

The Pennsylvania State College Bulletin

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Associate Professor and Supervisor of Mining Extension

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The School of Mineral Industries of the Pennsylvania State College

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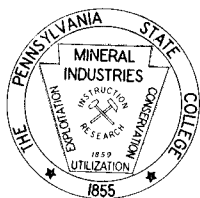
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PRELIMINARY TRAINING AND EDUCATION OF MINE OFFICIALS

By D. C. JONES*

IN PREPARING THIS PAPER it was necessary for me to assume that the committee in charge of arrangements had in mind the treatment of mine official training as it exists today and as it might exist in the near future or, say, ten years hence. The story of what is taking place today or has taken place in the past can readily be told. It is more difficult to predict what will take place in the future. We can be certain of only one thing, which is that changes will take place, not only in our methods of mining but also in our methods of instructing men who are either mine officials or candidates for the examinations through which mine official certificates are secured.

It is very appropriate to review the methods of training mining men while we are in the midst of a war because the impetus to this type of training was given near the close of the last war through the passage of the Smith-Hughes Act by Congress in 1917. This Act provided for the establishment of vocational training classes throughout the country in co-operation with the various state governments, and funds to be matched dollar-for-dollar by the states were set aside to pay for certain expenses in connection with such training work. Vocational training classes for all types of workmen are organized and operated under the Smith-Hughes Act and the mining industry in this and other states has received its share of the benefits resulting from this legislative act through the establishment of vocational classes in mining.

In Pennsylvania the State Department of Public Instruction administers the Smith-Hughes funds received from the Federal Government. Certain rules and procedures must be followed in securing and operating a vocational training class for the benefit of the workers in any community, but the requirements are not difficult to meet, and the benefits to any community are so great that it is surprising so few communities have taken advantage of this opportunity. The initial step to take is to present a petition signed by not less than 20 residents of the community to the school board of that district requesting a vocational training class. If the school board approves the request, and it is rare when they fail to approve it, then application must

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be made by the board to the State Department of Public Instruction for permission to operate such a class. This approval is usually granted if three conditions have been satisfied: first, if the board has secured a qualified person to teach; second, if the course to be studied has been approved previously or is submitted to the Department of Public Instruction for approval at that time; and, third, if a suitable meeting place, light, and heat are furnished. The instructional expense is paid by the school board during the term, but reimbursement for such expenditure is provided by the State after the close of the term during which the class operated. There is no charge made against the students who attend, except that which is necessary for securing the text material studied, so the term *free evening classes* is frequently applied to such work. This is the type of class which has provided training for so many miners since 1917, and its value is so evident that it is safe to predict it will continue to operate for many years in the future, either in its present or a revised form.

Training and education of mine officials does not necessarily require the establishment of a Smith-Hughes class, and many coal companies have operated so-called *private* classes for their men. These classes may be solely company-sponsored and operated, or they may be operated by some educational institution at the request of the company. Company employees serve as instructors, and they may be paid a nominal fee for each session taught or this service may be considered a part of their normal duties with the company. The course of study used will vary with the purpose of the training class, some being operated for the specific purpose of preparing men for the examinations given by the State Department of Mines, while others have had training for some particular job as their goal.

The history of vocational training of miners in Pennsylvania is an interesting story but a lengthy one. The high spots of this history are as follows:

In 1893 The Pennsylvania State College gave training and instruction to men at various mines throughout the State through lectures and demonstrations by members of the College staff. This type of training was more in the nature of our present institutes and could not properly be termed *class training*. This program is noteworthy because it represents the first organized adult vocational training work for miners and perhaps for any group of workers in this country.

In 1910 the College organized training classes for miners in co-operation with the State Y. M. C. A. and the Central Pennsylvania Coal Producers Association. Classroom facilities and other necessities were provided by the Y. M. C. A. organization, while the Producers Association provided funds for instructional expense. It is not known whether this type of training stopped because of the first World War, but the operation of mining classes in Y. M. C. A. buildings was gradually taken over by local mining institutes. There are few, if any, of these co-operative training centers in operation today.

The granting of Federal funds through the Smith-Hughes Act resulted in widespread installation of mining classes in Pennsylvania. The College resumed its efforts in this training work by developing a vocational mining class program in 1919, this time in co-operation with the State Department of Public Instruction, the State Department of Mines, and various mining organizations. Little is known of the work during the period from 1919 to 1931, mainly because no records of class activity, enrollment, and other statistics were kept. Following the appointment of H. B. Northrup as Director of Mineral Industries Extension, the department of the College which handles all vocational extension work in the mineral industries field, this work was placed on an organized basis and developed into a training program which has quietly but none-the-less effectively influenced the coal mining industry of the State. The extent of this program may be realized by the statement that more than 20,000 miners have been enrolled in classes during the twelve terms since 1931, and over 11,000 have been certified as having completed one or more years of study.

The status of the College in this vocational training work in Pennsylvania is frequently misunderstood by those persons in industry with whom we deal. Any vocational mining class which has been organized through the school board of a district is under the control of that board. It is likewise under the control of the State Department of Public Instruction because this branch of our State government insists on the operation of classes according to certain procedures before it will permit the disbursement of funds to school boards in connection with the instructional expense. If these two public school agencies were the only parties interested in promoting the training of miners, it is probable that there would be few such training classes, for neither agency has shown any inclination to promote aggressively the establishment of classes or provide the proper type of instructional material. In fact, some local school boards show little or no interest in the classes operating under their jurisdiction, and this is a mistake because the type of work done and the effort expended by the students deserves better treatment from the board members. The Pennsylvania State College, as a State-operated educational institution with a commitment to *carry education to the people of the State*, utilizes the facilities of these public school agencies to carry on a training program for the mining industry. Members of the College staff, operating under permission of the State Department of Public Instruction, follow up requests for training, interview school board members and officials of the mining company located in the community affected, provide advice on how to apply for and establish a class, more or less guide each class through its organization and development stage, and, finally, provide supervision of the class throughout each term to insure proper instruction for the students. Textbooks providing a definite curriculum in Coal Mining are published by the College so that students will be able to secure the proper type of text material at a minimum cost through the

use of a few books instead of many. It will be recognized, then, that to a large extent these are truly *Penn State mining extension classes*, even though the jurisdictional control of the work is still vested in the public school system. Lacking this control, the College has been compelled to work on a *good-will* basis to accomplish its purpose, and the value of this method of operation is attested by the widespread acceptance of our mining extension classes and the large number which continue to operate year after year in the same locations.

The present type of mining extension class is a result of the development of mining codes for the anthracite and bituminous coal industries of our State. One of the requirements of these codes is the certification of certain employees who perform specific jobs within and around the mines. This certification is accomplished by giving candidates an examination and, if they pass, granting them a certificate issued by the State Department of Mines which shows they are eligible for employment as fire bosses, mine foremen, etc. It was logical that programs of training should be devised for those persons who expected to take such examinations, and for years many communities had local *mining experts* who conducted training classes for those persons interested. Classes sponsored by the College, or by local mining institutes, and conducted in Y. M. C. A. buildings also served to train candidates for the examinations. Naturally the type and quality of each class depended largely on the instructor, inasmuch as he was the sole judge of what the students should be taught. Some of these classes were of good quality, but many were intended to supply the student with only the particular information he needed to pass a particular examination, so a review of previous examination questions and answers plus a study of the mining law constituted the course of study in most of the classes conducted by a local *mining expert*. This was usually sufficient for many men to pass the examinations and receive their certificates, for it is obvious that a certain amount of repetition is unavoidable in making up these examinations, so studying questions from previous examinations would eventually provide the applicant with much of the information he needed to pass his particular examination.

It has long been recognized that training of the above type does not produce in every instance a certified official capable of handling a supervisor's job in a mine. Even if the man has those personal qualities which are desirable in a supervisor, his training in mining fundamentals in the *examination preparation* type of class is insufficient for him to handle many of the technical phases of his supervisory work. A person trained in this manner lacks much of the fundamental mining knowledge and safety instruction which today is considered so essential. In an effort to upgrade the type of training given to prospective candidates for the State mining examinations, a tentative program of study was drawn up in 1930 by a group consisting of State Department of Mines representatives, members

of the State Department of Public Instruction, interested mining company officials, and staff members of The Pennsylvania State College. The proposed courses of study were given to the College as the agency best fitted to provide and disseminate this information throughout the State. Textbooks following the proposed outline were prepared by College staff members, and these have been used in our mining extension classes since that time. These books are being revised constantly to keep them abreast of the developments in the mining world, and in certain phases of mining they represent the most up-to-date material available as far as textbooks are concerned.

Classes now conducted by the College under this program are classified as first, second, and third year classes, with a separate textbook for each year of study. The students consider the first year of work as *fire-boss training*, and the material provided does give the applicant much of the information needed to pass the fire-boss examination. Likewise, the second year of work is considered as *mine-foreman training*, and this course has been designed to assist candidates to pass their foreman's examination. The textbooks for these two years of study, however, provide essential information beyond that required for the State examinations, and they should not be confused with classes of the *examination preparation* type. The third year of work is considered *advanced foreman training*, or it is work that section foremen and mine foremen can take to aid them in their understanding and solution of every-day mining problems which they as supervisors will encounter. A comprehensive study of the mining law is included with each year of work, so a student who completes the three courses of study should not only know his mining law thoroughly but also be able to apply it properly. Safety is a main consideration throughout the entire training program, and a large portion of the classwork deals with safe practices and safer operation of coal mines. Instructors are encouraged to correlate the studies with practice in the mines from which the students are drawn, and College staff members make frequent visits to each class to check on the quality of the instruction and to give talks or demonstrations which will increase the knowledge of the students.

One of the major difficulties encountered with students in our mining classes is their desire to study only that information which will point them toward the State mining examinations. Their immediate goal is the possession of a fire boss or mine foreman's certificate, and when the certificate has been received they take the attitude that a place should be made for them in the mine where they can put to use the knowledge which the certificate indicates they possess. Failure to gain such a job frequently results in their expressing condemnation of the company, of the quality of its officials, of its methods of mining, etc. We have attempted to counteract this attitude by having our instructors stress the value of thorough grounding in mining fundamentals instead of merely preparation for an examination. Possession of a certificate does not indicate that the person has all of the knowledge

necessary properly to discharge the duties of an official, and I do not believe it is the intent of the State Department of Mines to place such a value on these certificates. Any examination is limited in the amount of information it can draw from the person being examined, and a check of the examinations given by the State Department of Mines indicates that questions on the mining law predominate in every one. This is as it should be, for the department which prepares these examinations is interested in knowing whether an applicant is familiar with and can apply the provisions of the mining law. Their main objective is SAFETY, so their examinations deal mostly with rules and practices related to the safe operation of mines. We have attempted to convey to our instructors the idea that every student who applies himself to the work of our courses should be able to pass the State mining examinations because of the thorough preparation given in each class. The College feels it has an obligation to the mining industry to provide students with training which will serve them in all phases of their daily work; yet in many cases mining companies are concerned only with the number of their employees who pass their examinations and receive certificates. It is difficult to put across the *thorough training* idea to the students when company officials stress the *get the certificate* idea. As a result of this confusion in purpose between the College and the mining companies, a large number of students never progress beyond the first training course, and in our mines today we have a great number of men with certificates of fire boss grade which were received many years ago. Those students who are more receptive or who recognize the value of thorough training will complete the second and third years of study, and from this group are drawn those men who are today or at sometime in the future will be the officials in charge of our mines. We must likewise look to this group to supply some of our future appointments as State mine inspectors.

Most of the training classes today are intended to prepare men for the qualifying State examinations or for better performance of their work as mine officials. To a large extent the pattern of training is designed for hand-loading conditions in our mines, whereas a large portion of our present production comes from mines which are either partially or wholly mechanized. Training in mechanized mining practices has lagged behind the introduction of these practices into coal mines for several reasons. First, it was necessary to wait until the particular need of the mechanized mining official was determined through experience before a program of training could be devised to assist those who desired such work. Second, mechanized mining instruction applies directly to the machinery used in the mining of coal, and this requires that equipment be made available for such instruction and that shop facilities where this equipment can be studied be provided, and both of these items are difficult to secure. Third, the construction of training programs and text material has been slow, at least as far as the College is concerned, because of a limited staff and the necessity of developing

this program and material concurrently with the regular training work. Some progress has been made, however, in the past few years, and our experience to date indicates what training in mechanized mining practices will be like in the future.

At the present time the College is able to offer training courses in mechanized mining as follows: First, a *preparatory* course in mathematics which is designed to prepare students for the necessary calculations which they will encounter in the following courses. Next, a *machine maintenance* course, designed primarily for maintenance men, which provides study in the principles and practices of operating and maintaining mechanized mining equipment. This course can also be given with excellent results to groups of mine officials or operators of equipment. A third course, termed an *electrical maintenance* course, is designed to provide study in the operation and methods of making repairs to the electrical controls used on mechanized mining equipment. It is intended primarily for maintenance men, and it is doubtful whether many officials and operators will have the proper background to handle this particular study. A fourth course, termed a *supervisory* course, is intended primarily for mine officials or for those men who are training for official positions. It provides group discussions of problems in connection with a mechanized mine official's job, with topics of JOB INSTRUCTION, TIME STUDIES, OPERATING CYCLES, OPERATING CONTROL, and COST CONTROL providing a well-rounded program.

This mechanized mining program is designed for operation as a company-sponsored training program. At least two of the courses require shop facilities, and this means that close co-operation by the sponsoring company is necessary if these portions of the training work are to be carried out successively. Course instructors are selected from among the company personnel, and it is frequently necessary to have a separate instructor for each course in order to have a specialist in charge of certain portions of the training work. The students admitted to classes are necessarily restricted to persons working for the sponsoring company because of the intent of the program, which is to provide training only in those practices and on that equipment used by the company in their mine or mines. Classes may be conducted several times each day in order to accommodate the men working on alternate shifts. Details of the program, such as number and type of men to be trained, class schedules, number of courses to be given, etc., must be worked out for each company.

Since the initiation of mechanized mining classes in 1939 the College has trained approximately 750 men for six different coal companies. Some of these programs were quite successful, with more than 75 per cent of the men who started classes completing the full program of three courses. In other locations the work was not so successful, either because local conditions, such as inadequate company support, or inability of the men to travel to the classes because of gas rationing, or lack of interest on the part of

the men caused a drop in attendance to the point where we were forced to close the classes. It is absolutely necessary to have wholehearted company support, not only in providing shop and classroom facilities but also in the proper utilization of the trained men after they have completed their studies, in order to secure the maximum results from this type of training program.

The College has still another type of training program for the mining industry which is related indirectly to the production of coal and therefore should be considered with programs for training mine officials. This is a course on *coal preparation* which deals with the selective mining of coal and its sizing and cleaning in surface plants to meet the requirements of industry for a particular type of coal, or to meet the demand of the public for stoker coal. This course can be given to men who are connected with the management end of coal preparation, or to men who are in the sales department, or to those workmen engaged in the operation of the preparation plants. It would likewise be valuable in training the operating force of any mine so they would appreciate the effect of proper selective mining on the final product as sold by the company. During the past year we have had four classes in operation for three different coal companies and have trained approximately 70 men in this work. The course, which is designed for 145 hours of classwork, follows a prepared outline of study, with trade publications, Bureau of Mines publications, and magazine articles comprising the text material. The results of this past year indicate that such training has a definite place in the educational program of the mining industry, for those companies which had such training classes were well pleased with the results obtained. The College plans to assemble and publish text material for this coal preparation course as soon as the work becomes standardized.

In the future, then, we may expect the training and education of mine officials, and of other mine workers also, to continue on several different plans. Mining extension classes to train men for the State examinations and to prepare them for better handling of supervisory jobs within the mines will probably continue to operate in much the same manner as at present, and with possibly an average of 2000 students in from 50 to 75 class centers each term. Training in mechanized mining practices will undoubtedly show a large increase in enrollment after the war, for coal companies will be forced to the utilization of more and better mining equipment in order to mine their coal on the most economical basis possible, and this means that the men who will operate and supervise this equipment will have to be trained. Certainly, a greater degree of efficiency in the operation and supervision of such equipment than at present will be desirable, and programs of training will offer the best means of securing this efficiency. Coal preparation training programs will likewise be expanded in the future as more companies are forced to a greater degree of preparation in order to meet competition, and as mechanized mining, which requires better preparation facilities, becomes more widespread.

A future development in the training of men in mechanized mining practices may be the initiation of *regional training centers* to augment or even replace the company-sponsored type of program. A regional training center would require a centrally-located shop, possibly with classroom facilities, where the equipment and practices used in mechanized mining could be studied. Such a training center could serve a large number of mines in that vicinity, and men from any of these mines could enroll for training, thus overcoming the *restricted admission* defect of the company-sponsored type of program. It would be necessary to secure the loan of equipment which would be studied from one or more of the mines near the center, and this particular feature would make it necessary to have a co-operative arrangement between the companies and the training center worked out in detail. The training work would have to be subsidized in some manner, either by having each student pay a certain fee for each course to cover the cost of rental supplies, and text material, or by having the various companies assume their proportionate share of this upkeep on the basis of the number of students being trained who were employees of each company. This is not a fanciful idea, for such an arrangement has been in operation in West Virginia, with a local mining institute backing a training program conducted by West Virginia University. With this type of training center in operation, it would be possible to develop courses of study which would be even more intensely applicable to the mechanized mining operations in our mines than those now offered. There are no such training centers of this type in Pennsylvania now, nor do I believe it is possible to start such training centers while we are at war and both equipment and materials are restricted in use. However, this type of work offers great opportunities when we return to normal peacetime operation of our coal mines.

There is a vast field of training possibilities within the coal industry, and the work done so far has only scratched the surface of this training problem. The industry as a whole has been extremely backward in this matter of training mine personnel, although we have outstanding examples of individual companies that have made great strides in the development and operation of training programs. It has not been possible in the past, nor will it be possible in the future, for any one training agency, such as The Pennsylvania State College, to provide, unassisted, training of the type and scope needed by the industry. Coal companies, if they wish to benefit from the training of their employees, must take a more active part in the future by working co-operatively with the College on some or all of the training programs previously indicated. The College will welcome any move on the part of the coal companies toward the improvement and expansion of programs for the training and education of mine officials and other mine workers.