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VOL 1/1

THE PENNSYLVANIA GEOLOGICAL SURVEY

COMMONWEALTH OF PENNSYLVANIA

Raymond P. Shafer, Governor

STATE PLANNING BOARD

Irving Hand, Executive Director

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on the cover — The Old Museum Building which houses the Harrisburg Offices of the Pennsylvania Geological Survey. Photo by the Pennsylvania Historical and Museum Commission, Harrisburg, Pennsylvania.

PENNSYLVANIA GEOLOGY — a publication focused on geology and the earth sciences.

This magazine will feature the work of the Pennsylvania Geological Survey and others active in the field of geology and the allied earth sciences. It will be used to highlight current projects, to make the latest geological information available to the public, and to announce our new publications.

We welcome your suggestions and contributions and hope that you will comment on our new magazine.

FROM THE DESK
OF THE
STATE GEOLOGIST . . .



The Pennsylvania Geological Survey is pleased to present its new magazine. With this publication we aim to share with our fellow citizens the activities and services of the Pennsylvania Geological Survey, as well as other significant and newsworthy developments in the broad field of geology and earth sciences.

With a history dating back to 1836, the Survey is proud of its tradition and its record of accomplishments. Today, with a staff of 25 highly competent, professional geologists, the Pennsylvania Geological Survey is engaged in broad programs of geologic and topographic activities designed to serve the present and future needs of Pennsylvania and its citizens. This first issue of the magazine introduces the major divisions of the Survey's programs; future issues will further define the activities and will give detailed accounts of the objectives and progress of individual projects being conducted by the Survey.

The Pennsylvania Geological Survey is engaged in many projects of basic geologic mapping, numerous mineral resource investigations, extensive ground-water studies, and widespread topographic mapping. Geology is a dynamic subject, with new scientific techniques and awareness. So, too, the Geologic Survey must be dynamic and alert to new needs and new geologic challenges in Pennsylvania. We are pleased to note that geology is being recognized more and more as playing a vital role in man's daily life, controlling man's physical environment, and affecting his planning and his economic development. The Survey is striving to meet this increased use of geology through projects aimed at serving the needs of the many new users as well as a vigorous effort to effectively communicate its geologic findings. Thus, we see to it that the results of every project and every investigation are published and made public.

This magazine is another step in our program of communication. We shall strive to keep it meaningful. The birth of a new magazine is always an auspicious occasion. While the Pennsylvania Geological Survey has an extensive record of geological publications to its credit, this is our first attempt at a regular "newsy" magazine. We hope to make it a magazine of significant content, yet pleasantly readable. We shall always welcome your comments and suggestions, and by all means, we invite you to submit any geologic items which will be of interest to Pennsylvanians.

Arthur G. Socolow

THE PENNSYLVANIA GEOLOGICAL SURVEY _____

133 years of service....



to industry,

to government agencies,



to students,



to fellow geologists,



and to the individual.

A closer look at the SURVEY

In order to function efficiently, the Pennsylvania Geological Survey has several divisions, each working on specific projects and requests, but all working together for a better geological understanding of the Commonwealth. These divisions are the Field Geology Division, the Mineral Resources Division, the Environmental Geology Division, and the Oil and Gas Division.

The following article briefly describes the functions of the divisions and the specific projects currently in progress. Hopefully, from this you will gain a better understanding of the work of the Survey. A listing of the Survey staff appears on the inside of the back cover.

FIELD GEOLOGY DIVISION

Since the inception of the First Pennsylvania Geological Survey in 1836, field geologists have gathered the basic data which constitutes the framework of Pennsylvania geology. Today, no less compelling than it was more than a century ago, many of the geologic answers to fundamental problems concerning mineral resources, environmental conditions, and land utilization lie in direct examination of rock in the field rather than laboratory study of collected specimens. In recognition of this truism many of the Survey personnel are engaged in geologic field studies.

Classically, field geologists map the distribution of various rock strata and types in an area. However, this is only the first step towards the goal of understanding the processes and conditions by which the rocks were initially formed and subsequently altered both structurally and chemically. Only when rocks are fully understood in this sense can quantitative prediction be made as to their distribution, geometry, composition, and ultimately their mineral utility and effect upon society.

There are currently five regions in the Commonwealth in which active geologic field work is carried out by staff geologists. These areas have been selected where there is a need for information on the relationship of the rock strata to land use and development, to mineral deposits, and to fundamental geologic problems.

Four field geologists are working in the Clearfield County area on the Appalachian Plateau. Active strip mining there has created many exposures which aid in determining the coal reserves in that region and which relate to problems concerning the formation and distribution of coal and clay. These geologists also collect information and sample rocks at active strip mines

throughout the state — invaluable information that is lost as these mines are quickly backfilled.

Two field geologists are working in the mountainous terrain that is characteristic of the Valley and Ridge in Perry and Juniata Counties. Basic information is being obtained concerning the folding processes that created the mountains and the mineral potential of the various rock strata. This information will supplement geologic data required by urban centers in this region.

In the Pocono Plateau area in Monroe and Carbon Counties, two field geologists are engaged in a variety of studies. These include studies on the origin and economic geology of flagstone deposits, sand and gravel from glacial deposits, refractory sand from consolidated strata, and possible oil and gas deposits. In addition, the surficial and bedrock geologic map being compiled in this project has great utility in the planning of both urban and recreation development of this region.

Two field geologists, one working in Franklin County and the other working in Berks County, are engaged in an associated project. This project includes mapping the distribution of and studying the high calcium and cement limestones of the Great Valley. The economic mineral potential of the associated dolomites and shales is also being studied but to a lesser degree. In the course of these studies much was learned concerning the complex geologic history of these ancient mountains. The more accurate geologic maps produced as a consequence are useful in resolving the geologic problems associated with this heavily urbanized area.

The field geology program is augmented by cooperative U.S. Geological Survey geologists. Several U.S.G.S. geologists are studying the coal, clay, and sand deposits of southwestern Pennsylvania, and compiling land utilization maps derived from their geologic maps. Another geologist is working in the Valley and Ridge area in Bedford County supplementing work done by our staff geologists. In the Pocono Plateau a U.S.G.S. geologist is working in cooperation with staff geologists and studying slate and clay deposits in conjunction with his basic field geology studies.

The field geology program is further supplemented by a number of contractual geologists who undertake specific short term projects. These projects usually supplement the more comprehensive studies of one of the field geology groups. The contractual geologists are frequently professors of geology from a major university.

MINERAL RESOURCES DIVISION

The work of the Mineral Resources Division encompasses several functions. As a service unit, the division performs laboratory identification and analyses of rocks and minerals for all the Pennsylvania Geological Survey ongoing investigations, for state and cooperating federal agencies, and for the

public — whether as individuals or groups. The public services are provided free upon request within the limits of the Survey's facilities and the available staff time. In this division, geological investigations and services are performed within the rock preparation laboratory, the microscopic and petrographic laboratory, the photographic laboratory, the X-ray analysis laboratory, a semi-quantitative chemistry laboratory, and with the use of a variety of equipment ranging from simple binocular microscopes to complex X-ray diffraction and spectrographic instruments. Besides the maintenance of these laboratories and the services connected with them, each division member is engaged in one or more geological research projects, the function of which is to contribute to our understanding of Pennsylvania geology, particularly the geologic resource potentials in the state.

One of the most important projects in the Mineral Resources Division is a study of the potential uses of Pennsylvania's clays and shales. This project began in 1962 and is under continued investigation. The shale-clay project, in cooperation with the United States Bureau of Mines, includes the geology, chemistry, mineralogy, physical properties, and fired characteristics of clay and shale materials that could be utilized by such industries as refractory brick manufacturers, producers of lightweight aggregate, brick, and stoneware products.

Another major project has been the study of the Cornwall, Pennsylvania magnetite ore deposits, a major producer of iron ore with copper, gold, silver, cobalt, and limestone by-products. This research, now nearing publication, has emphasized the understanding of the origin of the ores with a view to determining methods for searching out new magnetite deposits and extending the reserves of known occurrences.

The Survey's program of coal research has been extended by the Mineral Resources Division to include chemical analysis data from strip mines which will yield information on power potential, pollution of air and ground water by sulfur, and a fundamental knowledge of the stratigraphy of coal and related sedimentary rocks.

Another ongoing project is a study of the crushed rock materials that are used in highway surface construction. This study involves both geology and laboratory testing and is being conducted in cooperation with the Pennsylvania Department of Highways, The Pennsylvania State University, and the Stone Producers Association of Pennsylvania. The project has been initiated to improve skid resistance in the hope of reducing traffic accidents on our congested highways.

In southern Lancaster County, a study is in progress that deals with serpentinites and metamorphic sedimentary rocks. The purpose of this project is to produce a map of the rock types in the area, to understand their structure and origin, and to assess economic potential, particularly with regard to serpentinite for crushed stone, chromite (an ore of chromium), magnesite (a source of magnesium), and talc.

In addition to these major projects many smaller research and service studies are underway. These include the publication of an industrial directory, information on mineral collecting localities, compilation of Pennsylvania's min-

eral resources, studies of Precambrian geology, a summary of the structural geology of the Triassic basin, a study of diabase dikes, and a summary of radiometric age dates of Pennsylvania rocks. Many of these projects are being carried out in conjunction with geologists from other divisions of the Survey.

ENVIRONMENTAL GEOLOGY DIVISION

The Pennsylvania Geological Survey recently established a Division of Environmental Geology. One of the primary goals of this new unit is to assist and advise government, industry, and the general public about the many geologic reports, maps, illustrations and other analyses which have been and are currently being developed by the Pennsylvania Geological Survey.

Planning on the municipal, county, and regional levels has demonstrated a great need for the description and interpretation of the physical features of an area. The Environmental Geology Division is particularly working to assist planning agencies in making use of geologic information such as engineering geology, mineral resources, topography, ground water, and many others, for more effective planning of all types of construction and land use projects.

Current projects of the Environmental Geology Division include a report entitled "Geology in Land-Use Planning." The importance of geology in land-use planning is emphasized. The geologic environment, including topography, general geology, engineering geology, water resources, and mineral resources are presented to the planner with the use of many photographs and sketches. Each of these factors is stressed in relation to data the planner needs, its uses, and examples of how this data can benefit him. The text closes with a summary of all geologic factors that should be used in evaluating land use, emphasizing how geology should be employed in planning, designating, and developing land use.

A new map showing the limestone and dolomite distribution in Pennsylvania has recently been released. An index of all Pennsylvania Geological Survey publications pertaining to carbonate rocks is keyed to the distribution map. A short text outlining the potential hazards of a limestone terrane, and the mineral resources and ground-water value is presented on the reverse side of the map. Specific areas in Pennsylvania are especially hazardous. The need for knowing this information is also outlined.

A third project concentrates on the engineering characteristics of the rocks of Pennsylvania. Each rock formation in Pennsylvania will be evaluated for bedding characteristics, jointing, faulting, folding, cleavage, depth to bedrock, depth of weathering, excavation characteristics, ease of excavation, type of construction material available, depth to water table, ground-water yield characteristics, active and abandoned oil and gas fields, topography, stability of rock slopes, landslide potential, and many others.

Computerization of Pennsylvania's water well data describes one of the newest projects of this division. Currently, water well data are available on well completion reports submitted to the Survey by the Commonwealth's licensed water well drillers. These data are to be transferred to coded well schedule sheets and computer cards will be punched from them. No publication will result but the information will be available to everyone.

As part of the Survey's continuing educational program, important geologic features in Pennsylvania's State Parks are being highlighted in a new series — Pennsylvania's Trail of Geology. A separate geologic park guide will be prepared for each state park in Pennsylvania. This guide will outline in general the geology of the park and specifically emphasize any and all important geologic features. Each guide will be written in a simple, informative style, easily read by the layman. It will be illustrated with photographs and sketches. A small geologic map or index map will be included in each guide. The first three guides, Archbald Pothole State Park, Hickory Run State Park and Trough Creek State Park have been released and are available at the state parks or upon request from the Survey.

OIL AND GAS DIVISION

The Oil and Gas Division has the primary task of providing applied research studies of the hydrocarbon resources of Pennsylvania. The basic subsurface geology described and studied by the staff of this division can be widely used outside of the confines of petroleum geology and engineering. This applied research is very important in ground-water evaluation, salt exploration, ground-water pollution, deep well waste disposal and other subsurface storage such as natural gas and potable water.

In addition to the research studies, this division collects, compiles and makes usable to industry, to the general public, and to government such important tabulations as well data cards, well sample descriptions, fluid analyses, core analyses, grain-size analyses, drilling and production statistics, well sample and core library, geophysical log file and unpublished oil and gas maps.

Current projects include the revision of the mineral resource report on crude oil reserves in Pennsylvania and also the pipeline map showing oil and gas pipelines in the Commonwealth. A "Guide to the Geology of the Pittsburgh Area" has been completed and will be published in the near future.

Compilations of deep and shallow formations and brine analyses have been completed and will be made available to the public either on open file or as a publication.

One of the newest projects is a subsurface disposal study which will define the critical and limiting conditions for disposal in subsurface reservoirs.

New base maps showing the location of oil and gas wells drilled since the Oil and Gas Laws of 1956 are currently in preparation.

34th ANNUAL FIELD CONFERENCE OF PENNSYLVANIA GEOLOGISTS

Oct. 2-4, 1969

THE POCONO FORMATION IN NORTHEASTERN PENNSYLVANIA

The Pocono Formation in northeastern Pennsylvania is a magnificent series of white sandstones, conglomerates, and dark shales. Called Vespertine by H.D. Rogers, State Geologist of the First Pennsylvania Geological Survey and renamed Pocono by J.P. Lesley, State Geologist of the Second Pennsylvania Geological Survey, the unit became the focus of a literary controversy known as 'the Pocono problem.' The rocks comprising the main body of the Pocono have seldom been in doubt, but definitions of the base of the unit range from the Catskill-Pocono transition zone of H.D. Rogers and I.C. White to the angular unconformity of J.P. Trexler, G.H. Wood, and H.H. Arndt. Long considered a body of terrestrial deposits, recent reports by W.D. Sevon indicate that part of the northeastern Pocono is in reality subaqueous in origin. B. Willard, A.D. Leonard, and J.D. Glaeser have all heralded marked alterations of the aerial distribution of the Pocono in northeastern Pennsylvania.

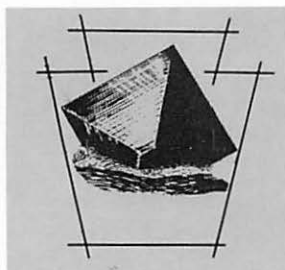
Therefore, the purpose of this conference will be to demonstrate, in the field, the various aspects of the Pocono Formation in northeastern Pennsylvania and to unify the Pocono as a consistent sedimentological assemblage. Hopefully the conference will clarify many aspects of Pocono geology and will stimulate further research on the formation throughout Pennsylvania.

The conference will be held on October 3 and 4, 1969, and will be centered in Hazelton, Pennsylvania. The field trip will be preceded on the evening of October 2 by an illustrated talk about the Pocono Formation in northeastern Pennsylvania.

The first day of the trip will emphasize the stratigraphy and sedimentology of the Pocono Formation. The main stops will be the type locality of the Pocono at Jim Thorpe (formerly Mauch Chunk) and four other diverse stops in the upper part of the Lehigh River gorge between Jim Thorpe and White Haven.

The second day of the field trip will demonstrate the lateral variation and sedimentological consistency of the Pocono Formation. Stops will be along the margins of the Lackawanna-Wyoming Basin.

Pre-registration announcements are being sent to our regular field conference mailing list. If you do not receive an announcement and wish to attend the conference contact Dr. Arthur A. Socolow, the Pennsylvania Geological Survey, Main Capitol Annex, Harrisburg, Pennsylvania, 17120.



EARTH SCIENCE TEACHERS' CORNER

PENNSYLVANIA GEOLOGY replaces many individual newsletters, bulletins, and news releases. One of those replaced is the Earth Science Teachers' Newsletter. This magazine will include items for educators in the Earth Science Teachers' Corner, and it is hoped that you will also find articles of interest in the rest of the magazine.

NEW FIELD TRIP GUIDE AVAILABLE

A field trip guide to Fayette County, Pennsylvania, has been prepared by John Tomikel in conjunction with the Sixteenth Annual Spring Conference of the Pennsylvania Council for Geography Education held last Spring near Uniontown. The guide is divided into two parts; the first pertaining to the settlement patterns in rural Fayette County and the second to the geology of the county.

This field trip guide is available from Dr. John Tomikel, Department of Earth Sciences, California State College, California, Pennsylvania, 15419, for \$1.00 plus postage.

IN-SERVICE INSTITUTE IN EARTH SCIENCE

The Pennsylvania State University, the Ogontz Campus in Abington, Pennsylvania, has received a grant from the National Science Foundation to offer two courses for six graduate credits to junior and senior high school teachers within commuting distance of the Ogontz Campus. Teachers with a minimum of three years of experience who are interested in acquiring the skills and knowledge necessary to teach the Earth Science Curriculum Project (ESCP) approach should apply immediately.

The courses cover background information in Earth Science and practical experience in the investigations developed by the Earth Science Curriculum Project.

Requests for applications should be addressed to: Prof. Peter C. Bazakas, Director, In-Service Institute in Earth Science, The Pennsylvania State University, The Ogontz Campus, 1600 Woodland Road, Abington, Pa., 19001. Telephone: TU6-9400, Ext. 208.

EDUCATIONAL SERIES

Two new booklets in the Educational Series of the Survey are now available — ES 7, *Coal in Pennsylvania* and ES 8, *Geology of Pennsylvania's Oil and Gas*. Free copies may be obtained by writing to the Pennsylvania Geological Survey, Main Capitol Annex, Harrisburg, Pennsylvania, 17120.

PENNSYLVANIA LEADS NATION

William H. Bolles, Earth and Space Science Advisor, Bureau of General and Academic Education, Pennsylvania Department of Education

The Commonwealth of Pennsylvania leads the nation in secondary student enrollment in Earth and Space Science. During the 1967-68 school year 108,000 students were enrolled among approximately 720 secondary schools. This is the highest Earth and Space Science enrollment among the 50 states.

Prior to the publishing of the Earth and Space Science Teaching Guide in 1958, there were 800 students receiving instruction in the earth sciences in 9 schools in Pennsylvania.

The tremendous growth of the Pennsylvania Earth and Space Science program can be accounted for in a number of ways. The introduction of the teaching guide came at a time when teachers were becoming increasingly dissatisfied with the superficial treatment of science offered by general science texts. The willingness of colleges and universities throughout the State to introduce teacher training programs in the earth sciences also provided the impetus for increased success. Organizations such as the American Geological Institute, in sponsoring the Duluth Conference out of which developed the Geology and Earth Sciences Sourcebook, the National Science Foundation through the Summer Institutes, In-Service Institutes, and Academic Year programs, and the Pennsylvania Geological Survey, which provided materials such as their educational series of publications, rock and fossil kits for teachers and group leaders, and assistance to school districts in the form of lecturers and consultative help, all served to stimulate interest among teachers and students.

At the near peak of Pennsylvania enrollment, national interest in the earth sciences was generated by the NSF funding of the AGI sponsored Earth Science Curriculum Project which was pilot tested in 10 schools in Pennsylvania. The somewhat late availability of the final edition of ESCP for the 1967-68 school year resulted in only 8,000 students taking the ESCP course. This figure has climbed to 36,000 students during the 1968-69 school year.

The Earth and Space Science Teaching Guide is being completely rewritten by a committee consisting of several members of the original writing committee together with secondary school teachers. The new guide is expected to be available early in 1970.

SURVEY ANNOUNCEMENTS

NEW COOPERATIVE COAL—TESTING PROGRAM

The Pennsylvania Geological Survey has established a cooperative agreement with the Pittsburgh Regional Office of the U.S. Bureau of Mines for extensive analysis of Pennsylvania coals.

The Survey is systematically mapping and sampling the various coal resources of the Commonwealth and is making careful notations of the geologic conditions and properties of the coal beds. The U.S. Bureau of Mines has agreed to conduct proximate analyses on the coal samples, thus yielding data on the content of volatile matter, moisture, ash, and sulfur in the coals.

The combined comprehensive study of the geologic conditions and chemical analyses of the coals should help to stimulate the consumption of Pennsylvania coals for various uses having specific and limited physical-chemical needs. The results of this study will also aid the coal industry to more efficiently develop as well as conserve Pennsylvania's valuable coal resources.

OIL AND GAS INDUSTRY ACTIVITY

On the basis of well records received by the Department of Mines and Mineral Industries, oil and gas industry activity during the first five months of 1969 is slightly above the comparable period last year. Successfully completed primary shallow oil and gas wells are up as well as secondary oil recovery and gas storage well completions. Although shallow highlight wells, those completed in excess of 50 BOPD and 2 MMCFGPD, have increased proportionally, dry holes have slightly decreased. Deep horizon drilling and completions, however, have not paralleled the advance in shallow well activity.

Although deep drilling decreased, the potential for discovery of significant new deep horizon reserves of gas in western Pennsylvania has received impetus from recent Cambro-Ordovician discoveries in eastern Ohio within 15 miles of the state line. Subsurface conditions for entrapment of gas in this interval appear to be at least as favorable in southwestern Pennsylvania.

SURVEY BASE MAP PROGRAM

The Pennsylvania Geological Survey has established scale, format, and procedure for the preparation and release on request of base maps showing the location of all oil and gas wells drilled since the Oil and Gas Laws of 1956, as well as areas of extensive pre-law field development in western Pennsylvania. Each map will encompass an area including four 15-minute topographic quadrangles. Deep and shallow horizon wells will be differentiated, depth of penetration indicated, well status illustrated and availability of well data other than permits and records shown. A few map areas will be available for distribution on request at a nominal fee by the end of the year. An announcement of availability will be made later this year.

GEOLOGICAL RESEARCH IN PENNSYLVANIA

The "Thirteenth Annual Newsletter of Geological Research in Pennsylvania" has been compiled by the Pennsylvania Geological Survey as an information service to all individuals using geological information in the State.

The research listings are grouped into categories to facilitate your search for information in a particular field. A list of publications printed during 1968 and early 1969 and a list of publications known to be in press are included.

Copies of the newsletter may be obtained by writing to the Bureau of Topographic and Geologic Survey, Main Capitol Annex, Harrisburg, Pennsylvania, 17120.

SURVEY PARTICIPATES IN NEW TOWN STUDY

In recognition of the fact that geology is a basic, controlling factor in the planning and development of any new community, the Pennsylvania Geological Survey is actively participating in the development of data for the area near New Stanton, Pennsylvania, where a burgeoning population growth is expected in conjunction with the new Chrysler Corporation assembly plant.

The Survey has developed data on the distribution of the various rock types and their physical properties, the occurrence of mineral resources which may affect land use, and the nature and distribution of available subsurface water.

This data will be incorporated in a broad planning program for the area being sponsored by the State Planning Board. The Survey's participation in the program helps demonstrate the importance of geology in land-use planning.

IMPORTANT NEW LAND USE PUBLICATION

The Pennsylvania Geological Survey has just released a significant new publication entitled "Geology and Land Use in Eastern Washington County, Pennsylvania." The report is a result of the cooperative program between the Pennsylvania Geological Survey and the United States Geological Survey and was written by B.H. Kent, S.P. Schweinfurth, and J.B. Roen. In demonstrating that geology has a direct effect and control on the use and development of land by man, they describe the composition, structure, and present condition of the bedrock in eastern Washington County. A brief discussion of how the rocks and rock layers react to natural forces and processes that continue to act upon them, to form contact springs and landslides, and to create engineering and construction problems is provided.

The lithologic maps and generalized lithologic columns that accompany the report show the general distribution, thickness, and variation of each of the principal coal beds and sandstone and limestone units which are at or near the ground surface within the mapped area. On the lithologic maps, the structure of the bedrock is outlined by structure contours drawn on the base of the Pittsburgh coal bed.

The report also includes more specific information, such as analytical and laboratory test data on representative samples of sandstone, limestone, coal, mudstone, claystone, and landslide material, and includes calculated reserves of Waynesburg coal within the mapped area. An index map showing the status of recent lithologic and geologic mapping in southwestern Pennsylvania is also provided.

Washington County borders the Pittsburgh metropolitan area, one of the major population and industrial centers in the United States. Within the next 10 years, much of what is now rural farmland within the county probably will be converted and subdivided to meet the needs of increasing population and industrial expansion. There appears to be no limit to this projected growth but there is a definite limit to the amount of land available, and land uses and land-use problems will therefore become increasingly critical. Rocks and geologic conditions may be either the cause of such problems or the means of resolving them, and geologic studies are most effective during the early stages of land-use planning, before land is committed and construction begins.

SURVEY INITIATES DISPOSAL WELL STUDY

Increased concern about pollution abatement on the surface has been accompanied by added industrial interest in the disposal of waste effluents into subsurface reservoirs. Since the limiting factors for such disposal are chiefly geological, the Pennsylvania Geological Survey has initiated a project to define the critical and limiting geological conditions. Disposal principles and guidelines will be stressed so that the public, industry, and government can better evaluate each proposal.

NEW SURVEY PUBLICATIONS

The following list of publications has been released by the Survey during the past few months. All of these publications are available at the Capitol Book Store, 10th and Market Streets, Harrisburg, Pennsylvania, 17125, except Information Circular 63 which is available free of charge from the Survey. Checks should be made payable to the Commonwealth of Pennsylvania. For Pennsylvania addresses, please add 6% State Sales Tax.

| <i>Publication</i> | <i>Price</i> |
|--|--------------|
| A 37 (Reprint) Mineral Resources of the Greensburg Quadrangle, Westmoreland County, Pennsylvania, by M.E. Johnson (162 p., 25 fig., and 13 pl.). | \$6.00 |
| A 54 (Reprint) Geology and Mineral Resources of the Brookville Quadrangle, Pennsylvania, by C.K. Graeber, R.M. Foose, and M.N. Shaffner (136 p., 14 fig., and 16 pl.). | 7.00 |
| A 65 (Reprint) Geology and Mineral Resources of the Punxsutawney Quadrangle, Pennsylvania, by G.H. Ashley (145 p., 26 fig., and 6 pl.) | 7.50 |
| A 75 (Reprint) Geology and Mineral Resources of the Curwensville Quadrangle, Pennsylvania, by G.H. Ashley (140 p., 32 fig., and 4 pl.). | 6.00 |
| A 178 (Reprint) Geology and Mineral Resources of the New Holland Quadrangle, Pennsylvania, by Anna I. Jonas and G.W. Stose (40 p. and 7 pl.). | 3.50 |
| G 56 Geology and Land Use in Eastern Washington County, Pennsylvania, by B.H. Kent, S.P. Schweinfurth, and J.B. Roen (31 p., 3 fig., 5 tab., and 2 pl.). | 2.75 |
| IC 60 Devonian Tully Limestone in Pennsylvania and Comparison to Type Tully Limestone in New York, by Philip Heckel (33 p., 4 fig., 3 tab., and 1 pl.). | .50 |
| IC 61 Revised Lithostratigraphic Nomenclature of the Pottsville and Allegheny Groups (Pennsylvanian) Clearfield County, Pennsylvania, by William E. Edmunds (36 p. and 14 fig.). | .50 |
| IC 62 The Precambrian in the Subsurface of Northwestern Pennsylvania and Adjoining Areas, by Timothy E. Saylor (25 p., 6 fig., 5 tab., and 2 pl.). | .45 |

| <i>Publication</i> | <i>Price</i> |
|---|--------------|
| IC 63 The Mineral Industry of Pennsylvania in 1967 , by Charles C. Yeloushan (37 p., 1 fig., and 10 tab.). | Free |
| M 50 Part 2-B, Economics of Pennsylvania's Clay and Shale Production , by George F. Deasy and Phyllis R. Griess (25 sheets with 79 maps). | 1.00 |
| M 59 Geology of the Elk Run Gas Pool, Jefferson County, Pennsylvania , by Louis Heyman (18 p., 4 fig., and 2 pl.). | .50 |
| M 60 Medina and Oriskany Production along the Shore of Lake Erie, Pierce Field, Erie County , by Dana R. Kelley and William G. McGlade (38 p., 6 fig., and 4 pl.). | 2.40 |
| PR 176 Geology of a Portion of the Allensville Quadrangle, Centre and Huntingdon Counties, Pennsylvania , by Linda L. Flueckinger (1 sheet containing geologic map, stratigraphic column, and text). | 2.20 |
| W 24 Geology and Hydrology of the Martinsburg Formation in Dauphin County, Pennsylvania , by Louis D. Carswell, Jerrald R. Hollowell, and Lucian B. Platt (54 p., 17 fig., 3 tab., and 1 pl.). | 2.30 |
| W 25 Hydrology of the Metamorphic and Igneous Rocks of Central Chester County, Pennsylvania , by Charles W. Poth (84 p., 29 fig., 6 tab., and 3 pl.). | 4.50 |

Calendar of Events

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|------------|--|
| Oct. 2-4 | 34 th Annual Field Conference of Pennsylvania Geologists, Hazleton, Pennsylvania (For details see page 9). |
| Oct. 14 | The Pennsylvania State University Geological Sciences Seminar — Dr. D. L. Turcotte, Cornell University, "Mantle Convection and the New Global Tectonics." |
| Oct. 18-22 | American Association of Stratigraphic Palynologists, 2 nd Annual Meeting. Information from Dr. A. Traverse, Deike 529, University Park, Penna., 16802 Field trip chairman, Dr. Eugene G. Williams, Department of Geology, The Pennsylvania State University. |
| Oct. 21 | The Pennsylvania State University Geological Sciences Seminar — Dr. John F. McCauley, U. S. Geological Survey, "The Geology of the Near Side of the Moon." |
| Oct. 28 | The Pennsylvania State University Geological Sciences Seminar — Dr. A. J. Naldrett, University of Toronto, "Origin of the Sudbury Deposits." |



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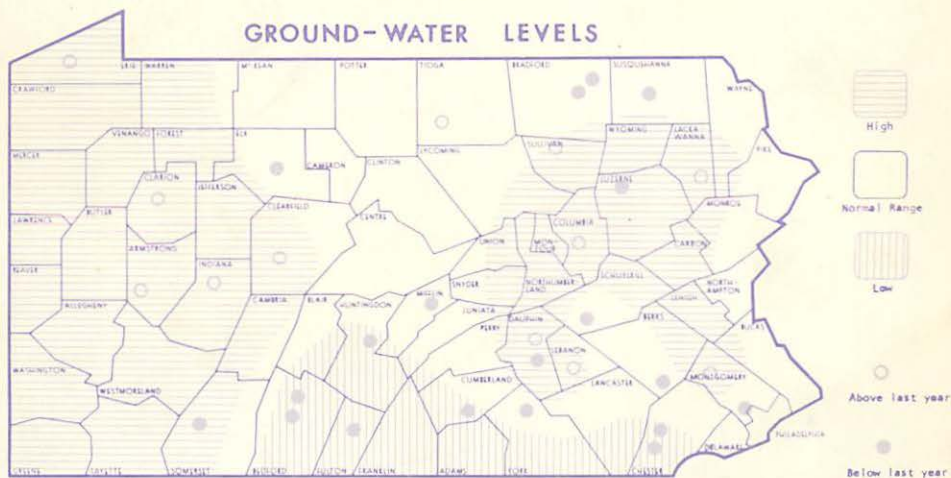
Frances Hunt, *Typist*
Debbie Lehmer, *Typist*
Cheryl Lewis, *Stenographer*
Virginia Milewski, *Draftsman*
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