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DISTRIBUTION OF APOLLO 15 LUNAR SAMPLES

The National Aeronautics and Space Administration has begun general distribution to U.S. and foreign scientists of the largest and most varied collection of rocks and soil yet returned from the moon.

More than 2,200 Apollo 15 samples and polished thin sections weighing a total of about three kilograms (6.6 pounds) will be distributed to 201 principal investigators for study by them and their co-investigators during the next year.

Approximately 700 scientists in the United States, Virgin Islands, 15 foreign countries and one international body (European Space Research Organization) will take part in analyzing the material collected by Astronauts David R. Scott and James B. Irwin near Hadley Rille and the Apennine mountain front on the Moon last July.

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November 3, 1971

Code 00
Page -32 CATEGORY -30

The scientific investigations will provide detailed information on the sample's mineralogy, petrology, chemistry, age and history and on the effects of micrometeorite impacts, solar radiation and cosmic ray bombardment.

Preliminary examination of samples in the Lunar Receiving Laboratory (LRL) at NASA's Manned Spacecraft Center, Houston, and studies of a small number of selected samples at other laboratories, show the Apollo 15 material to be of three types -- dark-colored, iron-rich basalts associated with mare and rille formation; a few basalts enriched in feldspar collected near the Apennine front; and light-colored, fragmental rocks or breccias consisting of soil-like materials which have been cemented together or of rock fragments which have been welded together by partial remelting.

The Apollo 15 material also contains several unique or unusual samples, some of which came from a small area on the Apennine front near Spur Crater. The samples collected at this site include a white crystalline rock called anorthorsite, composed almost entirely of calcium-rich feldspar, and preliminary age dating shows it to be about 4 billion years old; a very interesting black-and-white rock containing light-colored fragments composed of feldspar-rich breccias and dark-colored fragments composed of basalt; a 1.1 kilogram (2.5 pound) breccia which has the lowest potassium content of any lunar sample; and several green rocks.

Other samples of special scientific interest include a 9.6 kilogram (21.2 pound) basalt which is the largest rock ever returned from the Moon; numerous particles of a unique, green glassy material which has been discovered in nearly every sample of Apollo 15 soil and which appears to be derived from a common source; and a sponge-textured basalt about the size of a grapefruit which is about sixty (60) per cent porous.

By studying the Apollo 15 samples, scientists hope to be able to characterize lunar rocks which formed prior to the filling of the mare basins. A number of samples, mainly composed of breccias from St. George and Spur Craters, along with several basaltic rocks, may be composed of material which formed before an asteroid-sized body is believed to have impacted the Moon, blasting out the basin which formed Mare Imbrium early in lunar history.

Soils and breccias collected near the lunar module are believed to contain ray materials from Aristillus or Autolycus, craters located on the eastern edge of Mare Imbrium which may penetrate through the mare fill to the underlying basement material.

Other studies may provide clues to the formation of rilles, the canyon-like depressions which extend for hundreds of kilometers across the lunar surface. And it is hoped ages can be obtained for some of the craters at the Apollo 15 site which would provide relative sequence of formation of features at the Hadley site.

More than fifty layers of lunar soil, collected in a 2.5 meter (2.72 yards) deep drill core, are expected to illuminate millions of years of lunar and solar history recorded in the stratigraphic sequence in much the same way as the history of a tree can be reconstructed from its growth rings. Small samples from ends of each of the six segments making up the drill stem will be distributed for reconnaissance study and will provide information which will assist in planning for a more comprehensive future study of this important and complex sample.

The samples to be distributed represent around four per cent of the 77 kilograms (170 pounds) of lunar material returned by Apollo 15. The reamining 96 per cent of the sample material will be stored at MSC under carefully controlled conditions for future study.

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A total of 176 kilograms (388 pounds) of lunar material has been collected by the four U.S. lunar landing missions through Apollo 15. Of this total, 163 kilograms (359 pounds) are placed in reserve for future studies, for a time when new scientific instruments and concepts might become available.

Following is a list of principal investigators:

APOLLO 15 LUNAR SAMPLE ALLOCATION

INVESTIGATOR-INSTITUTION	APPROVED INVESTIGATION	NO. OF SAMPLES	WT. OF FINES (GRAMS)	WT. OF ROCKS (GRAMS)	NO. OF THIN SECTIONS
ARIZONA					
Moore, C. B. Arizona State University Tempe	Carbon & Nitrogen	42	15.0	14.0	0
Nagy, B. University of Arizona Tucson	Organic Geochemistry	13	15.5	17.0	0
CALIFORNIA					
Ahrens, T. J. California Institute of Technology Pasadena	High Pressure Hugoniot Measurements	1	0	15.0	0
Andersen, C. A. Hasler Research Center Goleta	Ion Microprobe Analysis of Heavy Elements	5	0.75	2.0	0
Anderson, O. L. University of California Los Angeles	Physical Properties of Lunar Rocks, Glass & Artificial Glass	5	0	68.0	0
Arnold, J. R. University of California San Diego	Solar & Lunar History from Bombardment Effects	2	20.0	1.5	0

INVESTIGATOR-INSTITUTION	APPROVED INVESTIGATION	NO. OF SAMPLES	WT. OF FINES (GRAMS)	WT. OF ROCKS (GRAMS)	NO. OF THIN SECTIONS
Arrhenius, G. O. University of California San Diego	Microstructure, Composition and Radiation Effects	19	3.0	10.7	0
Baedecker, P. A. University of California Los Angeles	Trace Elements	15	11.0	17.0	0
Burlingame, A. University of California Berkeley	Organic Characteristics	28	30.2	20.6	0
Calvin, M. University of California Berkeley	Analysis of Carbon Organic & Inorganic	7	21.0	11.0	0
Carmichael, I. S. E. University of California Berkeley	Petrographic and Crystallographic Study of Silicate Minerals	3	0.5	5.0	3
Carr, M. U. S. Geological Survey Menlo Park	Analyze Particulate Debris	9	2.75	0	0
Engel, A. E. University of California San Diego	Analysis for Marco Elements & Minerals	4	0	15.5	5
Epstein, S. California Institute of Technology Pasadena	Stable Isotope Abundance Measurements	18	22.0	39.2	0
Greenman, N.N. McDonnell-Douglas Astronautics Co. Santa Monica	Luminescence	10	0	3.5	0

INVESTIGATOR-INSTITUTION	APPROVED INVESTIGATION	NO. OF SAMPLES	WT. OF FINES (GRAMS)	WT. OF ROCKS (GRAMS)	NO. OF THIN SECTIONS
Grossman, J. J. McDonnell-Douglas Astronautics Co. Santa Monica	Microphysical, Microchemical and Adhesional Properties	2	10.0	0	0
Haines, E. Jet Propulsion Laboratory Pasadena	Search for Extinct Fissioning Nuclides	3	.75	1.0	0
Housley, R. M. North American Rockwell Corp. Thousand Oaks	Mossbauer Effect Study	7	2.0	4.1	0
Kaplan, I. R. University of California Los Angeles	Carbon & Sulfur Compounds	18	36.0	58.5	0
MacGregor, I. D. University of California Davis	Petrology, Mineralogy & Surface Features	4	2.0	0	3
Nash, D. B. Jet Propulsion Laboratory Pasadena	Spectral Reflectance, Albedo & Luminescence	23	12.0	10.1	0
Oyama, V. I. NASA Ames Research Center Moffett Field	Isolation, Culture & Characterization of Viable Organisms	2	20.0	0	0
Price, P. B. University of California Berkeley	Nuclear Tracks	19	2.10	27.0	0
Quaide, W. L. NASA Ames Research Center Moffett Field	Regolith Formation	14	6.0 plus 100 for non-destructive testing	0	0

INVESTIGATOR-INSTITUTION	APPROVED INVESTIGATION	NO. OF SAMPLES	WT. OF FINES (GRAMS)	WT. OF ROCKS (GRAMS)	NO. OF THIN SECTIONS
Reynolds, J. H. University of California Berkeley	Isotopic Studies	16	4.0	13.35	0
Rho, J. H. Jet Propulsion Laboratory Pasadena	Porphyrins & Aromatic Hydrocarbons Analysis	1	15	0	0
Schopf, J. W. University of California Los Angeles	Micropaleontological studies	16	0.9	1.2	5
Silver, L. T. California Institute of Technology Pasadena	Isotopic Systems	8	27.0	30.0	2
Tittmann, B. R. North American Rockwell Corp. Thousand Oaks	Surface Acoustic Wave Study	2	0	22.0	0
Urey, H. C. University of California San Diego	Isotopic Abundances by Mass Spectroscopy	15	4.0	11.25	0
Wasserburg, G. J. California Institute of Technology Pasadena	Geochemical Investigation	40	30.5	45.25	7
Wetherill, G. W. University of California Los Angeles	Isotopic Age Measurements	12	24.0	40.0	0
Wilshire, H. B. U.S. Geological Survey Menlo Park	Petrologic Identification of Lunar Stratigraphic Units	0	0	0	To Be Determined

INVESTIGATOR-INSTITUTION	APPROVED INVESTIGATION	NO. OF SAMPLES	WT. OF FINES (GRAMS)	WT. OF ROCKS (GRAMS)	NO. OF THIN SECTIONS
COLORADO					
Friedmann, I. U. S. Geological Survey Denver	Water Content, Deuterium, carbon 13, & oxygen 18 Analysis	10	6.0	12.45	0
CONNECTICUT					
Skinner, B. J. Yale University New Haven	Fugacities of Gaseous Species		(to be considered later)		
DELAWARE					
Glass, B. P. University of Delaware Newark	Stratigraphy Study	12	3.0	0	0
GEORGIA					
Sheppard, A. P. Georgia Institute of Technology Atlanta	Complex Permittivity Measurements	3	14.0	7.0	0
HAWAII					
Naughton, J. J. University of Hawaii Honolulu	Erosion by Alkali Metals	1	0	1.0	0
ILLINOIS					
Anders, E. University of Chicago	Determine 24 Elements by Neutron Activation Analysis; Measure Cosmic Ray Induced Aluminum 26 and Sodium 22 content	43	14.3	11.95	0
Clayton, R. University of Chicago	Oxygen Isotope Analysis	13	23.0	16.5	1

INVESTIGATOR-INSTITUTION	APPROVED INVESTIGATION	NO. OF SAMPLES	WT. OF FINES (GRAMS)	WT. OF ROCKS (GRAMS)	NO. OF THIN SECTIONS
Fernandez-Moran, H. University of Chicago	High Voltage Electron Micoscopy	4	0.5	8.0	2
Fields, P. R. Argonne National Laboratory Chicago	High Sensitivity Isotopic Analysis	2	12.0	0	0
Hafner, S. S. University of Chicago	Mossbauer Spectroscopy, Nuclear Magnetic Resonance & Electron Paramagnetic	3	0	9.0	3
Reed, G. W. Argonne National Laboratory Chicago	Determination of Concentrates & Determination of Primordial Lead & Other Heavy Elements by Fast and Slow Neutron Activation Analysis	23	8.0	21.5	0
Smith, J. V. University of Chicago	Mineralogy & Petrology	2	0	1.1	52
INDIANA					
Lipschutz, M. E. Purdue University Lafayette	Vanadium Isotopic Composition & Content & Analyze for Iron, Chromium, Titanium, and Magnesium by Atomic Absorption Spectrophotometer	3	4.0	2.0	0

INVESTIGATOR-INSTITUTION	APPROVED INVESTIGATION	NO. OF SAMPLES	WT. OF FINES (GRAMS)	WT. OF ROCKS (GRAMS)	NO. OF THIN SECTIONS
Meinschein, W. G. Indiana University Bloomington	Organic Analysis	18	14.5	7.7	0
KENTUCKY					
Birkebak, R. C. University of Kentucky Lexington	Thermal Radiation Characteristics and Thermophysical Properties & Measure Specific Heat	3	20.0	3.0	0
Ehmann, W. D. University of Kentucky Lexington	Elemental Analysis	9	4.0	7.0	0
MARYLAND					
Ghose, S. NASA Goddard Space Flight Center Greenbelt	Cooling History	2	0	8.0	2
Ponnamperuma, C. A. University of Maryland College Park	Carbon Compounds	5	23.0	25.0	0
Schnetzler, C. C. NASA Goddard Space Flight Center Greenbelt	Elemental Analysis, Rhodium/Strontium Age, Cosmic Ray Produced Radionuclide	21	8.0	31.6	2
Walter, L. S. NASA Goddard Space Flight Center Greenbelt	Comprehensive Mineralogical-Petrological Investigation	9	1.5	6.5	8
MASSACHUSETTS					
Barghoorn, E. S. Harvard University Cambridge	Electron Microscopy	15	1.1	11.5	3

INVESTIGATOR-INSTITUTION	APPROVED INVESTIGATION	NO. OF SAMPLES	WT. OF FINES (GRAMS)	WT. OF ROCKS (GRAMS)	NO. OF THIN SECTIONS
Biemann, K. Massachusetts Institute of Technology Cambridge	Organic Compounds	14	14.0	11.0	0
Burns, R. Massachusetts Institute of Technology Cambridge	Optical Absorption & Specular Reflectivity	3	0	3.0	3
Frondel, C. Harvard University Cambridge	Mineralogy, Petrology & Chemistry	4	6.0	2.0	1
Haggerty, S. E. University of Massachusetts Amherst	Opaque Oxides	5	1.25	0	9
Hays, J. F. Harvard University Cambridge	Melting Behavior & Phase Relations	2	0	4.0	2
Perry, C. H. Northeastern University Boston	Infrared Absorption & Light Scattering Spectra	16	2.75	3.0	1
Salisbury, J. W. Air Force Cambridge Research Laboratories Cambridge	Mid-Infrared Spectroscopy	4	8.0	0	0
Uhlmann, D. R. Massachusetts Institute of Technology Cambridge	Crystallization & Melting Kinetics of Lunar Compositions	(to be considered later)			
Westphal, W. B. Massachusetts Institute of Technology Cambridge	Dielectric Measurements	6	0	34.5	0

INVESTIGATOR-INSTITUTION	APPROVED INVESTIGATION	NO. OF SAMPLES	WT. OF FINES (GRAMS)	WT. OF ROCKS (GRAMS)	NO. OF THIN SECTIONS
Wones, D. R. Massachusetts Institute of Technology Cambridge	Calculate Elastic Properties from Measurement of Compressional Shear Wave Velocities at STP	8	20.0	34.5	0
MICHIGAN					
Ehrlich, R. Michigan State University East Lansing	Analysis of Grain Shape	5	1.25	0	0
MINNESOTA					
Banerjee, S. K. University of Minnesota Minneapolis	Magnetic Paleo-intensity	5	1.0	13.5	0
Murthy, V. R. University of Minnesota Minneapolis	Elemental and Isotopic Abundances	12	10.25	33.5	1
Pepin, R. University of Minnesota Minneapolis	Rare Gas Studies	12	10.0	8.0	0
MISSOURI					
Manuel, O. K. University of Missouri Rolla	Noble Gases	7	7.0	5.0	0
Walker, R. M. Washington University St. Louis	Solid State & Mass Spectrometric Measurements	21	2.3	25.2	0

INVESTIGATOR-INSTITUTION	APPROVED INVESTIGATION	NO. OF SAMPLES	WT. OF FINES (GRAMS)	WT. OF ROCKS (GRAMS)	NO. OF THIN SECTIONS
NEW JERSEY					
Hargraves, R. B. Princeton University Princeton	Magnetic Properties	2	0	6.8	2
Hollister, L. S. Princeton University Princeton	Compositional Zoning of Pyroxenes	0	0	0	5
NEW MEXICO					
Keil, K. University of New Mexico Albuquerque	Electron & Laser Microprobe	1	0	1.0	50
NEW YORK					
Cadenhead, D. A. State University of New York Buffalo	Surface Area & Pore Structure Analysis of Porous Samples	8	14.0	15.0	0
Carter, N. L. State University of New York Stony Brook	Deformation of Silicates	5	0.25	4.0	4
Davis, R. Brookhaven National Laboratory New York	Determine Argon 37, Argon 39 content	6	12.0	10.0	0
Fleischer, R. L. GE Research & Development Center Schenectady	Particle Track Studies	15	1.0	18.45	0
Gold, T. Cornell University Ithaca	Particle Size Analysis, Photometric Studies of Radiation Effects	15	9.5	8.0	0

INVESTIGATOR-INSTITUTION	APPROVED INVESTIGATION	NO. OF SAMPLES	WT. OF FINES (GRAMS)	WT. OF ROCKS (GRAMS)	NO. OF THIN SECTIONS
Papike, J. J. State University of New York Stony Brook	Crystal Chemistry & Chemical Petrology	9	2.0	8.25	5
Schaeffer, O. A. State University of New York Stony Brook	Low Energy Gases Trapped in Lunar Regolith	15	1.0	4.5	0
Wosinski, J. F. Corning Glass Works Corning	History & Origin of Glassy Phases	4	0	2.0	2
NORTH CAROLINA					
Isenhour, T. L. University of North Carolina Chapel Hill	Analysis of Volatile Metal Chelates by Mass Spectroscopy	7	9.0	2.2	0
Sievers, R. E. Aerospace Research Laboratory, University of North Carolina Chapel Hill	Concentration Metallic Elements	(shares samples with Isenhour)			
OKLAHOMA					
Barker, C. University of Tulsa	Analysis of the Volatile Elements	3	0	4.5	0
OHIO					
Cooper, A. Case Western Reserve University Cleveland	Characterization & History of Lunar Glass & Optical Absorption Studies	4	8.0	0	0
Radcliffe, S. V. Case Western Reserve University Cleveland	Conduct by High Voltage Transmission Electron Microscopy Study of Substructure	9	0.75	6.6	0

INVESTIGATOR-INSTITUTION	APPROVED INVESTIGATION	NO. OF SAMPLES	WT. OF FINES (GRAMS)	WT. OF ROCKS (GRAMS)	NO. OF THIN SECTIONS
OREGON					
Goles, G. G. University of Oregon Eugene	Geochemical Investigations	30	10.5	16.65	1
Schmitt, R. A. Oregon State University Corvallis	Elemental & Isotopic Abundance Studies	28	4.0	14.70	0
Weill, D. F. University of Oregon Eugene	Petrology-Mineralogy	5	1.25	0	8
PENNSYLVANIA					
Fuller, M. University of Pittsburgh	Magnetic Properties	18	0	0 plus 270 for nondestructive testing	0
Goldstein, J. I. Lehigh University Bethlehem	Metallic Phases	7	18.05	0	1
Inman, M. C. Pennsylvania State University University Park	Comparative Study with 100-1000 Kv Transmission Electron Microscopy	(to be considered later)			
Muan, A. Pennsylvania State University University Park	Phase Equilibrium Studies	3	0	6.0	3
Roy, R. Pennsylvania State University University Park	Quantitative Microluminescence & Related Studies of Fines & Glassy Material	12	8.0	2.0	2

INVESTIGATOR-INSTITUTION	APPROVED INVESTIGATION	NO. OF SAMPLES	WT. OF FINES (GRAMS)	WT. OF ROCKS (GRAMS)	NO. OF THIN SECTIONS
Schwerer, F. C. U. S. Steel Corporation Monroeville	Electrical Conductivity of Lunar Rocks with Corroborative Mossbauer Studies	4	0	2.9	0
Sclar, C. B. Lehigh University Bethlehem	Shock-Wave Damage in Minerals of Lunar Samples	11	3.5	3.0	5
TENNESSEE					
Gentry, R. V. Oak Ridge National Laboratory	Search for & Analysis of Radioactive Halos		(to be considered later)		
Kolopus, J. Oak Ridge National Laboratory	Determine Valence State & Summetry of Crystalline Material	6	0	7.8	0
O'Kelley, G. D. Oak Ridge National Laboratory	Measure Potassium, Uranium, and Thorium by Gamma-Ray Spectrometry	15	0 plus 400 for nondestructive testing	0 plus 1100 for nondestructive testing	0
TEXAS					
Brett, R. Manned Spacecraft Center Houston	Opaque Minerals	15	3.25	10.0	23
Bogard, D. D. Manned Spacecraft Center Houston	Depth Variations of Solar Wind Implanted Noble Gases	13	8.0	7.0	0
Carter, J. L. University of Texas Dallas	Mineralogy, Petrology & Surface Features	4	0.9	0	0

INVESTIGATOR-INSTITUTION	APPROVED INVESTIGATION	NO. OF SAMPLES	WT. OF FINES (GRAMS)	WT. OF ROCKS (GRAMS)	NO. OF THIN SECTIONS
Gast, P. W. Manned Spacecraft Center Houston	Isotope & Trace Element Studies	27	15.0	44.0	0
Gibson, E. K., Jr. Manned Spacecraft Center Houston	Thermal Analysis-Mass Spectrometric Study & Isotope Dilution Analysis	11	13.0	12.0	0
Helsley, C. E. University of Texas Dallas	Remanent Magnetism Studies	4	0	14.0	0
Heymann, D. Rice University Houston	Lunar Fines	13	6.8	4.0	0
Horz, F. Manned Spacecraft Center Houston	Micrometeorite Craters	7	0	6.5	0
Keith, J. E. Manned Spacecraft Center Houston	Gamma-Ray Spectroscopy	18	0 plus 400 for nondestructive testing	0 plus 1400 for nondescriptive testing	0
King, E. A. University of Houston	Mineralogy & Petrology of Fine Size Fractions	13	4.85	0	0
McKay, D. S. Manned Spacecraft Center Houston	Study of Fines & Breccias	2	0.5	0	1
Morrison, D. A. Manned Spacecraft Center Houston	Morphology & Surface Textures & Structure Analysis	6	0	4.2	0

INVESTIGATOR-INSTITUTION	APPROVED INVESTIGATION	NO. OF SAMPLES	WT. OF FINES (GRAMS)	WT. OF ROCKS (GRAMS)	NO. OF THIN SECTIONS
Oro, J. University of Houston	Carbonaceous Organic & Organogenic Matter	10	36.5	17.0	0
Powell, B. N. Rice University Houston	Systematic Mineralogy-Petrology Study	15	6.75	0	0
Sippel, R. F. Mobil Research & Development Corporation Dallas	Luminescence Petrography	8	2.0	0	2
Strangway, D. W. Manned Spacecraft Center Houston	Magnetic Properties Electrical Properties	38	11.0	34 plus 330 for nondestructive testing	0
WASHINGTON					
Perkins, R. W. Pacific Northwest Laboratory Richland	Analysis of Primordial & Cosmogenic Radionuclides	13	0 plus 650 for nondestructive testing	0 plus 600 for nondestructive testing	0
WEST VIRGINIA					
Karr, C. USDI (Mines) Morgantown	Infrared & Laser Mineral Identification	2	2.0	0	0
WISCONSIN					
Cameron, E. N. University of Wisconsin Madison	Opaque Phase	6	1.25	5.0	10
Haskin, L. A. University of Wisconsin Madison	Rare Earth & Other Trace Elements	26	4.0	25.95	2

INVESTIGATOR-INSTITUTION	APPROVED INVESTIGATION	NO. OF SAMPLES	WT. OF FINES (GRAMS)	WT. OF ROCKS (GRAMS)	NO. OF THIN SECTIONS
WASHINGTON, D.C.					
Bell, P. N. Carnegie Institution	Origin & Crystallization of Magmas	5	.75	3.0	7
Chao, E. U. S. Geological Survey	Impact Metamorphism Pressure Calibration of Shock Effects	19	10.0	16.0	14
Evans, H. T. U. S. Geological Survey	Crystal Chemical Study of Opaque and Related Minerals		(to be considered later)		
Fireman, E. L. Smithsonian Institution	Hydrogen 3, Argon 37, and Argon 39 Measurements	8	12.0	36.0	0
Fredriksson, K. Smithsonian Institution	Phase Analysis	8	2.75	0	5
Griscom, D. L. Naval Research Lab	Investigation of Lunar Glasses & Fine Material by Electron Spin Resonance	7	0.75	0.05	0
Mason, B. H. Smithsonian Institution	Integrated Mineralogic, Petrographic & Geochemical Investigations	15	5.75	19.0	8
Megrue, G. H. Smithsonian Institution	Laser Microprobe-Mass Spectrometer for Isotopic Abundance	4	0	7.5	0
Robie, R. A. U. S. Geological Survey	Specific Heat & Thermal Studies	4	60.0	40.0	0
Roedder, E. U. S. Geological Survey	Petrologic Study	7	1.25	6.0	5

INVESTIGATOR-INSTITUTION	APPROVED INVESTIGATION	NO. OF SAMPLES	WT. OF FINES (GRAMS)	WT. OF ROCKS (GRAMS)	NO. OF THIN SECTIONS
Rose, H. J. U. S. Geological Survey	Chemical & X-Ray Fluorescence Analysis	24	9.0	11.35	5
Ross, M. U. S. Geological Survey	Crystal Chemical Analysis	3	0	9.0	3
Sato, M. U. S. Geological Survey	Oxygen Fugacities & Crystallization Sequence	2	0	4.0	2
Sellers, G. A. U. S. Geological Survey	Petrographic, Mineralogic, & Size-Frequency Analysis	6	3.0	0	0
Senftle, F. E. U. S. Geological Survey	Magnetic Studies	2	0	0.3	0
Shields, W. R. National Bureau of Standards	Isotopic Abundance Ratio & Assay Analysis of Boron, Uranium & Thorium by Nuclear Track Counting. Analysis of Iron, Titanium, Aluminum, and Bismuth by Differential Polarography	4	8	10.0	0
Stewart, D. B. U. S. Geological Survey	Feldspar Structure, Domains & Stability	4	0	7.2	4
Wood, J. A. Smithsonian Institution	Mineralogic-Petrologic Study	11	6.95	0	1
VIRGIN ISLANDS					
Adams, J. B. College of the Virgin Islands	Visible and Near-Infrared Reflection Spectroscopy	22	21.0	5.3	0

INVESTIGATOR-INSTITUTION	APPROVED INVESTIGATION	NO. OF SAMPLES	WT. OF FINES (GRAMS)	WT. OF ROCKS (GRAMS)	NO. OF THIN SECTIONS
		FOREIGN COUNTRIES			
AUSTRALIA					
Compston, W. C. Australian National University Canberra	Chemical and Isotopic Studies	22	10.0	46.1	0
Lovering, J. F. University of Melbourne	Fission Trace Analysis Electron Microprobe Activation Analysis of Rhenium & Osmium	13	4.25	9.0	4
Ringwood, A. E. Australian National University Canberra	High Temperature, High Pressure	3	0	6.0	3
Taylor, S. R. Australian National University Canberra	Trace Element Abundances	17	7.0	9.75	0
BELGIUM					
Jedwab, J. Universite Libre de Bruxelles	Morphological & Chemical Study of Free-Growing Crystals & their Overgrowths	7	1.25	2	1
BRAZIL					
De Carvalho, G. Centro Brasileiro de Pesquisas Fisicas Rio de Janeiro	Existance of Alphy-Radiative Isotopes	1	0.5	0	0

INVESTIGATOR-INSTITUTION	APPROVED INVESTIGATION	NO. OF SAMPLES	WT. OF FINES (GRAMS)	WT. OF ROCKS (GRAMS)	NO. OF THIN SECTIONS
CANADA					
Masson, C. R. National Research Council Nova Scotia	Anionic Constituents	4	3.0	2.3	0
Maxwell, J. A. Geological Survey of Canada Ottawa	Chemical Composition	3	5.0	10.0	0
Thode, H. G. McMaster University Hamilton, Ontario	Stable Sulfur & Magnesium Isotopes	7	10.0	9.0	0
Traill, R. J. Geological Survey of Canada Ottawa	Petrology, Mineralogy, & Deformation	5	1.0	0	4
York, D. University of Toronto	Argon 40/Argon 39 Studies	4	0	3.25	0
ESRO					
Fitton, B. European Space Research Organization Netherlands	Measurement of Photoemission & Diffuse Reflectivity	3	6.0	0	0
FINLAND					
Wiik, H. G. Geological Survey of Finland Helsinki	Wet Chemical Methods to Determine Major Elemental Abundance	1	0	5.0	0
FRANCE					
Allegre, C. J. Institut de Physique de Globe Paris	Rhodium 87-Strontium 87 Age Determination & Trace Element Contents	4	2.0	10.0	0

INVESTIGATOR-INSTITUTION	APPROVED INVESTIGATION	NO. OF SAMPLES	WT. OF FINES (GRAMS)	WT. OF ROCKS (GRAMS)	NO. OF THIN SECTIONS
Christophe, M. Laboratoire de Mineralogie-Cristallographie de la Faculte de Sciences de Paris	Mineralogy and Petrology	5	1.5	2.0	2
Dollfus, A. Observatorie de Paris	Polarimetric & Photometric	13	2.5	1.7	0
Lalou, C. Centre des Faibles Radio-activities Gif-sur-Yvette	Thermoluminescence of Lunar Rocks and Dust	1	0	0.5	0
Lambert, G. Centre des Faibles Radio-activities de CNRS Gif-sur-Yvette	Radon Study	1	1.0	0	0
Maurette, M. Laboratoire de Spectrometrie de Masse du CNRS Orsay	Irradiation, Texture & Habit Histories	17	1.5	10.5	0
Pauleve, M. Centre d'Etudes Nucleaires de Grenoble	Magnetic Study of Meteorites of Iron-Nickel Alloy	1	2.0	0	0
Pellas, P. Laboratoire de Mineralogic de Museum CNRS Paris	Study of Cosmic Radiations	9	4.0	19.35	0
Roth, E. Centre d'Etudes Nucleaires de Saclay	Isotopic Abundances	2	3.0	5.0	0

INVESTIGATOR-INSTITUTION	APPROVED INVESTIGATION	NO. OF SAMPLES	WT. OF FINES (GRAMS)	WT. OF ROCKS (GRAMS)	NO. OF THIN SECTIONS
Yokoyama, Y. Centre des Faibles Radio-activities, Grif-sur-Yvette	Cosmonuclides	2	20.0	0	0
FEDERAL REPUBLIC OF GERMANY					
Berckhemer, H. Institut fur Meteorologie und Geophysik Mainz	Absorption of Elastic Waves in Lunar Rock Samples Under Vacuum and Low Temperature Conditions		(to be considered later)		
von Engelhardt, W. University of Tuebingen	Petrographic Study to Determine Shock Effects	11	3.75	0.75	5
Herr, W. University of Cologne	Determine Manganese 53 Content and Rhenium 185:Rhenium 187 Ratio by High Flux Neutron Bombardment	9	6.0	4.5	0
Hintenberger, H. Max Planck Institut fur Chemie Mainz	Determination of Concentrations & Isotopic Abundandances of Rare Gases & Age Determinations; Investigations on Non-Rare Gases in Lunar Fines & Breccias	3	2.0	6.0	0
Jagodzinski, H. University of Munich	X-Ray Investigation	1	0	1	1

INVESTIGATOR-INSTITUTION	APPROVED INVESTIGATION	NO. OF SAMPLES	WT. OF FINES (GRAMS)	WT. OF ROCKS (GRAMS)	NO. OF THIN SECTIONS
Kirsten, T. Max Planck Institut fur Kernphysik Heidelberg	Rare Gas Analysis	13	23.0	14.0	0
Ramdohr, P. Max Planck Institut fur Kernphysik Heidelberg	Opaque Minerals	5	0.95	0	8
Wanke, H. Max Planck Institut fur Chemie Mainz	Major & Trace Elemental Abundances & Cosmic Ray Induced Nuclides	5	10.0	0.1	0
INDIA					
Goel, P. S. Indian Institute of Technology Kanpur	Nitrogen Content by Neutron Activation Analysis	3	1.0	4.0	0
Lal, D. Tata Institute of Research Bombay	Radiation History	18	1.75	19.8	0
ITALY					
Demaria, G. University of Rome	Knudsen Cell Vaporization Studies	2	0	4.0	0
Funiciello, R. University of Rome	Morphology & Composition of Spherules	6	1.5	0	0
JAPAN					
Kushiro, I. University of Tokyo	Petrological Studies	3	0	6.0	3
Masuda, A. Science University of Tokyo	Isotopic Composition of Lanthanum	2	4.0	0	0

INVESTIGATOR-INSTITUTION	APPROVED INVESTIGATION	NO. OF SAMPLES	WT. OF FINES (GRAMS)	WT. OF ROCKS (GRAMS)	NO. OF THIN SECTIONS
Mizutani, H. University of Tokyo	Elastic, Anelastic and Thermal Properties	5	0	35.0	0
Nagata, T. University of Tokyo	Remanent Magnetism Studies	11	0	28.1	0
NORWAY					
Heier, K. S. Mineralogisk-Geologisk Museum University of Oslo	Trace Element Content & Conduct Electron Microscope Studies on Polished Thin Sections	10	9.0	22.0	0
SOUTH AFRICA					
Ahrens, L. H. University of Cape Town	Determine by X-Ray Fluorescence, Atomic Absorption, Gamma-Ray Emission; Alpha Spectrometry Abundance of Major, Minor, & Trace Elements	7	9.0	13.0	0
Strasheim, A. National Physical Research Laboratory Pretoria	Lithium Isotope Ratios	3	2.0	4.0	0
SWITZERLAND					
Bayer, G. Swiss Federal Institute of Technology Zurich	Microstructure, Melting & Crystallization of Fines	5	2.0	0.5	1
Geiss, J. University of Berne	Solar Wind & Cosmic Radiation	17	13.5	5.55	0

INVESTIGATOR-INSTITUTION	APPROVED INVESTIGATION	NO. OF SAMPLES	WT. OF FINES (GRAMS)	WT. OF ROCKS (GRAMS)	NO. OF THIN SECTIONS
Laves, F. Swiss Federal Institute of Technology Zurich	Crystallization & Thermal History of Plagioclases	7	1.5	3.1	1
Signer, P. Swiss Federal Institute of Technology Zurich	Origin of Rare Gases	7	19.75	1.0	0
Wenk, E. University of Basel	Crystal Opaques of Plagioclases	2	0	2.0	2
TAIWAN					
Juan, V. C. National Taiwan University	Petrological & Chemical Studies	10	6.0	3.0	5
UNITED KINGDOM					
Agrell, S. O. University of Cambridge England	Broad Mineralogic Studies and Selected Area Abundance Measurements of Light Stable Isotopes by Ion Bombardment Mass Spectrometry	20	7.5	5.0	12
Bastin, J. University of London England	Infrared & Thermal Studies	5	9.0	6.3	0
Brown, G. M. University of Durham England	Petrology, Mineralogy, Chemical Analysis	15	2.75	4.0	17
Drever, H. I. University of St. Andrews Scotland	Analogical Investigation of Terrestrial Magnesium and Calcium	0	0	0	4

INVESTIGATOR-INSTITUTION	APPROVED INVESTIGATION	NO. OF SAMPLES	WT. OF FINES (GRAMS)	WT. OF ROCKS (GRAMS)	NO. OF THIN SECTIONS
Edgington, J. A. Queen Mary College London England	Luminescent Properties	4	4.0	0	5
Eglinton, G. University of Bristol England	Organic Geochemistry	29	18.0	26.5	0
Gay, P. University of Cambridge England	Feldspar Studies	4	.25	2.1	2
Geake, J. University of Manchester England	Luminescence, Optical & Related Properties	8	2.5	3.0	0
Greenwood, N. N. University of Newcastle upon Tyne	Mossbauer Spectroscopy	5	2.25	0	0
McDonnell, J. A. M. University of Kent Canterbury England	Hypervelocity Impact	5	0.25	3.0	0

INVESTIGATOR-INSTITUTION	APPROVED INVESTIGATION	NO. OF SAMPLES	WT. OF FINES (GRAMS)	WT. OF ROCKS (GRAMS)	NO. OF THIN SECTIONS
O'Hara, M. J. University of Edinburgh Scotland	Experimental Petrology	4	0	8	4
Runcorn, S. K. University of Newcastle upon Tyne England	Magnetic Properties	7	3.0	32.0	0
Scoon, J. H. University of Cambridge England	Chemical Analysis	2	10.0	0	0
Turner, G. University of Sheffield England	Argon 40 - Argon 39 Dating	14	0	6.75	0
Zussman, J. University of Manchester England	Mineralogical, Petrological & Geochemical Investigations	7	1.0	2.5	4

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