get along on what he has received, and yet that is all the Legislature could give him. The Legislature has only a certain amount of money. I have been on the Appropriations Committee in the Senate for the last four sessions, and it is a hard job with that Committee to take the money they have and spread it out to take care of as many places as they must. We cannot take it and give it all to one place. We have to scatter it out and when it gets to the outer edge, it is so thin you can hardly see it. The institutions have to live on that and get along on it. They came up two years ago and wanted money to do certain things. I thought then they should have it, and still think they should, but I did not know where the money was to come from. Dr. Fulton and Dr. Brooks could not tell us where the money was to come from. Things had to go undone.

This Survey Commission is trying to look ten years into the future. The program now calls for an expenditure for school buildings—amounting to forty-four million dollars. This is not a very staggering sum. It would be a blessing if they had it tonight. It is an impossibility, we all know that, to levy a tax to get forty-four million dollars in one year. We are not going to try it. That is just in buildings alone that I am talking about in the ten year period. A little over four million dollars a year. During some of these years, the sum would be a little larger and some a little smaller.

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Then they are trying to raise five million five hundred thousand dollars for the schools below the teachers colleges. I do not know whether I could explain the financial arrangement they are trying to make. It is rather complicated. But the proposition is one of two propositions which the Commission has under discussion. It is necessary now in the State of Missouri for a school to levy sixty-five cents on the hundred dollars to secure the highest aid that they can get from the state—that is \$250. There are districts in the State of Missouri where a sixty-five cent levy means sixty-five dollars. That is all the taxable property in the district. Added to the \$250 from the state, that would make \$315. How long can you run a school for \$315?

That would be the only opportunity the boy or girl in that district would have to go to school, because when that was spent they would have to quit. The Commission proposes that if that district would levy thirty-five cents or twenty cents, it will be one or the other. I do not know which, the State of Missouri will give that district, it makes no difference what the income from their taxes—whether it is \$25, \$50, \$75 or whatever it is, enough to give them a \$900 school in that district. That is what we mean by giving an equal opportunity to every boy and girl and our basis is a \$900 district.

This would apply to Rolla and every town in the state. If Rolla would levy twenty cents, the state would make up enough to make each teacher get \$900. I do not mean by this that it is going to cut your taxes in Rolla, for the \$900 school in Rolla is not what you want, or have. I imagine you have about a \$1500 school. That is, your school pays \$1500 per teacher. Your taxes might come on up above this twenty cents.

In this way, every boy and girl then would have an opportunity to go to a \$900 school, which would mean an eight months school.

Then the idea is to start with a \$900 school, but advance as the state could secure the funds until every school in the state is put on a \$1500 basis. Every teacher who had 22 pupils in his or her school would be put on a \$1500 basis. But all teachers in Missouri are not ready to take charge of a \$1500 school, so these teachers will have time to prepare themselves as grades are raised until it comes to \$1500. By that time they must be prepared to take charge of a \$1500 school.

This is a complicated proposition, but I think I can say this, that the best educators of the country, whom we have employed in this Survey, have talked to us until they have convinced us that we can do these things for the people of the State of Missouri if they are willing to have them done for them. Also we think that this should be hastened—I do not know how, but one way you can have better schools is to put some of the districts together and haul the children to the school house and have two teachers or more to handle them. A lot of people do not like the idea of a consolidated school, but it would be like this town if it had sixteen school houses in it, and every neighborhood in town went to its own school house, and they all taught all of the eight grades in them. That is what we have in the country. The day is coming when these children could be transported to school and they should be. Some will say that they didn't do that when they were boys. Maybe they didn't and maybe the Lord will transport you some of these days, and you won't be bothered with these things.

The Commission has not settled about who is going to pay for all this. We have a man on the Commission who is worth forty million dollars. He is a good friend of mine, but he has never given me any money yet, and that is Mr. Gary. Mr. Gary is going to have to pay a good tax, and he is the willingest fellow you ever saw. He says, "I want to pay it! I want them to tax me!" And yet he went to Kansas City last week, and a lot of rich fellows there who were friends of his jumped on him, and they even said, "We will take our money out of your bank, that is what we will do." He said, "Go ahead and take it out." I like to see a man like that. You know they say poor people pay the taxes, but I do not think there are fifty

per cent of the people in the State of Missouri who pay cent of taxes. That may be an exaggerated statement, but I would like to try this audience. How many in this audience pay a direct tax? It would not run fifty per cent in this audience. We are going to tax the rich, the corporations.

I have wandered away from what I thought I was going to talk about tonight, but Dr. Fulton asked me to talk about the Survey, and that is what I am doing.

The federal government takes out of the State of Missouri every year forty-eight million dollars in income tax. The State of Missouri collects in income taxes four million dollars. We are going to raise that so that the State of Missouri will collect sixteen million dollars on income tax as against four. Most of it comes off of corporations. Corporations never pay any taxes. That may sound strange. A corporation is a tax gatherer that gathers the money from the people and turns it over to the state or the collector. The Frisco railroad does not pay one penny in taxes. They gather from you shippers on every carload that you send to market, on every package you receive, every ticket they sell in the passenger station, they charge a certain per cent of that for taxes. You pay it. Some of you people just said you didn't pay taxes. If you have shipped anything or bought a ticket on the Frisco railroad, you have paid some taxes to the state. When they come to make up their estimate of costs of handling freight and making money, they put in there in great big letters "TAXES" and that goes to make up a part of the cost of operation. And they take those taxes and pay to the Collector's Office, so as I say, they are not tax payers, but tax gatherers. A great big part of this money is to come from the great corporations in Missouri. I think they will pay it very cheerfully. They will just send it back to you. Mr. Ultimate Consumer always is the fellow who gets it. I am not going to worry you any more with that.

On next Monday, we are going to meet in Jefferson City and try to iron it out and try to put Missouri up to the top notch of the states of the Union, and try not to let them point the finger of scorn at us. We got Missouri out of the mud, let us get it out of being a nonentity. Let us get up on the top.

I rode from Jefferson City to here this afternoon on a road I think Dr. Buehler must have laid out, it is so wonderful. I thought as I went through Vichy of how when I was here at school the lawyers used to go to Vienna, a court, making the trip on horseback. They would go to Vichy and spend the night. There must have been a road there at that time, for they always stayed all night at Vichy. Then next day they would ride on to Vienna and as soon as they got through court they came back to Vichy. They always spent the night at Vichy going and coming. It was a full day's journey from here to Vienna. It now takes only 45 or 50 minutes to go to Vienna. You had to get on horseback and follow the blazes that were marked on the trees, but there was a well beaten path to Vichy because of that still.

But I am going to get back to my lecture. I have lost it somewhere. I am like one of the old preachers in Charleston County, the county just south of my county. Keytesville, the county seat, is just about a mile from the railroad station. They used to have a street car like they had in St. Louis in '57, pulled by a mule, from Keytesville down to the railroad station. One day there were two preachers who didn't care about paying fifteen cents to ride that mile to the station, so they were walking down. One of these preachers was a Methodist and the other was about the same line as I am, I guess. I don't know what. This old brother said to the Methodist brother, "How do you decide what you are going to preach about on Sunday?" The Methodist brother said, "I get my Bible and let it drop open and read around on the page until I decide the Lord wants me to talk about something and then I fix it up, firstly, secondly and thirdly." The other brother said, "I do just like you do; I just let my Bible fall open and there I find a verse, and then I fix it firstly, secondly and thirdly, and then I just scatters."

I am just like that old preacher. I did my firstly and secondly and thirdly, and now I guess I am going to

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The Engineer and Politics

(Continued from Page 12)

scatter. Did you ever read in the Good Book that this world was made by God, but nothing in it was ever finished? Nothing was finished—this world is not finished. You know, that is one thing about an engineer, nothing that an engineer ever does is finished. He lays out a railroad grade, they put up the grade, they put on the ties, and the steel, and then the trains come along, they build the stations, and the first thing you know, they find they need heavier steel, ties and new engines and cars, and so this thing that the engineer has laid out is never finished.

The same thing is true about our roads. I rode over number forty, which is supposed to be the "brag" road in Missouri, the other day, and I later told some of the people at home that number forty was an obsolete road. Our highway department would not build number forty as it was built if they were building it today, and yet it has only been down about four years. Progress and pushing ahead, that is the beauty about an engineer. He bores a hole in the mountain and it is never finished. The goal is just a foot or two ahead of him. In performing experiments in chemistry, they always think, "Tomorrow I will find it!" No matter what kind of an engineer, it is always tomorrow, I am going to find the thing that is causing this trouble. That makes it so fine for the engineer. He lives in hopes that tomorrow is the great day in his life, when he is going to discover something. I talked to the lady doctor who is here at your school trying to find the bug that causes trachoma. She said she would find it tomorrow. I hope she will. I hope the great things in life will be found tomorrow.

Just in my short life what wonderful things the engineers have found! I sit at home at night and hear the voices from New York coming through the air. I look up at the electric lights. I remember the first fellow who had a light in our town. It was a dandy. A brass can with a lamp chimney on it. After it burned five minutes, you had to light a match to find where it was. It is wonderful what has been done. Somebody is actually afraid that automobiles are going out of style in the next four or five years. I read a few days ago where a fellow in Germany says he has invented a plane that won't come down. If I can get one that won't fall, I will get one, but I want to be sure that it won't fall. But it is coming.

I saw a fellow the other day who is the smartest fellow and I think the biggest fool I ever saw. He is going to try to locate static. I said, "All right, I will give you four dollars most any time you will find static." I have an idea what static is. I don't know but what that comes from away over there. It may be the Great Engineer of the Universe talking to us in a way that we have not learned yet how to catch. It may be that it comes from heaven, I do not know. Wouldn't it be great if we found that that was God's way of talking to us!

You do not know what is going to happen in the world. I do not. I thought fifty years ago that I was going to be one of two things. I thought first I was going to be the greatest engineer in the world. About that time Eads built the bridge in St. Louis, and the jetties at New Orleans, and I thought Eads would have to take a back seat in three or four years. Next I thought I would like to be Professor of Mathematics at the School of Mines. I wanted the job only for about three or four months. I wanted to lick about a dozen fellows on the campus. But the Board of curators didn't think I would fill the job, and they got somebody else. Perhaps it was just as well. Then I wanted to help build a railroad and I did help build it. They have improved it since.

Then I went out surveying one day (I wish I could tell you all this story). I saw a girl and I thought she was about the prettiest thing I ever saw and she was. I said, "Now, look here, I am going to keep surveying you until I get things fixed up some way or other." I persuaded her after a long time, and so we got married. Then here was the question. I had been thumping around on the railroad and never knew where I would be any night, and I said, "Wouldn't a nice little home with that girl be the finest

thing on earth?" I thought, "I believe it would." So I got a little home and I quit engineering, except that I am still surveying. I am not telling you that now so you boys won't marry, because I think that is the greatest thing in the world. I don't want to say anything to stop any of the weddings, but that was my conclusion, and that was what I did.

Then I got into it. I did the biggest fool thing you ever heard of, I got mixed up with a newspaper. I don't know whether Charley Woods is here or not, but he could tell you that is a pretty foolish thing to do. Then I did something that was another foolish thing to do, I got mixed up in politics, and actually ran for office. That is the biggest fool thing anybody ever did. But the people of Missouri were nice to me and elected me to office, and then I got to thinking they must think I was somebody. I got through with that, and about that time we got a new Governor, and he did the funniest thing. He put me in the penitentiary and kept me there for four and a half years. I was surveying all that time—surveying men, men, men! There is nothing better in this world than men. Crooked men, dirty men, men to whom it didn't make much difference whether they would shoot you or say how-do-you-do. I had a nice time there, and got along very well. But Governor Gardner was about the hardest task master I ever saw. The penitentiary had been losing money, and he wanted it to pay for itself. I got through with it and made a little money for them in the four years I was there.

I went home and thought I was going to stay with my wife and have a good time, and then played the fool again and ran for the Senate. It is a nice place. You have a good time sometimes, and sometimes you don't. I would not advise anyone to run for the Senate or any other office. That is my observation of years. Some think it is a nice job, but there is a good deal of grief attached to it. You try to be nice to your friends and everybody, and make friends with everybody. You can't be the man on the circle because if you do, you are always in trouble. You can't be the man on the zigzag line because you will always be in trouble. You have to go the straight path and be honest with everybody. If you are not, you had better not be in anything, politics, business or whatever it might be.

I have now worried you for over an hour, and scattered around through a little of everything, but I would like to say a little more. I am a native born Missourian and very, very proud of my state, very, very proud of my home county and my home town—I was born in that town, and expect to die and be buried in that town. Each one of us ought to love Missouri. If we do, let us all join together in every way that we can, under every condition, and under all circumstances, to try to make her the greatest in all the galaxy of states. It takes team work. We have to make a survey of things and find the things to do. You know, just the other day I read how the President of the United States called in help. He started to make a survey of what the railroads and the business men could do, and has been at it all this week. Why? He is an engineer. The President of Mexico who was elected last week is an engineer. Mexico needs surveying, and the United States needs surveying, and Missouri needs surveying.

But after the survey is made, we should all join hands together with one long pull and let Missouri be up on the highest place, so that every Missourian may be very proud of his state. You know that great expression that we hear so often, that God is the architect of the world. I do not like that expression. An architect is a man who has put a plan on paper. Some contractor has taken the plans and built the house and completed it—put on the topmost brick. I would rather think of God as the Great Engineer, and he has taken this matter—I do not know where it came from—and formed the earth, and from that day to this, it has been cooling and spreading and doing this and that, and He put man here that he might help at this work that He had to do. I love to think of Him as an Engineer finishing the job, and we the servants who are laying out this plan and that plan until some day in that millennium we will have a great finished work, and God as the Engineer will say, "Well done, my good and faithful servant."

School Of Mines At Rolla Enrollment 1928-29 - 550

(Continued from Page 4)

The School of Mines offers the following four year curricula leading to baccalaureate degrees:

- | | |
|-----------------------|---------------------------|
| I Mine Engineering | V Mechanical Engineering |
| II Metallurgy | VI Electrical Engineering |
| III Civil Engineering | VII Chemical Engineering |
| IV General Science | VIII Ceramic Engineering |

There are, in addition, the following options within these curricula:

- | | |
|-------------|---|
| Group I. | Mine Engineering, Coal Mining, Mining Geology, and Petroleum Engineering. |
| Group VII. | Chemical Engineering and Petroleum Refining. |
| Group VIII. | Ceramic Engineering and Ceramic Technology. |

It will be observed that the work is highly specialistic in its type and calculated to equip engineers in special fields of work, particularly those having to do with mining and kindred industries.

The Board of Curators of the University function through an Executive Committee of three and the School is administered under a Director. There are seventeen full professors and other members of the staff which bring it up to a total of 67.

On account of the highly specialized nature of the work the school attracts a great many non-resident pupils, almost 50% of the students hailing from other states.

The school is acknowledged to be one of the high class mining schools in the United States and on account of its character attracts this special class of students. What has been heretofore said with reference to tuition at the University applies at this school. This Commission is of the opinion that the general trend toward increase of student charges should be recognized with a differential in favor of the resident student.

In addition to the usual scholastic work which is carried on in a school of this character, there is located on the campus of the Rolla School the State Mining Experiment Station. The object of this station is to conduct experiments relating to the mining industries of this state. It has been said by competent mining authorities that the research work of this school has developed enormously the ability to recover minerals in the lead and zinc industry. The Mississippi Valley Experiment Station of the Bureau of Mines of the United States Government is also located on the campus of the School of Mines. It was established in 1920 under the Foster Act as one of ten similar stations. Its work is carried on in conjunction with the State Bureau of Mines. Its allowance from the Federal Government amounts to twenty to twenty-five thousand dollars a year. The Missouri Clay Testing and Research Laboratories were established on the Rolla Campus in 1926 and are operating under the general supervision of the Ceramic Engineering Department. It was established with the active cooperation of the Fire Clay Industry of this state and has contributed greatly to the development of that very important industry.

The Missouri Bureau of Geology and Mines, commonly known as the Missouri Geological Survey, is located in the old Rolla Building on the campus. Here is the office of the State Geologist and his assistants. The Bureau is maintained independently from the School which merely provides a building for its occupancy. The character of its work is in harmony with that of the school and it undoubtedly contributes very much to the general atmosphere which is beneficial to the School of Mining Engineering.

NEEDS OF THE INSTITUTION

The most urgent need is that of additional maintenance and support. Appropriation for 1929-30 was \$567,000. The Strayer-Engelhardt report recommends an increase of approximately \$100,000 per annum for additional maintenance and operating support.

The plant at Rolla is comprised of the following buildings:

Parker Hall.

Containing the administrative offices, libraries, auditorium, and class rooms.

Norwood Hall.

Containing class rooms.

Mining Experiment Station Building.

Jointly used to house laboratories of the United States Bureau of Mines Experiment Station and departments of the school.

Metallurgy and Ore Dressing Building.

Housing departmental and class work.

Mechanical Hall.

Housing departmental and class work.

Chemistry Building.

Housing departmental and class work.

Rolla Building.

An old building housing the State Bureau of Mines and Geology, and in addition to these a Gymnasium, Garage, Director's Residence, Power House, Warehouse, and accessory buildings.

Of the foregoing it is said that the Rolla Building, the Chemistry Building and Mechanical Hall are mere make shifts.

Norwood Hall is over-crowded and not fire-proof.

The Strayer-Engelhardt report recommends the erection of three new buildings as follows:

- 1st: A building for electrical and mechanical engineering and physics which together with equipment will cost \$340,000.
- 2nd: A building for geology and ceramics costing \$225,000.
- 3rd: A building for chemistry and chemical engineering costing \$275,000, and a new power house costing \$125,000.

In addition there is recommended expenditures for fire-proofing and improving of old buildings which would make a total program of \$1,046,000.

We recommend the expenditures outlined in the Strayer-Engelhardt report.

In conclusion it may be said that this School, like the College of Agriculture, is a direct contact with the producers of wealth in this state. The lead and zinc industry has always been much interested in the work of this School. The Clay Industry of Missouri, who are assisting in conducting the research bureau of the school, submitted a brief to this Commission upon the improvements and needs of the School of Mines and were urgent in their request that this School receive adequate support, expressing the view that its contribution to Missouri's Industries was of vital importance. This Commission is of the opinion that the state should pursue a more liberal policy both in the way of current support and capital expenditure in order that this school may continue to measure up to its full measure of usefulness.

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For The Westminster Game

The following alumni, in addition to those here for the vocational students' homecoming, were on the campus the week ending November 9 for the Westminster game:

Ray Johnson, St. Louis; Joe Reid, Chattanooga, Tenn.; Doc McRae, Ft. Scott, Kansas; Jimmie Lemon, Maud, Okla.; Luther Murray, Macon, Mo.; Art Berry, Mexico, Mo.; T. B. Kent, Columbia, Mo.; L. A. Delano, Bonne Terre, Mo.; H. D. Thomas, Oklahoma City; Jack Kenney, Chicago; A. A. Peugnet, St. Louis; C. A. Freeman, Mexico, Mo.; Beans Cutter, Mexico, Mo.; Frank Wallower, E. St. Louis; Bill Knight, E. St. Louis, Ill.; Eddie and Mrs. Griswold, Ponca City, Okla.; Jack Gage, St. Louis; and Bill Schweickhardt, Chicago.

The Football Season

Five Won, Three Lost

By playing a good brand of football throughout the entire year, the Miners closed their season with their annual Turkey Day game with the Drury Panthers at Springfield on November 28. The season's record shows five games won and three dropped to the opposing squads.

The schedule started with the game at Kirksville with the Teachers College there. The Miners got away for a bad start and suffered several bad breaks, with the result that the Teachers scored two touchdowns from balls fumbled near the Miner goal line. However, in the fourth quarter, with but seven minutes left to play, the Miners started an offensive that the Teachers were unable to handle, and before the final gun had chalked up had two touchdowns of their own. They failed to kick goal on the first counter, but on the second Schofield circled the end for the extra point which won the game. The score stood 12 to 13 in favor of the Miners.

On October 12 the Miners met Lombard College at Rolla. The game was played on a slick, muddy field that held both teams down. The Miners outplayed Lombard rather consistently, making 219 yards in scrimmage while the visitors gained only 129 yards. However, at the final score Lombard had 7 points and the Miners 6. The two teams played without score to the third quarter, when at the beginning of the quarter Nichols, fast little quarterback for Lombard, tucked the ball under his arm on the kick off and paraded through the entire line for a touchdown, and then Lombard kicked goal. The Miners came back with a vengeance which soon carried them through for a marker, but failed to kick goal, leaving the score 6 to 7 in favor of Lombard, where it stood at the final gun.

On October 19, as one of the features of the Homecoming, the Miners met McKendree College and easily took them into camp with a score of 73 to 0 in favor of the Miners.

On November 1 the Miner aggregation journeyed over to Fayette, Missouri, to meet the Central College Eagles for the first conference game of the season. The Eagles went down before the Miner attack with a score of 6 to 19 in favor of the Miners. This was undoubtedly the best game of the season according to the opinion of the fans who attended. Of special interest was the splendid performance of the Miner band which is becoming more and more a feature of the Miner football games.

On November 9, as one of the features of the vocational students' Homecoming, the Miners met the Westminster Blue Jays in Rolla and went down to defeat at a score of 12 to 0. The entire game was a nip and tuck affair throughout, with the two teams showing about equal strength. The Miners gained on scrimmage 193 yards and Westminster 194. The Miners made 12 first downs and Westminster 13. The extraordinary playing of Boyd, Westminster quarter, was largely responsible for the Westminster victory. Although the Miners threatened to score on numerous occasions, when the game was over it stood 12 to 0 in favor of the Blue Jays.

On November 15 the Miners made a right-about-face to take the Maryville Teachers College into camp for the score of 33 to 6 in favor of the Miners.

On November 23 the Miner aggregation chartered a special train, and, with the school band and numerous rooters, journeyed to Muskogee, Oklahoma, to meet the Tahlequah Teachers in a migratory game played in Muskogee. The Miner machine worked perfectly and rolled up a score of 28 to 0 in favor of the Rolla crowd. Following the game about one hundred alumni and guests met at a celebration banquet.

On Thanksgiving Day the Miner squad journeyed to Springfield for their thirty-fourth annual clash with the Drury Panthers. The Drury aggregation first met the Miners in '93. During this time the Miner-Drury teams have missed only four games, these being the years 1895,

1897, 1907, and the war year 1918. In the first thirty-three games of the contest the Miners won 17, Drury 13, with 3 games tied. The Miners had scored 540 points against Drury, while Drury had chalked up 351 points against the Miners. The Miners journeyed to Springfield in high spirits this year, expecting to take their ancient enemy into camp, hands down, as the Miners had shown to much better advantage throughout the present season than the Panthers; but when the final gun announced the close of the 1929 football season for the two teams, the score stood 27 to 19 in favor of Drury. The Panthers opened up with an aerial attack that the Miners were unable to cope with, although in the final summary the Miners had gained 354 yards to Drury's 152.

A summary of the season will show that the Miner aggregation gave a good account of itself throughout the entire year. They chalked up 191 points while their opponents showed only 70 during the season. One of the most consistent gainers from the backfield was Dick Thornton, playing his first year with the Miners. Thornton's outstanding work won for him a berth on the All-State team of the Missouri College Athletic Union. Playing beside Thornton and almost equally as good, was Fritz Hassler, fullback and captain, whose work won for him a berth on the second string of the Missouri College Athletic Union, All-State. An outstanding record was also claimed by Frank Malik who, playing at end, managed to slip through the line to receive the pass that accounted for nine of the Miners' touchdowns during the season. Two of the Miner squad will receive their sheepskins in the spring. Lloyd Lacy, guard and last year's captain, will graduate in May, as will also H. F. Kirkpatrick, center. Lacy has been one of the outstanding players of the team during the last four years, and this year was granted a place on the second string All-State in recognition of his outstanding work.

The following men were awarded letters for their season's record: E. W. Londrigan, Springfield, Ill.; Ray Runder, St. Louis; D. T. Gibson, Denver, Colo.; S. Gorenstein, Chicago; Lloyd Lacy, St. Louis; O. M. Andres, Belleville, Ill.; Harry F. Kirkpatrick, Trenton, Mo.; W. B. Schofield, Eagle Pass, Texas; G. Sutherland, Dallas, Texas; R. A. Kelly, Granite City, Ill.; Frank Malik, Elyria, Ohio; Jack Yarber, Poplar Bluff, Mo.; John Sturm, St. Louis; G. J. Koch, Belleville, Ill.; J. C. DeFoe, Sedalia; E. Tomlinson, Springfield, Ill.; M. Hassler, St. Louis; J. Hyland, St. Paul, Minn.; H. R. Thornton, Chicago; L. Straughan, Dallas, Tex.; A. J. Williams, Granite City, Ill.

President T. J. Dover, Metuchen, N. J., and Business Manager C. C. Juhre, Rogers, Ark., were awarded letters according to the rules of the Association.

For meritorious service Lloyd Lacy, St. Louis, was awarded a gold football.

Basketball Schedule

Coach Rapp reports only three lettermen back for basketball this year. These are E. W. Heilig, M. G. Tieman and R. M. Carpenter. A number of new men are out but the practice has not advanced to a stage where it is possible to give a reasonable estimate of their probable strength.

The schedule for the season is as follows:

| | | |
|----------------------|--------------------|-------------|
| Concordia Seminary | Dec. 14 | St. Louis |
| Shurtleff College | Jan. 11 | Rolla |
| Drury College | Jan. 18 | Rolla |
| William Jewell | Jan. 29 | Rolla |
| Tarkio College | Jan. 31 | Tarkio |
| Tarkio College | Feb. 1 | Tarkio |
| Westminster | Feb. 5 | Rolla |
| Westminster | Feb. 20 | Fulton |
| Central College | Feb. 21 | Fayette |
| William Jewell | Feb. 22 | Liberty |
| Central Wesleyan | Feb. 25 | Rolla |
| Drury | Feb. 28 | Springfield |
| Springfield Teachers | Dates not arranged | |

Some Information Concerning Chemical Engineering Graduates

By K. Kershner, '20 Sec., M. S. M. Alumni Association

An investigation of the type of work, salary, and technical training of chemical engineering graduates of M. S. M. yielded some interesting data. The greater proportion of the graduates is employed in laboratory and plant control positions with considerable time devoted to research problems. There are several acting as consulting chemists and a few are engaged in non-technical lines of work. The amount of salary is necessarily a variable, inasmuch as the living expenses, the section of the country, the ability of the individual, and the different financial conditions of various branches of chemical manufacturing exert changing influences. Frequently the graduating chemist embarks on a training course in which the pay is at first low but which after a few years leads to much better remuneration. The following table is an attempt to compile an average salary scale:

| | |
|-------------------------------|---------------------|
| First year after graduation | \$125—175 per month |
| Second year after graduation | 175—200 per month |
| Third year after graduation | 200—225 per month |
| Fourth year after graduation | 225—240 per month |
| Fifth year after graduation | 240—250 per month |
| Sixth year after graduation | 250—275 per month |
| Seventh year after graduation | 275—300 per month |
| Eighth year after graduation | 300—350 per month |
| Ninth year after graduation | 350—470 per month |
| Tenth year after graduation | 470—520 per month |

The majority of those engaged in chemical engineering work state that the chances for future salary increases and advancement to positions of management are excellent. They report that the plant superintendents are being largely drawn from the chemical laboratories in an increasing number of industries.

In answer to the question, "Have you had opportunities to better your position had your technical training been different?" practically all answered, "No", though quite a few stated in addition that the present chemical curriculum was somewhat too theoretical in its later stages, and that insufficient emphasis was placed on the engineering and practical side of chemistry. This latter opinion was particularly stressed in reference to graduate courses.

Below are listed the suggestions made by graduate chemical engineers in regard to improvements that should be made in the present chemical curriculum. This list is arranged in the order of the emphasis placed on the suggestions.

1—More Industrial Chemistry courses stressing mathematical calculations needed in practical work; plant machinery and design; and power transmission and utilization.

2—Omit present sophomore English courses and give more Composition and Report Writing, and Business English.¹

3—More Engineering and Business Economics.

4—Greater stress on fundamentals and more attention to the practical engineering features of different courses.

5—More Physical Chemistry emphasizing Thermodynamics.

6—More Organic Chemistry emphasizing Organic Analysis.

7—(The following were about equally stressed): Include in the Chemical curriculum, courses in Engineering Materials; Mechanics; General Metallurgy;² General Geology; and Glass Blowing.

The general opinion is that a chemical engineering education is worth-while both from a financial standpoint and from other considerations, and that the field of Organic Chemistry including Petroleum Refining offers the greatest opportunities at present.

The question, "Are chemical engineers underpaid in comparison with other technical men with the same amount of experience?" drew a preponderance of replies that such is not the case, especially for chemical ENGINEERS. Some graduates added that in the case of chemists engaged in strictly analytical work the pay was low. It

seems that for the first five years the chemical engineer's pay is somewhat low, but after that he advances rapidly. This is somewhat verified in the salary table. Some graduates expressed the opinion the chemical engineer is more highly paid in the East particularly if they "do their stuff" in Organic Chemistry.

¹ During the last few years it has been possible to schedule a semester of "Advanced Composition" in the sophomore year to arrange for a two-hour elective course in "Engineering English" in the Senior year.

² A course in "General Metallurgy" has recently been added to the chemical curriculum.

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Vocates' Homecoming Big Success

Vocates once, Vocates twice,
Holy jumping German lice!

Are we here? We'll say!

We'll be here till Judgment Day,
FORTY-ONE!

A first reunion and homecoming of disabled war veterans who received their rehabilitation training at the MSM was held in Rolla on November 8 and 9, closing the evening of the 9th with a banquet tendered the visiting veterans by the Rolla business men at the Pierce Pennant Terrace restaurant, and a reception for their wives held at the Parish House.

After the football game November 9th between the Westminster College Blue Jays and the Miners, one of the features of the homecoming, the homecoming vocates went to the terminal for the banquet and the perfecting of an organization looking toward future homecomings each year. Fred C. Schneeberger of Clayton was appointed president of the organization, Frank Fink of Belle, Mo., vice-president, and J. D. Behnke of Rolla, secretary and treasurer.

Following the banquet Col. Charles L. Woods of Rolla delivered the address of welcome to the vocational students, and then Dr. Charles H. Fulton, director of the School of Mines, addressed the returning veterans. Dr. Fulton stated that it was generally considered by those familiar with the vocational training work of disabled veterans that those trained in highway work, topographic surveying, and other subjects at the School of Mines made a greater practical use of their training than perhaps any other group. He urged the veterans to maintain their organization, pointing out that they were not like the ordinary alumni body in that they would not be self-perpetuating. He expressed it as the opinion and hope of the vast majority of right-thinking men and women that there would be no need for additional vocational rehabilitation work for a very long time.

F. C. Schneeberger, the newly elected president of the vocational students, expressed the appreciation of the vocational students for their warm reception by Rolla at their homecoming. Then Col. J. L. Peatross of Rolla, in the closing speaker, told of his experiences with the American dough-boy in France.

The business men of Rolla voted to extend the veterans an invitation to be their guests at a similar banquet to be held at the time of their homecoming next year.

Those attending were: F. C. Schneeberger, Clayton; Paul A. Tower, Rolla; Chas. Toth, Kansas City; W. P. Heaton, Rolla; W. D. Phillips, Rolla; E. J. Wade, Granite City, Ill.; F. O. Fink, Jefferson City; S. P. Harner, Webster Groves; F. E. Weakley, Rolla; S. B. O'Hara, Washington, D. C.; D. N. Vincent, Monett; James E. Mitchell, St. Louis; Allen B. Johnson, E. St. Louis, Ill.; R. F. Brant, Rolla; S. M. Mauer, Webster Groves; Francis A. Pool, Paola, Kansas; B. B. Bondurant, Owensville; Clifford Stinson, Rolla; J. G. Huckins, Willow Springs, Mo.; John W. Gerdtz, Jefferson City; E. W. Wilburn, Webster Groves; J. D. Behnke, Rolla; J. L. Pasley, Jefferson City; D. F. Walsh, Rolla; Frank Watson, Rolla; H. A. Stuerman, St. Louis; Wm. D. Will, Waynesville, Mo.; James A. Logan, Rolla; E. H. Woolrych, St. Louis.

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General Alumni News

1929

Mr. and Mrs. M. E. Suhre spent several days in Rolla in October the guests of Mrs. Suhre's parents, Prof. and Mrs. J. H. Underwood. Maurice is with the Missouri Pacific Railroad Company at Wynne, Ark.

E. A. Godat is with the Cerro de Pasco Copper Corporation at Oroya, Peru.

Thomas H. Green is with the Northern Illinois Coal Company, Chicago, Ill.

John L. Baumann is employed by the Virginia Smelting Company, Debree Station, Norfolk, Va.

R. C. Miller is in the research department of Leeds & Northrup Company, Philadelphia. He lives at 5419 Germantown Ave., Philadelphia.

Fred Beatty is instructor in electrical engineering at the Georgia School of Technology, Atlanta, Ga.

Gus Crawford is with the Sperry Rail Service Corp., Chicago, Ill.

W. B. (Pete) Davis is with the Northern Peru Mining & Smelting Co., Shorey, Casilla 162, Trujillo, Peru, S. A.

Charlie Johnson is with Busch Sulzer Bros. Diesel Engine Company, 3300 South 2nd St., St. Louis, Mo.

Albert Mueller has accepted a position with the Braden Copper Company and has gone to Rancagua, Chile, S. A.

Russell Bryant spent Armistice day in Rolla. He is with the state highway department at Jefferson City.

George McCrorey is with the Missouri Ore Company at Iron Mountain, Mo.

A. L. (Doc) McRae, who is with the Frisco at Fort Scott, Kansas, spent the week end of November 9 in Rolla.

Jimmie Letts is civil engineer, Keokuk Power Company, Keokuk, Iowa. He lives at 707 Blondeau St., Keokuk.

L. F. VanSciver is electrical engineer with American Brown Boveri Corporation at Camden, N. J. His home address is 502 Haddon St.

Geo. W. Talley is living at 213 15th St., Apartment 406, Milwaukee, Wisconsin. He is with the Cutler-Hammer Company.

Boris Daniloff is a research Fellow in metallurgy at the Carnegie Institute of Technology and the U. S. Bureau of Mines at Pittsburgh, Pa., working on the problem "Investigation of FeO-MnO Slag System."

O. W. (Goose) Morris, who started in with the American Rolling Mill Company at Middletown, Ohio, was later transferred to Ashland, Kentucky, where he is now in the betterment department as assistant steam and combustion engineer.

1928

Sam Hodgdon passed through Rolla November 12 on his way to visit his parents at 230 Sylvester Ave., Webster Groves.

H. B. (Ducky) Moreland is assistant engineer for the Wabash Railroad. His address is 6639 University Drive, St. Louis, Mo.

Chuck Ambler, who has been at Jerome, Arizona, with the United Verde Copper Company, has been transferred to the Daisy Smelter of the United Verde Extension Mining Company at Clemenceau, Ariz., where he is assistant testing engineer.

Bill Schweickhardt, who has been with the Johns-Manville Company in Chicago as ceramist, passed through Rolla November 12 on his way to Auburn, Alabama, to attend the Alabama Polytechnic Institute.

Robert W. Couch is mine engineer, Homer Mine, M. A. Hanna Company, Iron River, Mich.

Albert L. Hill, who has been with the Geological Survey at Rolla since graduation, has accepted a position at Linn Creek on the Bagnell Dam project.

E. C. Faulkner is with J. A. Utley, Contracting Engineer, at Romeo, Mich.

Bill Machin, who is with the Indiana Road Paving Company, spent Thanksgiving week in Rolla.

Robert K. Grantham is located at 4621 Magoun Ave., Apt. 209, East Chicago, Indiana.

C. F. Herbert will be in Rolla for the next two weeks training the junior and senior miners in first aid and mine rescue work. Chuck is in the Safety Division of the U. S. Bureau of Mines.

1927

Mr. and Mrs. Lyman Robison were the guests of Mrs. Robison's parents, Mr. and Mrs. S. N. Lorts, the latter part of October. Lyman is with the Purina Mills Company, St. Louis.

Herbert Shear is doing flotation work for the National Equipment Company, Salt Lake City, Utah.

Frederick Clearman, who has been down in Chile with the Braden Copper Company, is back at MSM this year doing graduate work as a Fellow of the U. S. Bureau of Mines.

Joe Reid was a Rolla visitor November 4. Joe is with the St. Louis Smelting and Refining Company at Chattanooga, Tenn.

Bobbie Abbott is teaching at Sheffield Scientific School, Winchester Hall, Yale University, New Haven, Conn.

Ronald Mabrey, who is with the H. L. Hollis Company of Chicago, is temporarily located at Hot Springs, S. Dak.

"Chalky" Holman lives at 107 Brockmiller St., Marshall, Texas.

Jimmy McGraw and wife are in Rolla spending a two weeks' vacation the guests of Mrs. McGraw's parents, Mr. and Mrs. W. D. Jones. Jimmie is with the maintenance department of the Illinois State Highway at Ottawa.

1926

Bob Miller is with the Mazapil Copper Company, Concepcion del Oro, Zacatecas, Mexico.

A. L. Bradt is living at 129 South Vail St., Montebello, Calif.

Richard E. Sears is with the Willard Storage Battery Company, Cleveland, Ohio.

Millard Underwood is associate in bacteriology and clinical pathology at the Medical College of Virginia, Richmond, Va.

James E. Sargent is attending Tulsa University, Tulsa, Okla.

James P. Moore is junior mining engineer for the St. Joseph Lead Company at Rivermines, Mo.

1925

K. A. (Skeet) Ellison is chief geologist for the H. F. Wilcox Oil and Gas Company, Tulsa, Okla. Mr. Wilcox has a flying school as a side interest and Skeet has availed himself of the opportunity to become a full-fledged pilot.

James A. Westgard has moved from Hannibal to Memphis, Missouri. He is still with the Missouri State Highway.

Al Boyle and Mrs. Boyle attended MSM Homecoming. While in Rolla they were the guests of Prof. and Mrs. J. H. Underwood.

Paul E. Whitesell is with the Iowa State Highway Commission at Mason City, Iowa.

Adolph Kuechler has resigned his position with the Murray Tile Company at Cloverport, Ky., and is now a construction engineer with Robertson & Company, Inc., a firm of designing and construction engineers with headquarters in Cleveland. He is living at 2729 Edgehill Road, Cleveland Heights, Ohio.

Roger Day has resigned his position with Western Electric Company and will be with the Union Carbide and Carbon Laboratories, Brooklyn, N. Y.

1924

Homecoming greetings were received from "Scotty" Scott, who is one of the staff of Black & Veatch, Consulting Engineers, Kansas City, Mo. "G. R." was formerly an instructor in the department of Mechanical Drawing at MSM.

W. A. Schaeffer, Jr., was a campus visitor September 24. "Schaeff" is petroleum engineer with the Shell Petroleum Corporation at McCamey, Texas.

A. W. (Spoof) Walker is with the Indian Territory Illuminating Oil Company, Walker Camp, Seminole, Okla.

1923

J. G. Huckins is with the Missouri State Highway Department at Willow Springs, Mo.

George G. Harris is with the Shell Petroleum Corporation at Owensboro, Ky.

Karl Schmidt was in Rolla October 15. Schmidt is with the Tidal Oil Company at Fort Worth, Texas.

Wm. P. Gatts, who has been with the Pan-American Pencil Company at Lewisburg, Tenn., has accepted a position in the Trade Extension Department of the Bemis Brothers Bag Company, 601 South 4th St., St. Louis.

J. J. Haberthier, Forest City, Pa., owing to ill health, resigned his position with the Scranton Coal Company.

Mr. and Mrs. M. N. BeDell were in Rolla for MSM Homecoming. While here they were the guests of Prof. and Mrs. J. H. Underwood.

R. E. Murphy is in the department of geography at the University of Wisconsin where he is completing work for a Ph. D.

J. L. Gregg is metallurgist with the Battelle Memorial Institute, 505 King Avenue, Columbus, Ohio. Jimmie was formerly with the Western Electric Company at their Hawthorne works, Chicago.

1922

H. F. (Red) Shore is with the Geophysical Research Corporation, 713 Esperson Bldg., Houston, Texas. At present "Red" is at Orange, Texas. He is living at the new Holland Hotel.

J. G. (Gobby) Christner, who is with the Ingersoll-Rand Company, 11 Broadway, New York City, is temporarily in Japan in the interest of his company.

Ted Machin spent the Thanksgiving holidays in Rolla. He is employed by the Indiana Road Paving Company, Indianapolis, Ind.

1921

L. E. Davidson was a campus visitor October 12. Davidson is connected with the Madison Coal Corp., at Carbon-dale, Ill.

J. F. Helmerichs has severed his relations with the Hauser-Miller Company, Inc., and is now metallurgist for the Eisenstadt Manufacturing Company in St. Louis. His home is at 3971 Wilmington Ave., St. Louis.

L. E. Lumpkin is assistant engineer, Materials Department, Arkansas State Highway Dept., Little Rock, Ark.

1920

W. J. Nolte and Mrs. Nolte were Rolla visitors during the fall, the guests of Mrs. Nolte's parents, Mr. and Mrs. J. A. Watson. Nolte is with the Marland Oil Company at Wichita Falls, Texas.

R. C. Schappler of the State Highway Department, Jefferson City, was in Rolla October 22, visiting old friends.

George D. Clayton, Jr., of Hannibal, Missouri, was the guest of his brother, Prof. Charles Y. Clayton, over Labor Day.

Lawrence O. Casselman is chief of survey party on the Bagnell Dam project at Bagnell, Mo.

1918

Mr. and Mrs. W. C. Durning and Mr. and Mrs. Clay Halley of St. Louis, came out to enjoy the Homecoming at MSM and to visit Mrs. Durning's and Mrs. Halley's mother, Mrs. J. C. East. Durning is in the Tramway Department of A. Leschen & Sons Rope Company, and Halley is engineer, Asphalt Division, of the Standard Oil Company, St. Louis.

1917

George H. Kublin has resigned his position as chief engineer, Moon Motor Company, and has accepted a position as Executive engineer with the Auburn Motor Company, Auburn, Indiana.

J. S. Brown is chief geologist for the St. Joseph Lead Company, 250 Park Ave., New York City.

W. H. Boyle is with the Tennessee Copper Company, Copperhill, Tenn.

Capt. T. P. Walsh, who underwent an operation at Walter Reed Hospital during the summer, has been granted a leave of absence until January 1st. During this time Walsh is taking work in organic chemistry at the College of William and Mary, Williamsburg, Va. After January 1, he will be back in the 51st Coast Artillery, Ft. Eustis, Va.

J. J. Shipley, is southern representative for the U. S. Gypsum Company, 1510 Candler Bldg., Atlanta, Ga.

1916

J. L. Head spent October 12 in Rolla, viewing the scenes of his college days and calling on old friends. Head is engineer for the Chile Copper Company and has been in South America for the past several years. He is now in the New York offices of the Company. He was accompanied from New York by Mrs. Head and their two children.

T. P. McCague is district maintenance engineer for District 3, Illinois State Highway Dept., Ottawa, Illinois.

1915

Jacob C. Stroup is with Williamson & Company, Engineers and Manufacturers, 582 Market St., San Francisco, Calif.

1914

Riley M. Simrall is manager of the Elastite Expansion Joint Department of the Phillips-Carey Company of Cincinnati. His home address is 237 Burns Ave., Wyoming, Ohio.

1912

Paul E. Coaske is sales engineer for the Radiore Company, 606 South Hill St., Los Angeles, Calif. He is at present down in Mexico doing sales work for his company.

Eugene H. Broughton is living at 1020 8th St., Glendale, Calif.

Thomas A. Stroup is chief engineer of the West Virginia Coal and Coke Company, Omar, West Virginia.

John Hurtgen is with the Smith Engineering Corporation, St. Louis. His home address is 4808 Austria St., St. Louis.

J. S. Irwin is living at 935 St. Paul St., Denver, Colo.

George Condon is with the California Industrial Accident Corp., Los Angeles, Calif. His home is at 4866 Wiota St., Los Angeles.

1911

Ben Cody is metallurgist in charge of experimental leaching for the Phelps-Dodge Corporation at Douglas, Arizona.

Conway G. Williams, formerly of Jackson, Missouri, is metallurgist at the Magma Mill of the Utah Copper Company at Garfield, Utah.

1910

F. L. Flynt, 6833 Arthur St., St. Louis, was a Rolla visitor October 12.

Van H. Smith, metallurgist for the American Cyanamid Company, Vancouver, B. C., Canada, left Canada October 17 for the Orient for a five or six months' stay in Japan, Korea and China, having been lent by his own company to an English company to report on the latter's operations in the Orient.

1909

E. A. Elliott is with H. L. Doherty & Company, W. T. Waggoner Bldg., Fort Worth, Texas.

Mr. and Mrs. George A. Easley of Morristown, New Jersey, have returned from Europe where they spent the summer.

Wm. McElroy is associated with the Great Western Power Company, Oakland, Calif. He lives at 3270 Encinal Ave., Alameda, Calif.

1907

Mr. and Mrs. Walter C. Richards stopped in Rolla during October to visit old friends. They were making a tour of the Ozarks. Mr. Richards is assistant chief engineer, Tramway Department, of the A. Leschen & Sons Rope Company of St. Louis.

James C. Long resides at 1482 S. Shenandoah Ave., Los Angeles, Calif.

Wm. E. Brown is with the Hercules Powder Co., Hercules, Calif.

1906

From Joplin Globe—

Henry (Topsy) Hartzell is busy following the fortunes of the Baxter Springs and Rolla Miners football teams. Henry never forgets to pull for the Miners, as he was one of their star players some years back. And Henry can take things easy, too. Just recently some parties laid down \$100,000 on the barrelhead for Henry's and Si Kenney's and others' interests in the Just-right tailing mill—and they refused. Those boys have confidence in the zinc business, which is as it should be.

C. T. Green is with the Standard Oil Company at Richmond, Calif. His home is at 219 Santa Fe Ave., El Cerrito, Calif.

1904

R. A. Conrads is Director General of the Negociacion Minera de San Rafael y Anexas, S. A., Aptdo, 47-Bis., Mexico, D. F.

Clarence Woods is operating a gold mine at Tirapata, Peru. He is associated with Mr. Othick, who is the father of Dick Othick, a freshman at MSM this year.

1902

D. C. Cale, vice-president of the Certain-teed Products Corporation, who has been in the New York office for several years, is in San Francisco, Calif., at 1135 California Commercial Union Bldg.

1896

F. L. Flynn is metallurgist for Bunting Brass and Bronze Company, Toledo, Ohio. His home address is 540 Hampton Ave., Toledo.

1882

Senator W. R. Painter of Carrollton, Missouri, was a visitor to his Alma Mater September 19, 1929.

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Louis A. Freeman, U. S. V. B., is in the employ of J. P. Sparks Construction Company at Salem, Mo.

Mr. and Mrs. Charles Toth of Kansas City, were guests at the home of Prof. and Mrs. Ratliff during the Vocates' homecoming. Toth is now a licensed pilot, Municipal Airport, Kansas City.

A. C. Kroll, class of '30, is in the sampling department of the Magma Mill of the Utah Copper Company at Garfield, Utah.

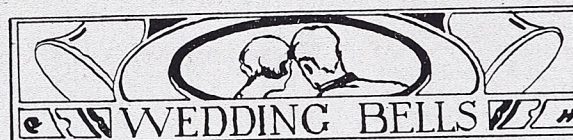
Mr. and Mrs. Donald Bisett, class of '30, and little son spent a few days during October with Mrs. Bisett's parents, Mr. and Mrs. K. M. Lenox, at Lake Springs. They were en route to St. Paul, Minn., where Don is engineer for the City Service Corp.

M. L. (Babe) Dorris, '23, recently of the Braden Copper Company, Sewell, Chile, but now with the Western Cart-ridge Company of Alton, Illinois; Theodore Herman, '27, of the Bethlehem Steel Company; and Frank C. Mulford, '23, of the Patino Mines and Enterprises, Catavi, Bolivia, were campus visitors the last of October.

Lucien Bolon, class of '31, is at St. Charles, Missouri, with the Wood Brothers Construction Company of St. Louis.

Paul C. (Don) White, class of '32, is in the Irrigation Engineering Department of the Standard Proof and Steamship Company with headquarters at La Ceiba, Honduras.

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The marriage of John Roy Lee and Miss Alma Frances Funkhouser, both of Hobart, Oklahoma, took place at the Estes home in Rolla September 15, 1929, Rev. Estes officiating. The bride is the daughter of Mrs. D. M. Funkhouser and graduated from the Hobart High School, later attending business college at Chillicothe, Mo. The young people are close friends of Rev. Estes and family and chose to come to Rolla to be married by him.

"Sheriff" graduated in General Science in 1927. He is a member of the Sigma Nu fraternity and while in school was an outstanding man in football, being captain of the team in '26. Mr. and Mrs. Lee are at home in Hobart, Okla., where Sheriff is engaged in business.

Rubert Paul Baumgartner and Miss Marguerite Church were married on September 17, 1929, at Wilkinsburg, Pa., the ceremony being performed by Father Walsh of the St. James Parish. The wedding was the culmination of a romance which began in 1927 at R. O. T. C. camp in Ft. Leavenworth, Kansas, where Bummie first met the young lady of his choice. Miss Church is the daughter of Captain and Mrs. Joseph Church of Providence, R. I.

"Bummie" graduated in 1928 in electrical engineering. He was a member of the Grubstakers, Dynamiters, Theta Tau, Tau Beta Pi, Phi Kappa Phi, and the Mercier Club, and was business manager of the Miner in '28. He has been with the Westinghouse Electric Company since graduation. Mr. and Mrs. Baumgartner will reside at 727 Hill St., Wilkinsburg, Pa.

Mr. C. E. Ault of Carterville, Missouri, has announced the marriage of his daughter, Mary Eleanor, to Shirley A. Lynch, son of Mrs. Alice M. Lynch of Girard, Illinois. The wedding took place in the First Presbyterian Church of Fort Worth, Texas, on October 5, 1929, Rev. James K. Thompson officiating.

Mrs. Lynch attended Missouri Valley College at Marshall, Mo., where she was a member of the Glee Club, Valkyrs, Dramatic Art Club, and was one of the May queens.

Lynch attended James Milliken University for two years and completed the work for a bachelor of science degree in mining at MSM with the class of '28. The past year he was instructor in mathematics at MSM while doing work toward a master's degree. He is a member of the Bonanza Club, Tau Beta Pi, was Secretary of the class of '28, a member of the senior council, and stage manager of the MSM players. He is now Associate Professor of Mathematics at North Texas Agricultural College at Arlington, Texas, where the young couple will make their home.

The wedding of Floyd A. Gerard and Miss Julia E. Patterson of Kenosha, Wisconsin, took place on October 1, 1929. Miss Patterson was a student at the Art Institute in Chicago, at the time of the marriage. "Tony", who is junior engineer with the Sanitary District of Chicago, graduated in civil engineering in 1927. He is a member of Theta Tau, and the American Society of Civil Engineers, and while in school was a member of the Dynamiters and the student council. Mr. and Mrs. Gerard are at home at 7703 Sheridan Road, Chicago.

Jack P. Campbell and Miss Frances Elizabeth Cotham of Monticello, Arkansas, were married on November 17, 1929, in Springfield, Missouri.

Jack graduated in civil engineering in '24. He is a member of the Kappa Sigma fraternity, Theta Tau and the Satyrs. He is with the U. S. Engineers with headquarters in Kansas City. At present he is located at Bolivar, Mo., where he and his bride will reside.

C. Howard Dresbach and Miss Mary Elizabeth Ledford were married at the bride's home in Amarillo, Texas, on November 8, 1929. The young lady is the daughter of Mr. and Mrs. C. B. Ledford, and a niece of Mike Ledford, '26, and Monte Ledford, '28.

Dresbach graduated in mining (petroleum geology option) last spring and is now geologist for the Gulf Production Company at Amarillo. He is a member of the Triangle fraternity. The young people will reside at 706-B Forest St., Amarillo.

T. W. Rubottom and Miss Alice Leavitt of Rolla, were united in marriage on October 21, 1929, at Moores, Pa., where Tommy is employed as mechanical engineer by the Westinghouse Electric Co. Tommy graduated with the class of '29 and has been with the Westinghouse company since graduation. The young couple are at home at 1138 Madison Ave., Moores, Pa.

Francis E. Tucker and Miss Buelah Johnson of Rolla, were married at Osceola, Arkansas, on August 10, 1929, although the wedding was announced but recently. Miss Johnson is a graduate of the Rolla High School and at the time of her marriage was bookkeeper for Mr. L. T. Hudson of Rolla.

Tucker, who is the son of Mr. and Mrs. Marion Tucker of Rolla, graduated from the Rolla High School and last spring graduated in civil engineering at MSM. While in school he made a good record scholastically and an outstanding record in athletics, having won several M's in both football and basketball. He is a member of the Lambda Chi Alpha fraternity. He is employed by the U. S. Engineers at Memphis, Tenn., where the young couple will make their home.

Ernest Merckling and Miss Emma Kennedy of Henrietta, Missouri, were married October 19, 1929, at the Methodist Parsonage in Rolla. Rev. H. R. Osborne officiating. Mrs. Merckling, who is a graduate of Missouri University, is teaching in the High School at Smithton, Missouri, and will remain there until next June. She is a member of

Alpha Gamma Delta Sorority. Merckling's home is in St. Louis and he graduated from Soldan High School before entering the School of Mines, where he is now a senior in chemical engineering.

George Edward Howard and Miss Grace Elizabeth Brown were married at the home of the bride's parents, Mr. and Mrs. Edward Brown, of Rolla, September 28, 1929. The ceremony was solemnized by Rev. C. W. Estes of the Rolla Presbyterian Church. Howard was a student at MSM last year. His home is in Williamsfield, Ohio, for which place the young couple left to make their home.

George G. Harris and Miss Clarice Maxine Taylor were married at Boonville, Indiana, January 4, 1929. George graduated in mining in 1923 and was a member of the Missouri Mining and Metallurgical Association and of the MSM Players while in school. He is employed by the Shell Petroleum Corporation at Owensboro, Ky.



Mr. and Mrs. R. L. Johnson announce the arrival of a son born October 6, 1929. The young man has been named in honor of his great uncle, Edward Mackey Johnson, MSM '92, who is general superintendent of the Eagle-Picher Lead Company at Henryetta, Okla. Mrs. Johnson was formerly Miss Josephine Farris of Rolla. Johnson graduated in 1921 and is superintendent of the Oil State Refining Company at Allen, Okla. He is a member of the Kappa Sigma fraternity.

Mr. and Mrs. Leo Schapiro are entertaining a little son, Leo graduated in 1924 and is now metallurgist with the Illinois Steel Company, Chicago, Illinois.

A son was born to Mr. and Mrs. Geo. F. Barnwell on June 14, 1929, in Weltevreden, Java, Dutch East Indies. Mrs. Barnwell will be remembered as Miss Lillian Allen of Rolla. Barnwell was formerly an instructor in geology at MSM.

A little daughter, Anna Louise, was born to Mr. and Mrs. George F. Berry on August 31, 1929. Mrs. Berry will be remembered in Rolla as Miss Nancy Clark. George attended MSM as a vocational student and received a certificate of proficiency in oil field engineering in 1924. He is with the Empire Gas and Fuel Company at Oak Hill, Kansas.

Mr. and Mrs. A. V. Eulich are celebrating the arrival of a son, John Freeman, born October 6, 1929. A coincidence is that the young man arrived on the fifth birthday of the Eulichs' other son who was also born on October 6. Mrs. Eulich was before her marriage Miss Margaret Sally of Rolla. Eulich graduated in 1920 and is a member of the Lambda Chi fraternity. He is with the Public Service Quarry Company in Kansas City, Mo.

A daughter, Joan Helen, was born to Mr. and Mrs. Geo. L. Richert on October 23, 1929. "Tex" Richert graduated with the class of '22 and was a member of the Prospectors, Sigma Gamma Epsilon and the Merciers. For the past four years he has been with the Minas de Matahambre, S. A., Matahambre, Pinar del Rio, Cuba, for which company he is now chief engineer.

Mr. and Mrs. Arthur L. Bradford are entertaining a son who arrived at their home in Rolla on October 12, 1929. The young man will answer to the name of Hilary Phariss Bradford.

Both Mr. and Mrs. Bradford are graduates of MSM, Mrs. Bradford having received a B. S. degree in 1928 and Mr. Bradford an M. S. degree in 1929, and both are members of Phi Kappa Phi. Mrs. Bradford was formerly Miss Phariss Cleino. Arthur is instructor in English at MSM.