Published During the College Year

Mineral Industries

School of Mineral Industries

THE PENNSYLVANIA STATE COLLEGE

Volume 15 | STATE COLLEGE, PA., OCTOBER 1945 | Number 1

Housing and Heating Conference

sponsored by

Division of Fuel Technology

T. S. SPICER, *Chairman of Conference*

On November 14, 15, and 16, 1945, the Division of Fuel Technology will hold a conference on Housing and Heating at the School of Mineral Industries, State College, Pennsylvania. The prospect of a tremendous expansion of the home building program in this country as soon as materials are available is imminent. It is therefore the belief of the Fuel Technology staff that a conference on heating and its influence on home construction would be highly beneficial at this time. Requests from outside sources have substantiated our feelings. Joint consideration of housing as well as heating was deemed advisable because these two subjects are so interlocked that one is dependent upon the other. The two and one half day meeting will include five sessions where twenty formal papers will be presented. (See program on page four). Experts from various parts of the country and many different industries will participate in the program and discussion. The fuel, heating, air conditioning, building supplies and control industries will be well represented. Architects, engineers, builders, contractors, research men, and many prospective home owners will be in attendance. Wednesday evening there will be a one hour motion picture showing "Modern Domestic Fuel Beds," followed by a Mineral Industries' Open House. An informal banquet will be held on Thursday evening followed by a period of refreshing entertainment.

The Housing Shortage and Why

There is a critical housing shortage now existing in this country. This condition is the result of many contributing factors and some of the more important ones will be discussed hereafter. With the steadily growing population there is likewise a parallel need for homes. The Coal-Heat Magazine has made the following analysis of our country's growth. In 1920, our population was 105,000,000; today it is around 139,000,000. We have averaged 1,280,000 marriages annually. Our birth rate, since 1920, has run from 16 to 23 per 1000 population, the death rate from 10.9 to 13, with a net increase of birth over death of 6 to 11 per thousand. The size of families has decreased from 4.1 in 1930 to 3.8 in 1940—which means that it takes 7.9%, or 19 more dwelling units, to house a thousand persons than it did in 1930.

What is more, people now live longer than they did before. Back in 1900 the average life expectancy in the United States, at birth was 47 years. By 1930 this had increased to 60 years, and by 1940 to 63 years. We have had a 35% increase in the number of persons over 65 years of age, since 1930—so the actual demand for housing is substantially higher than it was some years ago.

The director of the U.S. Bureau of Census has disclosed that since 1900 there has not been a decade in which fewer than 5,000,000 units have been built. Even in the depression decade of 1930-1940 the number of dwelling units built was 5,528,000.

According to the National Economic Committee in its report on housing, the market calls for some 600,000 non-farm dwelling units a year —340,000 to accommodate population growth, 45,000 to replace those purposely destroyed, and 215,000 to replace those units now suitable but which will wear out with time. And these figures do not include fire or tornado losses, nor do they cover the desired replacement of the 4,000,000 or so of the nation's sub-standard units.

The population shifts have also materially contributed to the demand for additional homes. Even now that the war is over, an immediate mass shift of the population to its former places of abode is not expected.

Consequently while our population was expanding during the war years, demanding more houses, residential building was curtailed to a new low due to wartime restrictions on non-essential building. Thus the tremendous back log of consumer demand or pent-up purchasing power will when coupled with this real need for homes, precipitate a gigantic home building-boom.

A Building-Boom—And How!

Reconversion Director John W. Snyder just announced the lifting of all restrictions on the construction of private homes and other buildings to be effective October 15, 1945. Before this announcement yes, even before the war with Japan had ended, predictions on the volume of buildings to be erected, had been made. For example, J. Frederick Dewhurst, Economist for the 20th Century Fund, testified before the Senate Business Committee recently that the maximum housing needs of the United States from 1946 through 1960 will call for an average construction of 1,500,000 family dwellings to house our farm and town families.

"The total city dwellings needs during the 15-year period are estimated at about 19.5 million new units, calling for the expenditure of 76 billion dollars," Dewhurst testified. Speaking of farm dwellings, he indicated that during the 15-year period maximum needs will be about 2,900,000 dwelling units, calling for the expenditure of approximately 5.8 billion dollars. These figures are based on 1940 price levels and average expenditures for dwelling units prior to the war.

The above estimate conforms to others that have been made. As a comparison The National Housing Agency estimates that 12,600,000 non farm houses will be built in the first post war decade.

Keeping Warm and the Big Decision

Johnstone, et al, write in their recent book, BUILDING OR BUYING A HOME: "Building or buying a home represents one of the largest financial transactions of a lifetime for the average family and is usually the happy conclusion of many eager years of planning and conscientious saving." This event is to the individual, indeed, one of life's milestones. The design and erection of each of these proposed millions of homes presents many weighty problems. Usually after months of consulta-

(Continued on page 3)

MINERAL INDUSTRIES

Published monthly by the School of Mineral Industries from October to May inclusive.
THE PENNSYLVANIA STATE COLLEGE
Mineral Industries Extension Services
H. B. NORTHRUP, Director

Pennsylvania's School of Mineral Industries and Experiment Station

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

Fields of Work

Geotechnology.

Earth Sciences: Geology, Mineralogy, Geography, Geophysics, Meteorology, and related subjects. **Mineral Engineering:** Mineral Economics, Mining, Mineral Preparation, and Petroleum and Natural Gas, **Mineral Technology:** Fuel Technology, Metallurgy, and Ceramics.

Divisions of Service

Resident Instruction
Extension Instruction
Correspondence Instruction
Mineral Industries Research

Entered as second-class matter at State College, Pa., November 1, 1938, under the Act of August 24, 1912.

OCTOBER 1945

TRENDS and OBJECTIVES

By Dean Edward Steidle

MACHINE AGE

Compiling a technical report is not too difficult when the facts are available. On the other hand philosophical expression, worth reading for its own sake, is a laborious contrivance that can be accomplished only in rare moments of meditation.

The Introduction of the recent Announcement of Pierce Management, Inc., Scranton, Pennsylvania, is thought provoking and is presented verbatim below:

"We are now engaged in a great war. The powerful countries that are emerging as victors are those whose basic industries of coal, iron and steel were modern, and mechanized to such an extent that production could be increased despite the great drain on manpower for military purposes. This must be our first line protection against future aggressors.

"Despite its high wage scales, American industry must further reduce costs to maintain a competitive international position, and when men and materials are again available our mechanization must be accelerated.

"American bituminous mines are considered highly mechanized, but in reality have attained only 60 per cent of their goal after all available machinery is applied to the total operation.

"Present face mechanization must be credited largely to aggressive machinery salesmen, but the final job of mechanization must be done by trained mining engineers who can augment force mechanization results with modern haulage, ventilation, hoisting and preparation systems. 'Outbye' the face is the imminent job in complete mechanization. Mines must be rearranged to suit the ideal loading equipment. Decisions must be reached whether to clean coal at the face by hand methods or load out the full seam for 100 per cent mechanical separation in the washery or tipple.

"Modernization requires the correlation of many engineering skills to attain superior results.

"We believe that the mining industry has only scratched the surface in the low cost movement of raw materials."

In general, the above statement holds good for all branches of the mineral industries. Further mechanization depends upon the solution of many intricate problems in sociology, economics and technology. The function of the School of Mineral Industries in the process is to search for new knowledge, and to train future technical leaders and skilled mineral workers of all kinds.

French Mission at State College

Dr. B. Long, internationally known glass technologist and director of the French Glass Research Institute, and Mr. M. Thouvenin, president of the Glass Manufacturers Association in France, both from Paris, were the guests of Glass Science during a two-day visit in State College in August. Both glass technologists were on an official mission to study American-French collaboration in the field of glass technology, fundamental research, and education in this field.

Dr. B. Long is well known as the inventor of foam glass—the product of a process of aluminizing glass—and other processes in the field of glass technology. He was formerly in charge of research in the famous St. Cobain Glass Works in France. He is the author of many scientific papers in the field of glass and refractory materials and is best known through his book on the properties of glass.

The Pennsylvania Grade Crude Oil Association

Ninth Annual

Penn State Secondary Recovery Conference

November 2-3, 1945

SCHOOL OF MINERAL INDUSTRIES

The Pennsylvania State College, State College, Pennsylvania

In order to report on the progress made in the secondary recovery research program during the past year, the Ninth Annual Penn State Secondary Recovery conference will be held in the School of Mineral Industries of The Pennsylvania State College on November 2 and 3, 1945.

At this meeting progress made in the research program, both from the laboratory and field points of view, will be summarized, and an opportunity will be offered for the oil producers to discuss their problems among themselves as well as with members of the research staff. As usual, a very important part of the program will be a round-table discussion of the laboratory and field work pertaining to current practices.

TENTATIVE PROGRAM

Friday, November 2, 1945

11:00 A.M.—12:00 P.M., 1:00 P.M.—2:00 P.M. Registration, School of Mineral Industries

2:00 P.M. Technical Session - - - - Mineral Industries Art Gallery

1. Wax Saturation in Oil Sands - - - - - - - J. C. Calhoun
2. Selective Plugging With Smoke in Air-Gas Drive - R. F. Nielsen
3. Wetting Agents in Water Flooding - - - - R. L. McCormick
4. Prediction of Behavior in Air-Gas Drive - - - - R. J. Day

6:15 P.M. Dinner—State College Hotel

8:00 P.M. Interstate Oil Compact conservation movie "Oil for Tomorrow" Mineral Industries Art Gallery

8:30 P.M. Inspection of Laboratories and Informal Discussions—School of Mineral Industries

Saturday, November 3, 1945

9:00 A.M. Technical Session Mineral Industries Art Gallery

5. Effective Permeability and Shot Well Radius From Field Data - - - - - - - - S. T. Yuster
6. Open Forum on Oil Production Problems — Oil Producers and Research Staff

2:00 P.M. Football Game—Penn State vs. Syracuse New Beaver Field

Housing and Heating Conference

(Continued from page 1)

tion, study and debate the builder or buyer himself must finally make the decision. It is therefore imperative that the individual responsible for such decision be furnished with the latest complete information. Building a home is a very important event to the industries as well. For instance, sealed in the design and construction of a home may be the fate of the fuel industries' future market.

Keeping warm is one of the foremost things to consider in planning a home. From the beginning of history keeping warm has always been a serious business of the human race. It is not strange then that the heating system is often referred to as the heart of the home. Cost analysis of a home indicates that the complete overall heating system may only represent 5 to 12 per cent of the total investment, yet it is almost continually contributing to the health, happiness and comfort of the occupants of the home. Selecting the fuel to serve the home and the type of heating system to utilize the fuel is often the sixty-four dollar question. This decision should be made at the time the design is drawn and before the die is cast. All too often in the past this major decision has been put off until last—yes, until the exterior of the house itself is finished. Then it is too late for choice and "what can be squeezed in" is often substituted for "what is best." The design and construction of the home is greatly influenced by the type of heating system and the kind of fuel fired and vice-versa. Hence, both must be considered simultaneously to achieve balanced design. Much attention will be given to the above problems by the conference in hope of preparing the public and the industries for the huge building job ahead.

Of the domestic fuels available in this part of the United States, coal will receive the major attention. This is readily understandable in view of the following statistics. Pennsylvania is the No. 1 coal producing state (in 1944 it produced 144,408,418 tons of bituminous coal and 64,112,589 tons of anthracite, making a grand total of 208,521,007 tons). Besides, coal is Pennsylvania's greatest mineral resource. Moreover, it is the most widely used domestic fuel, as shown in the table below. Mr. C. E. Lesher, President of the Pittsburgh Coal Carbonization Company in 1940 outlined the domestic heating load as follows:

	Coal or its Equivalent Tons per year
Anthracite	47,000,000
Cokes	12,000,000
Bituminous Coals	70,000,000
Briquets—packaged fuel	1,000,000
Oil—coal equivalent	20,000,000
Gas—coal equivalent	20,000,000
Total	170,000,000

From examination of the tentative program appearing hereafter it can be seen that more than half the papers are of general interest and apply to all types of fuel and home construction. Anyone interested in homes or heating or any of the phases thereof is cordially invited to attend this conference and participate in the discussions.

---o---

TENTATIVE PROGRAM
HOUSING AND HEATING CONFERENCE
sponsored by
Division of Fuel Technology
The Pennsylvania State College
State College, Pa.
at the
Mineral Industries Building
November 14-16, 1945

REGISTRATION 9-10:00 A.M.

SESSION No. 1 10:00 A.M., November 14
Subject: Housing Needs and Construction
(1) Address of Welcome
(2) The Dynamics of Housing and Equipment Demand
(3) Building Design and Its Effect on Heating and Air Conditioning
(4) What Builders Are Doing to Meet the Public Demand for Better Housing

SESSION No. 2 2:00 P.M., November 14
Subject: Basic Elements of Construction for Heating with Solid Fuels
(1) Proper Basement Design and Its Economic Advantages
(2) Coal, Ash and Clinker Storage
(3) Chimney and Fireplace Construction
(4) The Economics of Insulation

SESSION No. 3 9:30 A.M., November 15
Subject: Advances in Heating Equipment
(1) Stoves and Space Heaters
(2) Furnaces and Boilers
(3) Domestic Stokers
(4) Service Water Heaters
(5) Controls and Heat Regulators

SESSION No. 4 2:00 P.M., November 15
Subject: Engineering and Research Developments
(1) Trends in Heating Service and Fuel Engineering Activities
(2) Current Research on Comfort Heating with Coal
(3) Current Developments in Radiant Heating
(4) Current Developments in Air Conditioning

SESSION No. 5 9:30 A.M., November 16
Subject: Trends in Merchandising
(1) Commercial Standards
(2) The "Comfort Seal" Idea
(3) Merchandising the Packaged House
(4) Needs and Opportunities for Technical Men in the Domestic Heating Industry

Thursday Evening, November 15
Banquet: State College Hotel
Address of Welcome
Speaker:
Subject: Some Things We Have Learned About Housing Construction

All requests for room and banquet reservations should be addressed to Dr. H. B. Charmbury, c/o School of Mineral Industries. Those planning to attend are urged to do this as soon as possible.

DR. M. GENSAMER

Dr. Maxwell Gensamer, a staff member of Carnegie Institute of Technology for the past 16 years, assumed his new duties as Professor of Metallurgy and Head of the Department of Mineral Technology at the College on May 1.

The new department head, native

(Continued on page 4)

EXTENSION

A sense of gratification is always experienced when some tangible evidence of the results of labor is forthcoming. In the recent examinations given by the State Department of Mines for certificates of competancy as mine officials, results obtained by the students of the Nanticoke and Wilkes-Barre coal mining classes point directly to the value of technical training for miners who are sufficiently ambitious of advancement. In the State examinations given in those two centers, 21 men won mine foreman certificates and of these, 20 men were extension class students; 30 men won assistant mine foreman certificates and of these, 25 men were students in our classes last year. Results from other centers in which examinations were held were not available at the time of going to press but the results given indicate the need of training in mining to meet the increasingly technical nature of that vocation.

Experiment Station

Plant scale tests on preparing lightweight aggregate from slate were made at Ironton, Ohio, during the week of April 23. E. C. Henry, H. K. Lucas and A. W. Gauger participated in these tests.

C. C. Wright conducted tests on use of barley anthracite in the gas producer in co-operation with the Solid Fuels Administration for War, Anthracite Industries, Inc., and Wellman Engineering Company at Canaan, Connecticut, April 19-21, 1945.

During the past heating season home tests have been run on five experimental units of the Pennsylvania Stoker distributed throughout Central and Western Pennsylvania. Performance has been encouraging. The tests are under the supervision of a committee comprised of C. C. Wright, T. S. Spicer, Reed Scollon of the Central Pennsylvania Coal Producers' Association, H. F. Hebley of the Western Pennsylvania Coal Operators' Association, and W. A. Riddell of the Frederick Iron & Steel Company, Frederick, Maryland.

"Mineral Industries" is an integral part of the program of Mineral Industries Extension Services. It is published monthly from October to May, inclusive. The help of the readers of "Mineral Industries" is solicited in order to maintain a correct mailing list. The entire mailing list has been revised and checked against the last known address of each recipient. Duplications have been eliminated to the best of our ability, and everything possible has been done to make our mailing list thoroughly up to date. An incorrect mailing address results in a considerable expense and inconvenience to everyone concerned. Please advise H. B. Northrup, Director, Mineral Industries Extension Services, of any change in your address as given on this issue. He will appreciate, also, learning the name and address of any person or organization that you believe would be interested in receiving "Mineral Industries."

DR. M. GENSAMER

(Continued from page 3)

of Bradford, holds three degrees from Carnegie Tech: a bachelor of Science (1924), master of science (1931), and doctorate (1933).

Dr. Gensamer, who holds a U. S. Patent for the manufacture of non-aging steel, has served as galvanizing foreman, chemist in charge of laboratory, and acting chief metallurgist in charge of all heat treatment and galvanizing for the Page Steel and Wire Company, Monessen, Pennsylvania.

His professional association with Carnegie Tech began in 1929 when he was a graduate student and research assistant in the Metals Research Laboratory. He began teaching metallurgy in 1935 and, since 1943, has held the rank of full professor.

Dr. Gensamer is a member of the following professional and honorary organizations: Phi Kappa Phi, Sigma Xi, American Institute of Mining and Metallurgical Engineers, American Society for Metals, American Association of University Professors, and the United States Institute of Naval Affairs.

The new department head has served on numerous advisory committees to the National Defense Research Council (War Metallurgy Committee) of the Office of Scientific Research and Development. He has been a member of the executive committee and Chairman of the Pittsburgh Chapter of the American Society for Metals, and of the executive committee of the Pittsburgh Section of the American Institute of Mining and Metallurgical Engineers. He is a member of the Weld Stress Committee of the American Welding Society.

Dr. Gensamer has been the recipient of the Howe Medal of the American Society for Metals. He presented Annual Educational Lectures to the American Society for Metals during the national metal congress in October, 1940. He delivered the Sauveur Memorial Lecture of the American Society for Metals in January, 1945. He has been chosen to deliver the Campbell Memorial Lecture of the American Society for Metals at the next national metal congress.

He has published many research findings in professional and scientific journals, including:

C. E. Lacy and M. Gensamer: "The Tensile Properties of Alloyed Ferrites," Trans. A.S.M., 32, 1944.

J. R. Low and and M. Gensamer: "Aging and Yield Point in Steel," Trans. A.I.M.E., Metals Technology, 158, January, 1944.

M. Gensamer, E. B. Pearsall, W. S. Pellini, and J. R. Low: "The Tensile Properties of Pearlite, Bainite, and Spheroidite," A.S.M., October, 1941.

M. Gensamer: "The Static Crack Strength of Metals. Its Determination and Significance," Metal Progress, July, 1940.

M. Gensamer: "The Yield Point in Metals," Trans. A.I.M.E., 128, 104, 1938.

M. Gensamer and R. F. Mehl: "Yield Point of Single Crystals of Iron Under Static Loads," Trans. A.I.M.E., 131, 372, 1938.

M. Gensamer and B. Lustman: "Preferred Orientations Produced by Recrystallizing Cold-rolled Low-Carbon Sheet Steel," Trans. A.I.M.E., 125, 501, 1937.

C. S. Barrett and M. Gensamer: "Stress Analysis by X-ray Diffraction," Physics, 7, 1, 1936.

M. Gensamer: "Alloys of Iron and Manganese, Part XII. Alloys of Iron and Carbon with 2.5 and 4.5 per cent Manganese," Trans. A.S.S.T., XIX, 1028-1034, 1932.