

Mineral Industries

PUBLISHED DURING THE COLLEGE YEAR BY

THE DIVISION OF MINERAL INDUSTRIES EXTENSION

THE PENNSYLVANIA STATE COLLEGE

Volume 5

STATE COLLEGE, PENNSYLVANIA, OCTOBER, 1935

Number 2

MINING CONFERENCE ON THE WORK OF STANDARD PRACTICES

Committee of The American Mining Congress

OCTOBER 4 and 5

Fifth Mineral Industries Conference—Mining Section

On Friday, October 4, and Saturday, October 5, the Committee of The American Mining Congress in Pennsylvania and nearby states and other bituminous coal mine operators who are interested will meet at State College to discuss the projects selected for study by the committees.

In each of the various geographical districts, such as Central Pennsylvania, Western Pennsylvania, Southwestern Pennsylvania, Ohio, Northern West Virginia, committees have been formed to study and report on standard practices in the several phases of bituminous coal mine operation. These phases include face preparation, loading, transportation, power, mine maintenance, mining systems, surface preparation and safety.

PROGRAM

Registration for those attending will be open Friday morning and afternoon, and the first session will start at 2 o'clock with the following program:

Chairman—Mr. R. G. Pfahler, The Berwind-White Coal Mining Company, Windber, Pennsylvania.

"Proposed Standard Specifications for Testing Mine Fans" by Mr. J. F. MacWilliams, Pennsylvania Coal and Coke Corporation, Cresson, Pennsylvania.

"Mining Methods in Central Pennsylvania" by Mr. A. E. Roberts, Monroe Coal Mining Company, Revloc, Pennsylvania.

"Face Preparation Work" by Mr. A. E. Long, Clearfield Bituminous Coal Corporation, Indiana, Pennsylvania.

Ample opportunity will be given to discuss each of the subjects, after which the group will adjourn for dinner at 6:30 P. M. at the Nittany Lion Inn.

On Friday evening after dinner, opportunity will be provided for the meeting of individual committees and there will be a meeting also of the Student Penn State Mining Society which will be addressed by Mr. G. B. Southward, Mining Engineer of The American Mining Congress, Washington, D. C.

Saturday morning at 9:30, the group will reassemble to discuss how to carry on this committee work with profit to the individual, the company and the industry, Mr. G. B. Southward acting as chairman. Ample opportunity will be afforded to inspect the laboratories of the School of Mineral Industries, especially the work in mining, coal preparation, geophysics and fuel technology.

There are indications already that operators from Ohio and West Virginia will be in attendance, in addition to those from Pennsylvania. It is urged strongly that those who are planning to come make their reservations with the Nittany Lion Inn, State College, Pennsylvania, or write directly to Wm. R. Chedsey, Head of the Department of Mining, State College, Pennsylvania, with a request for accommodations such as are desired. The Inn has rather few single rooms.



PROF. W. R. CHEDSEY

LADIES' ENTERTAINMENT

Ladies accompanying the party will be entertained at an informal get-acquainted tea at the Nittany Lion Inn on Friday afternoon and, of course, will be welcomed at the dinner Friday evening. Early October is probably the prettiest time of the year around State College and many will find a trip here at that time most enjoyable and restful, in addition to the benefits and fellowship of the meeting.

OBJECTIVES OF THE PENNSYLVANIA STATE COLLEGE

A DIGEST OF A REPORT MADE BY A FACULTY
SURVEY COMMITTEE

The Pennsylvania State College operates under the provisions of the Federal Land Grant College Act accepted by the Commonwealth of Pennsylvania in 1863 to provide instruction and research in agriculture, engineering, technology, scientific and liberal studies, military tactics, and other subjects, in order to provide and promote, for the people of the Commonwealth and the nation, an education that is both liberal and practical.

Through its schools and departmental organizations the College carries forward its program of higher education by means of resident instruction, extension service, and research.

The following are its specific aims:

1. To give practice and training in the arts of learning, of thinking, and of communicating thought; to foster those intellectual pursuits, to inculcate those principles of living, and to promote those avocations, the knowledge and practice of which tend to broaden human interests and sympathies and to contribute to personal happiness and social welfare.

2. To advance the knowledge, the abilities, and the attitudes that make for better citizenship.

3. To stimulate a sense of responsibility for leadership.

4. To furnish opportunities for health and recreational education in order to assure a prolonged period of usefulness.

5. To develop high ideals of character, conduct, and cooperation.

6. To provide liberal education and special training for an effective place in economic, political, and social life.

The aim of resident undergraduate instruction is to arouse the desire to recognize and the ability to understand personal and social values and to express them in terms of human progress; to cultivate knowledge and the ability to apply it to the various vocations and professions.

The aim of resident graduate instruction is to afford opportunities for advanced work in various fields of knowledge, for the acquisition of more specialized abilities, and for the promotion of original investigation.

The aim of the extension service is to extend the educational resources of the College throughout the State and to make them effective to all its citizens.

The aim of research, which is desirable and feasible in every field covered by the institution, is to advance learning, to ascertain truth, to originate, improve, and develop methods, processes and products, and to provide enlarged opportunities and new wealth, in order that the citizens of the Commonwealth of the nation may live more genuinely and adequately.

Mineral Industries

Published monthly by the Division of Mineral Industries Extension from October to April, inclusive.

THE PENNSYLVANIA STATE COLLEGE
Division of Mineral Industries Extension
H. B. NORTHRUP, Director

Pennsylvania's School of Mineral Industries and Experiment Station

Dedicated to the exploration, development, and conservation of Pennsylvania's natural mineral resources, and their preparation, processing, and efficient utilization.

FIELD OF WORK

Geology, Mineralogy, Geography
Petroleum and Natural Gas
Mining and Geophysics
Mineral Economics
Fuel Technology
Metallurgy
Ceramics

DIVISIONS OF SERVICE

Resident Instruction
Extension Instruction
Correspondence Instruction
Mineral Industries Research

Entered as Second Class Matter at State College, Pa., November 7, 1931. Under the Act of February 28, 1925.

OCTOBER, 1935

FOSSIL EXHIBIT

An exhibit illustrating the geology and paleontology of the State College-Bellefonte area has been prepared recently by Dr. F. M. Swartz of the Department of Geology and can be seen in the west corridor of the first floor of the Mineral Industries Building. The exhibit is arranged about a model representing parts of the Nittany Valley and adjacent mountains, which shows the underground structures to a depth of about three miles. The surface is underlain by a series of blanket-like formations of rocks, some five miles thick, which have been folded into a great arch. (See Figure 1) The top of the arch has been cut away by erosion, laying bare edges of over twenty-five distinct rock formations.

The different formations contain different fossils, and specimens of some of the characteristic fossils of eleven of the formations are arranged around the model. (See Figure 2) Most of these fossils represent marine animals and show that the rocks in which they are found were deposited on the floors of seas which flooded central Pennsylvania some two hundred to five hundred million years ago.

One of the most interesting features of these fossil remains is the fact that they change from one formation to the next and

thus can be used by the geologist to identify the different rock bodies and to correlate them with the rock formations of New York, Maryland, and other parts of the world. Furthermore, the changes in the fossils illustrate the gradual evolution of the life of the ancient seas.

FIGURE 1. Model of Nittany Valley (a) and adjacent mountains near Bellefonte (b), Pennsylvania, showing underground structure; looking northeast. Nittany Valley has been cut in soluble limestone along the axis of the Nittany Valley arch or anticline. It is bounded by the Nittany Mountain (c) and Bald Eagle ridge (d), which follow the outcrops of the hard and insoluble Tuscarora and Oswego sandstones. To the left are seen the Bald Eagle Valley (e) and foothills of the Allegheny Front (f). The characters of the surface soils are determined by the characters of the underlying rock; consequently, vary wide-

ly in this area. The Carlisle and Black River limestones (g) are extensively quarried at Bellefonte and Pleasant Gap. The Tuscarora sandstone (i) is worked for ganister rock at Mt. Union, Lewistown, and elsewhere. The Portage and Chemung shales (h) are buried below the surface in western Pennsylvania, and in the rock domes of that area contain the famous Pennsylvania oil, distilled from the organic matter trapped in these sediments when they were deposited on the floors of the ancient seas.

FIGURE 2. Fossils of long extinct marine trilobites, collected in Oriskany beds near "e" in Figure 1. The specimen on the left is five inches long. This animal crawled over the seafloor, near what is now Bellefonte, about 350 million years ago. The trilobites became extinct when the Nittany Valley arch was rising, some 200 to 250 million years ago.



Figure 1.



Figure 2.

DEPARTMENT OF FUEL TECHNOLOGY

T. S. Spicer, '34, B.S. Fuel Technology, now of the Pittsburgh Coal Company, was operated upon recently for appendicitis. He writes that he is recuperating at the New Jersey seashore.

Dr. H. W. Nelson has completed the editorial work of the preliminary report of the Committee on Bituminous Research Planning, Coal Division, A.I.M.M.E., of which Dean Edward Steidle is Chairman. This report is now in the hands of the Committee for final revision.

METALLURGY DEPARTMENT

1935 graduates in Metallurgy are located as follows: Five are with the Bethlehem Steel Corporation—James Kelley and Weldon Wertz at the Cambria Plant in Johnstown; Ralph Haag and Arthur Harris at the Lackawanna Plant in Buffalo, and Robert W. Brown at the Sparrows Point Plant near Baltimore, Maryland.

Robert Stout is in the research department of the Carpenter Steel Company, Reading, Pa.; J. Cameron Henry and Bruce Siemon are with the metallurgical department of the American Steel and Wire Company at Donora, Pa.; D. D. Barbor is with the National Tube Company at McKeesport; Laird Lias with the Jones and Laughlin Steel Company at Pittsburgh; Philip Lansdale is Assistant Metallurgist with the Summerill Tubing Company at Bridgeport, Pa.

Henry Nickol is back at School as Research Assistant in Metallurgy; Harry Northrup, Jr. is in the metallurgical department of the Republic Steel Company at Youngstown, Ohio; W. F. Mott is with the Illinois Steel Company; Alvin Sharbaugh is with the Brown-Fayro Company at Johnstown, Pa.; Kenneth Mairs, M.S. 1935 is with the RCA Corp. at East Orange, N. J.

Dr. Charles R. Austin, Associate Professor of Metallurgy, who is in charge of the cooperative research on high temperature properties of metals and alloys, will represent Penn State at the Chicago meeting of the American Society for Metals and the National Metal Congress.

Dr. Austin will present two papers on The High Temperature Properties of Nickel-Cobalt Iron-Base Age-Hardening Alloys. The first paper deals with Mechanical, Age-Hardening, Work-Hardening and Temperature-Softening Properties of the Alloys and the second is entitled "Resistance to High Temperature Oxidation and to Chemical Corrosion with Electrical Resistivity and Metallographic Data on the Alloys."

* * *

Mr. James R. Long, Instructor in Metallurgy, has returned from a year's leave of absence spent in advanced graduate study at the Massachusetts Institute of Technology. His work involved special research on certain phases of the nitriding of steel and was conducted under Dr. V. O. Homberg. He expects to receive the Ph.D. in Metallurgy at the mid-semester commencement.

Mr. Long is assuming charge of the senior instructional work in metallography.

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Improved conditions in the metallurgical industries are reflected in a 100% increased enrollment in the Metallurgy Curriculum over the Freshman enrollment of 1933.

DEPARTMENT OF PETROLEUM AND NATURAL GAS

The Department of Petroleum and Natural Gas topped off a successful year by placing all its graduates. William Borland took a place on the Page lease (Olean Petroleum Corporation) and is putting to good use the background obtained in a senior thesis on water flood efficiencies. Martin Luther is following through a rapid succession of training jobs for Quaker State, and will soon rank as an engineer of broad refining experience, as well as one of good technical training. Luther revisited the department recently to talk over the problem of filtration, and we have no doubt that he will soon be well versed in the art of decolorizing Pennsylvania Grade lubricating oil. Richard Dombart is working on the Kane estate near Kanesholm. W. L. Gordon is now in Oklahoma, or was at last report, helping to establish a new Geologic Standards Company. We are happy to report that several personnel agents asked for men who had already been placed. The depression has passed lightly over the graduates in Petroleum and Natural Gas at The Pennsylvania State College.

Mr. Kenneth B. Barnes, for the past five years instructor in the department of Petroleum and Natural Gas Engineering, now has a new field of operations in Oklahoma. He has organized a new testing and consulting laboratory at Tulsa called "Geologic Standards Company". We join with Ken's many friends throughout the Pennsylvania fields in wishing him success.

Mr. Barnes' place will be ably filled by Mr. Ralph H. King, who comes to us with the M. S. degree in petroleum engineering from the University of Texas at Austin. Mr. King has had two years' field experience in the midcontinent fields, and outside of production problems his special hobby is paleontology. Mr. King is a member of Tau Beta Pi and Sigma Xi.

Professor C. A. Bonine, who has had charge of this department since its inception, has asked to be relieved of the work, and Wm. R. Chedsey, head of the Department of Mining, will act as head of this department also for the coming year.

MINERAL INDUSTRIES MUSEUM

The Mineral Industries Museum recently received a collection of rocks and minerals from Mr. W. L. Affelder of the class of 1899. The gift containing several hundred specimens includes minerals, rocks and fossils, from various parts of the globe, collected by Mr. Affelder in person beginning in his student days in this School. Of special interest among many attractive minerals is a specimen of Pyromorphite. This is lead phosphate from the old lead mines near Phoenixville, Pennsylvania. These mines have long since been closed and good crystals of Pyromorphite from the locality are now very rare and, therefore, highly prized by collectors. The minerals from the collection have been arranged in specific order and are placed on exhibit with Mr. Affelder's original labels printed by his own hand. The rocks and fossils will be used in other collections.

Mr. Affelder is well known throughout the State as a successful business man and to this Institution as a loyal alumnus and a member of our Board of Trustees.

DEPARTMENT OF GEOLOGY, MINERALOGY and GEOGRAPHY

Dr. A. W. Waldo, research assistant in petrography, published an article in the August Number of "The American Mineralogist", entitled "Identification of the Copper Ore Minerals by Means of X-Ray Powder Defraction Patterns".

Mr. E. F. Williams was in charge of the summer camp in geology in place of Professor Bonine.

Dr. J. C. Reed, a graduate of the Geology curriculum in 1927, recently published an article in the New York State Museum Bulletin entitled "The Geology of the Potsdam Quadrangle".

Mr. J. Robert Jones, a graduate in the Geology curriculum in 1932, has been associated with Dr. A. P. Honess in a research project sponsored by the Geological Society of America. They are studying the abnormal solution phenomena as revealed by the attack of optically active solutions on crystal surfaces.

Mr. Gilbert Espenshade, who was graduated in the Geology curriculum in 1933, was engaged in field work in Newfoundland for Princeton University during the summer.

Mr. George Heyl, a graduate of the class of 1932, received the Ph.D. degree in Geology in June from Princeton University and since that time has been working for the U. S. Coast and Geodetic Survey.

An article by Dr. F. M. Swartz, associate professor of Paleontology, entitled "Relations of the Silurian, Rochester and McKenzie Formations near Cumberland, Maryland, and Lakemont, Pennsylvania", appeared in the August Number of the Bulletin of the Geological Society of America. Reprints will be included in the technical paper series of the Mineral Industries Experiment Station and made available by that department.

CERAMICS DEPARTMENT

The Ceramics Department staff, together with two graduate students, Mr. Paul Smith and Mr. Bennett Ellefson, attended the summer meeting of the Glass Division of the American Ceramic Society at Keuka Lake, Hammondsport, N. Y. on September 13th and 14th. The program of this meeting was devoted largely to consideration of the strength of glass and to methods of properly measuring the resistance of glass fibers, sheet, bottles and bulbs to mechanical and thermal shock.

This subject has attracted a good deal of interest both in this country and abroad. The German glass industry has held recently a symposium on this subject and the British are about to hold one. It appears that the strength of most glass is only a few percent of the theoretical value and that the surface properties of the glass play a very important role in affecting the strength. Proper attention to this problem is one of the major responsibilities and opportunities in the glass industry and the Department of Ceramics expects to undertake some cooperative work in conjunction with the glass industry along these lines.

The social facilities offered by Dr. J. T. Littleton at his Willow Point cottage were appreciated greatly by all who attended the conference. About 125 representatives of the American glass industry were present.

THE ANTHRACITE MINING MODEL

The Mineral Industries Museum of the College, located on the third floor, west, of the Mineral Industries Building, contains many items of interest and of value. Probably the most valuable of the exhibits housed in this collection is that of the model depicting a composite of anthracite mining conditions.

The anthracite mine model was started in 1903 for the St. Louis Exposition. The idea was conceived by Mr. E. W. Parker and carried out by Professor Reber of The Pennsylvania State College who had charge of the Pennsylvania State exhibit. The actual work was done by Mr. E. E. Howell of Washington, D. C., who was reputed as the best model builder in the country at that time. Mr. Arthur Hobey Stores of Wilkes-Barre was engaged as a consultant.

When the Louisiana Purchase Exposition at St. Louis was closed, the anthracite op-

very close to the surface, the coal is often "mined" by steam shovels after the surface dirt has been removed. This type of operation is called "stripping", and is illustrated in the right center background where a steam shovel can be seen in operation.

The vertical shaft shown in section near the left center is typical of anthracite practice in reaching the flatter beds. There can be seen the customary layout for the "room and pillar" method of mining. Here the timbers supporting the roof are in place and the rooms are separated by pillars of coal which are left standing until all room development has been completed in that section, when they will be removed. "Break-throughs" are visible in the pillars. These are for the purpose of "coursing the air" for ventilation purposes. The "air bridges" or overcasts for conducting the air across the headings are observed on the gangway leading to the vertical shaft.

At the extreme lower left foreground the coal is rising slightly. Here is illustrated the method of operating a buggy breast. In the rooms on the overthrust fold in the

modern breakers and are characteristic of the industry.

This is one of the most cherished museum pieces at the College, not because of any particular historical association attached to it, but because of the great wealth of technical conditions illustrated by it. While conditions in some parts of the field have allowed newer methods to be used, there is, even today, a large number of places which use these same methods as those shown in the model.

DEPARTMENT OF MINING

At the last regular meeting of the school year 1934-35 the student club known as The Penn State Mining Society was reorganized entirely. This reorganization enables the society to become a student affiliate of the American Institute of Mining and Metallurgical Engineers. Eligibility for membership has been broadened to include students in Geology and Petroleum and Natural Gas Engineering, as well as



THE ANTHRACITE MINING MODEL

erators who had subscribed to building the model deposited it in the Mining Museum of The Pennsylvania State College, although there was a very strongly supported request for it to go to the National Museum in Washington. While it is supposed to be generalized and show on one model the many variations in the topography of the anthracite coal seams, it illustrates in addition the several types of anthracite mining employed at the time the model was constructed. Furthermore, the actual surface and coal topography are fairly well illustrative of one particular section of the great anthracite basin, namely, near Hazleton, Pennsylvania. Near this location there is a portion of the coal basin where the workings are quite flat, as shown in the left front foreground, and another portion where the coal exists in an overturned fold as shown in the center of the picture, and in another portion of the basin where the seams dip steeply, as shown at the extreme right of the illustration.

In the model, of course, the strata overlying the main coal seam have been partly cut away and removed in order to better illustrate the actual arrangement of typical underground workings and to furnish an idea of the manner in which the several anthracite seams of the valley are superimposed. Where the coal seam or seams lie

center of the picture is shown the system of culm flushing. This practice involves the utilization of fine waste material from the breaker. This fine refuse material is piped down from the breaker into these rooms in a stream of water and retained in the room cavity by a porous dam which is built across the neck or narrow part of the room. The water drains off and is re-used. This waste material or culm will, in time, solidly fill the room and act as a support for the roof during the removal of the coal remaining in what are now the pillars.

In the steeply dipping part toward the right hand end of the picture is shown an inclined shaft going down on the coal seam, following its dip, and also an area opened by battery breasts wherein the breasts are kept nearly full of broken coal as a means of supporting the roof while the breasts are being driven and upon which the miner stands as he mines the coal over his head. There can be seen also above the main gangway—which is rather heavily timbered—the air way or "monkey" drift by means of which the breasts are ventilated.

There are depicted also two breakers in the central part of the picture on the surface over the overthrust fold. These were, at the time the model was made, in 1904,

those in Mining Engineering. This will make a total membership for the Society of more than a hundred members. This increased membership, as well as affiliation with the American Institute of Mining and Metallurgical Engineers, should lend vigor and add interest to the work of the Society. Professor J. W. Stewart, of the Mining Department staff, was elected Faculty Advisor to the organization and Mr. Paul Sterling, Chief Mechanical Engineer for the Lehigh Valley Coal Company, was elected its Counselor. The first meeting of the Society during the present school year will be held October 4 in Room 315 of the Mineral Industries Building. At this meeting, which will take the form of a smoker and welcome to new students, it is planned to have Mr. Sterling, the Society's Counselor, and Mr. G. B. Southward, mining engineer for The American Mining Congress, as the principal speakers.

Professor Wm. R. Chedsey, head of the Department of Mining, acted as judge at a first aid contest held at Ebensburg, Pa., on Saturday, September 7. Professor Chedsey also served in a similar capacity at a first aid meeting held at Jennerstown, Pa., on Saturday, September 14.

It is a pleasure to report that all of the men graduating last June have been placed.