NEWS-LETTER

UNIVERSITY OF ILLINOIS

Department of Mining and Metallurgical Engineering Alumni

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A DEPARTMENTAL NEWS-LETTER

We have long felt the need for publication from this department which would serve to keep our alumni, students, and friends abreast of all activities in the department, and serve as a bond that will help maintain the interests and friendships begun at the University. This News-letter is presented in the hope of fulfilling that need, and its success will depend largely on each person who reads it. All are invited and requested to make suggestions and criticisms which will result in better and more complete service to all.

In addition to providing general information of interest, we feel that our principal service should be the maintenance of a complete file of the names and addresses of all the graduates of the department, and publication of other information of their activities that would be of interest to their classmates. On this phase, we shall be especially dependent upon you, and earnestly solicit your cooperation in providing us with your current location and employment and other news of interest to us all. We are glad to hear of your promotions, changes in employment, marriage, the progress of your family, etc.

The frequency of publication will depend considerably on the amount of news reaching our desk. We hope to present an issue two or three times yearly; more often if special occasions or quantity of news warrant.

Our circulation will include all alumni of the Department of Mining and Metallurgical Engineering, present students of the department, and any others who make known their desire to receive our paper.

State Analytical Lab in Mining Laboratory

The coal mine explosion at Centralia, Illinois, in March 1947 killed 111 miners, and has been ascribed to negligence on the part of both management and labor, and the improper application of rock dust to prevent propogation of the flame. Professor Walker was appointed interim Director of the Department of Mines and Minerals on April 2 and remained in the department until October 2, when he was replaced by Director Thomas Moses, since deceased.

During Professor Walker's tenure of office new legislation was passed by the general assembly, which requires active working areas in mines to be rock-dusted to within the last open cross-cut and the dust in the mines to contain a minimum of 65% incombustible content. Mine atmospheres shall not contain more than 0.75% methane to be classified as non-gassy mine. A methane content of from 0.75% to 1.0% classifies a mine as gassy and smoking is prohibited. More than 1.0% methane is prohibited and men should be removed from the mine. The legislation specifies the locations in the mines where the samples of air and dust are to be taken.

An analytical laboratory was established in the south end of the mining laboratory to analyze the samples of air and dust, which are collected by State Mine Inspectors and forwarded to the laboratory. The laboratory analyzes the air samples for carbon-dioxide, methane (max. 1.0% permitted), oxygen (minimum 19.5% permitted), and nitrogen by difference. Dust samples are analyzed for ash, moisture and carbon-dioxide; total to be not less than 65%. The laboratory employs nine full time and one part time personnel, and is set up to analyze 1000 samples each of air and dust per month.

The results of analyses are furnished to mine inspectors and coal operators, and it is hoped the information will contribute to greater safety in mines of Illinois.

Metals Congress In Philadelphia

Not as many of us as desired were able to make the trip to Philadelphia to attend the National Metals Congress this October, but a good representation of grads from the department were there. Those who were in Philadelphia gathered for the traditional alumni luncheon to renew acquaintances and see old friends again. Those who were present at the luncheon, besides Profs. Walker and Bruckner of the department, were: George Heckman '41 (G.E.), Stan Paprocki '47 (Battelle), Joe Gaines '44 (Signode Steel Strapping Co.), Jun Hino '41-'43 (Naval Res. Lab.), Frank Rough '43 (Battelle), Edw. Spencer '45 (Nat. Cyl. Gas), Richard Van Pelt '43 (Caterpillar), N. M. Erkun '48 (Pittsburgh Forging Co.), F. S. Williams '40 (Naval Air Exp. Sta.), J. L. Waisman '40 (Douglas), Paul Butler '40 (Arwood Prec. Casting), Philip H. Booth '29 (Youngstown Sheet and Tube), Frank Gaskill '32 (Linde Air Prod.), John B. LaPota '38 (Nat'l Cyl. Gas), Bob Bayer '44 (DuPont), Roy Lorentz '39 (Comb. Engr. Co.), W. E. Ellis '47 (Timken), and Don Roach '42 (Battelle).

A number of our alumni were seen at the Convention, but did not make it to the luncheon. Others may have been present but a partial list includes: Joe Lane (M.I.T.), Roland Carreker (G.E.), Norman Block (Foster Wheeler), Frank Bolda, Charles Bates (Delco), John Snyder (Rem. Arms), John Bell (West. Elec.), and John Milko (Battelle).

SHORT COURSE PLANNED

A short course in mining education, designed for high school principals and vocational guidance directors, has been recently announced for presentation during the summer of 1949. The department feels important information can be given these people concerning the field of mining engineering. Included in the course will be tours of the Urbana campus.

ENROLLMENT

Our department, along with other schools of metallurgy over the country, has failed to participate in the huge postwar increases in enrollment that have swelled other branches of engineering to new enrollment highs. The principal reason for this seems to have been the lack of government-armed services subsidization of metallurgical training during the war, and the great publicity given to advances in electronics, physics, and other engineering fields. Another factor is the general lack of understanding concerning what is meant and involved in the field of the mineral industries.

The enrollment figures for the department are shown below for the past several years until the present.

		Min.	Met.	Tot.
1941	Semester I	16	115	131
	Semester II	12	101	113
1942	Semester I	15	89	104
	Semester II	14	75	89
1943	Semester I	6	37	43
	Semester II	4	14	18
1944	Semester I	9	12	21
	Semester II	8	11	19
1945	Semester I	10	28	38
	Semester II	10	54	64
1946	Semester I	13	68	81
	Semester II	13	70	83
1947	Semester I	13	85	98
	Semester II	15	88	103
1948	Semester I	39	86	125

Only now are we approaching the prewar enrollment. These figures may be compared with the increase in enrollment of the E.E. Department from 325 before the war to 883 at the present. Prof. Clark is now organizing a committee to better publicize opportunities in mining and metallurgy, and to attract more young men into the field. With adequate and more informed vocational guidance, we expect a steady growth in departmental enrollment until we can provide enough graduates to satisfy the requests for men from industry. Prof. Clark's efforts are reflected in the large increase in mining enrollment for the fall semester.

The insufficient space for instruction and research activities is a serious handicap. Our student lounge has been converted to office space. We are looking forward to the day when we can expand our facilities to allow more staff and greater activity than is possible at the present.

Program of Special Lectures Initiated

In order to keep pace with the accelerated programs of research activity current in industry and education, the Department has initiated a new program of special lectures.

It is the purpose of this program to bring outstanding authorities in particular fields to the campus to present to the students and staff the most recent work in their fields. The Department feels that a great deal of information can be realized through a program such as this.

These lecturers receive a special appointment to the University as a Special Lecturer. Under this appointment, they will come to the campus once each semester for a series of two lectures in their fields of specialization.

A list of these nationally known authorities who have already accepted appointments includes:

Prof. Clarence Zener, Institute for the Study of Metals, University of Chicago.

Dr. W. A. Mudge, Director of Technical Service on Mill Products, International Nickel Co. Dr. Mudge will lecture on the metallurgy of nickel and nickel alloys.

George P. Halliwell, Director of Research, H. Kramer Co., Chicago. Mr. Halliwell has received an appointment as Special Lecturer in Non-ferrous Metallurgy, and he will also cover the metallurgy of secondary metals in his talks.

Joseph E. Drapeau, Technical Director, Metals Refining Division, Glidden Co., Hammond, Ind. Mr. Drapeau will present lectures in his field of specialization, powder metallurgy.

Advisory Committee for Mining Education Set Up

A Mining Advisory Committee appointed by Professor Walker, will consult with the department on the educational requirements of the mining industry, research programs needed by the industry, and in general integrate the work of the University and the industry. The personnel of the Advisory committee consists of:

Geo. F. Campbell, Pres., Old Ben Coal Corp.

D. H. Devonald, V. P., Peabody Coal Co.

B. E. Schonthal, Pres., B. E. Schontahl Co., and Secy.-Treas. Illinois Mining Institute.

H. H. Taylor, Jr., Pres., Franklin County Coal Corp.

H. A. Treadwell, V. P., Chi., Wilmington and Frank. Coal Corp.

Paul Weir, Pres., Paul Weir Co.

Henry C. Woods, V. P., Sahara Coal Co.

Miles Haman, Mgr., Crystal Fluorspar Co.

The first meeting of the advisory committee with the department faculty was held in the Illini Union Bldg. on September 28, in connection with the Eighth Conference in Coal Utilization, which was sponsored by the department. The second meeting of the committee and faculty was held at the University League Club in Chicago on October 19. It is expected that much good will result from these conferences. It is planned to hold conferences three or four times a year.

MIS Produces Varied, Interesting Program

The Mineral Industries Society, student society affiliated with the AIME, has planned a semester of interesting programs. During the war years, the society was inactive due to the low enrollment, but has since then presented a full schedule for its members.

The fall program this year began with a "get-acquainted" smoker at the Illini Union. The two meetings since then have featured Prof. Schedd of the C.E. Dept., speaking on the registration of professional engineers in Illinois, and Prof. W. H. Voskuil, who presented a short discussion of mineral economics. Two more meetings are scheduled for this semester, and both are expected to be full of interest and information. The speakers will be Mr. G. S. Mican, Supt. of Rolling Mills, Carnegie-Illinois Steel Corp., and Mr. J. R. McIntyre, Training Director, Wisconsin Steel Co.

The membership of the MIS has always been predominantly metallurgists, but recent attendance figures show the miners and geologists are turning out strong for the meetings. Hence, future programs are being planned to be of more particular concern to these groups.

Research Activities in the Department

The reputation of a department such as this depends on the work of its staff and its graduates. Hence, we believe you will be interested in this description of our work. At the same time, we shall always be ready to discuss here any interesting work in which you are engaged.

In spite of severe limitations of space and equipment available, the members of the department, sometimes with the assistance of graduate students, have been quite active in research activities. In order to acquaint you with the research being accomplished within the Department, a report of recent work is summarized below.

1) G. B. Clark and W. H. Harrison. "Slusher Solves Shrinkage Problem." **Eng. and Min. Jnl.** May, 1948. This is the story of the use of scrapers to solve operational problems in moving broken fluorspar ore from the stopes in a mine in So. Ill.

2) G. B. Clark, "Geol. Studies Can Avoid Costly Mistakes," **Eng. and Min. Jnl.** Aug., 1948. A discussion and summary of the geological factors which directly affect mining operations and the need for research for geological data on a quantitative, rather than qualitative basis.

3) G. B. Clark, "Shaped Charge Secrets," **Ordnance,** July-Aug., 1948. A brief article summarizing some of the interesting features of the shaped explosive charge which was used so successfully during the war, but to the present has had little application in peacetime uses.

4) H. L. Walker and W. J. Craig, "Effect of Grain Size on Tensile Strength, Elongation and Endurance Limit of Deep Drawing Brass." AIME T. P. 2478. In this investigation, an extensive study of the variation of the mechanical properties of deep drawing brass with grain size was conducted over a range of 0.004 to 0.024 mm. Results showed the endurance limit is almost doubled when the grain size is reduced from 0.024 to 0.004 mm. Considerable interest was shown in this paper and Prof. Walker's previous work on recrystallization and coalescence of cartridge brass by those who attended the recent AIME sessions in Philadelphia.

5) W. H. Bruckner and W. E. Ellis, "Strain Aging in Welding Low-C Structural Steel," **Jnl. Am. Weld. Soc.,** Sept., 1948. The paper is based on the master's thesis written by W. E. Ellis in which a study was made of Charpy impact values for a semi-skilled steel for different levels of strain and aging applied to the base metal and the weld metal. The data obtained leads to an important conclusion: the weld metal obtained in welding an insensitive steel base plate is insensitive to strain-againg. The research is being extended to a highly sensitive rimming steel, and Mr. Sandberg is engaged in this program for his master's thesis in the Department.

6) W. H. Bruckner and N. M. Newmark, "Axial Tension Impact Tests of Structural Steels," Preprinted for 1948 annual meeting. This is the report of part of the Task 5 program in the Engineering College sponsored by the Office of Naval Research. Axial tension impact tests were made of a number of project steels used in the "wide plate" investigation undertaken to develop information as to the cause of brittle failure of hull plate of welded transport and cargo vessels. As a result of preliminary tests, a standard specimen with a semi-circular notch was evolved, and the project steels were tested with this standard to determine the impact behavior over a range of temperatures and over a range of different initial energy in the pendulum of the impact testing machine. The study developed a classification of structural steels for susceptibility to brittle failure in correlation with wide plate of ship hull structure.

Acknowledgement was made in the paper of the aid given by the following graduates of the Department: S. Paprocki, W. Johnsson, L. H. Sheep, R. L. McGaughey and E. A. Hasemeyer.

7) E. J. Eckel and S. J. Paprocki, "A Diffusion Method for Determining the Austenitic Grain Size in Steel." (To appear in 1949 ASM **Trans.**) The paper describes a new method for determining the austenitic grain size of steel based on the intergranular diffusion of bronze in steel that occurs at temperatures in and above the critical range. The authors, as well as others who have used the diffusion method, believe that it is not just another method, but is actually much superior to other methods now used.

8) E. J. Eckel, R. M. Mayfield, G. W. Wensch, and F. A. Rough. (Being prepared as a U. of I. Engr. Exp. Sta. Bull.). The investigation utilizes the well known Jominy end-quench test for the evaluation. By using a single heat of steel and varying the quenching conditions, the hardness surveys give a measure of the cooling powers obtained. The variables that have been studied are: temperature, agitation, and composition of the quenching media.

9) A. C. Forsyth and R. P. Carreker, "The Fatigue Limit of SAE 1095" (to be published in **Metals Progress**). Samples of the steel were heat treated by three different methods: water quench and temper, austemper, and martemper and temper to a hardness of 53 Rockwell "C," and tested in a Krouse High Speed Repeated Stress Machine. The results showed fatigue limits of, 124,000, 130,000, and 160,000 psi., resp. The austempered specimens produced the highest tensile impact properties as well as the highest per cent elongation.

10) H. Czyzekski, "Small Foundries can Engage in Research and Development," **Am. Fdryman,** Apr. 1948. A broad outline of research

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Students Win AIME Awards

Two students from this department and one from the geology department were awarded prizes for technical papers submitted to the Chicago Section of AIME, in competition in the annual technical paper writing contest. The writer of the best student paper is awarded $50, and the second best paper wins $25. The Chicago Section will select the best papers from this area for entry in national competition, to be judged at a later date.

Students from this department have always carried off the lion's share of the prizes offered by the Chicago Section, and we are glad that these students have helped carry on that tradition. The winners of prizes, and the subject of their winning papers this year were:

W. E. Ellis, Washington, Illinois, first prize in graduate division. "Segregation and Cracking in Welding Low Carbon Structural Steel."

Benjamin J. Tudor, Taylorville, Illinois, first prize in undergad. div. "Airdox Breaking of Coal at Peabody Mines 8 and 9, Christian County, Illinois."

W. G. Lang, Champaign, Illinois, second prize in undergrad. div. "The Problem of Subsidence in Mining."

VISITOR FROM BRAZIL

It isn't often grads from as far as Brazil come back for a visit, so quite a few people were surprised when M. M. Guimaraes walked into the Met. Lab. the other day. Those who were here in '40 and '41 will remember him as the Met. student from Rio.

Still looking the same, and as sociable as ever, he has had varied experiences since leaving here — first with Brazil's new steel plant; then as mechanic, general technician, chief engineer, and manager (all combined) for a charcoal-burning blast furnace plant; and now as an executive looking after the family gold-mining interests.

The lode mine is one of the oldest in existence, Minas da Passagem, Passagem de Mariana, Brazil, about 300 miles north of Rio de Janeiro. The company is now opening up extensive new placer deposits, and the purchasing of new dredging equipment brought Guimaraes back to this country. We were all glad to see him again.

ALUMNI

We cannot be sure of the accuracy of the alumni records in the possession of the department, and in any case, the information at hand is inadequate. For that reason, we are entering a plea for up-to-date information from you. We are enclosing with this issue a card which can be conveniently filled out and returned to us. In this way, we hope to obtain complete, accurate records of all alumni. When this data is received, we hope to publish a form of directory, so that this information will be available to all.

If you know that our present mailing list is incomplete in any instance, we would appreciate any correction of it. And remember, we're always glad to hear from you at any time.

Dr. Clarence Zener Receives Appointment

Dr. Clarence Zener, Professor of the Institute for the Study of Metals, University of Chicago, was appointed Special Lecturer and Consultant in Physical Metallurgy in October. Dr. Zener enjoys a national reputation in the field of physics of metals. He is the author of some 64 scientific papers and one book. Dr. Zener will spend part of his time at Urbana with lectures in the field of physics of metals and will act as consultant to the faculty in their research work.

Dr. Zener's first visit to the campus was November 18 and 19, when he presented two lectures, and discussed current research problems with members of the staff. The titles of his talks were: "The Problem of Fraction" and "The Acoustical Spectrum of Metals."

Dr. Voskuil to Teach

Dr. Walter H. Voskuil, nationally known mineral economist, was appointed Professor of Mineral Economics on 10% time in September, 1948. Dr. Voskuil is mineral economist in the State Geological Survey and will continue in his work with that agency. A new course, Min. E. 301, World Mineral Economics, has been added to the departmental course offerings, and will be taught by Prof. Voskuil. The course will be open to all senior and graduate students in the university. Dr. Voskuil is the author of many articles and books in his field.

Research Activities In the Department

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in the foundry industry with a method of selecting fruitful projects for small foundries.

In addition to the above projects, there are a number of investigations in progress, most of them being problems for Ph.D. or master's theses. Only a very brief description follows for these cases.

1) W. H. Bruckner. Fracture problems in low carbon structural steels — assisted by Mrs. M. E. Moran, Mr. Frey, and Mr. Lattier.

2) Sam Leber. Studies of time-temperature relationships in precipitation hardening of beryllium-copper alloys.

3) S. W. Sandberg, Strain aging in welding a low carbon structural steel of rimming grade.

4) W. H. Bruckner. Motion picture studies of strain history of single grains of polycrystalline aggregrates.

5) R. W. Bohl. The effect of excess carbide particle size on the hardenability of hyper-eutectoid steels.

6) Harry Czyzewski. A fundamental study of the problem of wear of metals, and design for wear resistance.

7) G. W. Wensch. An investigation of the recrystallization and coalescence of high purity nickel.

8) S. L. Channon. The effect of prior grain size upon the recrystallization and coalescence of cold worked cartridge brass.

9) H. Czyzewski. An analysis of fatigue failure problems in the mass production industry, and a method of determining the relative merits of reducing production variables compared to increasing the endurance limit.

10) H. Czyzewski and B. C. Person of the Met. Dept., in cooperation with the Bureau of Economics and Business Research. A survey of Illinois foundries — markets, labor, classes of metals, raw materials, developments, and their relationships.

11) H. Czyzewski and W. Jonsson. The effect of exothermic reactions on the graphitization of cast iron.