

FIFTH LUNAR SCIENCE CONFERENCE

(March 18–22, 1974)

Sponsored by

THE LUNAR SCIENCE INSTITUTE

and

LYNDON B. JOHNSON SPACE CENTER

Houston, Tex., U.S.A.

1. Constraints on Structure and Composition of the Lunar Interior: I

(Monday, March 18, 1974)

Williams, J. G., Sinclair, W. S., Slade, M. A., Bender, P. L., Hauser, J. P., Mulholland, J. D., and Shelus, P. J.: 'Lunar Moments of Inertia Constraints from Lunar Laser Ranging'.

Albee, A. L., Chodos, A. A., Dymek, R. F., Gancarz, A. J., Goldman, D. S., Papanastassiou, D. A., and Wasserburg, G. J.: 'Dunite from the Lunar Highlands: Petrography, Deformational History, Rb–Sr Age'.

Ringwood, A. E. and Green, D. H.: 'Maria Basalts and Composition of Lunar Interior'.

Mizutani, H. and Osako, M.: 'Elastic Wave Velocities and Thermal Diffusivities of Apollo 17 Rocks'.

Toksóz, M. N., Dainty, A. M., and Solomon, S. C.: 'A Summary of Lunar Structural Constraints'.

Ganapathy, R. and Anders, E.: 'Bulk Compositions of the Moon and Earth, Estimated from Meteorites'.

Strangway, D. W. and Sharpe, H. A.: 'Models of Lunar Evolution'.

Smith, T. V.: 'Origin of Moon by Disintegrative Capture with Chemical Differentiation Followed by Sequential Accretion'.

Wood, J. A. and Mitler, H. E.: 'Origin of the Moon by a Modified Capture Mechanism, or Half a Loaf is Better than a Whole One'.

Grossman, L., Clayton, R. N., and Mayeda, T. K.: 'Oxygen Isotopic Compositions of Lunar Soils and Allende Inclusions and the Origin of the Moon'.

Runcorn, S. K.: 'On the Internal Dynamics of the Moon'.

Wänke, H., Palme, H., Baddenhausen, H., Dreibus, G., Jagoutz, E., Kruse, H., Spettel, B., and Teschke, F.: 'Composition of the Moon and Major Lunar Differentiation Processes'.

2. Characterization and Evolution of the Lunar Crust: I

(Monday, March 18, 1974)

Podwysocki, M., Weidner, J. R., Andre, C. G., Bickel, A. L., Lum, R. S., Adler, I., and Trombka, J.: 'An Analysis of the Apollo 15 X-Ray Fluorescence Experiment for Detailed Lunar Morphological and Geochemical Parameters'.

Steele, I. M., Smith, J. W., and Irving, A. J.: 'Mineralogical Studies of Crustal Rocks – Anorthosites; Norites; Armalcolite and Ilmenite'.

Roedder, E. and Wieblen, P. W.: 'Petrology of Clasts in Breccia 67915'.

Schonfeld, E.: 'Component Abundance and Evolution of Regoliths and Breccias: Interpretation by Mixing Models'.

Laul, J. C. and Schmitt, R. A.: 'Siderophile and Volatile Trace Elements in Apollo 17 Boulder-2 Rocks and Soils'.

- Chang, S. and Gibson, E. K.: 'Abundances of C, N, H, He, and S in Apollo 17 Soils from Stations 3 and 4: Implications for Solar Wind Exposure Ages and Regolith Evolution'.
- Hübner, W., Kirsten, T., and Kiko, J.: 'Rare Gases in Apollo 17 Soils with Emphasis on Analysis of Size and Mineral Fractions of Soil 74241'.
- Huneke, J. C., Jessberger, E. K., and Wasserburg, G. J.: 'The Age of Metamorphism of a Highland Breccia (65015) and a Glimpse at the Age of its Protolith'.
- Haines, E. L., Hutcheon, I. D., and Weiss, J. R.: 'Excess Fission Tracks in Apennine Front KREEP Basalts'.
- Nunes, P. D., Tatsumoto, M., and Unruh, D. M.: 'U-Th-Pb Systematics of Some Apollo 17 Samples'.
- Hinthorne, J. R. and Andersen, C. A.: 'Uranium-Lead and Lead-Lead Ratios in Lunar Samples 66095 and 12013 by Ion Microprobe Mass Analysis'.
- Meyer, C., Anderson, D. H., and Bradley, J. G.: 'Ion Microprobe Mass Analysis of Plagioclase from "Non-Mare" Lunar Samples'.

3. Exchange of Material and Energy Between the Moon and its Environment: I

(Monday, March 18, 1974)

- Thiel, K., Damm, G., Herr, W., and Baer, K.: 'Simulated Cosmic-Ray Induced U-Fission Tracks in Artificial Lunar Soil and Implications for the U-238 Fission Track Dating of Lunar Surface Samples'.
- Rancitelli, L. A., Perkins, R. W., Felix, W. D., and Wogman, N. A.: 'Anisotropy of the August 4-7, 1972 Solar Flares at the Apollo 17 Site'.
- O'Kelley, G. D., Eldridge, J. S., and Northcutt, K. J.: 'Concentrations of Cosmogenic Radionuclides in Apollo 17 Samples: Effects of the Solar Flare of August 1972'.
- Yokoyama, Y., Reyss, J.-L., and Guichard, F.: '²²Na-²⁶Al Chronology of Lunar Surface Processes'.
- Durrani, S. A., Hwang, F. S. W., and Fremlin, J. H.: 'Thermoluminescence of Apollo 17 Fines'.
- Borg, J., Maurette, M., Walker, R. M., and Zinner, E.: 'Apollo 17 Lunar Surface Cosmic Ray Experiment - Measurement of Heavy Solar Wind Particles'.
- Keith, J. E. and Clark, R. S.: 'The Saturated Activity of ²⁶Al in Lunar Samples as a Function of Chemical Composition and the Exposure Ages of Some Lunar Samples'.
- Hutcheon, I. D., Macdougall, D., Price, P. B., Hörz, F., Morrison, D., Schneider, E.: 'Rock 72315: A New Lunar Standard for Solar Flare and Micrometeorite Exposure'.
- Fechtig, H., Hartung, J. B., Nagel, K., Neukum, G., and Störzer, D.: 'Microcrater Studies, Derived Meteoroid Fluxes and Comparison with Satellite-Borne Experiments'.
- Rajan, R. S., Brownlee, D. E., and Hörz, F.: 'The Ancient Micrometeorite Flux'.

4. Characteristics and Movement of Materials in the Lunar Regolith: I

(Monday, March 18, 1974)

- Brunfelt, A. O., Heier, K. S., Nilssen, B., Steinnes, E., and Sundvoll, B.: 'Elemental Composition of Apollo 17 Fines'.
- Taylor, H. C. and Carter, J. L.: 'Apollo 17: Comparative Petrology of Fines from Taurus-Littrow'.
- Rhodes, J. M., Rodgers, K. V., Shih, C. Y., Bansal, B. M., Nyquist, L. E., and Wiesmann, H.: 'The Relationship Between Geology and Soil Chemistry at the Apollo 17 Landing Site'.
- Eberhardt, P., Eugster, O., Geiss, J., Graf, H., Grögler, N., Guggisberg, S., Jungck, M., Maurer, P., Mörgerli, M., and Stettler, A.: 'Solar Wind and Cosmic Radiation History of Taurus-Littrow Regolith'.
- Gibson, E. K. and Moore, G. W.: 'Total Sulfur Abundances and Distributions in the Valley of Taurus-Littrow: Evidence of Mixing'.
- Macdougall, D., Hutcheon, I. D., and Price, P. B.: 'Irradiation Records in Orange Glass and Two Boulders from Apollo 17'.
- Silver, L. T.: 'Patterns of U-Th-Pb Distributions and Isotope Relations in Apollo 17 Soils'.

- Duennebieber, F. K., Watkins, J., and Kovach, R.: 'Results from the Lunar Surface Profiling Experiment'.
- Criswell, D. R. and Lindsay, J. F.: 'Thermal Moonquakes and Booming Dunes'.
- Bjorkholm, P. J. and Gorenstein, P.: 'Variation of ^{22}Rn to ^{210}Po Activity Ratio on the Lunar Surface as Observed by Alpha Particle Spectrometer'.
- Stoenner, K. W. and Davis, R.: 'The Fast Neutron Production of ^{37}Ar in the Deep Drill String and the ^{222}Rn , U, He and Hydrogen Contents'.

5. Characterization and Evolution of the Mare Basins: I

(Monday, March 18, 1974)

- Schaeffer, O. A. and Husain, L.: 'Chronology of Lunar Basin Formation and Ages of Lunar Anorthositic Rocks'.
- Turner, G., Cadogan, P. H., and Yonge, C. J.: 'The Early Chronology of the Moon and Meteorites'.
- Morgan, J. W., Ganapathy, R., Higuchi, H., Krähenbühl, U., and Anders, E.: 'Lunar Basins: Tentative Characterization of Projectiles, from Meteoritic Elements in Apollo 17 Boulders'.
- Baldwin, R. B.: 'On the Origin of the Mare Basins'.
- Pieters, C., McCord, T. B., and Adams, J. B.: 'Evidence for Regional Occurrence of Orange Glass and Related Soils'.
- Head, J. W.: 'Lunar Dark Mantle Deposits: Possible Clues to the Distribution of Early Mare Deposits'.
- Lucchitta, B. K. and Schmitt, H. H.: 'Orange Material in the Sulpicius Gallus Formation at the Southwestern Edge of Mare Serenitatis'.
- Mao, H. K., El Goresy, A., and Bell, P. M.: 'Orange Glasses: Reaction of Molten Liquids with Apollo 17 Soil Breccia (70019) and Gabbro (79155)'.
- Cadenhead, D. A. and Buerger, W. G.: 'Gas Interaction Studies with Lunar Orange Soil 74220, 29'.
- Brown, G. M., Peckett, A., Emeelus, C. H., and Phillips, R.: 'Mineral-Chemical Properties of Apollo 17 Mare Basalts and Terra Fragments'.
- El Goresy, A., Ramdohr, P., Medenbach, O., and Bernhardt, H. J.: 'Taurus-Littrow Crystalline Rocks: Opaque Mineralogy and Geochemistry'.

6. Nature of Impact Processes and Their Effects on Lunar Materials: I

(Monday, March 18, 1974)

- Moore, C. B., Lewis, C. F., Cripe, J. D., and Volk, M.: 'Total Carbon and Sulfur Contents of Apollo 17 Lunar Samples'.
- Sill, G. T., Nagy, B., Nagy, L. A., Hamilton, P. B., McEwan, W. S., and Urey, H. C.: 'Carbon Compounds in Apollo 17 Lunar Samples: Indications of Cometary Contribution to Breccia 78155'.
- Wszolek, P. C., O'Connor, J. T., Walls, F. C., and Burlingame, A. L.: 'Thermal Release Profiles and the Distribution of Carbon and Nitrogen among Minerals and Aggregate Particles Separated from Lunar Soil'.
- Allen, R. O., Jovanovic, S., Showlater, D., and Reed, G. W.: 'Lunar Geochemistry of Labile Elements: Halogens, Primordial Pb, Hg, and Others'.
- Barnes, I. L., Garner, E. L., Gramlich, J. W., Machlan, L. A., Moody, J. R., Moore, L. J., Murphy, T. J., and Shields, W. R.: 'Isotopic Abundance Ratios and Concentrations of Selected Elements in Apollo 17 Samples'.
- Blanford, G., McKay, D. S., and Morrison, D.: 'Accretionary Particles and Microcraters'.
- Klein, L., Kritchevsky, G., Hopper, R. W., and Uhlmann, D. R.: 'The Formation of Lunar Glasses'.
- Müller, O.: 'Solar Wind - and Indigenous Nitrogen in Apollo 17 Lunar Samples'.
- Merlivat, L., Lelu, M., Nief, G., and Roth, E.: 'Deuterium Content of Lunar Material'.

Gehrke, C. W., Zumwalt, R., Kuo, K., Ponnampertuma, C., Shimoyama, A., Gay, M., Pal, R., and Buhl, P.: 'Search for Amino Acids in Apollo 17 Lunar Soil Samples'.

7. Exchange of Material and Energy Between the Moon and its Environment: II

(Tuesday, March 19, 1974)

- Hintenberger, H., Weber, H. W., and Schultz, L.: 'Solar, Spallogenic and Radiogenic Rare Gases in Apollo 17 Soils and Breccias'.
- Phinney, B., Baur, H., Frick, U., Funk, H., Schultz, L., and Signer, P.: 'He, Ne and Ar in Lunar Soil Mineral Separates'.
- Hodges, R. R., Hoffman, J. H., and Johnson, F. S.: 'The Lunar Atmosphere'.
- Vondrák, R. R., Freeman, J. W., and Lindeman, R. A.: 'Measurements of Lunar Atmospheric Loss Rate'.
- Rees, C. E. and Thode, H. G.: 'Sulphur Concentrations and Isotope Ratios in Apollo 16 and 17 Samples'.
- Batts, B. D., Biggar, G. H., Billetop, M. C. I., Davis, P. R., Eglinton, G., Erents, S. K., Gardiner, L. R., Gowar, A. P., Housley, R. M., Humphries, J. D., Jull, A. J. T., Maxwell, J. R., Mays, B. J., McCracken, N. M., and Pillinger, C. T.: 'The Origin of Lunar Carbide'.
- Kerridge, J. F., Kaplan, I. R., and Lesley, F. D.: 'Accumulation and Isotopic Evolution of Carbon on the Lunar Surface'.
- Chou, C. L., Baedeker, P. A., Bild, R. W., Robinson, K. L., and Wasson, J. T.: 'Volatile Elements in Lunar Soils'.
- Padawer, G. M., Kamykowski, E. A., Stauber, M. C., D'Agostino, M. D., and Brandt, W.: 'Concentration vs Depth Profiles of Carbon and Hydrogen in Lunar Rock Surfaces'.
- Leich, D. A., Tombrello, T. A., and Nurnett, D. S.: 'Trapped Solar Hydrogen in Lunar Samples'.
- Bastin, G., Comstock, G. M., Dran, J. C., Duraud, J. P., Maurette, M., and Thibaut, C.: 'Lunar Soil Maturation, Part III: Short-Term and Long-Term Aging of Radiation Damage Features in the Regolith'.
- Holmes, H. F., Fuller, E. L., and Gammage, R. B.: 'Some Surface Properties of Apollo 17 Soils'.

8. Characterization and Evolution of the Mare Basins: II

(Tuesday, March 19, 1974)

- Walker, D., Longhi, J., Stolper, E., Grove, T., and Hays, J. F.: 'Experimental Petrology and Origin of Titaniferous Lunar Basalts'.
- Lipin, B. and Muan, A.: 'Equilibria Bearing on the Behavior of Titanate Phases During Crystallization of Iron Silicate Melts under Strongly Reducing Conditions'.
- Rutherford, M. G., Hess, P. C., and Daniel, G. H.: 'Liquid Lines of Descent and Liquid Immiscibility in High Ti Lunar Basalt'.
- O'Hara, M. J., Biggar, G. M., Humphries, D. J., and Saha, P.: 'Experimental Petrology of High Titanium Basalt'.
- Duncan, A. R., Erlank, A. J., Willis, J. P., Sher, M. K., and Ahrens, L. H.: 'Trace Element Evidence for a Two Stage Origin of High-Titanium Mare Basalts'.
- Schaber, G. G., Thompson, T. W., Eggleton, R. E., and Zisk, S. H.: 'Lava Flows in Mare-Imbrium, Part II: Evaluation of Anomalously Low Earth-Based Radar Reflectivity'.
- Lindsley, D. H., Hartzmann, M. J., Kesson, S. E., and Cushman, M. K.: 'Fe-Mg-Ti Oxides in Lunar Mare Basalts: Chemical Evolution Interpreted from Experiment and Theory'.
- Ringwood, A. E.: 'Minor Element Chemistry of Maria Basalts'.
- Barker, C. and Sommer, M. A.: 'Gas Release Patterns for 15016 and 15065 and their Significance'.
- Lofgren, G. E., Donaldson, C. H., Williams, R. J., and Mullins, O.: 'Experimentally Reproduced Textures and Mineral Chemistry of A-15 Quartz Basalts'.
- Lovering, J. F. and Wark, D. A.: 'Rare Earth Element Fractionation in Phases Crystallizing from Lunar Late-Stage Magmatic Liquids'.

9. Characteristics and Movement of Materials in the Lunar Regolith: II

(Tuesday, March 19, 1974)

- Horai, K. and Winkler, J.: 'Thermal Diffusivity of Lunar Rock Sample 12001, 85'.
 Cremers, C. J.: 'Thermal Conductivity of Apollo 16 Lunar Fines'.
 Tittmann, B. R., Housley, R. M., and Cirlin, E. H.: 'Internal Friction in Rocks and Its Relationship to Volatiles on the Moon'.
 Herminghaus, Ch. and Berckheimer, H.: 'Ultra-Sound Absorption in Lunar Anorthosite'.
 Warren, N., Trice, R., and Anderson, O. L.: 'Seismic Q in a Scattering Medium'.
 Nakamura, Y.: 'High-Frequency Lunar Teleseismic Events'.
 Talwani, P., Nur, A., and Kovach, R.: 'Implications of Elastic Wave Velocities for Apollo 17 Rock Powders'.
 Alvarez, R.: 'Electrical Properties of Sample 70215 in the Temperature Range of 100 to 373 K'.
 Lucke, R. L., Henry, R. C., and Fastie, W. G.: 'Far Ultraviolet Lunar Mapping from Apollo 17'.

10. Characterization and Evolution of the Lunar Crust: II

(Tuesday, March 19, 1974)

- Masursky, H.: 'The Moon - Crustal Evolution'.
 Metzger, A. E., Trombka, J., Reedy, R. C., and Arnold, J. R.: 'Element Concentrations from Lunar Orbital Gamma-Ray Measurements'.
 Wilshire, H. G.: 'Provenance of Terra Breccias'.
 Dowty, E., Keil, K., and Prinz, M.: 'Igneous Rocks from Apollo 16 Rake Samples'.
 Hubbard, N. J., Rhodes, J. M., Nyquist, L. E., Shih, C. Y., Bansal, B. M., and Wiesmann, H.: 'Non-Mare and Highland Rock Types: Chemical Groups and Their Internal Variations'.
 Hodges, R. R. and Kushiro, I.: 'Apollo 17 Petrology and Experimental Determination of Differentiation Sequences in Model Moon Compositions'.
 Jakeš, P. and Reid, A.: 'Chromium Partitioning Between Olivine and Pyroxene and the Redox State of Lunar Rocks'.
 Weill, D., McKay, G., Kridelbaugh, S., and Grutzeck, M.: 'Evolution of REE, Sr and Ba Abundances During Lunar Igneous Differentiation'.
 Haskin, L. A., Shih, Bansal, B. M., Rhodes, J. M., Wiesmann, H., and Nyquist, L. E.: 'Chemical Evidence for the Origin of 67535 as a Cumulate'.
 Bogard, D. D., Nyquist, L. E., Bansal, M. M., and Wiesmann, H.: '76535: An Old Lunar Rock?'.
 Tera, F., Papanastassiou, D. A., and Wasserburg, G. J.: 'The Lunar Time Scale and a Summary of Isotopic Evidence for a Terminal Lunar Cataclysm'.
 Epstein, S. and Taylor, H. P.: 'Oxygen, Silicon, Carbon, and Hydrogen Isotope Fractionation Processes in Lunar Surface Materials'.
 Lightner, B. D. and Marti, K.: 'Lunar Trapped Xenon'.

11. Nature of Impact Processes and Their Effects on Lunar Materials: II

(Tuesday, March 19, 1974)

- Stoeser, D. B., Wolfe, R. W., Marvin, U. B., Wood, J. A., and Bower, J. F.: 'Petrographic Studies of a Boulder from the South Massif'.
 Chao, E. T. C. and Minkin, J. A.: 'The Petrogenesis of 77135, A Fragment-Laden Pigeonite Feldspathic Basalt - A Major Highland Rock Type'.
 The European Consortium - Eglinton, G., Mays, B. J., Pillinger, C. T., Agrell, J. E., Scoon, J. H., Dran, J. C., Maurete, M., Bowell, E., Dollfus, A., Geake, J. E., Schultz, P. H., and Signer, P.: 'The History of Lunar Breccia 14267'.
 Alexander, E. C. and Kahl, S. B.: ' ^{40}Ar - ^{39}Ar Studies of Lunar Breccias'.

- Nagata, T., Sugiura, N., Fisher, R. M., Schwerer, F. C., Fuller, M. D., and Dunn, J. R.: 'Effects of Meteoritic Impact on Magnetic Properties of Lunar Surface Materials'.
- Goldstein, J. I., Hewins, R. H., and Axon, H. J.: 'Metal-Silicate Relationships in 2 Apollo 17 Soils'.
- Senftle, F. E., Thorpe, A. N., Briggs, C., Alexander, C., and Minkin, J. A.: 'Antiferromagnetic (Neel) Transitions in Lunar Glass and Ilmenite'.
- Usselman, T. M. and Pearce, G. W.: 'Grain Growth of Iron: Implications for the Thermal Conditions in a Lunar Ejecta Blanket'.
- Housley, R. M., Circlin, E. H., and Grant, R. W.: 'Solar Wind and Micrometeorite Alteration of the Lunar Regolith'.
- Weeks, R. A., Purcell, T., and Prestel, D.: 'Irradiation-Induced Paramagnetic Species in Lunar Plagioclases'.
- Griscom, D. L., Marquardt, C. L., and Friebele, E. J.: 'Ferromagnetic Resonance of Fine Grained Iron and Magnetite Precipitates in Simulated Lunar Glasses: Comparison with Lunar Soils'.

12. Characteristics and Movement of Materials in the Lunar Regolith: III

(Wednesday, March 20, 1974)

- Evensen, N. M., Murthy, V. R., and Coscio, M. R.: 'Episodic Lunacy - V: Origin of the Exotic Component'.
- Philpotts, J. A., Schuhmann, S., Kouns, C. W., and Lum, R. K. L.: 'Lithophile Trace Elements in Apollo 17 Soils'.
- Meyer, H. O. A. and McCallister, R. H.: 'Apollo 16: Core 60004 - Analysis of <1 mm Fines'.
- Pepin, R. O., Basford, J. R., Dragon, J. C., Coscio, M. R., and Murthy, V. R.: 'K-Ar Ages and Depositional Chronologies of Apollo 15 Drill Core Fines'.
- Lindsay, J. F.: 'Depositional Processes on the Lunar Surface'.
- Gold, T., Bilson, E., and Baron, R. L.: 'Optical Properties of the Apollo 15 Deep Core Samples'.
- Finkel, R. C., Imamura, M., Honda, M., Kohl, C. P., Kocimski, S. M., and Arnold, J. R.: 'Cosmic Ray Produced Mn and Be Radionuclides in the Lunar Regolith'.
- Fireman, E. L.: 'History of the Lunar Regolith from Neutrons'.
- Woolum, D. S. and Burnett, D. S.: 'Lunar Neutron Capture Rates and Surface Mixing of the Regolith'.
- Asunmaa, S. K. and Arrhenius, G.: 'Adhesion and Clustering of Dielectric Particles in the Space Environment: The Electric Dipole Moments of Lunar Soil Grains'.

13. Characterization and Evolution of the Mare Basins: III

(Wednesday, March 20, 1974)

- Schaber, G. G. and Pike, R. J.: 'Photogeologic Detection of Surfaces Buried by Mare Basalts'.
- Young, R. A., Brennan, W. J., and Nichols, D. J.: 'Stratigraphic Variations Beneath Lunar Mare Surfaces as Indicated by Ejecta Characteristics of 0.5 to 2 km Craters'.
- Boyce, J. M., Dial, A. L., and Soderblom, L. A.: 'Relative Ages of Lunar Nearside Plains'.
- Stettler, A., Eberhardt, P., Geiss, J. J., Grögler, N., and Maurer, P.: 'Sequence of Terra Rock Formation and Basaltic Lava Flows on the Moon'.
- De Hon, R. A.: 'Thickness of Mare Material in the Tranquillitatis and Nectaris Basins'.
- Phillips, R. J., Adams, G. F., Brown, W. E., Eggleton, R. E., Jackson, P., Jordan, R., Peeples, W. J., Porcello, L. J., Schaber, G. G., Sill, W. R., Thompson, T. W., Ward, S. H., and Zelenka, J. S.: 'The Apollo 17 Lunar Sounder Experiment: A Progress Report'.
- Kunze, A. G. W.: 'Lunar Crustal Density Profile from an Analysis of Doppler Gravity Data'.
- Sjogren, W. L., Wimberly, R. N., and Wollenhaupt, W. R.: 'Apollo 17 Gravity Results'.
- Phillips, R. J. and Saunders, R. S.: 'Interpretation of Gravity Anomalies in the Irregular Maria'.
- Scott, D. H.: 'The Geologic Significance of some Lunar Gravity Anomalies'.
- Bryan, W. B. and Adams, M. L.: 'Volcanic and Tectonic Features of Crater Aitken'.
- Muehlberger, W. R.: 'Structural History of Southeastern Mare Serenitatis and Adjacent Highlands'.

14. Constraints on Structure and Composition of the Lunar Interior: II*(Wednesday, March 20, 1974)*

- Arkani-Hamed, J.: 'Density and Stress Differences in the Moon'.
- Schubert, G., Schwartz, K., Sonett, C. P., Smith, B. F., and Colburn, D. S.: 'Mare Imbrium: A Regional Site of Anomalous Electrical Conductivity'.
- Dyal, P., Parkin, C. W., and Daily, W. D.: 'Global Lunar Properties from Magnetometer Measurements'.
- Russell, C. T., Coleman, P. J., Lichtenstein, B. R., and Schubert, G.: 'The Permanent and Induced Magnetic Dipole Moment of the Moon'.
- Anderson, R. A., Howe, H. C., Lin, R. P., McGuire, R. E., Chase, L. M., and McCoy, J. E.: 'Observations of Energetic Electron Mirroring from the Lunar Remnant Magnetic Field'.
- Schwerer, F. C., Huffman, G. P., and Nagata, T.: 'Electrical Conductivity of Lunar Surface Rocks: Laboratory Measurements and Implications for Lunar Interior Temperatures'.

Presentations by Lunar Sample Consortia*(Wednesday, March 20, 1974)***15. Characteristics and Movement of Materials in the Lunar Regolith: IV***(Thursday, March 21, 1974)*

- Mason, B., Jacobson, S., Nelen, J. A., Melson, W. G., and Simkin, T.: 'Regolith Compositions from the Apollo 17 Missions'.
- Butler, J. C. and King, E. A.: 'Analysis of the Grain Size Frequency Distributions of Lunar Fines'.
- McKay, D. S., Fruland, R. M., and Heiken, G.: 'Grain Size Distribution as an Indicator of the Maturity of Lunar Soils'.
- Goswami, J. N. and Lal, D.: 'Cosmic Ray Irradiation Pattern at the Apollo 17 Site: Implication to Regolith Dynamics'.
- Borg, J., Comstock, G. M., Langevin, Y., Maurette, M., and Thibaut, C.: 'Lunar Soil Maturation, Part I: Microscopic and Macroscopic Dynamic Processes in the Regolith'.
- Goel, P. S., Shukia, P. N., Kothari, B. K., and Garg, A. N.: 'Solar Wind as Source of Nitrogen in Lunar Fines'.
- DesMarais, J. D., Hayes, J. M., and Meinschein, W. G.: 'Retention of Solar Wind-Implanted Elements in Lunar Soils'.
- Jordan, J. L., Walton, J. R., Heymann, D., and Lakatos, S.: 'The Rim of North Ray Crater: A Relatively Young Regolith'.
- Schneider, E. and Hörz, F.: 'Lunar Rock Erosion'.
- Hartung, J. B., Storzer, D., and Hörz, F.: 'Toward a Lunar Micrometer Clock'.
- McDonnell, J. A. M. and Flavill, R. P.: 'Sputter Erosion on the Lunar Surface: Measurements and Features under Simulated Solar He⁺ Bombardment'.
- Dollfus, A.: 'Regolith in the Solar System'.

16. Nature of Impact Processes and Their Effects on Lunar Materials: III*(Thursday, March 21, 1974)*

- Oberbeck, V., Hörz, F., Morrison, R. H., Quaide, W., and Gault, D. E.: 'Effects of Formation of Large Craters and Basins of Emplacement of Smooth Plains Materials'.
- Stöffler, D., Dence, M. R., Abadian, M., and Graup, G.: 'Ejecta Formations and Pre-Impact

- Stratigraphy of Lunar and Terrestrial Craters: Possible Implications for the Ancient Lunar Crust'.
- Grieve, R. A. F., Plant, A. G., and Dence, M. R.: 'Characteristics of Impact Melts in the Lunar Highlands'.
- Warner, J., Simonds, C., and Phinney, W. C.: 'Impact Induced Fractionation in the Highlands'.
- Crawford, M. L. and Hollister, L. S.: 'Feldspathic Basalt 14310, A Lunar Mantle Derived Magma'.
- Simmons, G., Siegfried, R., Richter, D., and Schatz, J.: 'Estimating Peak Shock Pressures for Lunar Rocks'.
- Sclar, C. B. and Bauer, J. F.: 'Shock Effects in Lunar Rocks 60015 and 77017'.
- Cole, D. M. and Ahrens, T. J.: 'Shock Compression of Lunar Finest from Apollo 17'.
- Cisowski, S., Fuller, M., Rose, M. F., and Wasilewski, P. J.: 'Impact Processes and their Effect on Lunar Magnetism'.
- Radcliffe, S. V., Christie, J. M., Nord, G. L., Lally, J. S., Heuer, A. H., Griggs, D. T., and Fisher, R. M.: 'Electron Petrographic Evidence Concerning the Origin and Lithification of the Lunar Breccias'.

17. Characterization and Evolution of the Lunar Crust: III

(Thursday, March 21, 1974)

- Chyi, L. L. and Ehmann, W. D.: 'Implications of Zr and Hf Abundances and their Ratios in Lunar Materials'.
- Taylor, S. R. and Jakeš, P.: 'Geochemical Zoning in the Moon'.
- Birck, J. L. and Allegre, C. J.: 'Constraints Imposed by ^{87}Rb - ^{87}Sr on Lunar Processes and on the Composition of the Lunar Mantle'.
- Mark, R. K., Lee-Hu, C., and Wetherill, G. W.: 'Rb-Sr Measurements on Lunar Igneous Rocks and Breccia Clasts'.
- Stephenson, A. and Collinson, D. W.: 'The Determination of Lunar Magnetic Field Palaeointensities'.
- Banerjee, S. K., Hoffman, K., and Swits, G.: 'Reversed Polarity Remanent Magnetization in a Layered Boulder near South Massif'.
- Pearce, G. W., Gose, W. A., and Strangway, D. W.: 'Magnetism of the Apollo 17 Samples'.
- Watson, D. E., Larson, E. E., and Reynolds, R. L.: 'Microscopic and Thermomagnetic Analysis of Apollo 17 Breccia and Basalt: Feasibility of Obtaining Meaningful Palaeointensities of the Lunar Magnetic Field'.
- Weiblen, P. W., Powell, B. N., and Aitken, F. A.: 'Petrogenetic Relationships of Spinel-Troctolites, Troctolites, and Anorthositic-Norites'.
- Drake, M. J., Taylor, C. J., and Goles, G. G.: 'Petrology and Geochemistry of Lunar Crustal Rocks'.
- Taylor, L. A. and Williams, K. L.: 'Formational History of Lunar Rocks: Applications of Experimental Geochemistry of the Opaque Minerals'.
- McCallum, I. S., Okumara, F. P., Mathez, E. A., and Ghose, S.: 'Pyroxene Relations in Highland Plutonic and High Grade Metamorphic Rocks'.

18. General Session

(Thursday, March 21, 1974)

- Adams, J. B. and McCord, T. M.: 'Post-Apollo Exploration of the Moon Using Earth-Based Telescopes'.
- Gault, D. E., Hörz, F., Brownlee, D. E., and Hartung, J. B.: 'Mixing of the Lunar Regolith'.
- Crozaz, G., Drozd, R., Hohenberg, C., Morgan, C., Ralston, C., Walker, R. M., and Yuhas, D.: 'Lunar Surface Dynamics: Some General Conclusions and New Results from Apollo 16 and 17'.
- Swann, G. A.: 'A Scheme for Estimating the Ages of Small Copernican Craters'.
- Clayton, R. N., Mayeda, T. K., and Hurd, J. M.: 'Loss of O, Si, S and K from the Lunar Regolith'.
- Kaula, W. B., Schubert, G., Lingenfelter, R. E., Sjogren, W. L., and Wollenhaupt, W.: 'Apollo Laser Altimetry and Inferences as to Lunar Structure'.

Papanastassiou, D. A., Rajan, R. S., Huneke, J. C., and Wasserburg, G. J.: 'Rb-Sr Ages and Lunar Analogs in a Basaltic Achondrite: Implications for Early Solar System Chronologies'.

19. Some Results from Skylab

(Thursday, March 21, 1974)

Owen Garriott: 'Skylab Overview with Emphasis on Solar Observations and Medical Research'.

William Lenoir: 'Earth Resources in Visual Observations from Skylab.'

20. Summary Session

(Friday, March 22, 1974)

A summary of each of the individual conference topics was presented.

- (1) Constraints on structure and composition of the lunar interior.
- (2) Characteristics and movement of materials in the lunar regolith.
- (3) Characterization and evolution of the mare basins.
- (4) Characterization and evolution of the lunar crust.
- (5) Nature of impact processes and their effects on lunar materials.
- (6) Exchange of material and energy between the Moon and its environment.

Full text of the Proceedings of this conference will be published by the Pergamon Press early in 1975. The abstracts of all papers submitted to the conference (900 pages in 2 parts) can be obtained from The Lunar Science Institute (Mrs Carolyn Watkins), 3303 NASA Road 1, Houston, Texas 77058, U.S.A. Price (must be prepaid): Continental U.S. \$ 1.00; Foreign \$ 6.00.

In this and the next issue of our journal we shall publish abbreviated abstracts of the papers included in the programme of the Conference.