

# Mineral Industries

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THE DIVISION OF MINERAL INDUSTRIES EXTENSION

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THE PENNSYLVANIA STATE COLLEGE

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Number 3

## Improvements On Penn State Campus Recently Completed

Why not return to the College some day soon and see the changes which have taken place on the campus since you departed years ago with your well-earned diploma safely tucked under your arm?

Have you ever seen anything more inspiring than the Old Main building? It is representative of a new quiet dignity, commensurate with the progress of education, yet retaining sufficient of the old atmosphere to make the old Grad feel perfectly at home. Convenience was not overlooked in the design of this building, neither does elegance predominate. It is a building of the college for students, faculty and friends of the college.

Then, there is the new Home Economics building, just under roof. This building is reported to be the last word in buildings for this purpose, surpassing anything, anywhere, in the completeness of its details. It was designed especially for home economics and it is reported that all available space has been efficiently utilized.

Remember when you used to walk up to Ac Hill to the Creamery to get a dish of real ice cream? Well, soon you will have to walk just a bit farther, for there is in process of completion a new dairy building just a little north of the old Creamery. This building, likewise, is reported to constitute the criterion in buildings of its nature, in so far as efficiency and service are concerned.

Then, there are new girls' dormitories, a new hospital, a new unit for botany, an additional wing to the Pond chemistry group, a new Liberal Arts unit, new Men's dormitories and new Recreation building

For friends of the College, visitors to the College and the public in general, there is, right on the Campus, one of the most unique and modern hostleries in the United States, the Nittany Lion Inn. Located on the north-west section of the Campus proper, overlooking a beautiful 18-hole golf course in the foreground and the Nittany Valley in the distance, its setting in the woods is ideal. Comfort, quiet, and a wonderful cuisine make it an ideal resting place for the Old Grad or for the parents of students in the College here on a visit to their children.

Located very handily to the Nittany Lion Inn is the new School of Mineral Industries building. Completed in 1930 at a cost of nearly \$500,000, and occupied for the first time in that year, it constitutes a very antithesis of what the Old Grad knew as the Mining building.

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## Mineral Industries Extension Courses Organized Under Smith-Hughes Plan



PROF. H. G. TURNER

### Turner Joins Faculty of Mineral Industries

Professor H. G. Turner has recently joined the faculty of the School of Mineral Industries as research associate in fuel technology. He also holds the position of director of research for the Anthracite Institute and will conduct the anthracite scientific research work in his laboratory, Room 303 of the Mineral Industries building.

Professor Turner received his undergraduate training at Syracuse University where he specialized in chemistry, geology, and mineralogy. While an undergraduate at Syracuse, he was elected to the faculty to serve as laboratory assistant in chemistry and mineralogy.

After graduation from Syracuse University in 1912 with the B. S. degree, he pursued advanced work at Chicago University and later at Syracuse where he returned as instructor in mineralogy in 1919. From 1913 to 1918, he served as instructor and, later, assistant professor of mineralogy. He took the degree of M. S. in 1914 at Syracuse and continued further advanced studies at that institution. In 1918, he was appointed assistant professor of geology at Lehigh University and held that position until 1930, when he relinquished undergraduate teaching to accept the position of director of research for the Anthracite Institute.

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### Co-operative Agreement in Effect Since 1923 Recently Revised To Meet Enlarged Scope of School

The aim of the Division of Mineral Industries Extension is to afford every mineral industries worker a basic and fundamental education thereby giving him a broad view of the entire industry in which he is engaged. Having this fundamental education, he will more fully realize where his job fits into the operating plan.

Mining Extension was reorganized in 1919 and in 1923, the State Department of Mines, the State Department of Public Instruction and the then School of Mines and Metallurgy entered into a formal agreement whereby those State Departments were to cooperate with and assist the School of Mines and Metallurgy in vocational educational extension work. The State Department of Mines proffered the assistance of its Mine Inspectors Staff numbering 55 men in the preparation of lesson material and in lectures to classes on pertinent mining topics vital to the future of the industry. The State Department of Public Instruction cooperated through their experience in methods of teaching and assisted vitally through their disbursement of Smith-Hughes funds for the partial payment of teachers.

The Smith-Hughes Act provides funds for the payment of teachers in free evening schools for the vocational education of adult workers. It provides, that when 20 or more such workers, 16 years of age or above, make written application to their local school board for the establishment of a free evening vocational school, the school board shall make all provisions for the establishment of such a class. The local school board shall also pay the teacher regularly. The Act provides that the school board shall be reimbursed by the State Department of Public Instruction in amount equal to two-thirds of the teachers salary, this amount being borne equally by the State and the Federal governments.

In a meeting held at Harrisburg in August 1931, Dean Edward Steidle and Professor H. B. Northrup of the School of Mineral Industries representing The Pennsylvania State College, met with representatives of the State Department of Public Instruction, State Department of Mines, State Department of Labor and Industry and representatives of industry and of education. The existing formal agreement of 1923 was revised, renewed and enlarged to meet the scope of the new School of Mineral Industries.

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## MINERAL INDUSTRIES

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Division of Mineral Industries Extension  
H. B. NORTHROP, Director

Editor

John T. Ryan Jr. '34

Managing Editor

Theodore A. Serrill '32

Associate Editor

Ernest J. Kaulfuss '34

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DECEMBER, 1931

### Scott Fills Research Post For Anthracite Institute

George Stanley Scott, Research Assistant for the Anthracite Institute, graduated from Lehigh University in 1920 as a Chemical Engineer. He served as Junior Chemist at the Pittsburgh Experiment Station of the United States Bureau of Mines for two years, working on a number of research problems and on fuel analysis. In 1923, he became Research Chemist for the Hudson Coal Company and a member of the Engineers Club at Scranton, residing at the Clubhouse. While with the Hudson Coal Company, Mr. Scott was called upon to find answers, mathematically or by experiment to a number of problems, some of various natures, but most of them pertaining to coal preparation. In connection with the latter, Mr. Scott planned and carried out the most comprehensive test of an anthracite breaker that had ever been made.

In 1925, Mr. Scott was associated with a briquetting enterprise in Michigan, which, for a number of reasons, failed to survive. Following this, he became a chemist for the American Rheolaveur Corporation of Wilkes-Barre, and a year later was made Chief Chemist, specializing in washability studies of American and foreign coals and cros. In 1929, the American Rheolaveur Corporation became affiliated with the Koppers Company of Pittsburgh and the general offices of the former corporation were moved to Pittsburgh. There was some discussion later in the year of moving the Laboratory to Pittsburgh, and it was then that Mr. Scott joined the Frost Research Laboratory, Inc., of Norristown, Pennsylvania, in the capacity of Assistant to Mr. Frost, the president and director. Mr. Scott, while with the Frost Research Laboratory carried on some original work on the combustibility of solid fuels. Most of his time, however, was devoted to the solution of a wide range of fuel technological problems of a commercial nature. Mr. Scott's splendid work at the Frost Research Laboratory, Inc., won him many friends in the technical and commercial world.

During the summer of 1931, Mr. Frost was prevailed upon to release Mr. Scott for more extensive research on Pennsylvania Anthracite with Professor H. G. Turner, director of research for the Anthracite Institute at The Pennsylvania State College.

Mr. Scott is the author of several publications on fuel problems. He is a member of Tau Beta Pi and the American Institute of Mining and Metallurgical Engineers.

### Dever Gives Lecture at Mining Society Meeting

Forty-three members attended a meeting of the Penn State Mining Society Monday evening, November 30, at which Mr. P. H. Dever of the Glen Alden Coal Company, Wilkes-Barre, gave a lecture on "Mine Fires, Explosions of Methane and the Best Practical Methods of Control."

Mr. Dever brought to the meeting the benefit of his many years of mining experience in the anthracite region in successfully coping with hazardous conditions that required ingenuity and ready resource. Mention was especially made of new equipment introduced within the last ten to fifteen or twenty years that has materially benefited this type of work.

A considerable part of the lecture was devoted to the recovery operations following the severe explosion at Woodward No. 3 Colliery in May, 1923. This was followed by considerable discussion and the answering of questions.

### Arizona Uses Copper for License Plates

Arizona has shown itself to be alert as well as progressive in the matter of ending the depression. Arizona produces more copper than any other state in the union, and as a result it has been greatly affected by the curtailment of copper production.

The Arizona Highway Department then hit upon the idea of using copper to make automobile license plates in 1932. The specifications now call for copper plates, although the size of the plate has been decreased on account of cost of materials, the new plate put up a very presentable appearance indeed.

The lowest bid for the job was 14½ cents per plate, and this compares favorably with the price of steel plates. The samples which were awarded the bid were subjected to severe temperature and weather tests to ascertain whether the lacquer would protect the plate from weather and prevent tarnishing of the copper.

Seventy thousands pounds of Arizona copper will be needed to produce the metal for new Arizona license plates.

"The Highway Commission has communicated with many of the other states urging them to use copper license plates in 1932. If some of the larger states should adopt the red metal, several million pounds of copper could be used, in this way doing away with the oversupply of this metal and putting the copper mines of the United States back to work."

—Arizona Highways, Sept., 1931

### SMITH-HUGHES PLAN

(Continued from page one)

By this agreement, the Division of Mineral Industries Extension is directly responsible for the preparation of all lesson material to be used in the instruction of the mineral industries workers of the State, and for the supervision of all class and instructional work.

All classes now existing in Mineral Industries Extension throughout the entire State with but one exception were organized under the Smith-Hughes plan, the excepted company desiring to maintain classes open only to their own workers.

Under the Smith-Hughes plan, instruction is given to the worker at a minimum cost. Many instances are at hand where it is advisable for the worker only to purchase the text material used in the course. This text material is valuable to him throughout his entire career and might not be otherwise available if supplied by the local school board under the Act.

Due to the lamentable condition of certain of Pennsylvania's industries, many of her workers lack employment and cannot pay their taxes. This makes local school board funds unavailable for the payment of one-third of the teachers salary. In many such instances, interested mineral industries companies are assuming the school boards share of the teachers salary payment, thereby fostering and sponsoring the educational work.

Operating companies find it more profitable to employ men educated in their particular line of endeavor. Accidents are very costly to industry and practically all mineral industries extension courses embody and stress safety instruction in their educational program. In addition, instruction is given covering the fundamentals of the occupation involved, as it is believed from a study of the results obtained in former classes that the man fundamentally educated and well rounded is a better workman than the man who receives "pointed" instruction or coaching for some particular job.

To that end then, the establishment and maintenance of classes to particularly "point" men so that they can successfully pass the State examinations for underground mine officials is not condoned. Such underground officials should be well rounded men, educationally as well as practically, to meet the conditions to be imposed upon them as a result of progress in the industry. It is here that a graded course of instruction is of extreme value.

Smith-Hughes funds are available and have long been used for the form of education just mentioned. They are also available for the establishment of classes for those men who have already obtained their State underground papers. Such classes are called Mine Foreman Training classes and are designed to stress the idea of individual thought and self reliance and to deal more with the personnel factor, which, when all is said and done is the most important factor in the industrial world today. Labor cannot be denied its place in the Sun, but the intelligence of the laboring class can be elevated to a higher plane, giving it a better understanding of its particular connection with industry as a whole.

# Bureau of Mines Assists in Anthracite Research Program

## 185 Coal Samples Taken To Assist Anthracite Utilization Study of Research Institute

The United States Bureau of Mines has been of great assistance to many mineral industries in the solution of their problems. It has been responsible for much of our knowledge concerning the origin, distribution and utilization of coal from peat to bituminous. Its participation in the technical problems of Pennsylvania anthracite, however, is an entirely new activity which was started on April 28, 1931, through the efforts of Professor H. G. Turner, director of research for the Anthracite Institute and research associate in fuel technology at The Pennsylvania State College.

During the past few months, two Bureau of Mines Engineers, Mr. Charles M. Stull and Mr. Henry Goodman together with Professor Turner have sampled all the anthracite beds at both ends and the middle of the Northern Field, the Eastern Middle Field, the Western Middle Field, and the Southern Field of the Pennsylvania Anthracite region.

About 185 face samples were collected in the following manner: The working face of the coal bed was dressed to a flat surface by means of sharp miners' picks. A channel 6 inches wide and 3 inches deep was cut in this face, the cuttings being caught on a large square canvass spread on the floor at the foot of the channel. These cuttings were dumped into canvass bags and carried to the surface where they were crushed in the Bureau of Mines portable crusher and quartered down to four-pound samples. These small samples were placed in air-tight containers and mailed to the Bureau of Mines laboratory in Pittsburgh for ulti-

matic analysis, proximate analysis, B. t. u. determinations and ash fusion tests.

Two samples of one and one-half inch lumps were also taken from top to bottom along the edges of each face sample channel and mailed to the Bureau of Mines station at Seattle, Washington, for friability tests. A 25-pound sample of each face sample was taken by Professor Turner for his laboratory at Penn State. In taking all samples, bone, pyrite and rock partings over 3/8 inch thick were eliminated so that the samples represented practically pure coal. Breaker samples were also taken to show the relation of prepared coal to pure coal as sampled underground.



TAKING SAMPLES AT COAL FACE

The information gained from this preliminary survey will give the Bureau of Mines and Professor Turner a comprehensive cross-section of the composition and nature of anthracite from the whole Pennsylvania anthracite region. A background of facts of this kind is invaluable in a research program leading to wider utilization and new uses for anthracite. During the next few years, it is hoped that the Bureau of Mines will continue this work until every coal bed in every mine of the anthracite region has been sampled and studied.

## TURNER JOINS FACULTY

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Professor Turner has had a wide range of professional experience aside from his teaching activities. He was connected with the Vermont State Geological Survey for two summers. He has pursued consulting work in almost all fields of geology and mineral technology. His most important consulting work has been in coal geology, petrography, geology of building stones and cements, metallic minerals, water supply and meteorology.

Professor Turner has made many valuable contributions to science through his writings. His most noteworthy contributions have been on the subject of Pennsylvania anthracite, which he has been studying for the past decade. His work on anthracite has been described in many recent text books both abroad and in America. He is a member of many scientific societies among which are Sigma Xi, Alpha Chi Sigma, The Coal Research Club of England and America, American Association for the Advancement of Science, American Institute of Mining and Metallurgical Engineers, American Chemical Society, the Engineers Club of Lehigh Valley, and the Pennsylvania Academy of Science.



PACKING SAMPLES ON SURFACE

## Graded Basic Courses Now Being Given By Extension Division

A study of the needs of the workers in the mineral industries of the State of Pennsylvania covering a period of the last four months has given rise to the formation of the opinion that the mineral industries workers of the State, with particular reference to the mining industry, should have a graded course of instruction for the evening vocational schools, which such men attend.

At present there are many kinds of lesson material representative of the particular locality, now being given to the mining men of the State. It is apparent that the mining industry is a basic institution and that a graded course of lesson material, covering the basic principles of mining, would be adaptable in any mining locality. Such a graded three year course would not only raise the plane of education of the men taking the prescribed course, but would at the same time cover those fundamentals of mining applicable to both the anthracite and bituminous fields, which would prepare men to sit in on competitive examinations offered by the State Department of Mines as a qualification of those men taking the examinations to receive their State papers as fire bosses, second grade and first grade mine foreman.

### Lesson Material Ready

The Division of Mineral Industries Extension of The Pennsylvania State College now has adequate lesson material to cover this field and meet the needs of such a graded course. At the present time, we have printed two volumes of anthracite mining lessons and two volumes of bituminous mining lessons. It is planned to dissociate these two volumes of lesson material, covering each branch of mining and prepare text book material from this dissociated material which will meet the requirements of a three year graded course covering all phases of coal mining.

Since the principle of mining is basic, it is believed that there is no need for both anthracite and bituminous lesson material. With this view in mind, therefore, it is contemplated to embody in the three books, covering the graded course on mining, those basic principles which will teach the men the fundamentals of both classes of mining. Each book will embody 60 lessons, covering two hours class room work per night and at the end of each lesson there will be assignments for home study and the work will be upon a graded basis similar to the method of grading used in common schools.

Upon the completion of each year of the graded work, a certificate will be issued, counting five industrial points toward a diploma in practical mining worth 15 industrial points. This gives the men an additional incentive and it is believed that with such a graded course, instructional work will be furthered for the mining industry. This method will allow a miner to move from one section of the State to another and if he has completed a given amount of work in his former location, he can enter an advanced class in his new location, upon presentation of his certificate showing that he

has completed a given amount of prescribed work in another locality, and which work was exactly on the same basis as the work in his new territory.

Such a transfer is not now possible for reasons stated in the beginning. Company or individual ideas creep into the class work and much material and time is devoted to teaching work, which is applicable only to the particular company in which the men are employed. While such information is valuable, it is hoped that with the plan such as outlined above, greater strides can be made in the mining educational field which will materially benefit both the State and the individual. Such instruction will tend to further the interests of the individual by instilling in the men those factors which are essential for safety, efficiency and economy.

### To Extend Courses

It is hoped, as experience dictates and as funds permit, to extend these same basic principles of fundamental education to all branches of the primary mineral industries of the State of Pennsylvania. Without question, the method and the kind of instruction will have to be tempered to meet the particular conditions involved. The School of Mineral Industries is vitally concerned with the education of the mineral industries workers of the State and is attempting to form and evaluate plans which shall include the best educational features possible to educate the workers of the State to meet the increasing demands placed upon such workers.

## IMPROVEMENTS ON CAMPUS

(Continued from page one)

Its attainment and efficiency of plan and construction are the result of untiring effort on the part of Dean Edward Steidle. Its presence on the campus is indicative of an "esprit de corps" of the prime movers among the mineral industries executives of the Commonwealth and the recognition of the necessity for such a plant at their State institution. This building should be the logical headquarters for the dissemination of all State mineral industries information. It is fairly well equipped, but additional laboratory apparatus is needed from time to time to keep pace with industrial progress and for research work, so as constantly to be in advance of industry.

The mineral industries constitute by far the largest tax-paying group in the State. They now have available housing facilities and personnel at their State Institution for the solution of their industrial problems. Those in the mineral industries who have never seen the College or the new Mineral Industries Building, welcome. To those who have already visited us, again most welcome.

## STATE BOXING SCHEDULE

Dartmouth at State College, January 16, Western Maryland at State College, February 6; North Carolina at Chapel Hill, N. C., February 13; Pittsburgh at State College, February 27; West Virginia at State College, March 5; Syracuse at Syracuse, March 12; Intercollegiate Championships at Syracuse, March 18 and 19; National Collegiate Athletic Association tournament at State College, March 25 and 26.

## Textbooks Used in Metallurgy Courses 1931-32

Course	Title and Author	Publisher
Met. 49	Luddell's Handbook of Non Ferrous Metallurgy. Vol. 1, only	McGraw-Hill
Met. 50	Richards Metallurgical Calculations	McGraw-Hill
Met. 52	Fulton & Sharwood Manual of Fire Assaying	McGraw-Hill
Met. 53	Lidell's Handbook of Non Ferrous Metallurgy, Vol. I, and Jeffries and Archer, Science of Metals	McGraw-Hill
Met. 54	Parr: Analysis of Fuels, Boiler Waters and Gases	McGraw-Hill
Met. 57	Stoughton: Metallurgy of Iron and Steel. Camp & Francis: Making Shaping and Treating of Steel	Carnegie Steel Co.
Met. 58	Same as Met. 54	
Met. 59	Rosenholtz: Elements of Ferrous Metallurgy	Wiley
Met. 61	Lidell Handbook of Ferrous Metallurgy Vol. II, only	McGraw-Hill
Met. 63	Same as Met. 59	
Met. 65	Same as Met. 61	
Met. 73	Camp: Making, Shaping and Treating of Steel, or Porter: Coal Carbonization	Chemical Catalog Co.
Met. 79 (479)	Same as Met. 59	
Met. 471	Sauveur: Metallography and Heat Treatment of Iron and Steel	McGraw-Hill
Met. 472	Woldman: Physical Metallurgy	Wiley
	Handbook Am. Soc. of Steel Tr	
Met. 474	National Metals Handbook, 1930 ed	Am. Soc. for Steel Treating
Met. 475	Same as Met. 61 and Met. 65	
Met. 476	Same as Met. 472	

Note:—All courses omitted from the above list which are listed in The Pennsylvania State College Catalogue, have no fixed textbook.

## Textbooks Used in Chemistry Courses In Metallurgical Engineering Curriculum—1931-32

Course	Title and Author	Publisher
Chem. 1	Smith & Kendall: College Chemistry	Century Co.
Chem. 2	Reedy: Elementary Qualitative Analysis	McGraw-Hill
Chem. 20	Hamilton & Simpson: Calculations of Quantitative Chemical Analysis	McGraw-Hill
	Hall: Textbook of Quantitative Analysis	Wiley
Chem. 24	Lord & Demorest: Metallurgical Analysis	McGraw-Hill
Phys. Chem. 10 & 12	Knox: Physico-Chemical Calculations	Methuen & Co.
	Getman: Outlines of Theoretical Chemistry	Wiley
Phys. Chem. 11	Same as last one above.	