Annual Report

July 1, 1970 to June 30, 1971

New Mexico State

Bureau of Mines and Mineral Resources

NEW MEXICO STATE
BUREAU OF MINES AND MINERAL RESOURCES

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Cover Photos

Front: New Mexico Tech—home of the Bureau.
Aerial view to west. Socorro Peak in right background.

Back: Mineral specimens from the Bureau's Mineralogical Museum.
Upper: Turquoise—official gemstone of New Mexico.
Lower: Smithsonite from the Kelly mine, Magdalena district.

New Mexico State
Bureau of Mines and Mineral Resources

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for the Fiscal Year
July 1, 1970 to June 30, 1971

by
Don H. Baker, Jr.
and Staff

Socorro, New Mexico August 1971

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August 27, 1971

TO: Board of Regents
Honorable Stirling A. Colgate, President
Members of the New Mexico Legislature
Board of Educational Finance
Taxpayers of New Mexico

I am pleased to provide you with the Annual Report of the New Mexico State Bureau of Mines for fiscal year 1970-71, the 58th year.

The approved Operating Budget of State funds was adhered to closely. A carry-over balance of about $448 remained at the year's end from a budget of $652,876.

A noteworthy development this year was the severalfold increase in utilization of the Bureau by other State agencies for technical information and assistance.

Respectfully submitted,

Don H. Baker, Jr.
Director

Rapid economic change imposes upon all institutions, particularly those supported by the taxpayer, new functions and responsibilities, and diminishes or enhances the importance of old ones. Failure to respond to such changing priorities makes an institution less effective or even obsolete. The Bureau's first duty is to perform its mission with maximum effectiveness.

ANNUAL REPORT

Most everyone in New Mexico became aware of environmental problems this year. The Bureau continued–even expanded–its attention to environmental problems in connection with the development of our mineral resources. This activity was exemplified in several ways, ranging from sponsorship of meetings to presenting testimony and publishing information on surface mining procedures. The Bureau sponsored a meeting between legislators and mineral industry representatives to promote better understanding of the problems and the methods industry is using to solve them. Staff members testified at numerous State and Federal agency hearings on various aspects of the environment and the possible effects of suggested controls and regulations.

Technical activities of the Bureau were directed toward increasing our knowledge of the earth's structure and the more efficient extraction of its mineral wealth, with serious concern for economic considerations as well as maximum protection and improvement of the environment. These efforts are listed in the projects underway and projects completed.

Early in the fiscal year a Director's Advisory Committee was appointed to assist the Bureau in selecting programs best fitting the needs of the State and the mineral industry, yet retaining impartiality in dispensing technical information and advice as may be appropriate and upon request. Those selected to serve are: Henry S. Birdseye (Board of Regents, New Mexico Institute of Mining Technology), William F. Darmitzel (mining industries), Walter Famariss, Jr. (petroleum industry), William W. Grant (coal industry), Ralph Stucky (Water Resources Research Institute), and Sherman A. Wengerd (American Institute of Professional Geologists). This committee has figured importantly in establishing project priorities and in reviewing operating procedures.

The last of the recommendations of the 1968 "Blue Ribbon" committee were implemented. This was the minimization of dual appointments of professional staff between the College Division and the Bureau, and, the employment of college staff for specific summer and off-term projects. Other recommendations, already implemented, were:

(1) Principal objective of the Bureau is investigating and evaluating the state's mineral resources with emphasis on aid to exploration and economic evaluation.

(2) Industrial research contracts must increase our knowledge and benefit all, with the results published. Consulting, even outside the state, by Bureau staff was eliminated because of possible conflict of interest and possible detriment to the minerals industry of New Mexico.

(3) The direction of graduate research programs by Bureau staff, and the

hiring of students to work in the laboratories wherever feasible was continued.

To create an awareness and understanding of New Mexico mineral resources, a "Mineralmobile" was constructed for use in school earth science programs and by various civic organizations in the state. This 3-sided trailer (see photos at rear of Appendix) exhibits more than 100 mineral and rock specimens, along with maps, photographs, and brochures illustrating our mining and fuel industries. The Bureau's Mineralogical Museum also aids considerably in establishing knowledge of minerals. Guided tours were conducted for 37 school and special groups. In memory of Tech student Wayne Seagriff, Mr. and Mrs. Seagriff donated their son's mineral collection to the museum.

To provide versatility and to assure permanent documentation and availability, all Bureau publications are now available on microfiche. Diazo prints of the microfiche can be obtained from the Publications Office. By using this system, libraries and companies can now maintain a complete set of Bureau publications in limited space.

Geologic Mapping Projects (numbers in brackets used on map, p. 8)

Geologic mapping projects completed or underway are: west half of Tucumcari 1:125,000 quadrangle [2] by Spiegel and Trauger; Pelona 30-minute quadrangle [3] by Willard and Stearns (Geol. Map 23); Roswell and Carlsbad 1:250,000 quadrangles [4] by V. Kelley (Mem. 24, in press); San Agustin Plains area [5] by Weber; Glorieta 7½-minute quadrangle [6] by Budding (being edited); San Diego Mountain area [7] by Seager, Hawley, and Clemons (Bull. 97, in press); Silver City 7½-minute quadrangle [8] by Cunningham and LeMone; west halves of Brownfield [9] (being edited), Clovis [10], and Hobbs [11] 1:250,000 quadrangles by Reeves in cooperation with Texas Bureau of Economic Geology; Eagle Nest area [12] by Clark and Read (Bull. 94, being edited); southern Peloncillo Mountains [13] by McGehee; Mt. Riley-Aden area [14] by Hoffer; Montezuma area [15] by Bejnar; Cuba and La Ventana 7½-minute quadrangles [16] by Woodward (being edited); volcanic exposures in Magdalena-Tres Montosos area [17] by Chapin; Little Hatchet Mountains [18] by Zeller (Bull. 96); Big Hatchet Mountains [19] by Zeller; Fort Sumner 1:250,000 quadrangle [46] by V. Kelley; Sierra de las Uvas [47] by Clemons and Seager; El Cristo Rey [48] by Lovejoy; northern Animas Mountain [49] by Soule; Regina and Nacimiento Peak 7½-minute quadrangle [50] by Woodward; West Potrillo-Mt. Riley area [51] by Hoffer.

General Geologic Studies (numbers in brackets used on map, p. 8)

General geologic studies are: a revision of southern Zuni Mountains guidebook [31] by Foster (reprinted as Scenic Trip 4); a scenic-trips guidebook of southwestern New Mexico [32] by James (in press); geochemistry of basalts

[33] by Renault (Circ. 113); Lake Valley crinoids [34] by Macurda; radiometric dating of volcanic rocks in Glenwood area [35] by Bikerman; geologic guides to Rock Hound, City of Rocks, Pancho Villa, Storrie Lake, Carlsbad Zoological-Botanical Gardens, Conchas Lake, Alamogordo Lake, and Elephant Butte Lake State Parks (brochures); geology of Bottomless Lakes, Bluewater Lake, Valley of Fires, and Fort Selden State Parks; Bibliography of New Mexico geology by Koehn and Koehn; microfauna of Cretaceous rocks in southwestern San Juan Basin [57] by Lessard; road logs and articles by Chapin and Foster for New Mexico Geol. Soc. guidebook (in press).

Mineral Resources Projects (numbers in brackets used on map, p. 9)

Mineral resources projects include petroleum potential of southwestern New Mexico [21] and southern Arizona by Kottlowski (published by American Petroleum Institute and American Association of Petroleum Geologists); Black Range tin [22] by Jahns; zeolites by Weber; K/Ar ages of Tertiary igneous rocks in central and western New Mexico by Weber (published in Isochron/West); K/Ar age of La Jara Peak Andesite by Chapin (in press); K/Ar ages of volcanic rocks in Luis Lopez manganese district by Willard (in press); Luis Lopez manganese deposits [23] by Willard; White Oaks gold area [24] by Willard; mineral resources of Socorro County [25] by Chapin; trace metallic elements of Cookes Peak and Tres Hermanas Mountains [26] by Babu; tin-bearing rhyolites [27] by Lufkin; Nogal mining district [28] by Thompson; low-sulfur strippable coal in San Juan Basin [1] by Shomaker, Beaumont, and Kottlowski (Mem. 25, in press); clays in New Mexico by Hawks (Part 1, central New Mexico, Circ. 110); mining history of the state by Christiansen; mineral resources on State lands in east-central New Mexico [20] by Foster, C. Smith, and Hawks (State Land Office report); hydrologic studies of De Baca County [44] by Mourant and Shomaker (Ground-Water Rpt. 10); ground-water resources of Dona Ana County [45] by King, Hawley, Taylor and Wilson (Hydrologic Rpt. 1); Survey of surface mining in New Mexico by Schilling, Baltosser, Griswold, Wagner, File, Beaumont, Kottlowski, and Baker (Circ. 114); records of wells and springs in the Socorro and Magdalena area [52] by Clark and Summers (Circ. 115); ground water of Guadalupe County [53] by Dinwiddie; coal and water resources of Ute Indian Reservations [54] by Shomaker, Holt, Lease, and Kottlowski; deep coal reserves near Hogback [55] by Lease and Shomaker; Chupadera red-bed copper [56] by Vonder Linden; mineral resources of Hidalgo County [58] by Elston; No Agua perlite deposits [59] by Naert and Wright.

Stratigraphic Investigations (numbers in brackets used on map, p. 9)

Stratigraphic investigations include: sedimentary influence of the Pedernal uplift [36] by Kottlowski (published in Basins of the Southwest by West

Texas and North Texas Geol. Soc.); Wolfcampian carbonate facies in southern New Mexico [40] by Jordan (thesis, completed) and Wilson; Early Pennsylvanian fusulinids of southern New Mexico [41] by King; Upper Paleozoic and Cretaceous stratigraphy of the Hidalgo County area [42] by Greenwood, Kottlowski, and Armstrong (New Mexico Geol. Soc. guidebook 21st field conf.); Permian reef facies of Guadalupe Mountains [43] by D. Smith; stratigraphy of Ogallala Formation of western High Plains [60] by Frye and Leonard; stratigraphy and carbonate petrology of Paleozoic rocks in Peloncillo Mountains [61] by Armstrong; reef facies in Big Hatchet Mountains [62] by Schupback and Wilson. Paleontologic studies continued with work on descriptions of the Endoceratida and of Tarphyceratida of the El Paso Limestone, and identification of cephalopods in eastern United States and Canada.

Distinguished Visiting Lecturer

The Bureau co-sponsored, with the College Division, a visit by Dr. June Rapson-McGugan of the Canadian Geological Survey, to present a short intensive course in sedimentary petrology and serve as consultant to Bureau staff and graduate students.

Oil and Gas Information

The Bureau's service of maintaining a cuttings library with samples from oil and gas wells drilled in the state continued to expand, with the receipt of 995 boxes of cuttings representing 214 wells, and electrical and other logs from 1,913 wells. Direct use of the facility was made by 128 persons connected with the mineral industry. Also the data was essential in responding promptly to 144 letters of inquiry, and 72 long distance telephone calls. Recognizing the importance of the library, $45,000 was allocated from the third Higher Education Capital Bond issue for constructing new storage facilities for these valuable records.

Metallurgical and Chemical Research

Mineral leaching and the related reaction chemistry continued as primary concerns. The Bureau-industry cooperative research project for evaluating the optimum recovery of copper from a major oxide deposit by agitation or in situ leaching resulted in acquisition of considerable useful data. Besides providing pertinent theoretical and practical data, these cooperative projects also stimulate graduate research projects and provide part-time employment for students. An important aspect of these projects is the training and experience gained by these future scientists and engineers.

A field laboratory for in situ extraction of red-bed copper is under consideration. The final decision on implementation will be made when

geological, hydrological, and environmental data are collected and evaluated. A thorough evaluation of this data will determine if mineralization is meaningful, what the geological environment of the deposit is, and the possible hydrological and environmental problems of in situ leaching.

Physical beneficiation tests of graphite, fluorite, mica, and coal for small mine operators continued. Small mining companies obtained beneficiation tests on 24 samples of ore; and 57 individuals were aided in solving problems concerning concentration methods, equipment, or applicability of recovery techniques. Modeling of metallurgical processing steps and production control systems engineering is a continuing project.

Tech's Idea Conference this year, "In Place Leaching and Extraction Technology," was attended by 70 representatives of industry and government agencies.

The analytical laboratories assisted in establishing methods for the analysis of trace elements. Techniques for accurate analyses of very small quantities of elements (such as 1 ppb mercury) in water and other media is becoming critical in programs designed to control and improve the quality of our environment. Laboratory staff assisted industrial laboratories in setting up analytical techniques and controls. The Bureau laboratory is a member of The Analytical Reference Service, a division of the Federal Environmental Protection Agency.

Drafting and Cartography

In addition to preparing maps and drawing illustrations for Bureau publications, the drafting and cartography section continued to produce charts, signs, graphics, and art for the other two divisions of New Mexico Tech. In a continuing effort to update techniques and reduce costs, the section chief visited organizations having similar functions.

FINANCIAL STATEMENT FOR BOARD OF EDUCATIONAL FINANCE–LEGISLATIVE BUDGET

Receipts

Beginning balance	$ 9,849.60
State appropriation	606,000.00
Publication sales	17,026.64
Basic geologic and ground-water appropriation	20,000.00
Total Receipts	652,876.24

Disbursements and Commitments

Salaries		
Full time	$334,075.85	
Part time (mostly students)	95,724.09	
Project contract	32,280.00	$462,079.94
Travel and Automotive		
Travel and per diem	$ 13,909.62	
Gas, repairs, and insurance	5,779.64	19,689.26
Repairs and Maintenance	$ 1,440.74	1,440.74
Supplies and Materials		
Postage and resale	$ 5,872.84	
Office	5,820.35	
Laboratory and scientific	10,221.39	21,914.58
Printing and Publications	$ 36,349.33	36,349.33
Other Operating Expenses		
Telephone and telegraph	$ 12,208.48	
Professional services	14,149.81	
Retirement	17,130.22	
Old Age and Survivors Insurance	10,604.78	
Overhead–New Mexico Tech	17,000.00	
Building use charge–New Mexico Tech	8,000.00	
Computer service	5,600.00	
Freight, insurance, audit, Board of Educational Finance, subscriptions, etc.	6,523.29	91,216.58
Capital Outlay	$ 19,737.75	19,737.75
Total Expenditures		$652,428.18
Balance		$ 448.06
Budgeted in November, 1970 for F.Y. '71-'72		238.00
Uncommitted balance, June 30, 1971		$ 210.06

FINANCIAL STATEMENT FOR GRANTS AND CONTRACTS BUDGET

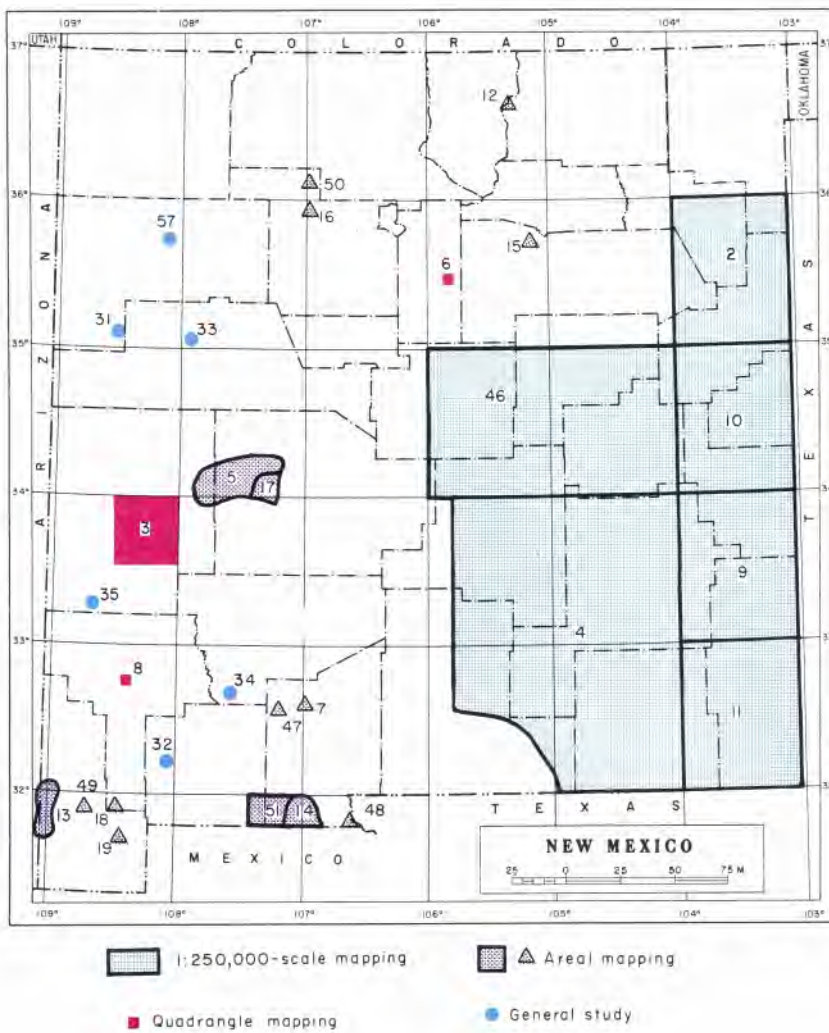
Receipts

Beginning balance (carried forward July 1, 1970)		$ 8,658.00
Income		
State and Federal	$76,675.00	
Other	11,172.00	87,847.00
Total Funds Available		$96,505.00

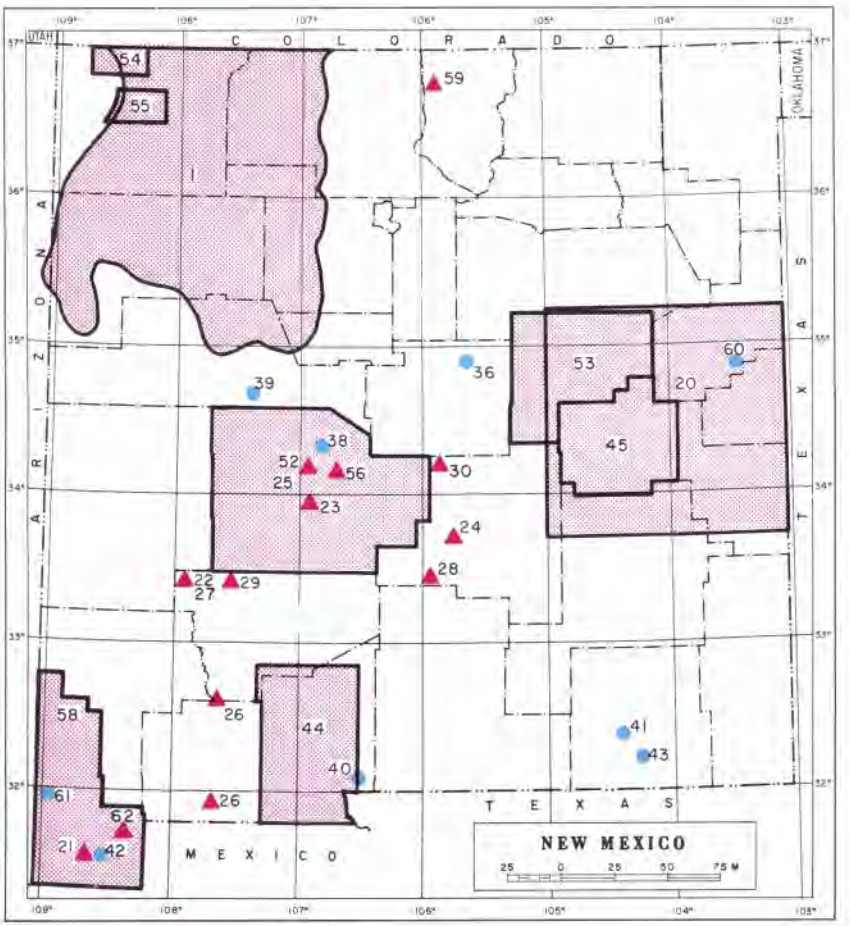
Expenditures

Salaries	$44,428.00	
Retirement	779.00	
Old Age and Survivors Insurance	721.00	
Travel	9,279.00	
Supplies	7,873.00	
Printing	2,079.00	
Equipment	12,939.00	
Other	15,328.00	
Overhead	385.00	
Total Expenditures		93,811.00
Balance, June 30, 1971		$ 2,694.00

GEOLOGIC MAPPING AND GENERAL STUDIES



MINERAL-RESOURCE AND STRATIGRAPHIC INVESTIGATIONS



APPENDIX

New Mexico's Mineral Production

New Mexico ranked sixth among the states in value of the minerals and fuels produced during calendar 1970. The value totalled $1,073,589,000, an increase of more than 11 percent according to preliminary figures released by the Federal Bureau of Mines.

With last year's fuel production at $666 million, or 62 percent of the total, New Mexico continued a healthy balance between fuels and other minerals. The Federal Bureau reported production of fuels "increased 5 percent over 1969, while metals valued at $296 million, increased 38 percent." Nonmetals at $111 million showed a growth of 24 percent over 1969.

Professional Activities

Staff members served as speakers or panelists at 17 technical meetings and 26 other meetings of service and rockhound organizations. In addition, the staff assisted the College Division by directing 14 thesis programs, 12 independent directed studies, teaching 5 courses, giving special lectures, and serving on graduate research committees.

Because of a resemblance to Hadley Rille near the Apollo 15 landing site on the moon, the Rio Grande Gorge near Taos was selected for field exercises for astronaut crews. Bureau geologists assisted in organizing and conducting the training expedition in March.

The analytical laboratories performed 8063 analyses on 3870 samples, including 51 complete water analyses. Reports were prepared on 65 sample groups submitted for mineral identification.

Bureau visitors totalled 2690. Although most were from the immediate region, some were from Canada, Czechoslovakia, South Africa, and Australia. Information and technical advice was also dispensed in 7697 letters and 5585 telephone calls.

The staff spent 1245 man days in the field requiring 709 man days of per diem and 126,118 miles of travel. The Bureau provided support for 56 undergraduate students, 18 graduate students, and 3 special students in performance of its programs. Three students presented technical papers at professional meetings.

In addition to holding memberships in a number of professional societies, staff members served on numerous committees of these societies. Staff also served on other national and state organizations committees including: American Commission on Stratigraphic Nomenclature, United States Solid Waste Liaison Committee, New Mexico Mining Safety Advisory Board, Western Governors' Advisory Council, Natural Resources Council for the Federation of Rocky Mountain States, Four Corners Regional Commission's Minerals and Fuels Advisory Committee, New Mexico State Land Com-

mission Advisory Council, Professional Ethics Committee of American Institute of Professional Geologists, New Mexico Mapping Advisory Committee, Interstate Oil Compact Commission Research Committee, House of Delegates of the American Association of Petroleum Geologists, New Mexico Earth Resources Consortium Committee.

Personnel Changes

Jacques Renault was on sabbatical leave with the Bureau de Recherches Geologique et Minieres at Orleans, France. Roshan Bhappu was appointed acting head of the Department of Metallurgy and Materials Engineering along with his Bureau duties. Alex. Nicholson, Editor-Geologist, passed away November 11, 1970. The following persons resigned: Mrs. M. J. Szydlowski, secretary; Mrs. Sue Wilks, typist; and Mrs. Martha Arnold, part-time editorial assistant.

Staff additions were: Karl Vonder Linden, Mining Engineer and Environmental Geologist (October, 1970); Charles Walker, Mineralogist (October, 1970); Blair Benner, Junior Metallurgist (March, 1971); Robert W. Kelley, Editor-Geologist (May, 1971); E. Jack Coats, Editorial Clerk (January, 1971); Mrs. Judy Peralta, Staff Stenographer (September, 1970); Mrs. Jill Collis, Secretary (June, 1971); and Michael Wooldridge, Draftsman (January, 1971).

Community Activities

The Bureau continued its lecture program on a variety of topics. This year's series included talks on moon rocks, travel in Turkey, and space photography. These programs have proven popular throughout the community.

Employees were involved in local communities activities including school board, Mental Health Association, children's clinics, and community service clubs. The Bureau entry "New Mexico's Mineral Industry—Yesterday & Today for a Better Tomorrow" won 3rd place in the Socorro County Fair parade (see photos at rear). The Bureau participated in the high school program for Vocational Office Education by hiring a part-time vocational business student for one semester.

Publications

The Bureau published 27 reports in the form of circulars, bulletins, memoirs, hydrologic reports, scenic trips, and State Park brochures. Cash sales totalled $17,026 against a printing cost of $36,350, of which $8,500 is allocated to publications still being printed.

New Issues:

Bulletin 95. *Geology and Mineral Deposits of the Gallinas Mountains, Lincoln*

and Torrance Counties, New Mexico, by Ralph M. Perhac. 51 pages, 11 figures, 2 plates, 7 tables. $3.50.

The Gallinas Mountains comprise a transgressive sedimentary sequence of Lower Permian Rocks intruded by middle (?) Tertiary rhyolite and trachyte laccoliths and associated bodies. Iron, copper, and fluorite-bastnaesite deposits are associated with the trachyte; iron also occurs as replacement bodies in Yeso Formation carbonate rocks.

Bulletin 96. *Geology of the Little Hatchet Mountains, Hidalgo and Grant Counties, New Mexico,* by Robert A. Zeller, Jr. 23 pages, 2 plates, (including colored geologic map, scale 1:31,680). $1.50.

The thick Early Cretaceous sequence is a key to Mesozoic stratigraphy in the Southwest. It consists, in ascending order, of unnamed beds, Hell-to-Finish, U-Bar, Mojado, and Ringbone Formations, overlain by the Early Tertiary Hidalgo volcanics, and by younger volcanic rocks. Intrusive rocks are of Precambrian, Laramide, and Tertiary age. Laramide thrust faults and Tertiary normal faults characterize the structure. Copper, lead, silver, zinc, molybdenum, tungsten, and gold ores are favorable for exploration.

Ground-Water Report 10. *Reconnaissance of Water Resources of De Baca County, New Mexico,* by Walter A. Mourant and John W. Schomaker. 87 pages, 10 figures, 4 plates, 6 tables. $4.50.

Ground water is used for all domestic and some stock and irrigation supplies; surface water from the Pecos River is used for stock and most irrigation. Principal aquifers are the Santa Rosa Sandstone and alluvium. At current consumption rates, ground-water levels should remain stable. Significant additional supplies from other aquifers in the county are unlikely.

Hydrologic Report 1. *Geology and Ground-water Resources of Central and Western Dona Ana County, New Mexico,* by W. E. King, J. W. Hawley, A. M. Taylor, and R. P. Wilson. 64 pages. $3.50.

Provides details on the stratigraphy, lithology, and water-bearing characteristics of both the consolidated and unconsolidated materials. Study area is divided into two regions: the Rio Grande Valley and the adjacent uplands. Prepared in cooperation with the Water Resources Research Institute, New Mexico State University.

Circular 110. *Test Data for New Mexico Clay Materials, Part 1, Central New Mexico (Bernalillo, Los Alamos, Sandoval, and Santa Fe Counties),* by William L. Hawks. 37 pages, 5 figures, 15 tables. $0.50.

Descriptions of clay-material localities and test data for about 65 samples. In addition to those currently used, promising deposits are Mancos shale at Tonque and Placitas, shales from the Sandia and Abo Formations near Sandia Park, shales in the Mesaverde Formation near Coyote, and a fire clay in the Morrison Formation near San Ysidro.

Circular 111. *Computerization of the New Mexico Bureau of Mines Mineralogical Museum,* by Jacques Renault, Rena Mae Bonem, and Ronald Riese. 49 pages, 11 figures. $1.00.

The museum catalog listing more than 7,000 specimens has been computerized for rapid retrieval of specimens having any desired combination of characteristics. The computer is an IBM 360/44; programs are written in FORTRAN IV. Appen-

dices include program descriptions, card formats, flow charts, and program listings.

Circular 112. *The Dissolution of Chalcocite in Oxygenated Sulfuric Acid Sollution,* by Walter W. Fisher and Ronald J. Roman. 28 pages, 13 figures, 1 table. $0.50.

Although the dissolution of chalcocite in a variety of lixiviants has been studied by many investigators, none has completely defined the chemistry and mechanism. The importance of chalcocite as an ore mineral in copper leach demps justifies a detailed study.

Circular 113. *Major-Element Variations in the Potrillo, Carrizozo and McCartys Basalt Fields, New Mexico,* by Jacques Renault. 22 pages, 4 tables. $0.75.

Sixty-two samples of fresh Quaternary basalt from the Potrillo, Carrizozo and McCartys volcanic fields were analyzed by X-ray fluorescence spectroscopy to determine areal composition variations, characterize their mean compositions, and correlate their compositions with their tectonic settings.

Circular 114. *Survey of Surface Mining in New Mexico,* by John H. Schilling, Will W. Baltosser, George B. Griswold, Walter K. Wagner and Lucien A. File, Frank E. Kottlowski and Edward C. Beaumont, and Don H. Baker, Jr. 17 pages, 4 illustrations, 1 table. $1.00.

Short articles describing surface mining of copper, uranium, molybdenum, coal, and construction materials by open-pit and strip-mining methods as related to the ecology, economy, and scenic beauty of the state.

Circular 115. *Records of Wells and Springs in the Socorro and Magdalena Areas, Socorro County, New Mexico, 1968,* by N. J. Clark and W. K. Summers. 51 pages. $1.25.

Statistical records of wells, chemical analyses, and water-level measurements.

State Park Brochures. *Rock Hound State Park, City of Rocks State Park, Pancho Villa State Park, Storrie Lake State Park, Conchas Lake and Alamogordo Lake State Parks, Elephant Butte Lake State Park,* and *Zoological-Botanical Gardens State Park.* Free leaflets.

Seven leaflets, prepared by Bureau staff and others in cooperation with the New Mexico State Park and Recreation Commission, describing the location, facilities, history, flora, fauna, and geology of the state park and its environs. Principal emphasis is on geology.

Annual Report. *New Mexico State Bureau of Mines and Mineral Resources Annual Report for the Fiscal Year July 1, 1969, to June 30, 1970,* by Don H. Baker, Jr., and staff. 22 pages, illustrations. Free.

Summarizes reorganization and activities of the Bureau, with listings of current projects, including: geologic mapping; mineral resource, stratigraphic, general geologic, and paleontological studies; chemical and metallurgical research; and professional and public services.

Laws *and Regulations Governing Mineral Rights in New Mexico,* by Victor H. Verity and Robert J. Young. 71 pages. $1.00.

Constantly changing laws and regulations require that legal problems be submitted to an attorney; this booklet is intended only as a field guide for the

prospector and miner, to assist in locating a mining claim and maintaining its validity, and is limited to State and Federal mining laws as they apply within New Mexico.

Geologic Map 23. *Reconnaissance Geologic Map of the Pelona Thirty-minute Quadrangle,* 1971, by Max E. Willard and Charles E. Stearns. $1.00.

Revised issues:

Scenic Trip 4. *Southern Zuni Mountains and Zuni-Cibola Trail, New Mexico,* revised and expanded 1971, by Roy W. Foster. 75 pages. $1.50.s,

A summary of the geologic, archaeological and recent events that have shaped the landscape and culture along the Zuni-Cibola Trail. Road logs of five recommended side trips.

Re-issues:

Bulletin 8. *The Ore Deposits of Socorro County, New Mexico,* by S. G. Lasky, 1932. 139 pages, 21 figures, 4 plates. $1.50.

Memoir 11. *Geology of Part of the Southern Sangre de Cristo Mountains, New Mexico,* by John P. Miller, Arthur Montgomery, and Patrick K. Sutherland, 1963. 106 pages, 22 figures, 13 plates, 1 map. $6.00.

Circular 5. *Gold Mining and Gold Deposits in New Mexico,* by E. H. Wells and T. P. Wootton, 1932; revised by T. P. Wootton, 1940. 26 pages. $0.50.

Circular 101. *Exploration for Mineral Resources,* compiled and edited by Frank E. Kottlowski and Roy W. Foster, 1969. 126 pages, 68 figures. $1.00.

Scenic Trip 6. *Trail Guide to the Upper Pecos,* by Arthur Montgomery and Patrick K. Sutherland; second edition, 1967. 64 pages, 1 chart, 2 maps. $1.50.

In press:

Bulletin 97. *Geology of the San Diego Mountain Area, Dona Ana County, New Mexico,* by William R. Seager, John W. Hawley, and Russell E. Clemons.

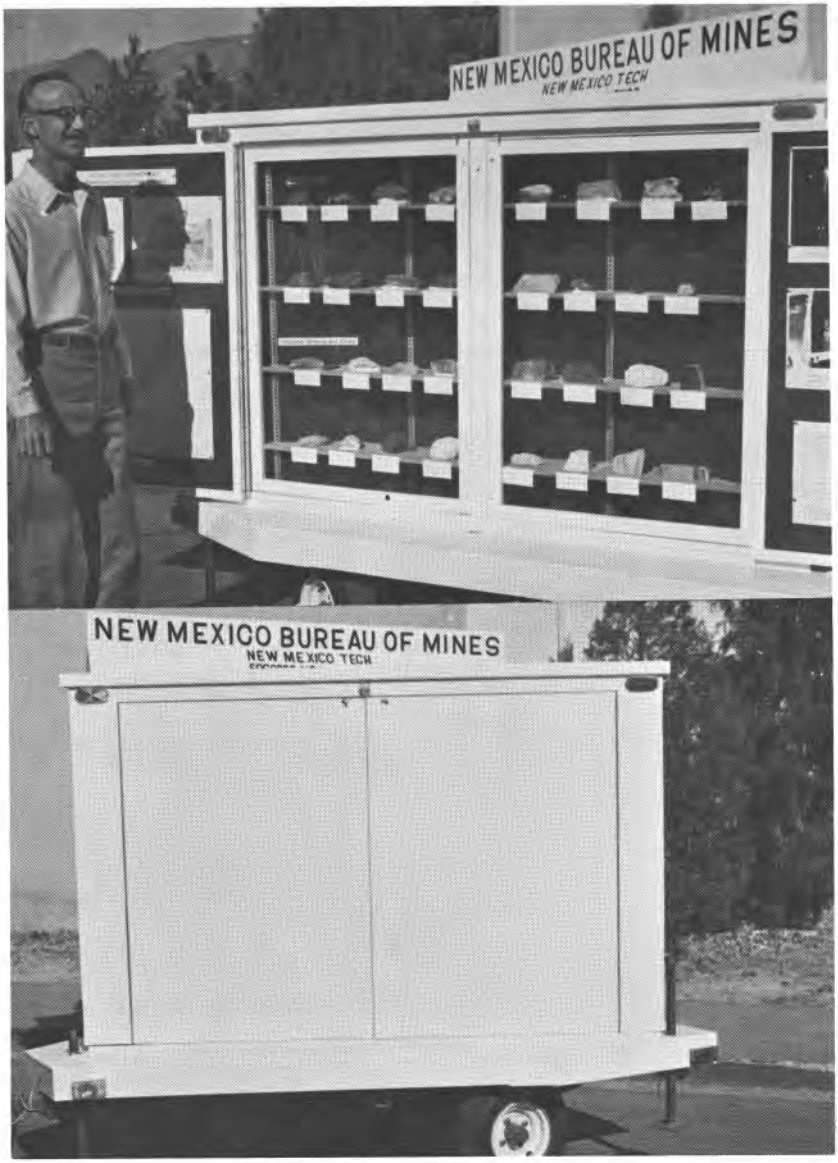
Memoir 24. *Geology of the Pecos Country, Southeastern New Mexico,* by Vincent C. Kelley.

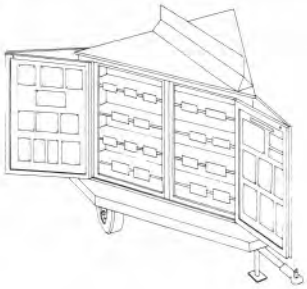
Memoir 25. *Strippable Low-sulfur Coal Resources of the San Juan Basin in New Mexico and Colorado,* compiled by John W. Shomaker, Edward C. Beaumont and Frank E. Kottlowski, with articles by William R. Speer, Robin C. Lease, John W. Shomaker, Edward C. Beaumont, Frank E. Kottlowski, and Walter H. Pierce.

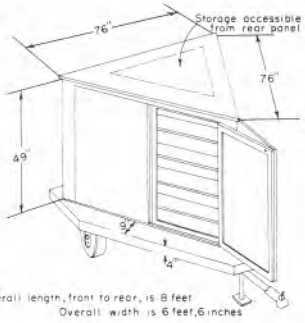
Scenic Trip 10. *Southwestern New Mexico,* by H. L. James.

Geologic Map 25. *Cuba 7½-Minute Quadrangle,* by L. A. Woodward et al.


WESTSIDE
TRACK





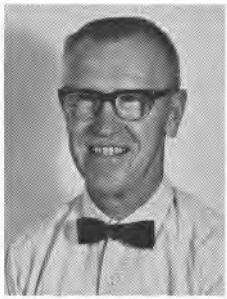


Overall length, front to rear, is 8 feet
Overall width is 6 feet, 6 inches


TOMORROW


NEW MEXICO'S MINERA
YESTERDAY & TODAY F
TOMORRO

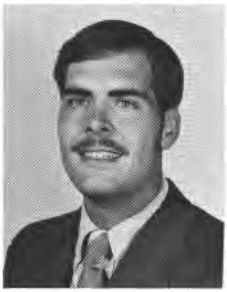
Don H. Baker, Jr.
Director
July 1, 1969



William E. Arnold
Scientific Illustrator
Jan. 4, 1954

Robert A. Bieberman
Petroleum Geologist
June 1, 1950

Frank E. Kottlowski
Assistant Director, Senior Geologist
July 2, 1951



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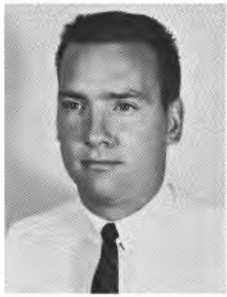

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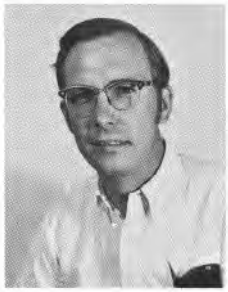

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Juarine W. Wooldridge
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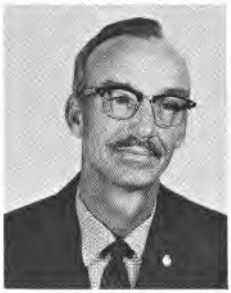

Robert H. Weber
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