## Table of Contents

	Page
Foreword	iii
Moderators and program committee	v
Officers and Committee Chairmen	vi
Founder Members	vii
Life Members	vii
Symposium Notes	ix
Dr. Erwin W. Müller—Guest Speaker	xi
TECHNICAL PROGRAM	
THE ROLE OF SPECTROSCOPY IN VACUUM SCIENCE	Page
Mass Spectrographic Studies of Impurities on Surfaces—A. J. Ahearn	1
The Vacuum Microbalance and Omegatron Spectrometer: Study of the Interaction of Oxygen and Clean Germanium Surfaces—S. P. Wolsky and E. J. Zdanuk	6
The Desorption Spectrometer as an Analytic Tool in Ultra-high vacuum Investigations—P. A. Redhead	12
The Ionization of Adsorbed Gas by Impact of Slow Electrons—G. E. Moore	16
Ultra-high Vacuum Studies with a Small Bakeable Mass Spectrometer—R. E. Honig	20
Residual Gases in Vacuum Systems—A. Klopfer, S. Garbe and W. Schmidt	27
Experimental Study of an Omegatron Type Mass Spectrometer—D. Charles and R. J. Warnecke, Jr.	34
HIGH AND ULTRA-HIGH VACUUM SYSTEMS	
The Production of Ultra-high Vacuum in Metal Systems Larger than One Thousand Liters—I. Farkass and G. F. Vanderschmidt	42
An Ultra-high Vacuum Chamber for Space Simulation—John C. Simons, Jr	48
A Differentially Pumped Ultra-high Vacuum System—M. Rivera and R. Le Riche	55
Ultra-high Vacuum Pumping by Vibrating Membrane—H. Schwarz	60

## Table of Contents

	H. L. Caswell
	Diffusion Pump and Baffle Systems of Large Suct than 10 <sup>-8</sup> Torr—H. G. Nöller, G. Reich and V
	VACUUM MEASURING TECHNIQUES
	New Method for Vacuum Measurements in the N. A. Florescu
	Advances in the Design of Vacuum Gauges J. R. Roehrig and G. F. Vanderschmidt
ubes—R. L. Ramey 85	The Theory and Design of Subminiature Ionization
	A Multi-Point Vacuum Measuring System for I P. L. Vitkus
	An Ultra-sensitive Mass Spectrometer Leak D Vacuum Technology—J. L. Peters
g Silica Membrane	An Improved Helium-only Sensitive Method fo Helium Leaks—C. B. Bicknell
	VACUUM SYSTEM APPLICATIONS
	Relations Between Size of Vacuum Chamber, Pumping Speed—B. B. Dayton
120	Vacuum Treatment of Milk—C. W. Hall
	Equipment for Hot Rolling Strip in Vacuum-Kulinski
129	Pressure Simulation of Outer Space-D. J. Sant
Performance of Oil	A New Type of Boiler that Permits Improvement Diffusion Pumps—D. L. Stevenson
	Relationship of Diffusion Pump Performance t Pumping Fluid—H. R. Smith
	Recent Development of Ultra-high Vacuum Pumps—W. K. Huber and E. A. Trendelenbu
	The Vacuum System of a 3 BeV Proton Syncl D. L. Collins and M. Szekely
V. W. Balwanz 159	A High Pumping-Rate System for 10-6 mm Hg
	Sputtering of Metals and Semiconductors by N. Laegreid and G. K. Wehner
n, J. T. Mark and	Evaluation of Large Diffusion Pumps and Tra System of the Model C-Stellarator—W. G. C. S. Geiger
del C-Stellarator—	Ultra-high Vacuum System Developments for J. T. Mark and Karl Dreyer

## APPLICATIONS OF VACUUM IN SCIENCE

D. W. Moore	181
Electron Beams in Vacuum Processes—E. S. Candidus, M. H. Hablanian and H. A. Steinherz	185
A New Electron Gun for the Vacuum Evaporation of Metals and Dielectrics— R. Thun and J. B. Ramsey	192
Adsorption of Gases on Mercury at 77 °K—G. E. Becker	197
On the Use of the Pumping Time Equation in the Vacuum Technique— T. T. H. Kraus	204
Apparatus for Electron Optical Study of Low-density Gas-glow—S. R. Mielczarek, D. C. Schubert and L. Marton	206
THIN FILMS AND VAPORIZING SOURCES	
Nitride, Silicide and Oxide Evaporated Films for the Electronic Industry— E. H. Layer	210
Cathodoluminescence of Evaporated Zinc Sulfide-Manganese Films—J. P. Reames	215
Evaporated Chromium Films on Hot Substrates—Dorothy M. Hoffman and J. Riseman	218
Gas Absorption by Vacuum Evaporated Magnetic Films—F. R. Gleason, J. H. Greiner and L. R. Yetter	222
The Use of Sensitization Methods for Study of Distillation Source Images—L. E. Preuss and C. Alt Anthony	228
Large-area Sources and Two-source Control—K. H. Behrndt	242
A Simple Film Thickness Gauge Utilizing Newton's Rings—A. W. Winston, C. A. Baer and L. R. Allen	249
VACUUM SYSTEM COMPONENTS	
A Demountable Ultra-high Vacuum Glass-system and Its Components— K. H. Behrndt	255
Results with Ultra-high Vacuum Metal System Including Windows, Evaporators and Lead-ins—H. Ehlers and J. Moll	261
A Large Bakeable Vacuum Valve—T. H. Batzer	265
Corrosion-Resistant Roots Pumps—H. Bode	268
Ultra-low Temperature Mechanical Refrigeration Systems for High-vacuum Traps and Baffles—H. R. Smith and P. B. Kennedy	271
Ceramic, Sapphire and Glass Seals for the Model C-Stellarator—J. A. Zollman,	278

## Table of Contents

Improved Reliability of Soft Glass to Metal Vacuum Tight Seals—F. A. Loughridge and W. S. Wong	283
Design of Work-accelerated Electron Guns for Electron Beam Welding—T. H. Crane	288
IONIC PUMPING	
The Behavior of Titanium in a High Vacuum—J. Morrison	291
Properties of a Small Titanium-ion Pump—A. Klopfer and W. Ermrich	297
A Method for Greatly Enhancing the Pumping Action of a Penning Discharge—W. M. Brubaker	302
Design Considerations for High Speed Getter-ion Pumps—R. Zaphiropoulos and W. A. Lloyd	307
Some Studies of Getter-ion Pumped Vacuum Systems—I. Ames and R. L. Christensen	311
Recent Information on the Gettering of Gases by Barium Films—Paolo Della Porta	317
CUMULATIVE INDEX OF 1954–1959 SYMPOSIA	
Index A: Titles of Papers including Authors	325
Index B: Alphabetical Index of Authors	333