

NEWS-LETTER

UNIVERSITY OF ILLINOIS

Department of Mining and Metallurgical Engineering Alumni

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NEWS-LETTER

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GRAD DISTRIBUTION ANALYZED

After checking alumni addresses for publication in the Alumni Directory Issue of the News-Letter, it was interesting to note the geographical distribution of graduates. The results of this survey is shown in the table below. Almost half the metallurgists stay in the state, mostly in Chicago, while only about one third of the miners stay in Illinois, and most of those outside the Windy City.

If we classify as midwest, locations in Missouri, Ohio, Indiana, Pennsylvania, Wisconsin, and Michigan, we see the mets have not wandered far, with about three-fourths settling in Illinois or in these nearby states, and only half the miners staying that close to home. Most of the mets that report eastern addresses are in the N. Y.-N. J. industrial area, while the

miners down east are mostly in the West Virginia mining areas or located in Washington, D. C.

An appreciable number of both miners and mets turned west after graduation, with the majority working in California now. As would be anticipated by most, a much larger percentage of the miners were attracted to foreign employment than the mets. For those interested, the addresses of mining and metallurgical alumni show a distribution as follows:

Location	% Mets	% Miners	% Dept.
Chicago -----	27	11.5	21.5
Downstate Ill. -	19.5	22	20.5
Midwest -----	28.5	17.5	24.5
West -----	6.5	9.5	8.
S. West -----	2.	7.	4.
East -----	11.	18.5	13.
South -----	2.5	4.5	3.
Foreign -----	3.	9.5	5.5

Program of Special Lectures is Continued

The program of special lectures which was initiated last year has been extended with considerable success. The first lecturer in the present series for the school year 1949-1950 was Dr. W. A. Mudge of the International Nickel Company, who presented a survey of the age hardening phenomena in metals, with particular reference to the newer age hardening nickel alloys. In November, Mr. G. P. Halliwell of the H. Kramer Co. next gave two lectures on the casting of copper-base alloys, with particular emphasis on the difficulties encountered due to gases in the metal. The special lecturer in December was Dr. Clarence Zener of the University of Chicago, who explained a new theory he has developed on the mechanism of diffusion in metals on the atomic scale. In a second lecture, Dr. Zener explained the use of internal friction measurements in determining solid solubility limits of carbon in ferrite.

On Jan. 12, Dr. Thomas Blewitt of Carnegie Tech was on the campus to describe some of his experi-

ments in the production of disorder from ordered Cu-Au alloys by plastic deformation, and his interpretation of the results in explaining the mechanism of plastic flow.

Lectures in March were presented by Dr. Charles Wert of the Institute for the Study of Metals, University of Chicago, and Dr. L. W. Eastwood, of Battelle Institute. Dr. Wert, who is working with Zener in Chicago, spoke on his experiments of the quantitative measurements of some properties of iron containing small amounts of carbon by internal friction methods. Dr. Eastwood has been with Battelle since the end of the war working on the process metallurgy of titanium, and the properties of titanium and its alloys. His lecture described his experiences with some problems in the production of titanium. Most recently, Dr. V. N. Krivobok, in charge of the stainless steel section of the Development and Research Division of the International Nickel Co. gave a most enjoyable talk, in his own inimitable fashion, on the latest

Two Bulletins on Careers Published

The department has prepared three bulletins during the past year for the purpose of providing information about the department and the mineral industries field, and to attract desirable students to our graduate and undergraduate programs in mining and metallurgical engineering.

Two bulletins are entitled "Careers in Metallurgical Engineering" and "Careers in Mining Engineering." The publications are similar in nature; both endeavor to describe careers in the fields of mining and metallurgy with special regard to the student entering college and attempting to choose a career and plan a course of study. The careers bulletin for metallurgy contains a description of the curriculum in metallurgical engineering.

The third publication is entitled "Graduate Research and Instruction in Mining and Metallurgical Engineering," and describes the graduate facilities for study and research in the department.

If alumni or others would like to receive a copy of any of the above booklets, or know of a person who would be interested in having this information, the department will gladly take care of your requests.

developments in stainless steels and high temperature alloys.

Talks by on-campus personnel are scheduled for occasions when special lecturers are not here, so that a full seminar schedule is presented. In addition to discussions of research problems by staff and graduate students in the department, members of the physics department concerned with the physics of solids have explained their research programs. Talks by men from the physics department have been by Dr. F. Fumi on the chemistry of intermetallic compounds, and by Dr. Roy Shuttleworth on some aspects of the mechanism of sintering.

SKETCHES OF THE FACULTY

We are continuing our policy of presenting short biographical sketches of members of the faculty with some notes on the background of a relative newcomer to the staff, and of one of our veterans.

WALTER H. BRUCKNER

Walter H. Bruckner, Research Assistant Professor of Metallurgical Engineering, came to the department in 1938. Born in New York City in 1903 of German parentage, he learned to speak German at an early age and acquired a fluency with languages which has stood him in good stead many times since. Prof. Bruckner received his A. B. from Columbia College in 1927, B. S. in 1928, and Ch. E. in 1930 from Columbia Engineering School.

Prof. Bruckner has had varied experience: research engineer for Crucible Steel Co., where his interests were high alloy steels, corrosion resistance, and welding; physical metallurgist with American Smelting and Refining, working with smelting and refining operations on non-ferrous metals and alloys, creep, and corrosion resistance of lead alloys; physical metallurgist at the U. S. Naval Research Labs. on problems of weldability of iron alloys, high cobalt alloys, and the metallurgy of storage battery grid alloys; staff member of Metals and Alloys, Chemical Abstracts, and Ceramics Abstracts, reading about 30 journals a month in German, French, Italian, Dutch, Swedish, and Spanish. Since coming to Illinois, his interests have been over a wide field; hardenability of carburizing steels, weldability, fatigue of welded steels, strain aging of structural steels, impact properties and brittle fracture of structural steels, etc.

In 1947, Prof. Bruckner began teaching a course on the metallurgy of welding which has been a popular elective. A text patterned after the course is soon to be published by Pitman. Other published work by Walter can be found frequently in the *Welding Journal*, *Metals Progress*, and the *Transactions of the AIME*, *ASTM*, *AFA*, and *Am. Cer. Soc.* Prof. Bruckner has membership in the following societies and honoraries: *AIME*, *ASM*, *Am. Welding Soc.*, *Electrochemical Soc.*, *Am. Soc. Naval Engrs.*, *Epsilon Chi*, *Sigma Xi*.

Walter has many extra-curricular interests: he is an accomplished musician, and is interested in oil painting and sculpturing, and in the boy scout activities. Number one outdoor interest is fishing, and on vacations, he and the family (wife Ruth, son Charles, 17, and daughter Audrey, 11) camp in the Michigan woods. Not the least in his interests is a glass of cold beer on a hot summer night. But perhaps his greatest interest is in keeping his office door open to graduates and undergrads for consultation on problems metallurgical.

GEORGE B. CLARK

George Bromley Clark came from out of the West to become Assistant Professor of Mining Engineering at Illinois in Sept., 1946. George was educated and obtained most of his early experience in his native Utah. He has his B. S. from the University of Utah in 1935, and his M. S. from Utah in 1946. Last year he obtained the E. M. degree from the U. of I.

Prof. Clark had a year of teaching experience at the University of Utah in 1938. He has also had varied experience with mining operations, being employed by Tintic Standard Mining Co. as Junior Engineer; Lime Mountain Cons. Mng. Co., as mineral surveyor; and the U. S. Bureau of Mines as sampling foreman. George spent three and one-half years in the army, including two trips to the ETO.

Music and tennis are his main interests outside office hours. George has a great interest in mine explosives problems, and is continuing extensive research in this field. Prof. Clark has considerable enthusiasm for his work, and has done much to stimulate student enrollment in mining.

Dr. Young Addresses MIS

A high spot of the Mineral Industries Society yearly program was on Jan. 18, when Dr. L. E. Young, National President of the AIME and an alumnus and former Professor at the University addressed the group. He drew on his wealth of experience in advising graduating miners and metallurgists on their professional responsibilities and opportunities.

Dr. Young emphasized the engineer's indebtedness to his profes-

First Engineering Open House Since 1941 Held

The first all-engineering student exhibit and show since the start of the war was held the weekend of March 31-April 1. Those who were here when these exhibits were an important annual event will remember the excitement and activity that regularly attracts thousands of visitors to the engineering campus. A parade and dance were also on the program of student activities.

The metallurgists created large quantities of smoke, fire and noise to stimulate visitors' interest with operation of such equipment as the induction furnace, a 3½-inch diameter cupola, electric arc furnace, and heat treating furnaces. Other features of the metallurgy exhibit were demonstrations of metallizing, stress analysis, metallographic studies, magnaflux, etc.

The miners featured an exhibit (through the courtesy of the Bituminous Coal Institute) of a complete woman's wardrobe (modeled by a member of the MIS) made from coal, and other products derived from coal. Other displays were of types of mining equipment and demonstrations of laboratory equipment (roll crusher, jaw crusher, gyratory, classifier and ball mill, tabling, jigging, and coal preparation). Another interesting exhibit was a demonstration of coal dust explosions.

Open house visitors were also shown movies of typical mining and metallurgical operations.

Dr. Young urged respect for "overalls and hard work," which are, in his opinion, in a large measure the reason for American industrial domination. He warned against the dangers of socialism, and his comparisons of competitive industry with the socialization movement in England were quite enlightening, especially since Dr. Young was able to quote widely from many personal friends in high level administrative positions in England and elsewhere.

Mr. Paul Weir, who was here for the meeting, agreed with Dr. Young fully, and summed up the situation in two statements. A man in a nationalized industry has but one boss, whom he must please or get out of the industry. A man in an allied industry supplying the nationalized industry has only one customer, whom he must satisfy or lose his business.

Current Departmental Research

Judging from many letters and comments by alumni, it is apparent that a large interest lies in the research program of the department. In order to keep all informed concerning research conducted by the department, the News-Letter proposes to publish from time to time a description of current projects.

At the present time, staff and graduates have a considerable volume of work in progress, in spite of the severe space limitations which are faced here. An effort was made this semester to interest senior students in undergraduate thesis problems, with the result that five seniors are also engaged on research projects. Some valuable experience in planning and conducting a research investigation is obtained by the students, although the projects are necessarily not so involved that the work cannot be completed in a semester's time.

CURRENT RESEARCH

Below are listed various current projects, with a brief description of the nature of the investigation. In parentheses are named the personnel working on the projects.

Deformation phenomena in abrasion (Czyzewski and Perkins). An evaluation of the scratch test in studying wear and deformation phenomena. Results have been qualitative so far, but an extension of the test to allow some quantitative measurements is anticipated. Some interesting deformation patterns have been observed.

Foundry coke testing in 3½-inch diameter cupola built by the department (Czyzewski and Kaminski). To date, this project has consisted of construction of the midget cupola and attempts to melt iron in it.

Casting of stainless steel in ceramic molds (Czyzewski and Frederick). The work is in cooperation with the ceramics department. The ceramics department is interested in developing a ceramic mold which will produce a high quality surface to the casting. The casting is to be done in this department. The effect of metal casting temperature and mold preparation on the metal structure and properties will be evaluated.

Heat treating characteristics of cast binary copper-beryllium alloys, and the effects of controlled amounts of iron and aluminum on

properties and structure of cast and wrought Cu-Be alloys (Hildebrandt).

Fatigue limit of SAE 52100 after various heat and subatmospheric treatments (Forsyth and Beggan).

Fatigue of SAE 1095 after oil quench and temper, martemp and temper, and isothermal treatments to constant hardness (Forsyth and Dyke). The above two projects are a continuation of previous work by Dr. Forsyth and graduate students under his direction.

Micromechanism of fracture in tension impact (Bruckner). A fundamental study in which the progress of fracture is followed by testing specimens under impact, where the pendulum energy is less than that required for complete breaking of the specimen.

Energy-ductility relationship for temper brittleness in alloy steels (Bruckner and Turner). This is the subject of Mr. Turner's master's degree thesis, but work is not yet in progress.

Solid phase bonding of cold worked alpha brass (Bruckner and Hoskins).

Metallographic studies of welded joints in copper (Bohl). An investigation, in cooperation with the C.E. department, into the effect of base metal, filler metal, welding process, and plate thickness on welded joints in copper plates. Mechanical test data is obtained by the C.E. department, while metallographic studies are carried out in this department. Tests so far have been on welds as produced under normal industrial conditions.

Metallographic studies with the motion picture camera of metal solidification, tensile failure, and other phenomena (Bruckner and Turner). Work to date has been directed toward perfection of techniques.

Electrolytic polishing of titanium and titanium-base alloys (Ricketts and Caskey).

Projects relating to coal composition and cleaning (Chedsey and graduate students).

Tests on creep of rocks, tensile strength of rocks, along with a statistical evaluation of U. S. Bureau of Mines work on strength properties of rocks (Wuerker).

Mechanical properties of brittle materials as related to comminution (Wuerker).

Recrystallization and coalescence

in alpha brass (Walker and Channon). A very thorough program carried out as Mr. Channon's Ph. D. thesis on the effect of per cent reduction and prior grain size on recrystallization and coalescence phenomena.

Causes of the differences in hardening power of aqueous quenching media (Eckel). An attempt to explain the differences in quenching power observed for some of the common quenching media.

RECENT PAPERS

Recent technical papers published by members of the department are:

W. H. Bruckner and S. W. Sandberg, "Strain Aging in Welding Low-Carbon Structural Steel," *Jnl. Am. Weld. Soc.*, Sept., 1949.

W. H. Bruckner, W. M. Wilson, W. H. Munse, "Fatigue Strength of Joints Connecting Steel Structural Members," *Bull. 380, U. of I. Engr. Exp. Sta.*, May, 1949.

H. Czyzewski, "Illinois Foundry Industry," *Current Economic Comment*, Nov. 1949.

H. Czyzewski and B. C. Person, "The Foundry Industry in Illinois," *Bull. 70, Bur. Econ. and Bus. Res., U. of I.* This bulletin is a thorough survey of Illinois foundries—markets, labor, classes of metal, raw materials, developments, and their relationships.

H. Czyzewski, "Technical Control and Development in Illinois Foundries," *Am. Foundryman*, April, 1950.

E. J. Eckel, R. Mayfield, G. Wensch, and F. Rough, "An Evaluation of the Hardening Power of Quenching Media," *U. of I. Engr. Exp. Sta. Bull.* (in press). This very extensive publication describes the work done by Eckel and graduate students assisting him over the past four years on evaluation of quenching media. Variables studied were temperature, agitation, and composition of media.

E. J. Eckel, "A Hardenability Test for Shallow Hardening Steels," *Met. Prog.*, April, 1950. Describing a simple test designed by Prof. Eckel for hardenability testing of shallow hardening steels. This new test involves the internal quenching of a round through a hole drilled eccentrically through a bar in a longitudinal direction. After quenching, the bar is sectioned and hardness readings made

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Mets Inspect Peoria Industrial Plants

Although the extensive field trips that were an annual affair to prewar classes have not been scheduled in recent years, shorter inspection trips are occasionally planned. On April 3, junior and senior metallurgists spent the day in Peoria inspecting operations at Caterpillar Tractor Co. and Keystone Steel and Wire. Of special interest was the foundry and assembly line operations at Caterpillar. At Keystone, the group saw steelmaking in the basic open hearth furnace, and all the rolling and drawing operations required to produce wire from the original ingot.

In the evening the group attended the regular monthly meeting of the Peoria chapter of the ASM. The technical session consisted of a talk on nodular cast iron by Max Kuniansky, vice-president of the Lynchburg Foundry. The program also included movies of the Bradley basketball team in action.

Course Content Changed

The course metallurgists of the past ten years remember as the Metallurgy of Deep Drawing and Pressing has been altered in content this spring to present a more general and fundamental picture of all forming operations, rather than only deep drawing.

The objectives of the revised course include a review of the fundamentals of plastic action, and a study of the various mechanical forming processes: rolling, forging, deep drawing, extrusion, and rod and wire drawing. Each process is considered with regard to calculation of metal flow and forming stresses, equipment used, applications, properties developed, and material and operational defects and difficulties encountered.

It is hoped that the more fundamental nature of this course, in presenting a general study of the more important forming operations, will prove to strengthen the undergraduate curriculum.

DEPARTMENT RESEARCH . . .

(Continued from Page 2)

on an inscribed circle concentric with the circumference. This results in a series of hardness readings at small increments of distance from the quenched surface, thus is very sensitive to low hard-

NEW STAFF BITS ABOUT 'EM

From Thomas Simms, Met. '40, of the Crerar Library, comes the suggestion of a decennial reunion of the class of 1940. Tom proposes a luncheon and get-together on the weekend of Homecoming this fall. Any comments from the class of '40?

Receipt and appreciation of the News-Letter has been received from Turkey, from Mike Unal, Met. '49.

Sam Leber, Met. '47, has all but fully recovered from his attack of polio, and at the start of the year began working for Horizons, Inc., a Cleveland research lab. His address is 12964 Cedar Road, Cleveland Heights, Ohio.

We see by the letterheads of local chapters of the technical societies that Ed Sluetz, Met. '47, is publicity chairman of the Peoria ASM chapter, and Bill Rudin, Met. '42, is news correspondent and C. M. Searcy, Met. '36, chairman of the reception committee for the Chicago AIME chapter.

A visitor to the Met. Lab. during the Christmas holidays was Dan Demeter, Met. '49. He is working as metallurgist at Youngstown Sheet and Tube, E. Chicago.

R. A. Campbell, Min. '50, is working for U. S. Coal and Coke at Gary, W. Va. Earlier this year he received the Old Timers' Club annual award to the outstanding graduate in mining engineering. Club President Paul Weir came to Urbana to make the presentation of an engraved watch to Richard.

After gaining a year of industrial experience with the Edwards Valve Co., Tom Noggle, Met. '48,

has returned to the campus for his master's degree. Tom is holding down a half-time research assistantship while spending half-time taking courses in the graduate school.

enability. The quenching jig is very simple, and the bars are easily prepared, giving an added advantage over the less sensitive Jominy L-bar, which is more difficult to machine.

H. L. Walker, "Education of Engineering Students," St. Louis, Mo., Engrs. Club. This pamphlet was prepared as a consequence of a talk by Prof. Walker at a meeting of the St. Louis Engineers Club. The group regarded the talk highly enough to want permanent copies of Prof. Walker's address.

Fred L. Seigrist, Met. '48, is now working for Westinghouse Electric Corp., Atomic Power Division. His home address is 63 Clairton Road, Pleasant Hills, Pittsburgh, Pa.

Chuck Boley reports that Israel Godoy-Peralta, Min. 44, is now working for the Departamento de Minas y Petroles, Teatinos 50, Santiago, Chile. His home address is E. Samit 282, Santiago.

Publication of the alumni directory has resulted in a number of corrections being received, in addition to the normal amount of changes of address. To keep your file up-to-date, the changes are listed below:

Jonathan Smith reports his home address now as 2632 North 73rd Avenue, Elmwood Park, Ill.

John Merutka is now working for National Lock Co., Rockford, Ill.

Morris Wolin is now working for the Division Lead Co. His home address is unchanged.

Keller Phillippe has moved to 16112 Harvestmoon, Puente, Calif.

Oliver H. Round reports his home address as Lyndon, Ill. His business address is 49th Engr. Heavy Shop Co., Ft. Belvoir, Va.

R. W. Hailey is working for General Electric, and resides at 12 Van Vorst Drive, Ballston Lake, N. Y.

J. D. Hailey resides at 124 Rockingham Street, Toledo, Ohio, and is employed by Owens-Illinois Glass.

ANY POTENTIAL METS?

We have been informed of the following additions to the families of alumni which have accrued over the past year. If we left out announcement of your pride and joy, it's because you didn't tell us about it. R. P. Carreker, Met. '46, a girl, March, 1950. E. B. Gempler, Met. '49, a girl, Jan., 1950. Jack Chase, Met. '43, a boy, May, 1949. John A. Snyder, Met. '37, a boy, Oct., 1949. R. D. Kilimnik, Met. '40, a boy, Aug., 1949. George Sinclair, Met. '48, a girl, March, 1950.