

Publications of the Faculty

COLLEGE OF MINES,

and the Staff

ARIZONA BUREAU OF MINES

UNIVERSITY OF ARIZONA

Tucson, Arizona

Includes material published or in preparation during the period
June 1, 1966 - June 1, 1967.

I. BOOKS

COLLEGE OF MINES

CHEMICAL ENGINEERING

Rehm, T. R.
Transport Process Fundamentals. Undergraduate textbook,
1967. (In preparation).

GEOLOGY

Lustig, L. K.
Inventory of research on geomorphology and surface hydrology
of arid environments. Univ. of Ariz. Press. (in press).

Titley, Spencer R.
Geology of the Porphyry Copper Deposits, Southwestern
North America. Univ. of Ariz. Press, 1966. 304 pages.
With C. J. Hicks.

GEOLOGICAL ENGINEERING

Lacy, W. C.
Economic Geology. New York: McGraw Hill. With
W. C. Peters. (In preparation).

Principles of Geological Engineering. New York: McGraw
Hill. With Spencer Titley. (In preparation).

Peters, William C.
"Geology of the Bingham Canyon Porphyry Copper Deposit,
Utah" in Geology of the Porphyry Copper Deposits South-
western North America. Tucson, Arizona: University of
Arizona Press, 1966, pages 165-175. With A. H. James
and C. W. Field.

Peters, W. C.
(see Lacy, W. C.)

Titley, Spencer
(see Lacy, W. C.)

I. BOOKS (Cont.)

GEOPHYSICS - GEOCHEMISTRY

Sumner, John S.

Mining Geophysics, Volumes I and II, Chairman of the Editorial Committee, Society of Exploration Geophysicists, 1967. (Volume II in press).

HYDROLOGY

Simpson, Eugene S.

"Velocity and the Longitudinal Dispersion Coefficient in Flow through Porous Media," in Hydrology and Flow Through Porous Media, by R. J. M. DeWiest, Princeton University. (In press).

METALLURGY - METALLURGICAL ENGINEERING

Smith, Sigmund L.

Pocket Handbook for Engineers. Tucson, Arizona: Sturm and Smith Publishers, 1967. 40 pages.

MINING ENGINEERING

Hewlett, Richard F.

Computer Methods in Mine Valuation. Reading, Massachusetts: Addison-Wesley Press. With Roland D. Parks. (In preparation).

ARIZONA BUREAU OF MINES

GEOLOGY

Keith, Stanton B.

Some Major Industrial Rock Products of Arizona. Tucson, Arizona: University of Arizona, Arizona Bureau of Mines Bulletin 177. (In preparation).

I. BOOKS (Cont.)

GEOLOGY (Cont.)

Moore, Richard T.

Geology and Mineral Resources of the Virgin Mountains, Mohave County, Arizona. Tucson, Arizona: University of Arizona, Arizona Bureau of Mines Bulletin 178. (In preparation).

Peirce, H. Wesley

Geologic Guidebook 2 - Arizona Highways 77 and 177. Tucson, Arizona: University of Arizona, Arizona Bureau of Mines Bulletin 176, 1967. (In press).

II. ARTICLES

COLLEGE OF MINES

CHEMICAL ENGINEERING

Freeh, E. J.

"Analog Computer Simulation of a Fourdrinier Paper Machine," American Paper Industry/Paperweek, (In press).

"A Mathematical Model for Batch Grinding in a Ball Mill," Transactions AIME. With W. E. Horst and R. C. Kellner. (In press).

"An Analysis of the Influence of Assumptions re Boundary Conditions on the Analog Computer Solution of the One-Dimensional Diffusion Equation," (In preparation).

Rehm, T. R.

"Laboratory Distillation in a Two-Inch Plate Column," Chemical Engineering Progress Symposium Series, Vol. 63, No. 70 (1967), pp. 44-51. With R. W. Mead.

"Marangoni Flow: An Additional Mechanism in Boiling Heat Transfer," Science, Vol. 153 (1966), pp. 1106-7. With R. L. Bamford and J. L. McGrew.

II. ARTICLES (Cont.)

CHEMICAL ENGINEERING

Rehm, T. R.

"An Empirical Expression for the Turbulent Flow Velocity Distribution," Industrial & Engineering Chemistry Fundamentals. With D. O. Capps. (Submitted for publication).

Richardson, R. C.

"Preliminary Evaluation of Extrusion Process Dynamics," Industrial Nucleonics, January, 1967.

White, D. H.

"Teaching Water Treatment in the Graduate School of Chemical Engineering," Symposia on Water Treatment, National Meeting of American Institute of Chemical Engineers, (September 1967). (In press).

GEOLOGY

Anthony, John W.

"Useful modifications to the Bond Crystal Sphere Grinder," Review of Scientific Instruments. With R. B. Laughon. (In press).

Gould, L. M.

"Antarctica," in Britannica Book of The Year, (1966), pp. 95-96.

Laughon, R. B.

"Useful modifications to the Bond Crystal Sphere Grinder," Review of Scientific Instruments. With J. W. Anthony. (In press).

Lustig, L. K.

"Earth-Moon Relations," Encyclopedia of Earth Sciences, Rhodes W. Fairbridge, editor, Reinhold Publishing Company. (In press).

"Sediment Transport in the Cache Creek drainage basin," U. S. Geol. Survey Prof. Paper 562-A. With R. B. Busch. (In press).

II. ARTICLES (Cont.)

GEOLOGY (Cont.)

Mayo, Evans B.

"Preliminary Report on a Structural Study in the Museum Embayment, Tucson Mountains, Arizona," Arizona Geological Society Digest, V. 8 (1966), pp. 1-32.

"Paleocurrents in the Museum Embayment, Tucson Mountains Arizona," Arizona Academy of Science Journal, V. 4 (1966), pp. 75-80.

"A History of Geologic Investigations in the Tucson Mountains." (Submitted for publication).

Pye, Willard D.

"Arizona: A New Frontier to Explore," Interstate Oil Compact Commission Committee Bull., Vol. VIII, No. 2 (1966), pp. 37-49.

Schreiber, Joseph F.

"Inventory of research on desert coastal zones," in W. G. McGinnies, B. Goldman, P. P. Paylore, Eds., Inventory of Geographic Research on Desert Environment. Office of Arid Lands Research, University of Arizona (1967). (In press).

Titley, Spencer R.

"Geologic Analysis and Terrain Evaluation of Lunar Orbiter Site II P-13," in Langley Working Paper 365 (Feb. 1967). NASA (1967).

"Manned Exploration of the Lunar Surface," Ann. N. Y. Acad. Sci., Vol. 140, Art. 1 (1966), pp. 636-646. With D. P. Elston).

"Geologic History of the Mare Humorum Region of the Moon," Ann. Rept. Astrogeologic Studies, U. S. Geol. Survey (1967), (open file). (In press).

"Geologic History of the Pitatus Region of the Moon," Ann. Rept. Astrogeologic Studies, U. S. Geol. Survey (1967), (open file). (In press).

II. ARTICLES (Cont.)

GEOLOGY (Cont.)

Titley, Spencer R.

"Geologic Analysis and Terrain Evaluation of Lunar Orbiter Site III P-10," in Langley Working Paper, NASA (1967). (In press).

Wilson, Richard F.

"Correlation of Upper Triassic and Triassic formations between southwestern Utah and southern Nevada," U. S. Geol. Survey Bull, 1244-D, p. D1-D20. With J. H. Stewart.

Wilson, Richard F., co-editor

"The evolution of the Colorado River in Arizona," Museum of Northern Arizona Tech Series. With co-editors E. D. McKee, W. Breed and C. C. Breed. (In press).

"Whitmore Point, a new member of the Moenave Formation in southwestern Utah and northwestern Arizona," Plateau. (In press).

GEOLOGICAL ENGINEERING

Peters, William C.

"A Geologist Views the Symposium," Pay Dirt (June 17, 1966), p. 4.

"The Role of the Geologist in the Life Cycle of a Mine," Journal of Geological Education, Vol. 14, No. 5 (December 1966), pp. 191-193.

GEOPHYSICS - GEOCHEMISTRY

Anthony, John W.

"An investigation of physical property variations related to thorium content of synthetic monazite," American Mineralogist. (In press)

"Hemihedrite, a new zinc lead chromate from Arizona," American Mineralogist. With S. A. Williams. (Submitted for publication).

II. ARTICLES (Cont.)

GEOPHYSICS - GEOCHEMISTRY

Damon, Paul E.

"Arizona Radiocarbon Dates VI," Radiocarbon, Vol. 8 (1966), pp. 1-21. With C. V. Haynes and D. C. Grey.

"Argon 40 in Cogenetic Feldspar-Mica Mineral Assemblages," Journal of Geophysical Research, 72 (1967), pp. 1361-1375. With D. E. Livingston, R. L. Mauger, R. Bennett and A. W. Laughlin.

"K/Ar Chronology of the Tucson Mountains, Pima County, Arizona," Geological Society of America, Bulletin 77 (1966), pp. 1225-1234. With Michael Birkman.

"Potassium-Argon Dating of Igneous and Metamorphic Rocks with Applications to the Basin Ranges of Arizona and Sonora," Chapter in Radiometric Dating for Geologists, E. I. Hamilton and R. M. Farquhar, Eds., Interscience Publishers, London.

"Behavior of Some Elements during Magmatic Crystallization: Letter to the Editor," Geochimica et Cosmochimica Acta. (In press).

"Arizona Radiocarbon Dates VII," Radiocarbon, Vol. 9 With C. V. Haynes, D. C. Grey, and R. Bennett. (In press).

"The Problem of Excess Argon-40 in Volcanic Rocks," Proc. International Atomic Energy Agency Symposium on Radioactive Dating, Monaco. With A. W. Laughlin and J. Percious. (In press).

"Geochronology of the Emplacement, Enrichment and Preservation of Arizona Porphyry Copper Deposits," Transactions, Society of Mining Engineers of American Institute of Mining Engineers. With D. E. Livingston, R. L. Mauger. (Submitted for publication).

"Cenozoic Argon Ages on Metamorphic Rocks from the Basin and Range Province," American Journal of Science. With R. L. Mauger and D. E. Livingston. (Submitted for publication).

II. ARTICLES (Cont.)

GEOPHYSICS - GEOCHEMISTRY

DuBois, R. L.

"Remanent magnetism of several meteorite classes."
(In preparation).

"Secular variation for the past 2000 years." (In
preparation).

"Westward drift and the origin of secular variation."
(In preparation).

Guilbert, John M.

"Electron-optical study of Alteration to Smectite in the Cheto
Clay Deposit," Clays and Clay Minerals, Proc. of 16th Nat.
Conf., pp. 35-44. With R. L. Sloane. (In press).

"Electron-optical Study of Hydrothermal Fringe Alteration
of Plagioclase in Quartz Monzonite, Butte District, Montana,"
Clays and Clay Minerals, Proc. of 17th Nat. Conf. (1967).
With R. L. Sloane. (Submitted for publication).

Sumner, John S.

"Underground Induced Polarization Surveying at the Home-
stake Mine," Mining Congress Journal, Vol. 53 (1967),
pp. 66-73.

"The Problem of Negative Induced Polarization Anomalies,"
Berkeley Symposium on Induced Electrical Polarization
(1967). (In press).

"Gravity Methods of Exploration," Mining Geophysics,
Volume II, Society of Exploration Geophysicists (1967).
(In press).

Titley, Spencer R.

"Geochemistry: Testing for the elements," Encyclopedia
of Earth Science, Fairbridge, Ed. (1967). (In press).

"Seismic Energy as an agent of morphological modification
on the Moon," Ann. Rept. Astrogeologic Studies, U. S.
Geol. Survey (open file). Also in Review for Icarus (1967).
(In press).

II. ARTICLES (Cont.)

HYDROLOGY

Kisiel, Chester C.

"Transformation of Deterministic and Stochastic Processes in Hydrology," International Hydrology Symposium (September 1967).

Harshbarger, John W.

"Educational Progress in Water Resources--Present and Future." (Submitted for publication).

"The Water Challenge." (Submitted for publication).

METALLURGY - METALLURGICAL ENGINEERING

Horst, William E.

"A Mathematical Model for Batch Grinding in a Ball Mill," Transactions AIME. With E. J. Freeh and R. C. Kellner. (In press).

Keating, Kenneth L.

"Pressure Transmitting Medium for Fragile Structure or Single Crystal," The Review of Scientific Instruments, Vol. 38, No. 1 (January 1967). With R. G. Brophy, C. A. Hering and W. S. McEwan.

MINING ENGINEERING

Abel, John F. Jr.

"Statistical Analysis of Tunnel Supporting Loads," Transactions Society of Mining Engineering, AIME, Vol. 238 (September 1966), pp. 288-301.

"Tunnel Mechanics," Quarterly, CSM, Vol. 62, No. 2 (April 1967), p. 102.

"A Solid Inclusion Borehole Probe to Determine 3-dimensional Stress Changes at a Point in a Rock Mass," Bulletin, USGS, with T. C. Nichols, Jr., and F. T. Lee. (In press).

II. ARTICLES (Cont.)

MINING ENGINEERING (Cont.)

Dotson, Jay C.

"Reliability Engineering and its Application in Mining," Mining Congress Journal, Vol. 25, No. 8 (August 1966), pp. 68-74.

"Mining Technology in 1966--Open Pit Developments," Mining Engineering, Vol. 19, No. 2 (February 1967), pp. 85-88.

Forrester, J. D.

"Higher Education for Mineral Industry Engineers," Arizona Professional Engineer, Vol. 19, No. 2 (February 1967).

"Arizona Professional Engineer," Arizona Professional Engineer, Vol. 18, No. 5 (May 1966).

"The Mining Industry as a Resource of Arizona," Proceedings, State Workshop for State and County Leaders - Community and Resource Development. (In press).

Krumlauf, Harry E.

"Report on Arizona's Small Mines," Pay Dirt, Vol. 335 (February 17, 1967), pp. 5-6.

Peters, William C.

"The Pre-Production Interval of Mines," Mining Engineering, Vol. 18, No. 8 (August 1966), pp. 63-64.

"Cost and Value of Drill Hole Information," Mining Congress Journal, Vol. 53, No. 1 (January 1967), pp. 56-59.

III. REVIEWS

COLLEGE OF MINES

CHEMICAL ENGINEERING

Rehm, T. R.

Review of Convective Heat and Mass Transfer, by W. M. Kays. The Journal of the Astronautical Sciences, Vol. 14 (1967). (In press).

III. REVIEWS (Cont.)

CHEMICAL ENGINEERING (Cont.)

White, D. H.

Review of Plastic Molds for Thermoforming, by Harold P. Schick. Metals Progress (1967). (In press).

GEOPHYSICS - GEOCHEMISTRY

Damon, Paul E.

Review of Potassium Argon Dating, edited by O. A. Schaeffer and J. Zahringer. Transactions American Geophysical Union, 48 (1967), pp. 274-275.

Sumner, John S.

Review of Mining Geophysics, by D. S. Parasnis in Geophysics, Vol. 32, No. 2, pp. 365-366.

Sumner, John S.

Review of Interpretation of Resistivity Data, by Van Nostrand and Cook in Geophysics, Vol. 32, No. 1, p. 133.

METALLURGY - METALLURGICAL ENGINEERING

Murphy, Daniel J.

Review of Effects of Nitrogen and Manganese on the Deformation Substructure of Iron Strained at 20°, 225° and 450°C, by J. D. Baird and C. R. MacKenzie. Journal of the Iron and Steel Institute, (May 1964). Metal Progress, Vol. 91, No. 2, (Feb. 1967), p. 168.

Review of Sintered Plates from Low Density Nickel Powder, by H. A. Hancock, D. J. I. Evans and V. N. Mackeiv. Canadian Institute of Mining and Metallurgy, Annual General Meeting (1964). Metal Progress, Vol. 91, No. 2 (February 1967), p. 166.

Review of The Effect of Hydrostatic Pressure on Brittleness in Chromium, by F. P. Bullen, F. Henderson, H. L. Wain, and M. S. Paterson. Philosophical Magazine, Vol. 9, No. 101 (May 1964), p. 803. Metal Progress, Vol. 91, No. 3 (March 1967), p. 168.

III. REVIEWS (Cont.)

METALLURGY - METALLURGICAL ENGINEERING (Cont.)

Murphy, Daniel J.

Review of Platinum Metals in the Fuel Cell, by H. G. Oswin. Platinum Metals Review, Vol. 8, No. 2 (April 1964).
Metals Progress, Vol. 91, No. 3 (March 1967), p. 156.

Review of Mechanical Properties of High-Density Sintered Iron-Copper and Iron-Copper-Tin Alloys, by N. C. Kothari. Transactions ASM, Vol. 57 (1964), p. 909. Metal Progress, Vol. 91, No. 4 (April 1967), p. 178.

Review of Effects of Interstitial Impurities on the Low Temperature Tensile Properties of Tungsten, by Joseph R. Stephens. NASA TN D-2287 (June 1964). Metal Progress, Vol. 91, No. 4 (April 1967), p. 168.

Review of Studies of Composites Containing Fibered or Reacted Additives, by Max Quatnetz, John W. Wheeton, and Thomas P. Herbell, Lewis Research Center. NASA TN D-2757. Metal Progress. (In press).

Review of Commercial Applications for Refractory Metals, by James H. Keeler, ASME Publication Number 65-MD-9. Metal Progress. (In press).

IV. DIVERSE CONTRIBUTIONS

COLLEGE OF MINES

CHEMICAL ENGINEERING

Cox, N. D.

"Evaluation of the Engineering Residency at Du Pont, 1965-1966: John R. Brand, Preceptor," Ford Foundation, (July 1966).

Rehm, T. R.

Abstracts of 19 technical articles in the Nuclear Technology and Unit Operations Field. Chemical Abstracts, Vol. 65, (1966), Vol. 66, (1967).

IV. DIVERSE CONTRIBUTIONS (Cont.)

GEOPHYSICS - GEOCHEMISTRY

DuBois, R. L.

"Remanent magnetism of several meteorite classes," Am. Geophysical Union, Annual Meeting, (1967), (Abstract).

"Archaeomagnetism and secular variation for the past 2000 years," Am. Geophysical Union, Annual Meeting, (1967), (Abstract).

"Archaeomagnetic results from Southwestern U. S.," Third U. S. - Japan Meeting on Paleomagnetism, (1966), (Abstract).

Sumner, John S.

"Geophysical Surveying in Southern Arizona Basins," 36th Annual Meeting of the Society of Exploration Geophysicists, (1966).

Titley, Spencer R.

"Mineralogy and Significance of some precious metal sulfides and Sulfosalts from Gilman, Colorado," Geol. Soc. Am. Program Annual Meeting of Rocky Mtn. Section, (1967).

METALLURGY - METALLURGICAL ENGINEERING

Keating, Kenneth L.

"The Metallurgical Aspects of Corrosion." Paper delivered to the Arizona Chapter of The National Association of Corrosion Engineers, (March 22, 1967).

"Semiconductors." Paper delivered to the Morenci Chapter of the American Society of Mining and Metallurgical Engineers, (May 9, 1967).

MINING ENGINEERING

Dotson, Jay C. (Editor)

"Symposium on American Mineral Law," University of Arizona, (March 1966), 395 pages.

IV. DIVERSE CONTRIBUTIONS (Cont.)

ARIZONA BUREAU OF MINES

GEOLOGY

Moore, Richard T.

"Mineral Exploration in the Basin-Range Province, Arizona,"
1967 Annual Meeting of the American Institute of Mining,
Metallurgical, and Petroleum Engineers, (1967). With H.
Wesley Peirce).

Peirce, H. Wesley

(see Moore, Richard T.)

V. TECHNICAL REPORTS

COLLEGE OF MINES

CHEMICAL ENGINEERING

Edwards, R. M.

"Application of Hybrid Computation Techniques to Design,"
National Science Foundation, Grant GK-150 (January, 1967).
With E. J. Freeh.

Freeh, E. J.

(see Edwards, R. M.)

Rehm, T. R.

"Bubble Growth Parameters in Saturated and Subcooled
Nucleate Boiling." Final Report No. NGR 06-004-035 to
National Aeronautics and Space Administration (December
1966).

GEOLOGICAL ENGINEERING

Hewlett, Richard F.

"Geologic Statistical Models," U. S. Bureau of Mines,
Rept. of Investigations. (In press).

V. TECHNICAL REPORTS (Cont.)

HYDROLOGY

Wright, Jerome J.

"Development of a Transparent Matrix System which can be Utilized in the Construction of Three-Dimensional Hydraulic Flow Models," Final Report on Grant No. GE-1712, National Science Foundation (June 1966).

MINING ENGINEERING

Krumlauf, Harry E.

"Exploration and Development of Small Mines," Arizona Bureau of Mines, Mineral Technology Series No. 48, Bulletin No. 174 (revised), University of Arizona Press (1966), 34 pages.

Hewlett, Richard F.

"Construction of Empirical Statistical Models," U. S. Bureau of Mines, Rept. of Investigations. (In press).

"Complex Statistical Models," U. S. Bureau of Mines, Rept. of Investigations. (Submitted for publication).

Krumlauf, Harry E.

"The Ventilation of Small Mines." (In preparation).

VI. MAPS

COLLEGE OF MINES

GEOLOGY

Titley, Spencer R.

"Geologic Map of the Pitatus Region of the Moon," U. S. Geol. Survey Misc. Geol. Inves. Map I-485 (1966). With N. J. Trask.

"Geologic Map of the Mare Humorur Region of the Moon," U. S. Geological Survey Misc. Geol. Inves. Map I-495 (1967).

VI. MAPS (Cont.)

GEOLOGY (Cont.)

Titley, Spencer R.

"Preliminary Geologic Map of the Maurolycus Region of the Moon," 1:1,000,000, Ann. Rept. Astrogeologic Studies, U. S. Geol. Survey (open file) (1967). With N. D. Cozad. (In press).

"Preliminary Geologic Map of the Flamsteed Region of the Moon," 1:500,000, Ann. Rept. Astrogeologic Studies. U. S. Geol. Survey (open file) (1967). (In press).