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Bibliography and Index on Vacuum and
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U.S. DEPARTMENT OF COMMERCE
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UNITED STATES DEPARTMENT OF COMMERCE • Luther H. Hodges, *Secretary*
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Bibliography and Index on Vacuum and Low Pressure Measurement

W. G. Brombacher



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Foreword

Preparation of this bibliography and index on vacuum and low pressure was undertaken to fill the need of scientists, engineers, and other users for sources of information. It was originally planned to include a critical review of vacuum and low pressure measurement with the bibliography. In order to avoid undue delay in the publication of the bibliography it was found advisable to omit the review which, however, will be prepared for separate publication.

This bibliography was prepared as part of the work on vacuum standards which is now in progress in the Mechanics Division under the supervision of D. P. Johnson, Chief of the Pressure and Vacuum Section.

A. V. Astin, Director,

Contents

	Page
Foreword-----	III
1. Introduction-----	1
2. Bibliography-----	2
3. Author Index-----	51
4. Subject Index-----	64

BIBLIOGRAPHY AND INDEX ON VACUUM AND LOW PRESSURE MEASUREMENT

W. G. Brombacher

The bibliography contains 1538 references, of which 52 are on books. About 550 of the periodical references are specifically on pressure measurement including both vacuum gages and micromanometers. The balance are on vacuum technology, including adsorption, degassing, vacuum pumps, controlled gas leaks, valves, seals and vacuum systems, all of which bear on the technique of vacuum measurement. The indices consist of an author index and an index of the subject matter of the listed references.

1. INTRODUCTION

Vacuum technology has been advancing at a rapidly accelerating rate during the past few years in response to the needs of science and industry. To meet the need for means of locating technical information, abstracts of current literature on vacuum technology are available in a number of the publications. Notable among those specifically on vacuum technology are: a) Vacuum (since 1951), The international journal and abstracting service for vacuum science and technology. Pergamon Press, London. b) Le Vide (since 1946), Société Française des Ingénieurs des Techniciens du Vide, Paris, France. Other abstract journals or publications containing a significant number of abstracts on vacuum measurement include c) Physical abstracts, Section A of Science abstracts, Institution of Electrical Engineers, London. d) Chemical abstracts, American Chemical Society, Columbus, Ohio. e) Engineering index, Engineering Societies, New York. f) Physikalische Berichte, Deutsche Gesellschaft für technische Physik, Braunschweig.

Excellent surveys of vacuum measurement are given in Dushman's "Scientific foundations of vacuum technique" (1949) and in Leck's "Pressure measurement in vacuum systems" (1957) but the references are incomplete and do not include the flood of papers published since. The preparation of an up-to-date bibliography, undertaken here, appears to fill a need for a source of readily available information. This paper consists essentially of a) a bibliography, b) an author index, and c) an index of the subject matter of the bibliography. While the primary objective is to focus on vacuum measurement, it was believed essential to include in the bibliography articles on vacuum technology in some measure accessory or essential to vacuum measurement. For maximum usefulness, an index of the subject matter of the references has been prepared. The abstract publications listed in the previous paragraph have been freely drawn upon in preparing the bibliography.

Neither surveys nor bibliographies appear to be available on micromanometers, covering absolute pressure measurements just above the high vacuum range or on sensitive, small differential pressure

measurement. This instrumentation is of interest principally to workers in scientific and industrial laboratories. References to micromanometers are listed in the bibliography and are indexed similarly as described in the preceding paragraph.

It was originally planned to include a critical review of vacuum and low pressure instrumentation with emphasis on possible standard instruments and on calibration methods. Preparing and including this review would delay publication unduly. Since the bibliography and indices will adequately meet the needs of many of those interested in the field, it was decided to issue the bibliography as promptly as possible. The review will be prepared and issued separately.

Standard vacuum terminology has been proposed by the American Vacuum Society [58148] and the British Standards Institution [58104]. In the subject index the American proposed classification of degrees of high vacuum has been adhered to. This is

Condition	Pressure range, Torr
High vacuum	10^{-3} to 10^{-6}
Very high vacuum	10^{-6} to 10^{-9}
Ultra-high vacuum	10^{-9} and below

The Torr equals 1/760 of an atmosphere of pressure (1013.250 millibars) or at pressures in the vacuum range, one millimeter of mercury for all practical purposes.

The term micromanometers is rather generally used to designate designs of liquid or mechanical type pressure measuring instruments which are an order more sensitive than designs considered more or less standard. More specifically, micromanometers may be defined as instruments of the liquid or mechanical type used to measure absolute or differential pressure in the range from about 10^{-4} to 10 mm of mercury, with the ability to detect pressure changes of less than about 0.01 mm of mercury. It also includes water or oil manometers used to measure differential pressure, with a pressure change of less than about 0.01 inch of water detectable.

2. BIBLIOGRAPHY

The references are divided into a list of books and a list of papers and reports, all listed chronologically, by years. Books are designated by the letter "B" followed by two digits indicating the year of publication and by a single digit identifying the order of listing. For example B592 indicates a book published in 1959, listed second in the book list. Papers and reports are designated by four digits or five, where necessary, the first two indicating the year of publication or issue, and the last two or three the order of listing. Thus 58122 indicates 122d in the list for 1958.

The bibliography contains 1538 references, of which 52 are books. About 550 of the periodical references are specifically on pressure measurement. The period covered is up to January 1, 1961.

A reasonable effort was made to list all significant references on vacuum and low pressure instrumentation, particularly those published since 1949. Extensive, but not necessarily complete,

references to vacuum technology and phenomena were included, since making valid vacuum measurements involve the effect of such phenomena as adsorption, degassing etc. References are therefore included on adsorption, degassing, outgassing, surface reaction, mechanical and diffusion pumps, leak detection, controlled gas leaks, and on hardware such as seals, valves, gaskets and vacuum systems. References on methods of calibrating vacuum gages and on standards of measurement are also listed.

Papers on micromanometers, both liquid and mechanical types, are listed. The criterion for inclusion of those measuring absolute or differential pressure is stated in the Introduction.

With minor exceptions neither catalogs, nor announcements in trade journals of new instruments without technical data, nor patents, are listed. Papers covering applications of vacuum technology are of necessity omitted, unless of some significance in vacuum measurement.

BOOKS

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|------|---|------|--|
| B241 | J. R. Panell, Fluid velocity and pressure. Edward Arnold & Co., London, 135 p. (1924). | B472 | R. M. Barrer, Diffusion in and through solids. Cambridge Univ. Press, London, 464 p. (1947). |
| B261 | L. Dunoyer, Vacuum practice. Translation by J. H. Smith, D. Van Nostrand Co., New York, 228 p. (1926). | B473 | L. H. Martin & R. D. Hill, A manual of vacuum practice. Melbourne Univ. Press, 120 p. (1947). |
| B321 | J. W. McBain, The sorption of gases and vapors by solids. E. Routledge & Sons, London, 577 p. (1932). | B491 | S. Dushman, Scientific foundations of vacuum technique. John Wiley & Sons, New York, 882 p. (1949). |
| B341 | S. J. Gregg, The absorption of gases by solids. Methuen's Monographs on Chemical Subjects, Van Nostrand Co., New York, 120 p. (1934). | B492 | A. Guthrie & K. R. Wakerling, Vacuum equipment and techniques. McGraw-Hill Book Co., New York, 264 p. (1949). |
| B381 | E. H. Kennard, Kinetic theory of gases. McGraw-Hill Book Co., New York, 483 p. (1938). | B493 | M. Benedick & C. Williams, Engineering developments in the gaseous diffusion process. McGraw-Hill Book Co., New York, 129 p. (1949). |
| B382 | J. Strong, Procedures in experimental physics. (Technique of high vacuum, p. 93-150) Prentice-Hall, 642 p. (1938). | B494 | R. S. Burden, Surface tension and the spreading of liquids. Cambridge Univ. Press, 2d ed., 92 p. (1949). |
| B391 | A. Farkas & H. W. Melville, Methods in gas reactions. Macmillan & Co., 384 p. (1939). | B495 | A. R. Miller, Absorption of gases on solids. Cambridge Univ. Press, 128 p. (1949). |
| B431 | S. Brunauer, The absorption of gases and vapors. VI, Physical absorption. Princeton Univ. Press, 520 p. (1943). | B496 | E. Ower, The measurement of air flow. (Chapter on manometers). Chapman & Hall, London, 293 p. (1949). |
| B471 | S. Jnanananda, High vacua. Van Nostrand, New York, 310 p. (1947). | B501 | M. Knudsen, Kinetic theory of gases: some modern aspects. John Wiley & Sons, New York, 3d ed., 64 p. (1950). |

- B502 R. Jaeckel, Vacuum, its measurement and production. In German. Springer-Verlag, Berlin, 301 p. (1950).
- B503 G. Moench, High vacuum techniques. In German. R. A. Lang Verlag, Poessneck, 2d ed. of *Vakuumtechnik im Laboratorium*, 472 p. (1950).
- B504 E. L. Holland-Merten, Handbook of vacuum technique. In German. W. Knapp, Halle-Saale, 2d ed., 636 p. (1950).
- B505 C. E. Normand et al, Vacuum problems and techniques. Tennessee Eastman Corp., 265 p. (1950).
- B506 L. Dunoyer, Vacuum and its applications. In French. Presses Universitaires de France, Paris, 112 p. (1950).
- B511 L. Marton, Editor, Advances in Electronics, v 3, Chapter on field emission microscopy by F. Ashworth, p. 1-42. Academic Press, New York 357 p. (1951).
- B512 M. Leblanc, Vacuum techniques. In French. Colin, Paris, 187 p. (1951).
- B513 J. R. Davy, Industrial high vacuum. Pittman, London, 243 p. (1951).
- B514 S. H. Gregg, Surface chemistry of solids. Reinhold Publ. Corp., 297 p. (1951).
- B515 H. Ebert, Compression vacuum gages. In German. Vieweg & Sohn, Brunswick, 37 p. (1951).
- B521 A. L. Reimann, Vacuum technique. Chapman & Hall, London, 449 p. (1952).
- B522 W. Jost, Diffusion in solids, liquids and gases. Academic Press, New York, 558 p. (1952).
- B523 A. C. Graves & D. K. Frohman, Miscellaneous physical and chemical techniques of the Los Alamos project. McGraw-Hill Book Co., New York, 323 p. (1952).
- B524 H. S. W. Massey & E. H. S. Burhop, Electronic and ionic impact phenomena. Clarendon Press, Oxford, 669 p. (1952).
- B531 G. P. Barnard, Modern mass spectrometry. 400 references. The Institute of Physics, London, 326 p. (1953).
- B532 H. E. Newell, Jr., High altitude rocket research. Academic Press, New York, 298 p. (1953).
- B533 J. Reilly & W. N. Rae, Physico-chemical methods. Vol. 1, (Chapter on Pressure measurement, p. 233-258) D. Van Nostrand, 5th ed., 760 p. (1953).
- B541 T. E. Jordan, Vapor pressure of organic compounds, Interscience, New York, 266 p. (1954).
- B542 T. S. Gray, Applied electronics. John Wiley & Sons, New York, 2d ed., 881 p. (1954).
- B543 G. W. Morey, The properties of glass. Reinhold Publ. Corp., 2d ed., 591 p. (1954).
- B551 J. Yarwood, High-vacuum technique. John Wiley & Sons, New York, 3d ed., 208 p. (1955).
- B561 G. N. Patterson, Molecular flow of gases. John Wiley & Sons, 217 p. (1956).
- B571 J. H. Leck, Pressure measurement in vacuum systems. 192 references. Institute of Physics, London, 144 p. (1957).
- B572 M. Auwaerter, Editor, Vacuum techniques and the physics of evaporated films. In German. Wissenschaftliche Verlagsgesellschaft, Stuttgart, 282 p. (1957).
- B581 K. Diels & R. Jaeckel, Vacuum handbook for laboratory and industry. In German. 52 pages of references. Springer-Verlag, Berlin, 270 p. (1958).
- B582 H. E. Duckworth, Mass Spectroscopy. Cambridge Univ. Press, 206 p. (1958).
- B583 D. H. Everett & F. S. Stone, Editors, The structure and properties of porous materials. Tenth Symposium, Colston Research Soc., Academic Press, 389 p. (1958).
- B591 M. Knoll, Materials and processes of electron devices. 2300 references. Springer-Verlag, Berlin, 484 p. (1959).
- B592 K. S. Lion, Instrumentation in scientific research; electrical input transducers. McGraw-Hill Book Co., New York, 324 p. (1959).
- B593 W. Espe, Materials for high vacuum applications. Vol. 1, Metals and metallic conductors. In German. Deutscher Verlag der Wissenschaften. 916 p. (1959).
- B594 J. D. Waldron, Editor, Advances in mass spectrometry. 2000 references. Pergamon Press, Oxford, 704 p. (1959).
- B601 A. B. Adamson, Physical chemistry of surfaces. Interscience Publishers, 629 p. (1960).
- B602 S. Schwartz, Editor, Selected semiconductor circuits handbook. John Wiley & Sons, 503 p. (1960).
- B603 N. R. Nilsson, Editor, Ionization phenomena in gases. Fourth Intern. Conf. on Ionization Phenomena in gases, Upsala, 1959. North-Holland Publ. Co., 2 vol. 1210 p. (1960).

- 7401 H. McLeod, Apparatus for measurement of low pressures of a gas. *Phil. Mag.* 48, 110-112 (1874).
- 0501 K. Prytz, Sensitive detector of the position of a reflecting surface. In German. *Ann. Phys.* (4) 16, 735-745 (1905).
- 0601 M. Pirani, Continuously indicating vacuum gage. In German. *Deut. Phys. Ges. Verh.* 8, 686-694 (1906).
- 0602 W. Voege, A new vacuum gage. In German. *Phys. Zt.* 7, 498-500 (1906).
- 0901 F. M. G. Johnson & D. McIntosh, Liquid chlorine. *Am. Chem. Soc.*, 31, 1138-1144 (1909).
- 0902 K. Scheel & W. Heuse, On an apparatus for measuring very low pressures. In German. *Zt. Instrumentenk.* 29, 14-20 (1909).
- 0903 K. Scheel & W. Heuse, Two mercury manometers for measuring low pressure. In German. *Zt. Instrumentenk.* 29, 344-349 (1909).
- 1001 M. Knudsen, Thermal molecular pressure of gases in tubes and porous bodies. In German. *Ann. Phys.* 31, 633-640 (1910).
- 1002 M. Knudsen, An absolute manometer. In German. *Ann. Phys.* 32, 809-842 (1910).
- 1101 M. Knudsen, The molecular heat conductivity of gases and the accommodation coefficient. In German. *Ann. Phys.* 34, 593-656 (1911).
- 1102 M. Von Smoluchowski, On the theory of the heat conductivity of gases at low pressure and the resulting pressure. In German. *Ann. Phys.* 35, 983-1004 (1911).
- 1103 C. F. Hale, On the measurement of very small gas pressures. *Trans. Am. Electro. Chem. Soc.* 20, 243-258 (1911).
- 1301 I. Langmuir, Chemical reactions at very low pressures. I. The clean up of oxygen in a tungsten lamp. *J. Am. Chem. Soc.* 35, 105-127 (1913).
- 1302 I. Langmuir, Chemical reactions at very low pressures. II. Chemical clean up of nitrogen in a tungsten lamp. *J. Am. Chem. Soc.* 35, 931-945 (1913).
- 1303 E. Von Angerer, The pressure of cathode rays. In German. *Ann. Phys.* 41, 1-29 (1913).
- 1304 I. Langmuir, The effect of space charges and residual gases on thermionic currents in high vacuum. *Phys. Rev.* 2, 450-486 (1913).
- 1305 W. Gaede, External friction of gases. In German. *Ann. Phys.* 41, 289-336 (1913).
- 1306 C. F. Muendel, Measurement and theory of low pressures at low temperatures. In German. *Zt. phys. Chem.*, 85, 435-465 (1913).
- 1401 I. Langmuir & G. M. J. Mackay, The dissociation of hydrogen into atoms. I. Experimental. *J. Am. Chem. Soc.* 36, 1708-1722 (1914).
- 1402 J. W. Woodrow, Experiments on the production and measurement of high vacua. *Phys. Rev.* 4, 491-497 (1914).
- 1403 M. Knudsen, Determination of the molecular weights of a small quantity of gas. In German. *Ann. Phys.* 44, 525-536 (1914).
- 1404 F. Haber & F. Kerschbaum, Measurement of low pressures with an vibrating quartz fiber. In German. *Zt. Elektrochem.* 20, 296-305 (1914).
- 1405 W. Rohn, A continuously indicating electric vacuum gage. In German. *Zt. Elektrochem.* 20, 539-542 (1914).
- 1406 J. B. Firth, The sorption of hydrogen by charcoal at liquid air temperatures. In German. *Zt. phys. Chem.* 86, 294-308 (1914).
- 1501 I. Langmuir, The dissociation of hydrogen into atoms. II. Calculation of the degree of dissociation and heat of formation. *J. Am. Chem. Soc.* 37, 417-458 (1915).
- 1502 I. Langmuir, Chemical reactions at low pressures. *J. Am. Chem. Soc.* 37, 1139-1167 (1915).
- 1601 O. E. Buckley, An ionization manometer. *Proc. Nat. Accd. Sci.* 2, 683-685 (1916).
- 1701 S. Weber, Experimental research on the heat conductivity of gases. In German. *Ann. Phys.* 54, 325-356, 437-462 (1917).
- 1801 J. E. Shrader & R. G. Sherwood, Production and measurement of high vacua. *Phys. Rev.* 12, 70-80 (1918).
- 1802 I. Langmuir, The absorption of gases on plane surfaces of glass, mica and platinum. *J. Am. Chem. Soc.* 40, 1341-1403 (1918).
- 1901 J. E. Shrader & H. M. Ryder, An optical lever manometer. *Phys. Rev.* 13, 321-326 (1919).
- 1902 Masamichi So, On an ionization manometer. *Proc. Phys. Math. Soc. (Japan)* 1, 76-87 (1919).
- 1903 G. D. West, On the forces acting on heated metal foil surfaces in rarified gases. *Proc. Phys. Soc. London*, 32, 166-189, 222-231 (1919-20).

- 1904 L. F. Richardson, A form of Knudsen's vacuum manometer. Proc. Phys. Soc., London, 31, 270-277 (1919).
- 1905 G. W. Todd, A simple theory of the Knudsen vacuum gauge. Phil. Mag. 38, 381-382 (1919).
- 1906 J. E. Shrader, Residual gases and vapors in highly exhausted glass bulbs. Phys. Rev. 13, 434-437 (1919).
- 1907 I. Langmuir, Chemical reactions at low pressures. IV. The cleanup of nitrogen by a heated molybdenum filament. J. Am. Chem. Soc. 41, 167-194 (1919).
- 2101 S. Dushman & C. G. Found, Studies with the ionization gauge. I. Construction and method of calibration. Phys. Rev. 17, 7-19 (1921).
- 2102 N. R. Campbell, A method for the micro-analysis of gases by the use of the Pirani pressure gauge. Proc. Phys. Soc., London, 33, 287-296 (1921).
- 2103 A. H. Pfund, An extension of the range of the McLeod gauge. Phys. Rev. 18, 78-82 (1921).
- 2301 E. K. Carver, An improved optical lever manometer. J. Am. Chem. Soc. 45, 59-63 (1923).
- 2302 A. S. Coolidge, The upper range of the quartz-fiber manometer. J. Am. Chem. Soc. 45, 1637-1643 (1923).
- 2303 J. E. Harris & E. E. Schumacher, Measurements on the gases evolved from glasses of known chemical composition. J. Ind. Eng. Chem. 15, 174-177 (1923).
- 2401 G. Hettner, On the theory of radiometers. In German. Zt. Phys. 27, 12-22 (1924).
- 2402 C. G. Found & S. Dushman, Studies with ionization gauge. Phys. Rev. 23, 734-743 (1924).
- 2403 H. Simon, Ionization gages. In German. Zt. tech. Phys. 5, 221-233 (1924).
- 2404 D. H. Bangham & F. P. Burt, The behavior of gases in contact with glass surfaces. Proc. Roy. Soc., London, A105, 481-488 (1924).
- 2405 J. J. Manley, A preliminary measurement of a primary gas-grown skin. Proc. Phys. Soc., London, 36, 288-290 (1924).
- 2406 N. R. Campbell & E. G. New, The disappearance of gas in the electrical discharge. Phil. Mag. 48, 553-580 (1924).
- 2407 A. Einstein, On the theory of radiometric forces. In German. Zt. Phys. 27, 1-6 (1924).
- 2501 M. Abraham, Theory of ionizationgases. In German. Zt. tech. Phys. 6, 437-438 (1925).
- 2502 K. T. Compton & C. C. Van Voorhis, Probability of ionization of gas molecules by electron impacts. Phys. Rev. 26, 436-453 (1925).
- 2503 M. L. Hamlin, A laboratory vacuum gage. J. Am. Chem. Soc. 47, 709-712 (1925).
- 2504 E. B. King, Two new types of high vacuum gauge. Proc. Phys. Soc., London 38, 80-84 (1925).
- 2505 W. A. Patrick & J. S. Long, The adsorption of butane by silica gel. J. Phys. Chem. 29, 336-343 (1925).
- 2506 M. Volmer, Thermodynamic consequences from the equation of state for adsorbed substances. In German. Zt. phys. Chem. 115, 253-260 (1925).
- 2507 W. A. Patrick, W. C. Preston & A. E. Owens, A study of adsorption phenomena in the vicinity of the critical temperature. J. Phys. Chem. 29, 421-434 (1925).
- 2508 W. A. Patrick & L. H. Opdycke, The adsorption of vapors by silica gel by a dynamic method. J. Phys. Chem. 29, 601-609 (1925).
- 2601 J. J. Hopfield, Capillary valves for gases. J. Opt. Soc. Am. 12, 391-392 (1926).
- 2602 K. T. Compton & C. C. Van Voorhis, Probability of ionization of gas molecules by electron impacts. II. Critique. Phys. Rev. 27, 724-731 (1926).
- 2603 E. Brueche, On plate and fiber vacuum gages. In German. Ann. Phys. 79, 695-733 (1926).
- 2604 C. G. Found & N. B. Reynolds, Direct reading ionization gauge. J. Opt. Soc. Am. & Rev. Sci. Inst. 13, 217-222 (1926).
- 2605 E. Rumpf, A thermoelectric vacuum gage. In German. Zt. tech. Phys. 7, 224-226 (1926).
- 2606 H. Rowe, The adsorption of gases by activated charcoal at very low pressures. I. At air temperature. II. At -183°C. Phil. Mag. 1, 109-131, 1042-1054 (1926).
- 2701 J. J. Manley, On the construction and standardization of an interferometer pressure gauge. Proc. Phys. Soc., London, 40, 57-61 (1927-28).
- 2702 H. H. Lowry & P. S. Olmstead, The adsorption of gases by solids with special reference to the adsorption of carbon dioxide by charcoal. J. Phys. Chem. 31, 1601-1626 (1927).
- 2703 G. Glockler, W. P. Baxter & R. H. Dalton, The activation of molecular hydrogen by electron impact. J. Am. Chem. Soc. 49, 58-65 (1927).

- 2704 A. L. Hughes & A. M. Skellet, Dissociation of hydrogen by electrons. Phys. Rev. 30, 11-25 (1927).
- 2801 R. J. Clark, A method of calibration of a McLeod gauge. J. Sci. Inst. 5, 126-130 (1928).
- 2802 I. Langmuir & H. A. Jones, Collisions between electrons and gas molecules. Phys. Rev. 31, 357-404 (1928).
- 2803 G. Mierdel, Electrodeless ring current. In German. Ann. Phys. 85, 612-640 (1928).
- 2804 E. Brueche & W. Littwin, Experimental research on radiometer problems. In German. Zt. Phys. 52, 318-333 (1928).
- 2805 L. F. Stanley, The construction and calibration of a sensitive form of Pirani gauge for measurement of high vacua. Proc. Phys. Soc., London, 41, 194-203 (1928-29).
- 2806 H. Zeise, Research on the monomolecular character of the adsorption of gases on glass and charcoal. In German. Zt. phys. Chem. A136, 385-418 (1928).
- 2901 M. C. Johnson & G. O. Harrison, A pressure gauge for continuous reading in moderate vacua. J. Sci. Inst. 6, 305-308 (1929).
- 2902 A. R. Olsen & L. L. Hirst, A new differential pressure gage. J. Am. Chem. Soc. 51, 2378-2379 (1929).
- 2903 K. C. D. Hickman, On some vacuum gauges. J. Opt. Soc. Am. 18, 305-331 (1929).
- 2904 G. Kornfeld & E. Klingler, The kinetics of the reaction $2\text{NO} + \text{O}_2 \rightarrow 2\text{NO}_2$ at low pressures. In German. Zt. phys. Chem. B, 4, 37-66 (1929).
- 2905 A. Simon & F. Fehér, New method for the distant indication of small pressures. In German. Zt. Elektrochem. 35, 162-165 (1929).
- 2906 E. Mueller & K. Schwabe, The absorption of hydrogen by platinum metals. In German. Zt. Elektrochem. 35, 165-184 (1929).
- 2907 A. Magnus & H. Kratz, On the adsorption of carbon dioxide and ammonia by charcoal and graphite. In German. Zt. anorg. Chem. 184, 241-271 (1929).
- 2908 A. Magnus, Theory of gas adsorption. In German. Zt. phys. Chem. A142, 401-430 (1929).
- 2909 C. R. Burch, Some experiments on vacuum distillation. Proc. Roy. Soc., London, Ser. A 123, 271-284 (1929).
- 2910 J. L. Hodgson, A sensitive micromanometer. J. Sci. Inst. 6, 153-156 (1929).
- 3001 J. K. Roberts, The exchange of energy between gas atoms and solid surfaces. Proc. Roy. Soc. A129, 146-161 (1930).
- 3002 M. Knudsen, Radiometric pressure and accommodation coefficients. In German. Ann. Phys. 6, 129-185 (1930). Translation into English: K. Danske Vidensk Selsk. 11, No. 1 (1930-32).
- 3003 P. T. Smith, The ionization of helium, neon, and argon by electron impact. Phys. Rev. 36, 1293-1302 (1930).
- 3004 W. Bleakney, The ionization of hydrogen by single electron contact. Phys. Rev. 35, 1180-1186 (1930).
- 3005 W. Bleakney, Ionization potentials and probabilities for the formation of multiply charged ions in helium, neon and argon. Phys. Rev. 36, 1303-1308 (1930).
- 3006 P. Bricout, Absolute manometer, electrostatically compensated. Compte Rendus 190, 733-735 (1930).
- 3007 E. A. Stewardson, A continuous reading aneroid manometer for moderately low pressures. J. Sci. Inst. 7, 217-221 (1930).
- 3101 A. Ellett & R. M. Zabel, The Pirani gauge for the measurement of small changes in pressure. Phys. Rev. 37, 1102-1111 (1931).
- 3102 N. B. Reynolds, Studies with an ionization gauge. Physics 1, 182-191 (1931).
- 3103 M. D. Sarbey, Measurement of vacuum in radio tubes. Electronics 2, 594-595 (1931).
- 3104 P. T. Smith, The ionization of mercury vapor by electron impact. Phys. Rev. 37, 808-814 (1931).
- 3105 E. K. Jaycox & H. W. Weinhart, A new design of an ionization manometer. Rev. Sci. Inst. 2, 401-411 (1931).
- 3106 T. G. Pearson, A manometer for measuring low pressures of easily condensable gases. Zt. phys. Chem. A, 156, 86-88 (1931).
- 3107 K. Sommermeyer, Sensitive diaphragm manometer. In German. Zt. phys. Chem. A, 155, 208-210 (1931).
- 3108 T. Theodorsen, Investigation of the diaphragm type pressure cell. Nat. Advisory Comm. Aeronaut. Tech. Report No. 388, 18 p. (1931).

- 3109 S. Dushman, Recent advances in the production and measurement of high vacua. 59 references. J. Franklin Inst. 211, 689-750 (1931).
- 3110 P. I. Lukirsky & S. W. Ptizyn, On the absorption of metastable and ionized nitrogen by magnesium. In German. Zt. Phys. 71, 339-349 (1931).
- 3111 A. Betz, A micromanometer with convenient indicating means. In German. Messtechnik 7, 37-39 (1931).
- 3201 K. Newbury & C. L. Utterback, Low vapor pressure gauge. Rev. Sci. Inst. 3, 593-595 (1932).
- 3202 J. K. Roberts, The exchange of energy between gas atoms and solid surfaces. II. The temperature variation of the accommodation coefficient of helium. Proc. Roy. Soc. A135, 192-205 (1932).
- 3203 J. T. Tate & P. T. Smith, The efficiencies of ionization and ionization potentials of various gases under electron impact. Phys. Rev. 39, 270-277 (1932).
- 3204 E. Fredlund, On the performance limits of the Knudsen manometer. In German. Ann. Phys. 13, 802-810 (1932).
- 3205 E. Fredlund, Investigation of the Knudsen manometer. In German. Ann. Phys. 14, 617-643 (1932).
- 3206 L. A. DuBridge & W. W. Roehr, The thermionic and photoelectric work functions of molybdenum. Phys. Rev. 42, 52-57 (1932).
- 3207 H. Klumb & T. Haase, Measurement of differences in mercury level. In German. Zt. tech. Phys. 13, 372-373 (1932).
- 3208 M. R. Andrews, Reaction of gases with incandescent tantalum. J. Am. Chem. Soc. 54, 1845-1854 (1932).
- 3209 G. Glockler & J. L. Wilson, The activation of molecular oxygen by electron impact. J. Am. Chem. Soc. 54, 4544-4556 (1932).
- 3210 K. Neumann & E. Voelker, Torsion balance method of measuring small vapor pressure. Zt. phys. Chem. A161, 33-45 (1932).
- 3211 M. Rusch & O. Bunge, Sources of error in measuring pressure using a cold trap. In German. Zt. tech. Phys. 13, 77-81 (1932).
- 3212 K. H. Ramaswamy, The calibration of a McLeod gauge in a vacuum system. Phil. Mag. 14, 96-99 (1932).
- 3301 A. W. Porter, Capillary ascent or depression of liquids in cylindrical tubes. Trans. Faraday Soc. 29, 702-707 (1933).
- 3302 J. K. Roberts, The exchange of energy between gas atoms and solid surfaces. III. The accommodation coefficient of neon. Proc. Roy. Soc. A142, 518-524 (1933).
- 3303 R. J. Cashman & W. S. Huxford, Photoelectric sensitivity of magnesium. Phys. Rev. 43, 811-818 (1933).
- 3304 H. Murmann, Vacuum measurement by means of hot wires. In German. Zt. Phys. 86, 14-20 (1933).
- 3305 H. Murmann, Hot wire indicating vacuum gage. In German. Zt. tech. Phys. 14, 538-540 (1933).
- 3306 A. L. Reimann, The cleanup of hydrogen by magnesium. Phil. Mag. 16, 673-686 (1933).
- 3307 I. Langmuir, Surface chemistry. 37 references. Chem. Reviews 13, 147-191 (1933).
- 3308 W. von Meyeren, Improvement of vacua by electrical discharge. In German. Zt. Phys. 84, 531-540 (1933).
- 3309 R. M. Zabel, Vapor pressure of vacuum cements. Rev. Sci. Inst. 4, 233-234 (1933).
- 3401 B. G. Dickins, The effect of accommodation on heat conduction through gases. Proc. Roy. Soc. A143, 517-540 (1934).
- 3402 W. B. Mann, Exchange of energy between platinum surface and gas molecules. Proc. Roy. Soc. A146, 776-791 (1934).
- 3403 A. L. Reimann, The clean-up of various gases by magnesium, calcium and barium. Phil. Mag. 18, 1117-1132 (1934).
- 3404 N. Morgulis, On the theory of ionization gages. In German. Phys. Zt. Sovjetunion 5, 407-417 (1934).
- 3405 S. G. Foord, An improved Bourdon gauge. J. Sci. Inst. 11, 126-127 (1934).
- 3406 W. Gaede, Vacuum measurement. In German. Zt. tech. Phys. 15, 664-668 (1934).
- 3407 J. B. H. Kuper, A. C. operation of an ionization gauge. Rev. Sci. Inst. 8, 394 (1934).
- 3408 W. P. Overbeck & F. A. Meyer, Grid current control for the ionization gauge. Rev. Sci. Inst. 5, 287-289 (1934).
- 3409 R. M. Barrer, The mechanism of activated diffusion through silica glass. J. Chem. Soc. p. 378-386 (1934).
- 3410 W. von Meyeren, Improvement of vacua by electrical discharge. II. In German. Zt. Phys. 91, 727-736 (1934).

- 3501 M. J. Copley, T. E. Phipps & J. Glasser, An ionization gage for the detection of molecular rays. *Rev. Sci. Inst.* 6, 371 (1935).
- 3502 P. A. Anderson, The contact difference of potential between tungsten and barium. The external work function of barium. *Phys. Rev.* 47, 958-964 (1935).
- 3503 R. E. H. Rasmussen, Radiometer force and dimensions of radiometer elements. In German. *Ann. Phys.* 22, 643-656 (1935).
- 3504 J. W. M. DuMond & W. N. Pickels, Superiority of a Knudsen type vacuum gauge for large metal systems with organic vapor pumps; its design and operation. *Rev. Sci. Insts.* 6, 362-370 (1935).
- 3505 M. Francis, On the use of the McLeod gauge with non-permanent gases. *Trans. Faraday Soc.* 31, 1325-1331 (1935).
- 3506 V. Kunzl & J. Slavik, Valve for close regulation of the pressures of gases and its application to vacuum tubes. In German. *Zt. tech. Phys.* 16, 272-276 (1935).
- 3507 H. Moser, Rotating vacuum gauge with three ranges covering 0.0001 to 700 mm Hg. In German. *Phys. Zt.* 36, 1-2 (1935).
- 3508 R. H. Fowler, A statistical derivation of Langmuir's adsorption isotherm. *Proc. Camb. Phil. Soc.* 31, 260-264 (1935).
- 3509 W. G. Palmer & R. E. D. Clark, Adsorption on measured surfaces of vitreous silica. I. & II. *Proc. Roy. Soc., London*, A149, 360-384 (1935); A160 254-267 (1937).
- 3510 H. Reichardt, Torsion balance micromanometer. *Zt. Instrumentenk.* 55, 23-33 (1935).
- 3511 H. Reichardt, Pressure gage for small pressure differences. In German. *Ver. Deut. Ing.* 79, 1503-1504 (1935).
- 3601 E. Schmidt, Measurement of small pressure differences at high pressures. *Ver. Deut. Ing.* 80, 635 (1936).
- 3602 R. D. Huntoon & A. Ellett, Ionization gauge for atomic beam measurements. *Phys. Rev.* 49, 381-387 (1936).
- 3603 W. Heinze & S. Wagner, Activation of oxide-cathodes. I. Changes in the emitting area. In German. *Zt. tech. Phys.* 17, 645-653 (1936).
- 3604 H. G. de Boer & J. D. Fast, The influence of oxygen and nitrogen on the $\alpha - \beta$ transition of zirconium. *Rec. trav. Chim.* 55, 459-467 (1936).
- 3605 E. W. Muller, Theory of electron emission under the act on strong fields. *Phys. Zt.* 37, 838-842 (1936); *Zt. tech. Phys.* 17, 412-416 (1936).
- 3606 E. W. Müller, Dependence of the emission of field electrons on the work function. In German. *Zt. Phys.* 102, 734-761 (1936).
- 3607 C. J. Smithells & C. E. Ransley, The diffusion of gases through metals. III. The degassing of nickel and the diffusion of carbon monoxide through nickel. *Proc. Roy. Soc., London*, 155, 195-212 (1936).
- 3608 C. F. DeVoe, The photoelectric properties of zinc. *Phys. Rev.* 50, 481-485 (1936).
- 3609 K. C. D. Hickman, Vacuum pumps and pump oils. Part II. Comparison of pump oils. *J. Franklin Inst.* 221, 383-402 (1936).
- 3610 K. C. D. Hickman, Vacuum pumps and pump oils. Part I. Fractionation pumps. *J. Franklin Inst.* 221, 215-235, 383-402 (1936).
- 3611 V. Deitz, The vapor pressure of potassium chloride and caesium iodide crystals. *J. Chem. Physics*, 4, 575-580 (1936).
- 3612 Th. Haase, G. Klages & H. Klumb, Heat loss of bodies in gases and application to measurement of gas pressure. In German. *Phys. Zt.* 37, 440-444 (1936).
- 3613 H. Klumb & Th. Haase, Low pressure manometers. In German. *Phys. Zt.* 37, 27-32 (1936).
- 3614 R. H. Fowler, Adsorption isotherms. Critical conditions. *Proc. Camb. Phil. Soc.* 32, 144-151 (1936).
- 3615 H. Alterthum, A. Lompe & R. Seeliger, Clean-up of inert gases by electric discharge. In German. *Zt. tech. Phys.* 17, 407-412 (1936).
- 3616 H. J. de Boer & J. D. Fast, The $\alpha - \beta$ transition of zirconium in the presence of hydrogen. *Rec. trav. Chim.* 55, 350-356 (1936).
- 3701 K. C. D. Hickman, J. C. Hecker & N. D. Embree, Determination of low vapour pressures. *Ind. Eng. Chem., Anal. Ed.* 9, 264-267 (1937).
- 3702 W. B. Mann & W. C. Newell, The exchange of energy between a platinum surface and hydrogen and deuterium molecules. *Proc. Roy. Soc. A158*, 397-402 (1937).
- 3703 G. C. Dunlap & J. G. Trump, Thermocouple gauge for vacuum measurement. *Rev. Sci. Inst.* 8, 37-38 (1937).
- 3704 J. B. Hoag & N. M. Smith, Jr., A thyratron-controlled ionization gage. *Rev. Sci. Inst.* 7, 497-499 (1937).

- 3705 F. M. Penning, High vacuum gauges. Philips. Tech. Rev. 2, 201-208 (1937).
- 3706 F. M. Penning, A new manometer for low gas pressures. In German. Physica 4, 71-75 (1937).
- 3707 L. N. Ridenour & C. W. Lampson, Thermionic control of an ionization gage. Rev. Sci. Inst. 8, 162-164 (1937).
- 3708 E. A. Lederer & D. H. Walmsley, Batalum, a barium getter for metal tubes. RCA Review 2, 117-123 (July 1937).
- 3709 A. L. Hughes, Simple Knudsen gauge. Rev. Sci. Insts. 8, 409-412 (1937).
- 3710 E. Fredlund, Low pressure radiometer manometer. In German. Ann. Phys. 30, 99-112 (1937).
- 3711 E. W. Müller, Field emission and cathodic dispersion of thoriated tungsten. In German. Zt. Phys. 106, 132-140 (1937).
- 3712 E. W. Müller, Electron microscope observation of field cathodes. In German. Zt. Phys. 106, 541-550 (1937).
- 3713 L. Walden, Instrument suspensions. J. Sci. Inst. 14, 257-268 (1937).
- 3714 J. B. H. Kuper, A vacuum gauge for leak hunting. Rev. Sci. Inst. 8, 131-132 (1937).
- 3715 J. R. Lacher, A theoretical formula for the solubility of hydrogen in palladium. Proc. Roy. Soc., London, A161, 525-545 (1937).
- 3716 H. Adzumi, On the flow of gases through a porous wall. Bull. Chem. Soc., Japan 12, 304-312 (1937).
- 3717 W. B. Nottingham, Electrical and luminescent properties of willemite under electron bombardment. J. Appl. Phys. 8, 762-778 (1937).
- 3801 P. Rosenberg, Method for diminishing the sticking of mercury in capillaries. Rev. Sci. Inst. 9, 258-259 (1938).
- 3802 E. W. Flösdorf, A simplified and portable McLeod gage. Ind. Eng. Chem., Anal. Ed. 10, 534 (1938).
- 3803 C. T. Archer, Thermal conduction in hydrogen-deuterium mixtures. Proc. Roy. Soc. A165, 474-485 (1938).
- 3804 H. Spencer-Gregory & E. H. Dock, The effect of temperature on the thermal conductivity and the accommodation coefficient of hydrogen below 0°C. Phil. Mag. 25, 129-147 (1938).
- 3805 C. G. Montgomery & D. D. Montgomery, Grid controlled ionization gage. Rev. Sci. Insts. 9, 58 (1938).
- 3806 E. Fredlund, Absolute measurement of radio-metric action in gases. Phil. Mag. 26, 987-1000 (1938).
- 3807 A. E. Lockenvitz, Radiometer-type vacuum gage. Rev. Sci. Insts. 9, 417-420 (1938).
- 3808 P. A. Anderson, The contact difference of potential between barium and magnesium. Phys. Rev. 54, 753-757 (1938).
- 3809 E. W. Müller, Further observations with the field electron microscope. Zt. Phys. 108, 668-680 (1938).
- 3810 W. Hunsmann, A differential method of measuring small amounts of absorbed gases. In German. Zt. Elektrochem. 44, 540-542 (1938).
- 3811 S. Brunauer, P. H. Emmett & E. Teller, adsorption of gases in multimolecular layers. J. Am. Chem. Soc. 60, 309-319 (1938).
- 3812 F. J. Wilkins, Statistical mechanics of the adsorption of gases at solid surfaces. Proc. Roy. Soc., London, A164, 496-509 (1938).
- 3813 F. J. Wilkins, The adsorption of argon, nitrogen and oxygen on smooth platinum foil at low temperatures and pressures. Proc. Roy. Soc., London, A164, 510-531 (1938).
- 3901 P. Rosenberg, Design of an accurate McLeod gauge. Rev. Sci. Insts. 10, 131-134 (1939).
- 3902 B. Raines, The accommodation coefficient of helium on nickel. Phys. Rev. 56, 691-695 (1939).
- 3903 G. Wetterer, Quartz fiber manometer. In German. Zt. techn. Phys. 20, 281-283 (1939).
- 3904 R. Grigorovici, Simple glass manometer for low pressures. Zt. techn. Phys. 20, 102-104 (1939).
- 3905 E. J. Scott, An automatic Pirani vacuum gauge. Rev. Sci. Inst. 10, 349-350 (1939).
- 3906 F. H. Verhoek & A. L. Marshall, Vapor pressures and accommodation coefficients of four non-volatile compounds. J. Am. Chem. Soc. 61, 2737-2742 (1939).
- 3907 J. P. Blewett, The properties of oxide-cathodes. I. & II. J. Appl. Phys. 10, 668-679, 831-848 (1939).
- 3908 L. T. Work & V. W. Haedrich, Performance of ejectors as a function of molecular weights of vapors. 27 references. J. Ind. Eng. Chem. 31, 464-477 (1939).
- 3909 S. T. Martin, On the thermionic and adsorptive properties of the surfaces of a tungsten single crystal. Phys. Rev. 56, 947-959 (1939).

- 3910 S. Werner, A simple Knudsen gage. Zt. tech. Phys. 20, 13-16 (1939).
- 4001 P. Sederholm & C. Benedicks, Differential liquid manometer of high sensitivity, founded on O. Pettersson's theory of submarine waves. Arkiv f. Mat. Astro. och Fys. 27A, 8, 5 p. (1940).
- 4002 L. F. Ehrke & C. M. Slack, Gettering powers of various metals for H₂, O₂, N₂, CO₂ and air. J. Appl. Physics 11, 129-136 (1940).
- 4003 R. S. Morse & R. M. Bowie, Ionization gage. Rev. Sci. Insts. 11, 91-94 (1940).
- 4004 R. M. Bowie, Ionization gage circuit. Rev. Sci. Inst. 11, 265-267 (1940).
- 4005 E. Fredlund, Absolute measurements of radiometric action in gases. II. Ark. Mat. Astron. Fys. A27, No. 12 (1940).
- 4006 P. A. Anderson, Contact p. d. between Ba and Zn. External work function of Zn. Phys. Rev. 57, 122-127 (1940).
- 4007 M. Benjamin & R. O. Jenkins, Distribution of autoelectronic emission from single crystal metal points. Part I. Tungsten, molybdenum, nickel in the clean state. Proc. Roy. Soc., London, A176, 262-279 (1940).
- 4008 C. Kenty, Rugged quartz membrane manometers of small volume. 16 references. Rev. Sci. Inst. 11, 377-386 (1940).
- 4009 E. J. Lawton, More about vacuum leak testing. Rev. Sci. Inst. 11, 134 (1940).
- 4010 W. J. H. Moll & H. C. Burger, Thermoelectric vacuum gage. In German. Zt. tech. Phys. 21, 199-203 (1940).
- 4011 A. O. Nier, A mass spectrometer for routine isotope abundance measurements. Rev. Sci. Inst. 11, 212-216 (1940).
- 4012 C. Weiss & H. Westmeyer, A simple vacuum gage. In German. Zt. Instrumentenk. 60, 53-54 (1940).
- 4013 R. R. Sullivan & K. L. Hertel, Flow of air through porous media. J. Appl. Phys. 11, 761-765 (1940).
- 4014 K. J. Laidler, S. Glasstone & H. Eyring, Application of the theory of absolute reaction rates to heterogeneous processes. I. The adsorption and desorption of gases. J. Chem. Phys. 8, 659-667 (1940).
- 4015 I. Langmuir, Monolayers on solids. J. Chem. Soc. p. 511-543 (1940).
- 4016 S. von Friesen, Large molecular pumps of the disk type. Rev. Sci. Inst. 11, 362-364 (1940).
- 4017 H. Schwarz, The mechanism of electronic clean-up of gases at pressures below about 10⁻⁴ Torr. In German. Zt. Phys. 117, 23-40 (1940).
- 4018 H. D. Hagstrum & J. T. Tate, On the thermal activation of the oxygen molecule. Phys. Rev. 57, 1071 (1940).
- 4019 H. F. Baird & C. J. Banwell, Recording of air-pressure oscillations associated with microseisms at Christchurch. N. Z. J. Sci. Techn. 21, 314B-329B (1940).
- 4101 H. Weidemann, Theory of the ring manometer. In German. Luftfahrtforschung 18, 223-229, (1941).
- x 4102 W. E. Parkins & W. A. Higginbotham, An ionization gage circuit with a magic eye. Rev. Sci. Insts. 12, 366-367 (1941).
- 4103 L. N. Ridenour, Magic eye ionization gage. Rev. Sci. Insts. 12, 134-136 (1941).
- 4104 R. W. Ditchburn & J. C. Gilmour, Vapor pressures of monatomic vapors. Rev. Modern Phys. 13, 310-327 (1941).
- 4105 W. Bartholomczyk, Thermoelectric method of measuring pressure. In German. Zt. tech. Phys. 22, 25-27 (1941).
- 4106 K. S. Rao, Hysteresis in sorption. III. Permanence and scanning of the hysteresis loop. Silica gel-water system. J. Phys. Chem. 45, 513-517 (1944).
- 4107 S. Hukagawa & J. Nambo, Adsorption properties of metallic zirconium for gases and its applications. Electrotech. J., Japan, 5, 27-30 (1941).
- 4108 W. H. Keesom & J. Schweers, Measurements of hydrogen adsorption on glass. Physica 8, 1007-1019 (1941).
- 4109 W. H. Keesom & J. Schweers, Measurements of helium and neon adsorption on glass. Physica 8, 1020-1031 (1941).
- 4110 W. H. Keesom & J. Schweers, Measurements of helium on solidified layers of some gases. Physica 8, 1032-1043 (1941).
- 4111 B. Gutenberg & H. Benioff, Atmospheric-pressure waves near Pasadena. Trans. Am. Geophys. Union 22, 424-426 (1941).
- 4112 N. G. Keevil, R. F. Errington & L. T. Newnam, The use of the McLeod gauge in measuring volumes. Rev. Sci. Inst. 12, 609-611 (1941).

- 4201 J. E. De Graaf and H. C. Hamaker, The sorption of gases by barium. *Physica* 9, 297-309 (1942).
- 4202 R. B. Nelson & A. K. Wing, Emission regulating circuit for an ionization gage. *Rev. Sci. Insts.* 13, 215-217 (1942).
- 4203 J. H. Daniel, Field emission from tungsten and thoriated tungsten single crystals. *Phys. Rev.* 61, 657-667 (1942).
- 4204 E. Wickers, Pure mercury. *Chem. Eng. News* 20, 1111 (1942).
- 4205 M. H. Armbruster, The adsorption of gases at low temperature and pressure on smooth silver. *J. Am. Chem. Soc.* 64, 2545-2553 (1942).
- 4206 E. A. Gulbransen, Some observations on the formation and stability of oxide films. 24 references. *Trans. Am. Electrochem. Soc.* 82, 375-387 (1942).
- 4207 R. Jaeckel, Application of organic oils for diffusion pumps and a new design of oil diffusion pump. In German. *Zt. tech. Phys.* 23, 177-186 (1942).
- 4208 W. A. Wildhack & V. H. Goerke, The limiting deflections of corrugated metal diaphragms. Natl. Advisory Comm. Aeronaut. Tech. Note No. 876, 47 p. (1942).
- 4301 F. Kirby, A tilting oil McLeod gage. *Atom. Energy Comm.* AECD2673, 5 p. (1943).
- 4302 L. B. Thomas & F. Olmer, The accommodation coefficients of He, Ne, Ar, H₂, D₂, O₂, CO₂ and Hg on platinum as a function of temperature. 20 references. *J. Am. Chem. Soc.* 65, 1036-1043 (1943).
- 4303 F. E. E. Germann & K. A. Gagos, Accurate low-pressure gage. *Ind. Eng. Chem., Anal. Ed.* 15, 285-286 (1943).
- 4304 A. Rostagni, Universal vacuum meter. In Italian. *Ricerca Sci.* 14, 416-421 (1943).
- 4305 G. Burrows, Notes on high-vacuum technique. *J. Sci. Inst.* 20, 21-28 (1943).
- 4306 G. Haase, A McLeod gage with high accuracy and sensitivity. In German. *Zt. tech. Phys.* 24, 27-34 (1943).
- 4307 E. Weise, Semiconductor type gage for measuring high and low gas pressures. In German. *Zt. tech. Phys.* 24, 66-69 (1943).
- 4308 L. A. Wooten & C. Brown, Surface area of oxide coated cathodes by adsorption of gas at low pressures. *J. Am. Chem. Soc.* 65, 113-118 (1943).
- 4309 G. Haase, On the measurement of very low pressures with a McLeod gage. In German. *Zt. tech. Phys.* 24, 53-55 (1943).
- 4401 I. Amdur, M. M. Jones & H. Pearlman, Accommodation coefficients on gas covered platinum. *J. Chem. Phys.* 12, 159-166 (1944).
- 4402 O. Klemperer, Prevention of capillary disturbances in electrolytic field plotting troughs and in McLeod gages. *J. Sci. Insts.* 21, 88 (1944).
- 4403 K. M. Simpson, Philips type vacuum gauge. *Univ. Calif. Rad. Lab. Report No. RL20.6.19* (1944).
- 4404 L. F. Wouters, The characteristics of Philips-type gauges. *Univ. Calif. Rad. Lab. Report No. RL20.6.18* (1944).
- 4405 H. Schwarz, Gettering by ionization gages. In German. *Zt. Phys.* 122, 437-450 (1944).
- 4406 S. Weber, On the theory of radiometers and Knudsen's radiometer force. In German. *K. Danske Vidensk Selsk* 21, No. 1, 57 p. (1944).
- 4407 H. Klumb & H. Schwarz, On an absolute vacuum gage. In German. *Zt. Phys.* 122, 418-436 (1944).
- 4408 J. L. v. Eichborn, Mutual adhesion of substances not miscible spatially. II. Evidence of adhesion in condensed moisture and hysteresis of the borderline of water drops on mercury surfaces. *Kolloid-Zt.* 109, 62-78 (1944).
- 4409 H. Veith, Determination of the thickness of water films adhering to glass. *Zt. Phys. Chem.* 193, 378-385 (1944).
- 4410 W. G. Frankenburg, The adsorption of hydrogen on tungsten. I. & II. *J. Am. Chem. Soc.* 66, 1827-1847 (1944).
- 4411 H. K. Livingston, Cross-sectional areas of molecules adsorbed on solid surfaces. *J. Am. Chem. Soc.* 66, 569-573 (1944).
- 4412 R. M. Barrer & D. A. Ibbetson, Occlusion of hydrocarbons by chabazite and analcrite. *Trans. Faraday Soc.* 40, 195-206 (1944).
- 4413 R. M. Barrer, Sorption by gmelinite and mordenite. *Trans. Faraday Soc.* 40, 555-564 (1944).
- 4414 K. C. D. Hickman, High-vacuum short-path distillation--a review. 110 references. *Chem. Reviews* 34, 51-106 (1944).

- 4415 Anonymous, Getting and getters. Light metals, 7, 34-52, 77-94 (1944).
- 4416 F. J. Norton & A. L. Marshall, The degassing of metals. Trans. Am. Inst. Mining & Met. Eng. 156, 351-371 (1944).
- 4501 L. Sacher, Electrical measurements of small variations in atmospheric pressures. Helvetica Physica Acta 18, 527-550 (1945).
- 4502 E. W. Flosdorff, Water vapour and the McLeod type of vacuum gauge. Ind. Eng. Chem. Anal. Ed. 17, 198-199 (1945).
- 4503 S. Dushman & A. H. Young, Calibration of ionization gauge for different gases. Phys. Rev. 68, 278 (1945).
- 4504 G. L. H. Jonker & B. D. H. Tellegen, The current to a positive grid in electron tubes. Phillips Research Reports 1, 13-32 (1945-46).
- 4505 H. Nelson, The hydrogen gauge--an ultra-sensitive device for location of air leaks in vacuum-device envelopes. Rev. Sci. Inst. 16, 273-275 (1945).
- 4506 R. B. Nelson, An a. c. operated leak detector and ionization gauge. Rev. Sci. Inst. 16, 55-57 (1945).
- 4507 R. A. Beebe, J. B. Beckwith & J. M. Honig, The determination of small surface areas by Krypton adsorption at low temperatures. J. Am. Chem. Soc. 67, 1554-1558 (1945).
- 4508 P. H. Emmett, Gas adsorption methods for measuring surface area of adsorbents. 24 references. Ind. Eng. Chem. 37, 639-644 (1945).
- 4509 A. G. Foster, The sorption of condensable vapours by porous solids. III. Multimolecular adsorption. J. Chem. Soc. p. 769-773 (1945).
- 4510 R. E. Honig, Gas flow in the mass spectrometer. J. Appl. Physics 16, 646-654 (1945).
- 4511 R. Witty, High vacuum pumps. J. Sci. Inst. 22, 201-206 (1945).
- 4601 H. G. East & H. Kuhn, Accurate bellows manometer. J. Sci. Inst. 23, 185 (1946).
- 4602 M. H. Armbruster, The sorption of water vapor at low pressure on the surface of some cold-rolled steels at 20°C. J. Am. Chem. Soc. 68, 1342-1347 (1946).
- 4603 E. S. Rittner, A Pirani gage for use at pressures up to 15 mm. Rev. Sci. Inst. 17, 113-114 (1946).
- 4604 E. D. Hart & W. H. Elkin, Welding fine thermocouple wires. J. Sci. Inst. 23, 17-18 (1946).
- 4605 R. G. Picard, P. C. Smith, & S. M. Zollers, A reliable high-vacuum gauge and control system. Rev. Sci. Inst. 17, 125-129 (1946).
- 4606 R. J. Webber & C. T. Lane, An easily constructed all-metal vacuum gage. Rev. Sci. Inst. 17, 308 (1946).
- 4607 A. H. King, Ionization gauge control unit. J. Sci. Insts. 23, 85 (1946).
- 4608 J. R. Downing & G. Mellon, A sensitive vacuum gauge with linear response. Rev. Sci. Insts. 17, 218-223 (1946).
- 4609 G. L. Mellen, Radium-type vacuum gage. Electronics 19, April, 142-146 (1946).
- 4610 N. Cabrera & J. Terrien, Time lag of a Knudsen manometer incorporating an oscillatory system. In French. Rev. Sci., Paris, 84, 224-226 (1946).
- 4611 S. E. Williams, A Knudsen absolute manometer. J. Sci. Insts. 23, 144-146 (1946).
- 4612 H. Robinson & M. C. Flanagan, Thermocouple vacuum gage. Gen. Elect. Rev. 49, 42-44 (1946).
- 4613 G. P. Brown, A. DiNardo, G. K. Cheng & T. K. Sherwood, The flow of gases in pipes at low pressures. J. Appl. Phys. 17, 802-813 (1946).
- 4614 A. Bobenrieth, Ionization gage for vacuum measurement. In French. Le Vide, 1, 61-64 (1946).
- 4615 W. E. Barr & V. J. Anhorn, Scientific glass blowing techniques. X. Vacuum gages. 20 references. Instruments 19, 666-680, 734-746 (1946).
- 4616 C. M. Fogel, An ionization gauge of simple construction. Proc. Inst. Radio Eng. 34, 302-304 (1946).
- 4617 E. A. Hamacher, An automatic ionization vacuum gauge and monitor. Rev. Sci. Inst. 17, 281 (1946).
- 4618 H. A. Thomas, T. W. Williams & J. A. Hippel, A mass spectrometer type of leak detector. Rev. Sci. Inst. 17, 368-372 (1946).
- 4619 H. E. Van Valkenburg, Application of the ion gage in high vacuum measurement. Gen. Elect. Rev. 49, 38-42 (June 1946).
- 4620 W. G. Worcester & E. G. Doughty, High vacuum leak testing with the mass spectrometer. Trans. Am. Inst. Elect. Eng. 65, 946-955 (1946).

- 4621 P. Alexander, The theory of the mercury vapour vacuum pump and a new high-speed pump. *J. Sci. Inst.* 23, 11-16 (1946).
- 4622 I. Estermann, Molecular beam technique. 69 references. *Rev. Mod. Phys.* 18, 300-323 (1946).
- 4623 R. C. Jones & W. H. Furry, The separation of isotopes by thermal diffusion. *Rev. Modern Phys.* 18, 151-224 (1946).
- 4624 M. L. Wiedmann & P. R. Trumpler, Thermal accommodation coefficients. *Trans. A.S.M.E.* 68, 57-64 (1946).
- 4625 C. Kemball, On the surface tension of mercury. *Trans. Faraday Soc.* 42, 526-537 (1946).
- 4626 J. A. Becker, C. B. Green & G. L. Pearson, Properties and uses of thermistors. *Trans. Am. Inst. Elect. Eng.* 65, 711-725 (1946).
- 4627 J. W. Hodgins, E. A. Flood & J. R. Dacey, The flow of gases and vapors through media. *Can. J. Research*, 24B, 167-177 (1946).
- 4628 C. Kemball & E. K. Rideal, The adsorption of vapors on mercury. I. Nonpolar substances. *Proc. Roy. Soc., London* A187, 53-73 (1946).
- 4629 G. D. Yarnold, The hysteresis of the angle of contact of mercury. *Proc. Phys. Soc., London* 58, 120-125 (1946).
- 4630 H. M. Carlson, Adjustable-range sensitive draft gage. *Instruments* 19, 134-135 (1946).
- 4631 L. Pauling, R. E. Wood & J. H. Sturdvant, An instrument for determining the partial pressure of oxygen in a gas. *J. Am. Chem. Soc.* 68, 795-798 (1946).
- 4632 P. Tarbes, Improvement of McLeod gage. In French. *Le Vide* 1, 9-11 (1946).
- 4701 J. C. Lilly, V. Legallais & R. Cherry, A variable capacitor for measurement of pressure and mechanical displacement; a theoretical analysis and its experimental evaluation. *J. Appl. Physics* 18, 613-628 (1947).
- 4702 H. R. Hindley, A direct-reading differential micromanometer. *J. Sci. Inst.* 24, 295-297 (1947).
- 4703 Naval Ord. Lab., Microbarometric waves from Helgoland "Big Bang". Naval Ord. Lab. Report No. 1070 49 p. (1947).
- 4704 H. Von Ubisch, An investigation on hot-wire vacuum gauges. 43 references. *Arkiv f. Mat. Astro. och Fysik* 34A, No. 14 33 p. (1947).
- 4705 C. Kenty & F. W. Reuter, An apparatus for micro gas analysis. *Rev. Sci. Inst.* 18, 918-924 (1947).
- 4706 J. W. Tills, J. B. Lovatt, & J. F. C. Potts, Improvements in pressure gages. British Patent No. 589,176 (1947). Provisional specifications. No. 9234 (1944), 14037 (1944), 19307 (1944), 4909 (1945).
- 4707 J. Tills & F. C. Potts, Improvements in vacuum gages. British Patent No. 592,379 (1947).
- 4708 J. Blears, Measurement of the ultimate pressures of oil-diffusion pumps. *Proc. Roy. Soc., London* A188, 62-76 (1947).
- 4709 C. G. McIlwraith, Starter for cold cathode ionization gauges. *Rev. Sci. Insts.* 18, 683 (1947).
- 4710 S. Weber, Investigation of the effect of accommodation coefficients on radiometers and molecular manometers. In German. *K. Danske Vidensk Selsk.* 24, No. 4, 59 p. (1947).
- 4711 A. Rostagni & I. Filosofo, Compensating radiometric vacuum meter. In Italian. *Nuovo Cimento* 4, 74-84 (1947).
- 4712 D. R. Stull, Vapor pressure of pure substances. Organic and inorganic compounds. 965 references. 1500 compounds. *Ind. Eng. Chem.* 39, 517-550 (1947).
- 4713 R. B. Jacobs & H. F. Zehr, New developments in vacuum engineering. *J. Appl. Physics* 18, 34-48 (1947).
- 4714 W. A. Weyl, Chemical aspects of some mechanical properties of glass. *Research* 1, 50-61 (1947).
- 4715 W. P. Dryer, Calculations for high vacuum systems. *Chem. Eng.* 54, 127-131, Nov., 122-124, Dec. (1947).
- 4716 W. S. Young & R. C. Taylor, Vacuum micromanometer. *Anal. Chem.* 19, 133-135 (1947).
- 4717 B. V. Deryagin, V. I. Gol'danskii & B. V. Karasev, Multimolecular adsorption and condensation of vapor on glass as studied by optical methods. *Doklady Akad. Nauk S. S. S. R.* 57, 697-700 (1947).
- 4718 C. Kemball, The adsorption of vapours on mercury. III. Polar substances. *Proc. Roy. Soc., London* A190, 117-137 (1947).
- 4719 B. B. Dayton, Standardization and sensitivity of ionization gages. In French. *Le Vide* 2, 349-355 (1947).
- 4720 J. E. Brow & F. A. Schwertz, Simple micromanometer. *Rev. Sci. Inst.* 18, 183-186 (1947).

- 4721 A. J. Ede, Use of McLeod gauge with a mixture of gas and vapour. *J. Sci. Inst.* 24, 198-199 (1947).
- 4722 N. F. Mott, The theory of the formation of protective oxide films on metals. III. *Trans. Faraday Soc.* 43, 429-434 (1947).
- 4723 W. Gaede, Gas ballast pumps. In German. *Zt. Naturf.* 2A, 233-238 (1947).
- 4801 A. S. Halliday, A distant reading manometer with particular application to the measurement of small pressures. *Aero. Res. Comm. Grt. Brit. Reports and Memoranda R M No. 2744*, 5 p. (1948).
- 4802 A. E. Cameron & D. F. Eggers, An ion velocitron. *Rev. Sci. Inst.* 19, 605-606 (1948).
- 4803 H. Matheson & M. Eden, A highly sensitive differential manometer. *Rev. Sci. Inst.* 19, 502-506 (1948).
- 4804 P. Romann, The inherent errors in the readings of a McLeod gage. In French. *Le Vide* 3, 522-530 (1948).
- 4805 C. M. Schwartz & R. Lavender, A stable Pirani-gauge circuit for indication and control of vacuum equipment. *Rev. Sci. Inst.* 19, 814-815 (1948).
- 4806 H. Von Ubisch, An investigation on hot-wire vacuum gauges. III. *Arkiv. f. Mat. Astro. och Fysik*, 36A, No. 4, 14 p. (1948); *Nature* 161, 927 (1948).
- 4807 R. R. Legault, B. Makower & W. F. Talburt, Apparatus for measurement of vapor pressure. *Anal. Chem.* 20, 428-430 (1948).
- 4808 L. Apker, Surface phenomena useful in vacuum techniques. *Ind. Eng. Chem.* 40, 846-847 (1948).
- 4809 R. I. Garrod & K. A. Gross, A combined thermocouple and cold-cathode vacuum gauge. *J. Sci. Insts.* 25, 378-383 (1948).
- 4810 H. I. S. Allwood, Vacuum protection system for oil diffusion pumps and thermionic filaments. *J. Sci. Insts.* 25, 207-208 (1948).
- 4811 L. Apker, E. Taft & J. Dickey, Energy distribution of photoelectrons from polycrystalline tungsten. *Phys. Rev.* 73, 46-50 (1948).
- 4812 J. H. Martin, Adjustable glass capillary gas leak. *Rev. Sci. Inst.* 19, 404-405 (1948).
- 4813 P. Alexander, The glycerol vapour vacuum pump. *J. Sci. Inst.* 25, 313-314 (1948).
- 4814 W. C. White & J. S. Hickey, Electronics simulates sense of smell. *Electronics* 21, 100-102 (March, 1948).
- 4815 R. H. Savage & C. Brown, Chemical and physical adsorption of gases on carbon dust. *J. Am. Chem. Soc.* 70, 2362-2366 (1948).
- 4816 B. B. Dayton, Measurement and comparison of pumping speeds. 32 references. *Ind. Eng. Chem.* 40, 795-803 (1948).
- 4817 R. Neumann, High vacuum pumps. I. Early types. II. Modern developments. III. Diffusion pumps. IV. Diffusion pump design. V. Conclusion. 148 references. *Electronic Eng.* 20, 3-8, 44-48, 79-82, 122-125, 163-167 (1948).
- 4818 C. E. Norman, Design of high vacuum systems. *Ind. Eng. Chem.* 40, 783-787 (1948).
- 4819 H. M. Sullivan, Vacuum pumping equipment and systems. *Rev. Sci. Inst.* 19, 1-15 (1948).
- 4820 B. B. Dayton, The speed of oil and mercury diffusion pumps for hydrogen, helium and deuterium. *Rev. Sci. Inst.* 19, 793-804 (1948).
- 4821 E. A. Gulbransen & W. S. Wysong, Thin oxide films on tungsten. 27 references. *Am. Inst. Mining & Met. Eng., Inst. of Metals Div.* 175, 611-627 (1948).
- 4822 C. Kemball, E. K. Rideal & E. A. Guggenheim, Thermodynamics of monolayers. *Trans. Faraday Soc.* 44, 948-954 (1948).
- 4823 R. I. Razouk & A. S. Salem, The adsorption of water vapor on glass surfaces. *J. Phys. & Colloid. Chem.* 52, 1208-1227 (1948).
- 4824 G. W. Monk, Apparatus for weighing in vacuum. *J. Appl. Phys.* 19, 485-486 (1948).
- 4825 J. A. H. Kersten, On the relation between the thermal conductivity of rarified gases and the sensitivity range of Pirani gauges. *Physica* 14, 567-568 (1948).
- 4826 R. W. Makinson & P. B. Treacy, An ionization manometer of high sensitivity. *J. Sci. Inst.* 25, 298-299 (1948).
- 4827 R. W. Asmussen & B. Buchmann-Olsen, A note on the absolute manometer. *Trans. Danish Acad. Tech. Sci. No. 6*, 8 p. (1948).
- 4828 G. L. Mellen, New techniques in the measurement of pressures below 10 mm. *Ind. Eng. Chem.* 40, 787-791 (1948).
- 4829 I. E. Puddington, A sensitive mercury manometer. *Rev. Sci. Inst.* 19, 577-579 (1948).
- 4901 R. R. Cyr, A 16-point Pirani gage recorder. Univ. California, Eng. Dept. Berkeley, Report He-150-53; N7-ONR-295 Task 3 (Feb. 28, 1949).

- 4902 E. F. Cox, J. V. Atanasoff, B. I. Snavely, D. W. Becker & J. Brown, Upper-atmosphere temperature from Helgoland big bang. *J. Meteorol.* 6, 306-311 (1949).
- 4903 L. Dunoyer, Study of the thermal vacuum gage. In French. *Comptes Rendus* 228, 372-374, 471-473 (1949); *Le Vide* 4, 571-584; 603-618; 643-660 (1949).
- 4904 F. M. Penning & K. Nienhuis, Construction and application of a new design of the Philips vacuum gauge. *Philips Tech. Rev.* 11, 116-122 (1949).
- 4905 E. A. Gulbransen & K. F. Andrews, Kinetics of the reactions of zirconium with O₂, N₂, and H₂. 34 references. *Trans. Am. Inst. Mining & Met. Eng., J. Metals* 185, 515-525 (1949).
- 4906 G. Herrmann & O. Krieg, The effect of gases and vapors on the emission from oxycathodes. In German. *Ann. Phys. Leipzig* 4, 441-464 (1949).
- 4907 C. Hayashi, K. Hashimoto, et al, Several improvements on the Philips gauge. *Rev. Sci. Insts.* 20, 524-526 (1949).
- 4908 P. Leduc, Precautions to be taken in the use of the Philip's gauge. In French. *Le Vide* 4, 684 (1949).
- 4909 G. C. Fryburg & J. H. Simons, A precision vacuum gauge. *Rev. Sci. Insts.* 20, 541-548 (1949).
- 4910 C. H. Bachman, A new principle in controlled vacuum leaks. *Rev. Sci. Inst.* 20, 219-220 (1949).
- 4911 J. Groszkowski, A McLeod gauge of multiple compression. In French. *Le Vide* 4, 668-672 (1949).
- 4912 T. Hibi & K. Isikawa, On the method of determining the best operating condition of a fractionating oil diffusion pump. *Sci. Rep., Res. Inst. Tohoku Univ.* A1, 261-265 (Oct. 1949).
- 4913 E. A. Gulbransen & K. F. Andrews, Kinetics of the reactions of titanium with O₂, N₂ and H₂. 48 references. *Trans. Am. Inst. Mining & Met. Eng., J. of Metals* 185, 741-748 (1949).
- 4914 W. M. Hickam, Design for a metal mass spectrometer tube. *Rev. Sci. Inst.* 20, 472-474 (1949).
- 4915 G. Haase, Wetting of glass surfaces. *Glas-tech. Ber.* 22, 262 (1949).
- 4916 B. L. Harris & P. H. Emmett, Adsorption studies. Physical adsorption of nitrogen, toluene, benzene, ethyl iodide, hydrogen sulphide, water vapor, carbon disulphide and pentane on various porous, nonporous solids. *J. Phys. & Colloid Chem.* 53, 811-825 (1949).
- 4917 M. Seddig & G. Haase, Experimental investigations of the critical condensation temperature. *Kolloid-Zt.* 114, 169-174 (1949).
- 4918 C. J. Milner, Ionization gauge pressure switch. *J. Sci. Inst.* 26, 159 (1949).
- 4919 J. S. Nisbet, A pressure controller sensitive to 10⁻⁴ mm of mercury. *J. Sci. Inst.* 26, 271-273 (1949).
- 4920 E. A. Gulbransen & H. F. Andrews, Mullite and zircon furnace tubes for high temperature and high vacuum systems. *Ind. Eng. Chem.* 41, 2762-2767 (1949).
- 4921 G. Briegleb, Baro-photometer for measuring small differential pressures. In German. *Chemie-Ing.-Technik* 21, 6-8 (1949).
- 4922 R. Comolet, New method of recording the position of a meniscus. *Comptes Rendus* 229, 867-868 (1949).
- 4923 J. A. H. Kersten & H. Brinkman, Construction and theoretical analysis of direct reading hot-wire vacuum gauge with zero point control. *Appl. Sci. Research* A1, 289-305 (1949).
- 4924 N. Cabrera, On the oxidation of metals at low temperatures and the influence of light. *Phil. Mag.* 40, 175-188 (1949).
- 5001 A. P. Crary, Stratosphere winds and temperature from acoustical propagation studies. *J. Meteorol.* 7, 233-242 (1950). AF Camb. Res. Lab., Geophys. Res. Paper No. 5 (1950).
- 5002 R. Havens, R. Koll & H. LaGow, A new vacuum gage. *Rev. Sci. Insts.* 21, 596-598 (1950).
- 5003 J. E. Johnston, A demountable tetrode ionization gage. *Atom. Energy Res. Estab. Grt. Brit. Report No. G/R 480* (1950).
- 5004 A. H. Turnbull, Experiments with a differential Pirani gauge leak detector. *At. Energy Res. Estab. Grt. Br., Report No. AERE G/R 477*, 9 p. (Mar. 1950).
- 5505 E. Wenk, Jr., A diaphragm-type gage for measuring low pressures in fluids. *D. Taylor Model Basin Report No. 665* 15 p. (1950).
- 5006 M. Axelbank, A rotary McLeod gage. *Rev. Sci. Inst.* 21, 511-513 (1950).
- 5007 W. Franzen & J. Horton, A reliable Pirani vacuum safety circuit. *Rev. Sci. Inst.* 21, 935 (1950).
- 5008 E. Blasco & L. Miranda, A new Pirani type vacuum gage. *Rev. Sci. Inst.* 21, 494-495 (1950).
- 5009 S. Wagener, A method of measuring the efficiency of getters at low pressures. *British J. Applied Physics* 1, 225-231 (1950).

- 5010 W. Espe, W. Knoll, & M. P. Wilder, Getter materials for electron tubes. 74 references. *Electronics* 23, 80-86 October (1950).
- 5011 F. M. Kelly, An all metal ionization gage. *Rev. Sci. Inst.* 21, 673-674 (1950).
- 5012 R. T. Bayard & D. Alpert, Extension of the low pressure range of the ionization gauge. *Rev. Sci. Insts.* 21, 571-572 (1950).
- 5013 J. J. Lander, Ultra-high vacuum ionization manometer. *Rev. Sci. Inst.* 21, 672-673 (1950).
- 5014 W. Steckelmacher & S. Van Der Meer, Automatic regulation of thermionic emission. *J. Sci. Insts.* 27, 189-191 (1950).
- 5015 M. Shepherd & J. A. Hippel, Mass spectrometry. 79 references. *Anal. Chem.* 22, 23-25 (1950).
- 5016 E. C. Evans & K. E. Burmaster, A Philips-type ionization gauge for measuring of vacuum from 10^{-7} to 10^{-1} mm Hg. *Proc. Inst. Radio Eng.* 38, 651-654 (1950).
- 5017 C. P. Butler & F. E. Carpenter, A motor for use in vacuum systems. *Rev. Sci. Inst.* 21, 103 (1950).
- 5018 J. W. Clark & G. H. Witts, An automatic control of high vacuum systems. *Electronics* 23, 108-110 (June 1950).
- 5019 W. J. Clark, The telerecording of thickness, pressure flow and other physical quantities using a simple electromagnetic circuit. *Trans. Soc. Instr. Technol.* 2, 18-45 (March 1950).
- 5020 Z. G. Deutsch & F. Raible, Mass spectrometer for leak detection. *Chem. Engg.* 57, 279-284 (1950).
- 5021 H. E. Duckworth, A large Dempster double-focussing mass spectrograph. *Rev. Sci. Inst.* 21, 54-59 (1950).
- 5022 N. A. Eckstein, J. W. Fitzgerald & C. A. Boyd, A method of making glass-to-metal seals. *Rev. Sci. Inst.* 21, 398-399 (1950).
- 5023 R. I. Garrod, A low-impedance high vacuum valve. *J. Sci. Instr.* 27, 205 (1950).
- 5024 R. M. Ilfeld, A recording mass spectrometer. Instrumentation. (Minn.-Honeywell Reg. Co) 4, 20-22 (Spring 1950).
- 5025 J. T. Lloyd, An audible vacuum leak detector. *J. Sci. Instr.* 27, 76 (1950).
- 5026 L. K. Nash, Gas analysis. 358 references. *Anal. Chem.* 22, 108-118 (1950).
- 5027 W. P. Ratchford & M. L. Fein, An improved manostat and manometer. *Anal. Chem.* 22, 838-839 (1950).
- 5028 L. Spiers & W. P. Jolly, The Pirani effect in a thermionic filament as a means of measuring low pressure. *Brit. J. Appl. Phys.* 1, 132-133 (1950).
- 5029 J. A. Allen & J. W. Mitchell, The adsorption of gases on copper films. *Discuss. Faraday Soc.* No. 8, 309-314 (1950).
- 5030 Ch. Biguenet, The photo-absorption of a thin film of barium. In French. *Le Vide* 5, 831-836 (1950).
- 5031 R. Champeix, On the possibility of using the ionization of gas molecules for the production of low pressures. In French. *Comptes Rendus* 231, 40-42 (1950); *Le Vide* 5, 912-913 (1950).
- 5032 R. W. Cloud & S. F. Philp, Vacuum tests of rubber, lead, and teflon gaskets and vinyl acetate joints. *Rev. Sci. Inst.* 21, 731-733 (1950).
- 5033 L. Dunoyer, Formulae for the flow of gases in pipes at low pressures. In French. *Le Vide* 5, 881-886 (1950).
- 5034 I. Filosofo, M. Merlin & A. Rostagni, Measuring low vapour pressure. In Italian. *II Nuovo Cimento* 7, 69-75 (1950).
- 5035 G. Haase, The gettering efficiency of thin barium films at low pressures. In German. *Zt. angew. Phys.* 2, 188-191 (1950).
- 5036 R. Henry, Measurement of the pumping speed of rotary pumps. In French. *Le Vide* 5, 859-865 (1950).
- 5037 J. J. Hopfield, Glass variable microleaks for gases. *Rev. Sci. Inst.* 21, 671-672 (1950).
- 5038 S. Oyama, On the vapor flow in the diffusion pump. *J. Phys. Soc., Japan* 5, 192-197 (1950).
- 5039 J. W. A. van der Scheer, A universal power supply circuit for use with ionization gauges. *Het PTT-Bedrijf, Holland* 3, 24-29 (May 1950).
- 5040 G. W. Sears & E. R. Hopke, An effective vacuum cut-off. *Rev. Sci. Inst.* 21, 570 (1950).
- 5041 R. Witty, The characteristics of diffusion pumps. *Brit. J. Appl. Phys.* 1, 232-237 (1950).
- 5042 H. D. Hagstrum & H. W. Weinhart, A new porcelain rod leak. *Rev. Sci. Inst.* 21, 394 (1950).
- 5043 R. E. Halsted & Alfred O. Nier, Gas flow through the mass spectrometer viscous leak. *Rev. Sci. Inst.* 21, 1019-1021 (1950).
- 5044 R. E. Honig, A greaseless gas flow valve. *Rev. Sci. Inst.* 21, 1024-1025 (1950).

- 5045 G. H. Jenks, A convenient leak for testing helium leak detectors. *Rev. Sci. Inst.* 21, 674-675 (1950).
- 5046 L. Kerwin, A new type mass spectrometer. *Rev. Sci. Inst.* 21, 96-97 (1950).
- 5047 J. P. Molnar & C. D. Hartman, Data on porcelain rod leak. *Rev. Sci. Inst.* 21, 394-395 (1950).
- 5048 A. B. Stewart, Degassing extended glass systems. *Rev. Sci. Inst.* 21, 258 (1950).
- 5049 R. I. Garrod & R. A. Coyle, Multiple high-vacuum valve unit. *J. Sci. Inst.* 27, 228-229 (1950).
- 5050 J. E. Stanworth, Nickel-chromium-iron for sealing to glass. *J. Sci. Inst.* 282-284 (1950).
- 5051 A. S. Iberall, Permeability of glass wool and other highly porous media. *J. Research, Nat. Bur. Stds.* 45, 398-406 (1950). RP 2150.
- 5052 S. Nagaeda, Changes of glass surface by acidic gases. *J. Japan. Ceram. Assoc.* 50, 648-650 (1950).
- 5053 F. Ayer, Suppressing mercury vapor in vacuum systems. *Rev. Sci. Inst.* 21, 496 (1950).
- 5054 G. H. Metson, Vacuum factor of the oxide-cathode valve. *Brit. J. Appl. Phys.* 1, 73-77 (1950).
- 5055 F. D. Werner, An investigation of the possible use of the glow discharge as a means for measuring air flow characteristics. *Rev. Sci. Inst.* 21, 61-68 (1950).
- 6056 D. B. Spalding, Simple manometer for use in measuring low air velocities. *J. Sci. Inst.* 27, 310-312 (1950).
- 5057 W. H. Bennett, Radio frequency mass spectrometer. *J. Appl. Phys.* 21, 143-149 (1950).
- 5101 D. Alpert, C. G. Matland & A. O. McCoubrey, A null-reading absolute manometer. *Rev. Sci. Inst.* 22, 370-371 (1951).
- 5102 V. H. Dibeler & F. Cordero, Diaphragm-type micromanometer for use on a mass spectrometer. *J. Research NBS* 46, 1-4 (1951). RP 2167.
- 5103 M. L. Greenough & W. E. Williams, An electronic circuit for measuring the displacement of pressure-sensitive diaphragms. *J. Research, NBS* 46, 5-10 (1951). RP 2168.
- 5104 J. M. Los & J. A. Morrison, A sensitive differential manometer. *Rev. Sci. Inst.* 22, 805-809 (1951).
- 5105 H. Schwarz, Procedures and instruments for vacuum measurement. In German. 173 references. *Arch. f. Tech. Mess.* V1341-2, 4 p. (Sept. 1951); V1341-3, 4 p. (Jan. 1952); V1341-4, 4 p. (March 1952); V1341-5, 4 p. (May 1952).
- 5106 G. H. Metson, The physical basis of the residual vacuum characteristics of a thermionic valve. *Brit. J. Appl. Physics* 2, 46-48 (1951).
- 5107 S. Wagener, Efficiency and mechanism of barium getters at low pressures. *Brit. J. Appl. Physics* 2, 132-138 (1951).
- 5108 P. A. Richards & W. A. Tuthill, A simple ion-gauge regulator. *Rev. Sci. Insts.* 22, 841-842 (1951).
- 5109 L. Riddiford, Notes on the ionization gage. 22 references. *J. Sci. Insts.* 28, 375-379 (1951). Correction, JSI, 31, 111 (1954).
- 5110 O. A. Weinreich, Thermionic properties of incoated and thorium-coated rhodium and iridium cathodes. *Phys. Rev.* 82, 573 (1951).
- 5111 G. Gimenez & J. Labeyrie, Vacuum gauge using alpha rays. In French. *J. Phys. Radium* 12, 64A-65A (1951).
- 5112 J. Blears, Application of the mass spectrometer to high vacuum problems. *J. Sci. Insts.* 28, Suppl. No. 1, p. 36-42 (1951).
- 5113 W. Steckelmacher, Review of vacuum gages. 65 references. *J. Sci. Insts.* 28, Suppl. No. 1, 10-19 (1951).
- 5114 J. Blears & J. H. Leck, General principles of leak detection. 22 references. *J. Sci. Insts.* 28, Suppl. No. 1, 20-28 (1951).
- 5115 C. G. Milner, A cold-cathode mass spectrometer leak detector. *J. Sci. Insts.* 28, Suppl. No. 1, 29-36 (1951).
- 5116 L. Riddiford, The vacuum system of the Birmingham proton synchrotron. *J. Sci. Insts.* 28, Suppl. No. 1, 47-58 (1951).
- 5117 R. Gomer, A novel method for the estimation of very low pressures. *J. Chem. Phys.* 19, 1072-1073 (1951).
- 5118 M. H. Mueller & R. B. Bilinski, Sensitive leak control. *Rev. Sci. Inst.* 22, 704 (1951).
- 5119 H. Hinterberger, Experience with metal foil as high vacuum seals. In German. *Zt. Naturforsch.* 6A, 459-462 (1951). Translation No. 2554, Atomic Energy Com.
- 5120 D. Alpert, Vacuum valve for the handling of very pure gases. *Rev. Sci. Inst.* 22, 536-537 (1951).

- 5121 H. Sommer, H. A. Thomas & J. A. Hippel, The measurement of e/M by cyclotron resonance. *Phys. Rev.* 82, 697-702 (1951).
- 5122 L. L. Katan, Vacuum-powder insulation for low temperatures. 13 references. *Vacuum* 1, 191-202 (1951).
- 5123 D. Latham, B. D. Power & N. T. M. Dennis, Investigations into the ultimate pressures of diffusion pumps designed to purify their working fluids. *Vacuum* 1, 97-114 (1951).
- 5124 A. von Engel, New trends in vacuum research based on ionization phenomena. 15 references. *Vacuum* 1, 257-265 (1951).
- 5125 W. Steckelmacher, Knudsen gauges. 48 references. *Vacuum* 1, 266-282 (1951).
- 5126 E. Eberhardt, H. Kern & H. Klumb, Investigation of quartz fibers. In German. *Zt. angew. Phys.* 3, 209-211 (1951).
- 5127 J. Blears & J. H. Leck, Differential methods of leak detection. *Brit. J. Appl. Phys.* 2, 227-232 (1951).
- 5128 H. R. Dvorak & R. N. Little, Jr., Interchangeable glass-to-metal seals for high vacuum work. *Rev. Sci. Inst.* 22, 1027-1028 (1951).
- 5129 W. A. Jenkins, A bubble counter for vacuum systems. *Rev. Sci. Inst.* 22, 845 (1951).
- 5130 C. Kenty, A new self-locking mercury cutoff. *Rev. Sci. Inst.* 22, 844-845 (1951).
- 5131 J. Stern, A vacuum valve for glass systems. *Rev. Sci. Inst.* 22, 702-703 (1951).
- 5132 F. P. Bowden & J. E. Young, Friction of clean metals and the influence of adsorbed films. *Proc. Roy. Soc., London*, 208A, 311-325 (1951).
- 5133 M. Chiozzotto, Automatic pressure control unit for high vacuum plant. In Italian. *Nuovo Cimento* 5, 345-348 (1951).
- 5134 H. Ebert, Progress in vacuum technology in 1949-1950. In German. *Glastech. Berichte* 24, 152-157, 177-178 (1951).
- 5135 R. I. Garrod, A compact sliding vacuum seal. *J. Sci. Inst.* 28, 187 (1951).
- 5136 R. Gilmont, Design and operational characteristics of Cartesian manostats. *Anal. Chem.* 23, 157-162 (1951).
- 5137 J. M. Goldschwartz, A high-speed ionization gauge. In French. *Le Vide* 6, 955-956 (1951).
- 5138 K. Hickman, Reverse separation in fractionation pumps. *Rev. Sci. Inst.* 22, 141-146 (1951).
- 5139 R. B. Jacobs, The design of molecular pumps. *Rev. Sci. Inst.* 22, 217-220 (1951).
- 5140 C. Kenty, A McLeod gauge with an electrical contact. *Rev. Sci. Inst.* 22, 217-218 (1951).
- 5141 R. L. Longini, A high-speed hot baffle for oil diffusion pump systems. *Rev. Sci. Inst.* 22, 345-346 (1951).
- 5142 J. Romand, V. Schwetzkoff & B. Vodar, The absorption of ultraviolet light for detecting leaks and measuring pressure. In French. *Le Vide* 6, 1046 (1951).
- 5143 E. Umbilia, Metallising glass. *Glass* 28, 343-351 (1951).
- 5144 F. Wade, The measurement of high vacuum by electrical methods. *Electronic Eng.* 23, 30-34, Jan., 44-48, Feb. (1951).
- 5145 S. Wagener & C. B. Johnson, Calibration of ionization gauges for various gases at low pressures. *J. Sci. Inst.* 28, 278 (1951).
- 5146 R. M. Barrer & D. M. Grove, Flow of gases and vapours in a porous medium and its bearing on adsorption problems. I. The steady state of flow. *Trans. Faraday Soc.* 47, 826-837 (1951).
- 5147 R. M. Barrer & D. M. Grove, Flow of gases and vapours in a porous medium and its bearing on adsorption problems. II. Transient flow. *Trans. Faraday Soc.* 47, 837-844 (1951).
- 5148 R. C. Dartnell, H. V. Fairbanks & W. A. Koehler, Investigation of the adherence of glass to metals and alloys. *J. Am. Ceramic Soc.* 34, 357-360 (1951).
- 5149 D. R. Goddard, Modern vacuum pumps. *J. Sci. Inst.* 28, Suppl. 1, 1-7 (1951).
- 5150 B. Gutenberg, Sound propagation in the atmosphere. 30 references. Compendium of Meteorology, T. F. Malone, Editor, Am. Meteor. Soc. 366-375 (1951).
- 5151 A. J. Madden, Jr. & E. L. Piret, Heat transfer from wires to gases at subatmosphere pressures under natural convection conditions. *Proc. Gen. Discuss. on Heat Transfer, Inst. Mech. Eng.*, Section 4 (1951).
- 5152 R. Meakin, Determination of mercury level in a steel tube manometer. *J. Sci. Inst.* 28, 372-373 (1951).
- 5153 M. J. Reddan & G. F. Rouse, Clean-up of helium gas in an arc discharge. *Trans. Am. Inst. Elect. Engrs.* 70, Pt. 2, 1924-1929 (1951).

- 5154 M. E. Reinders, J. Schutten & J. Kistemaker, Leak detection with a mass spectrometer using hydrogen gas. *Appl. Sci. Res.* B2, 66-70 (1951).
- 5155 L. Riddiford & R. F. Coe, Leaks in vacuum liquid-air traps. *J. Sci. Inst.* 28, 352-353 (1951).
- 5156 H. Von Uebisch, On the conduction of heat in rarified gases and its manometric application. I. *Appl. Sci. Res.* A2, 364-402 (1951).
- 5157 E. Volcker, A simple method of leak detection in high vacuum apparatus. In German. *Zt. Naturforsch.* 6a, 512-513 (1951).
- 5158 H. Von Uebisch, On the conduction of heat in rarified gases and its manometric application. II. *Appl. Sci. Res.* A2, 403-430 (1951).
- 5159 N. Warmoltz, On the application of a Philips ionization gauge type of ion source in a mass spectrometer leak detector. *Appl. Sci. Res.* 2B, 61-65 (1951).
- 5160 C. G. Youngs, T. M. Mallard & B. M. Craig, Photo-electric vacuum controller. *Canad. J. Techn.* 29, 447-450 (1951).
- 5161 J. A. Becker, The use of the field emission electron microscope in adsorption studies of W on W and Ba on W. *Bell Syst. Tech. J.* 30, 907-932 (1951).
- 5162 A. Kobayashi & S. Furuya, Reactions of barium film with oxygen. I. *J. Phys. Soc., Japan* 6, 238-243 (1951).
- 5163 R. L. Sproull, W. C. Dash, W. W. Tyler & A. R. Moore, Growth and manipulation of barium oxide crystals. *Rev. Sci. Inst.* 22, 410-414 (1951).
- 5164 J. D. Babbitt, The diffusion of adsorbed gases through solids. *Canad. J. Phys.* 29, 437-446 (1951).
- 5165 G. Jura, The determination of surface area of the surfaces of solids. 71 references. Chapter in physical methods in chemical analysis, W. G. Berl, Editor, Academic Press, p. 255-303 (1951).
- 5166 B. B. Dayton, Vacuum techniques and analysis. 227 references. Chapter in physical methods in chemical analysis, W. G. Berl, Editor, Academic Press, P. 333-386 (1951).
- 5167 R. E. Peck, W. S. Fagan & P. P. Werlein, Heat transfer through gases at low pressures. *Trans. ASME* 73, 281-287 (1951).
- 5201 R. J. Havens, R. T. Koll & H. E. LaGow, The pressure, density and temperature of the earth's atmosphere to 160 km. *J. Geophys. Research*, 57, 59-72 (1952).
- 5202 J. H. Leck, The high temperature Pirani gauge. *J. Sci. Insts.* 29, 258-263 (1952).
- 5203 A. E. J. Eggleton & F. C. Tompkins, The thermal accommodation coefficient of gases and their absorption on iron. *Trans. Faraday Soc.* 48, 738-749 (1952).
- 5204 T. Arizumi & S. Kotani, Gettering process of barium-sorption properties of oxygen to barium. *J. Phys. Soc., Japan* 7, 300-307 (1952).
- 5205 S. Wagener, The production of very high vacuum by the use of getters. *Proc. Inst. Elect. Engineers, Grt. Brit. Part 3*, 99, 135-147 (1952).
- 5206 J. H. Burrow & E. W. J. Mitchell, The ionization gauge-two modifications. *J. Sci. Insts.* 29, 27-28 (1952).
- 5207 O. A. Weinreich & H. Bleecher, Ionization gage with thorium-coated cathode. *Rev. Sci. Inst.* 23, 56 (1952).
- 5208 N. Warmoltz & E. Bouwmeester, An easily degassable ionization gauge with a simple and stable circuit. *Appl. Sci. Research* 2B, 273-276 (1952).
- 5209 A. H. Beck & A. D. Brisbane, A cylindrical magnetron ionization gauge. *Vacuum* 2, 137-146 (1952).
- 5210 C. N. W. Litting & W. K. Taylor, An automatically-controlled Knudsen-type vacuum gauge. *Proc. Inst. Elect. Eng.* 99, Part IV, Monograph No. 36 (1952).
- 5211 S. C. Brown & J. E. Coyle, An all-metal vacuum valve. *Rev. Sci. Inst.* 23, 570-571 (1952).
- 5212 E. W. Becker & O. Stehl, Electrostatic differential manometer. In German. *Zt. angew. Phys.* 4, 20-22 (1952).
- 5213 G. Burrows & R. Jackson, Determination of the molecular weights of low vapour pressure oils and greases. *Vacuum* 2, 50-55 (1952).
- 5214 Anonymous, The 206 R pressure transmitter. *Taylor Technology* 4, No. 3, 17-19 (1952).
- 5215 G. Von Dardel & H. Von Uebisch, Hot wire manometers. *Teknisk Tidskrift (Sweden)* 82, 203-208 (1952).
- 5216 D. Degras, A thermocouple gage. In French. *Le Vide* 7, 1153-1171 (1952).
- 5217 N. A. Florescu, Shunted thermocouple vacuum gage. *J. Sci. Inst.* 29, 298 (1952).

- 5218 J. S. Foster, Jr. & E. J. Lofgren, Ion pump. Vacuum 2, 257 (1952).
- 5219 J. S. Foster, Jr., E. O. Lawrence & E. J. Lofgren, A high vacuum high speed ion pump. Univ. Calif., Radiation Lab. Report No. UCRL 1930 (1952).
- 5220 W. F. Giauque, T. H. Geballe, D. N. Lyon & J. J. Fritz, Some properties of plastics and the use of plastic apparatus at low temperature. Rev. Sci. Inst. 23, 169-173 (1952).
- 5221 F. A. Gould & T. Vickers, Capillary depression in mercury barometers and manometers. J. Sci. Inst. 29, 85-87 (1952).
- 5222 A. G. Hayward, Simple vacuum seals. Vacuum 2, 262-264 (1952).
- 5223 K. C. D. Hickman, Studies in high vacuum evaporation. Surface behavior in the pot still. Ind. Eng. Chem. 44, 1892-1902 (1952).
- 5224 K. C. D. Hickman & D. J. Trevoy, Studies in high vacuum evaporation. Comparison of high vacuum stills and tensimeters. Ind. Eng. Chem. 44, 1903-1911 (1952).
- 5225 K. Hickman & D. J. Trevoy, Evaporation from liquid surfaces in vacuum. 16 references. Vacuum 2, 3-18 (1952).
- 5226 J. A. W. Huggill, The flow of gases through capillaries. Proc. Roy. Soc., London, 212A, 123-136 (1952).
- 5227 H. G. Jensen, An investigation of a metal Knudsen manometer. Vacuum 2, 388-389 (1952).
- 5228 D. Latham, B. D. Power & N. T. M. Dennis, An assessment of some working fluids for diffusion pumps. 20 references. Vacuum 2, 33-49 (1952).
- 5229 J. B. Lawrence, Mercury the purest metal. Instruments 25, 310-312 (1952).
- 5230 G. J. Maslach, A precision differential manometer. Rev. Sci. Inst. 23, 367-369 (1952).
- 5231 F. J. Miranda & W. M. Jones, Vacuum seals for continuously evacuated accelerator tubes operating in high ambient pressure. Vacuum 2, 259-262 (1952).
- 5232 G. C. Moench, Improving the performance of glass Dewar flasks. In German. Glas- und Hochvakuum Tech. 1, 9-13 (1952).
- 5233 N. Ochert & W. Steckelmacher, Leak detection practice with particular reference to the hydrogen palladium method. 71 references. Vacuum 2, 125-136 (1952).
- 5234 L. G. Parratt & E. L. Jossem, Backstreaming in oil diffusion pumps. Rev. Sci. Inst. 23, 188-189 (1952).
- 5235 L. Riddiford, Comments on new trends in ionization phenomena. Vacuum 2, 151-152 (1952).
- 5236 M. Seddig & G. Haase, Measurements of pressures below 10^{-7} mm of mercury by absorption. In German. Zt. angew. Phys. 4, 105-108 (1952).
- 5237 H. Sibata, Y. Tuzi & H. Kumagai, A new circuit for ionization vacuum gauge. Rev. Sci. Inst. 23, 54-55 (1952).
- 5238 L. R. Sitney, A high speed rotary vacuum seal. Rev. Sci. Inst. 23, 505-506 (1952).
- 5239 M. H. Stanier & J. H. Beynon, A greaseless mercury-sealed vacuum tap. J. Sci. Inst. 29, 165-166 (1952).
- 5240 J. D. Strong, On a bakable evaporation apparatus. Vacuum 2, 111-114 (1952).
- 5241 H. Von Ubisch, Hot wire manometers for chemical applications. Anal. Chem. 24, 931-938 (1952).
- 5242 M. J. Vermandé, The operation and performance of the Penning gauge. In French. Le Vide 7, 1145-1152 (1952).
- 5243 E. L. Wheeler, Apparatus for triple distillation of mercury. Anal. Chem. 24, 751-752 (1952).
- 5244 P. D. Zemany, Free molecular flow in the sample inlet to the mass spectrometer. J. Appl. Phys. 23, 924-927 (1952).
- 5245 K. Ziock, Vacuum-measuring techniques. In German. Glas- und Hochvakuum Tech. 1, 57-62 (1952).
- 5246 A. Boettcher, Glass surfaces in a high vacuum. In German. Glastech. Berichte 25, 347-353 (1952).
- 5247 E. A. Bunt & R. J. McCulloch, The design of high vacuum systems. Part I. & II. Ind. Chem. 460-465, 503-508 (1952).
- 5248 W. E. Bush, Causes of failure of vacuum systems. Univ. Calif. Rad. Lab. Report No. UCRL-1887 (1952).
- 5249 W. E. Bush, Design of radiation-heated cathodes for ion pumps. Univ. Calif. Rad. Lab. Report No. UCRL-1929 (1952).

- 5250 N. A. Florescu, A compression vacuum gauge with a large working range. *Investigations Physicae*, No. 3, 4 p. (1952).
- 5251 G. Glockler & H. V. Horst, The Pirani gauge. *Science* 116, 364-367 (1952).
- 5252 R. Jaeckel & H. G. Noeller, Vacuum pumps for pressures below one Torr. In German. *Zt. Ver. Deut. Ing.* 94, 797-803 (1952).
- 5253 R. Palme, Tungsten and molybdenum in vacuum engineering. In German. *Glas-und-Hochvakuum Tech.* 134-139 (Dec. 1952).
- 5254 P. A. Redhead, Stabilized ion gauge control unit. Nat. Res. Council, Canada, Report No. ERB 275 (1952).
- 5255 H. Schwarz, Method of realizing high vacua by ionization. Design of electronic pump. In French. *Le Vide* 7, 1262-1266 (1952).
- 5256 J. R. Sites & R. Baldock, Mass spectrometer studies of high vacuum materials. *Atomic Energy Com. Report No. ORNL-1405* (1952).
- 5257 V. T. Slavianskii, On the conditions of the performance of an absolute mercury manometer. In Russian. *Zhurnal Teknicheskoi Fiziki*, Moscow, 22, 1881-1884 (1952).
- 5258 R. A. Wallace & W. R. Vanderveer, Brazing vacuum-tight joints in high nickel alloys. *Materials & Methods* 36, 117-118 (Dec. 1952).
- 5259 R. Gomer & J. K. Hulm, Field emission from tantalum in the normal and superconducting state. *J. Chem. Phys.* 20, 1500-1502 (1952).
- 5260 J. J. Lander, H. E. Kern & A. L. Beach, Solubility and diffusion coefficient of carbon in nickel; Reaction rates of nickel-carbon alloys with barium oxide. *J. Appl. Phys.* 23, 1305-1309 (1952).
- 5261 F. J. Norton, Diffusion of gases through solids. *Gen. Elect. Rev.* 55, 28-29 (Sept. 1952).
- 5262 D. M. Tolstoi, Slip of mercury on glass. *Doklady Akad. Nauk SSSR* 85, 1329-1332 (1952). *Chem. Abstracts* 47, 1450 (1953).
- 5263 L. Akobjanoff, A precise gas manometer. *Rev. Sci. Inst.* 23, 447-448 (1952).
- 5264 W. H. Bergmann, Observations on glow discharges on magnetic fields. In German. *Acta Phys. Austriaca* 5, 425-428 (1952).
- 5265 K. P. Coffin & S. H. Bauer, Apparatus for imposing and measuring rapid pressure changes in gases. *Rev. Sci. Inst.* 23, 115-118 (1952).
- 5266 O. Tsukakoshi, Calibration of Fogel-type and Bayard type ionization gauges. *J. Tokyo Research Inst.* 46, 247-254 (1952).
- 5267 G. Valle, Theory of the discharge potential of coaxial cylindrical electrodes in a transverse magnetic field. In Italian. *Nuovo Cimento* 9, 145-168 (1952).
- 5268 C. I. Witman, On the measurement of vapor pressures by effusion. *J. Chem. Phys.* 20, 161-163 (1952).
- 5269 W. Pupp, Practicality of an ionization vacuum gage. In German. *Glas-und-Hochvakuum Tech.* 1, 3-6 (1952).
- 5270 W. Pupp, Thermoelectric vacuum gage "Theva." *Glas-und-Hochvakuum Tech.* 1, 66-68 (1952).
- 5271 J. L. Patterson, Miniature electrical pressure gage utilizing stretched flat diaphragm. *Natl. Advisory Comm. Aeronaut. Tech. Note* No. 2659, 47 p. (1952).
- 5272 R. A. Clark, T. I. Gilroy & E. Reissner, Stresses and deformations of toroidal shells of elliptical cross section. *ASME J. Appl. Mechanics* 74, 37-44 (1952).
- 5273 W. Wuest, The influence of the cross-sectional form on the behavior of Bourdon tubes. *Ingenieure Archiv* 20, 116-125 (1952).
- 5301 I. G. Baxter, Differential Capacitance Manometer. *J. Sci. Inst.* 30, 358-360 (1953).
- 5302 D. B. Cook & C. J. Danby, A simple diaphragm micromanometer. *J. Sci. Inst.* 30, 238-240 (1953).
- 5303 W. H. Kaechle & W. G. Brombacher, Diaphragm type vacuum gage. *N. B. S. Report No. 2621*, 26 p. (1953).
- 5304 R. A. K. Long, An automatic micromanometer for the measurement of low air speeds. *J. Sci. Inst.* 30, 481-482 (1953).
- 5305 T. A. Perls, W. H. Kaechle & D. S. Goalwin, A diaphragm-type, capacitance-type micro-manometer for very low differential pressures. *N. B. S. Report No. 2165*, 7 p. (1953).
- 5306 M. J. Pilny, A small Pirani gage for measurements of nonsteady low pressures. *Natl. Advisory Comm. Aeronaut. Tech. Note TN 2946*, 36 p. (1953).
- 5307 D. C. Pressey, Temperature-stable, capacitance pressure gauge. *J. Sci. Inst.* 30, 20-24 (1953).
- 5308 S. Wagener, The use of getters for the production of very high vacuum. 19 references. *Vacuum* 3, 11-23 (1953).
- 5309 R. N. Bloomer & M. E. Haine, The electronic clean-up of gases in sealed-off vacuum systems. 14 references. *Vacuum* 3, 128-135 (1953).

- 5310 D. Alpert, New developments in the production and measurement of ultra high vacuum. 37 references. *J. Appl. Phys.* 24, 860-876 (1953).
- 5311 G. K. T. Conn & H. N. Daglish, Cold cathode gauges for the measurement of low pressures. 24 references. *Vacuum* 3, 24-34 (1953).
- 5312 J. H. Leck, Sorption and desorption of gas in the cold-cathode ionization gage. *J. Sci. Insts.* 30, 271-274 (1953).
- 5313 J. A. Becker & C. D. Hartman, Field emission microscope and flash filament techniques for the study of structure and absorption on metal surfaces. *J. Phys. Chem.* 57, 153-159 (1953).
- 5314 H. D. Hagstrum, Instrumentation and experimental procedure for studies of electron ejection by ions and ionization by electron impact. 26 references. *Rev. Sci. Insts.* 24, 1122-1142 (1953).
- 5315 H. Koenig, The formation of adsorbed layers in vacuum chambers and their detection by electrons. 15 references. *Vacuum* 3, 3-10 (1953).
- 5316 F. L. Jones, Electrical discharges and the vacuum physicist. 28 references. *Vacuum* 3, 116-127 (1953).
- 5317 H. Klumb & E. Weissmann, A new manometer for the pressure region 10^{-2} to 10^{-6} mm Hg. *Glas-und-Hochvakuum Tech.* 2, 266-269 (1953).
- 5318 H. Klumb & H. Kollmannsperger, Research on the friction manometer. *Glas-und-Hochvakuum Tech.* 2, 211-213 (1953).
- 5319 K. D. Mielenz & E. Schoenheit, On the theory of the quartz fibre manometer. *Zt. angew. Phys.* 5, 90-94 (1953).
- 5320 J. Yarwood, Isolation values for vacuum systems. 33 references. *Vacuum* 3, 398-411 (1953).
- 5321 M. Michijima, Measurement of vapour pressures; some problems in vacuum techniques. *Oyo Butsuri* 22, 180-184 (1953).
- 5322 H. Wessel, Wettability of glass measured by contact-angle method. In German. *Silikattech.* 4, 59-63 (1953).
- 5323 J. S. Foster Jr., Some measurements on a high-vacuum high speed ion pump. Univ. Calif., UCRL Report No. 2312 (1953).
- 5324 E. F. Babelay & L. A. Smith, A needle valve type of variable gas leak for mass spectrometers. *Rev. Sci. Inst.* 24, 508-510 (1953).
- 5325 J. Morrison, A leak control tube. *Rev. Sci. Inst.* 24, 546-547 (1953).
- 5326 A. J. Stinnett, A vibrating needle variable gas leak. *Rev. Sci. Inst.* 24, 883-884 (1953).
- 5327 I. G. Baxter, A capacitance manometer of low thermal sensitivity. *J. Sci. Inst.* 30, 456-457 (1953).
- 5328 F. S. Sherman, New experiments on impact pressure interpretation in supersonic and subsonic rarified gas streams. *Natl. Advisory Comm. Aeronaut. Tech. Note No. 2995*, 73 p. (1953).
- 5329 G. A. Alers, J. A. Jacobs & P. R. Malmberg, Increased sensitivity of leak detection with hydrogen. *Rev. Sci. Inst.* 24, 399-400 (1953).
- 5330 D. Alpert, Copper isolation trap for vacuum systems. *Rev. Sci. Inst.* 24, 1004-1005 (1953).
- 5331 M. A. Biondi, Oil manometer for ultra-high vacuum systems. *Rev. Sci. Inst.* 24, 989-990 (1953).
- 5332 R. Forman, A vacuum valve to provide small controlled leak rates. *Rev. Sci. Inst.* 24, 326-327 (1953).
- 5333 J. S. Foster, Jr., E. O. Lawrence & E. J. Lofgren, A high vacuum high speed ion pump. *Rev. Sci. Inst.* 24, 388-390 (1953).
- 5334 G. H. Miller, Vacuum cold trap. *Rev. Sci. Inst.* 24, 549-550 (1953).
- 5335 J. Morrison, A controlled gas leak. *Rev. Sci. Inst.* 24, 230-231 (1953).
- 5336 J. Pollard, A conduction-cooled trap for demountable vacuum systems. *Rev. Sci. Inst.* 24, 996-997 (1953).
- 5337 D. H. Pringle & R. M. Kidd, Improvements to a null-reading absolute manometer. *Rev. Sci. Inst.* 24, 877 (1953).
- 5338 E. G. Reilly, A combination high-vacuum and pressure valve. *Rev. Sci. Inst.* 24, 875-876 (1953).
- 5339 W. W. Schriever, Jr., A double seal vacuum coupling. *Rev. Sci. Inst.* 24, 402-403 (1953).
- 5340 H. Schwarz, Methods of obtaining high vacuum by ionization. Construction of an "electronic pump". *Rev. Sci. Inst.* 24, 371-374 (1953). Error corrected, 25, 924 (1954).
- 5341 C. M. Stevens, A vacuum lock for routine solid analyses with a mass spectrometer. *Rev. Sci. Inst.* 24, 148-151 (1953).
- 5342 E. Tajima, K. Kaneko & A. Katajama, Some characteristics of an oil ejector pump. *Rev. Sci. Inst.* 24, 323-325 (1953).

- 5343 D. J. Trevoy & W. A. Torpey, A vacuum anemometer. Rev. Sci. Inst. 24, 676-682 (1953).
- 5344 R. Haefer, The breakdown voltages of gaseous discharges in transverse magnetic fields in the pressure range 10 to 10^{-8} mm Hg. In German. Acta Phys. Austriaca, 7, 52-90, 251-277 (1953).
- 5345 M. J. Aitken, An electrical analogue to a high vacuum system. Brit. J. Appl. Phys. 4, 188 (1953).
- 5346 S. Asao & K. Muramatsu, A large unwelded vacuum gate valve. J. Sci. Inst. 30, 209-210 (1953).
- 5347 A. Bobenrieth, A degassable Penning gauge. In French. Le Vide 8, 1302-1304 (1953).
- 5348 W. Duesing, Vacuum tight glass-to-metal seals for use in electrical engineering. In German. Glastech. Berichte 26, 232-238 (1953).
- 5349 G. Economos, Behavior of refractory oxides in contact with metals at high temperatures. Ind. Eng. Chem. 45, 458-459 (1953).
- 5350 F. J. Fitz Osborne, A simplified ionization gauge circuit. Canad. J. Phys. 31, 11-14 (1953).
- 5351 W. L. Harries & A. Von Engel, A new electron multiplication process. Nature 171, 517 (1953).
- 5352 E. R. Harrison, Glass leak and control valves. J. Sci. Inst. 30, 170-171 (1953).
- 5353 K. Histake & K. Matsuda, A study on diffusion pump oil by the mass spectrometer and the gas analysis of the final volume. J. Phys. Soc., Japan, 8, 416-421 (1953).
- 5354 E. L. Holland-Merten, H. Reuther & S. Siwienski, The use of silicone oil as an operating fuel for diffusion pumps. In German. Chem. Technik 5, 301-303 (1953).
- 5355 H. Ishii, Ultimate pressure obtained by oil diffusion pump. Oyo Butsuri (J. Appl. Physics, Univ. of Tokio) 22, 69-72 (1953).
- 5356 G. L. Kington & J. M. Holmes, Adsorption by evaporated copper films at 78°K . Part I. Krypton and hydrogen. Trans. Faraday Soc. 49, 417-423 (1953).
- 5357 G. L. Kington & J. M. Holmes, Adsorption by evaporated copper films at 78°K . Part 2. Krypton and oxygen. Trans. Faraday Soc. 49, 425-432 (1953).
- 5358 H. Klumb, E. Robens & O. Scholz, Supersonic speeds in high vacuum. In German. Naturwiss. 40, 196-197 (1953).
- 5359 E. R. Lind & J. F. Steinhaus, Development of a large, linear jet, mercury diffusion pump having high pumping speeds in the 10^{-6} mm mercury absolute pressure range. Calif. Res. & Dev. Co.; Atomic Energy Com. Report No. MTA-14 (1953).
- 5360 M. A. Miller & A. S. Russell, Vacuum tightness of welded and brazed aluminum containers. Welding J. 116-118 (Feb. 1953).
- 5361 A. O. C. Nier, The mass spectrometer. Scientific Am. 68-74 (March, 1953).
- 5362 F. J. Norton, Helium diffusion through glass. J. Am. Ceramic Soc. 36, 90-96 (March, 1953).
- 5363 E. Thomas, Calculation of the rate of diffusion through a plate of palladium. In French. Soc. Roy. Belge Ing. Industr. Mem. 19-32 (1953).
- 5364 G. M. van Koppen, A metal vacuum valve. Appl. Sci. Res. 3B, 141 (1953).
- 5365 G. von Dardel, Combined Pirani and ionization gauge circuit. J. Sci. Inst. 30, 114-117 (1953).
- 5366 S. Wagener, Sorption of gases at very low pressures by thorium powder. Proc. Phys. Soc., London 66B, 400-413 (1953).
- 5367 R. Gomer & J. K. Hulm, A method for studying the mobility of chemisorbed films: oxygen on tungsten. J. Am. Chem. Soc. 75, 4114-4115 (1953).
- 5368 H. D. Hagstrum, Electron ejection from Mo by He^+ , He^{++} , and He_2^{+} . Phys. Rev. 89, 244-255 (1953).
- 5369 R. G. Herb, R. H. Davis, A. S. Divatia & D. Saxon, Evapor-ion pump. (abstract). Phys. Rev. 89, 897 (1953).
- 5370 E. Thomas, J. Destappes & J. Dupont, A stainless steel trap for a metal vacuum system. Vacuum 3, 413 (1953).
- 5371 L. M. Van der Pyl, Bibliography on Bourdon tubes and Bourdon tube gages. Am. Soc. Mech. Eng., Paper No. 53-IRD-1, 22 p. (1953).
- 5372 O. Tsukakoshi, Device for evacuation in high vacuum. J. Sci. Research Inst., Tokyo, 47, 133-148 (1953).
- 5373 F. H. Reynolds, An electrical manometer for gas pressures up to 40 mm of mercury. J. Sci. Inst. 30, 92-96 (1953).
- 5374 W. Hartel, Method for determining water vapor in vacuum apparatus. In German. Zt. Ver. Deut. Ing. 95, 215-218 (1953).

- 5375 R. Uyeda & Y. Sugiura, A flowmeter in vacuum technique. *J. Phys. Soc., Japan* 8, 99-103 (1953).
- 5376 S. M. Branson, A simple ion gauge stabilizer. *Inst. Practice* 7, 425-427 (1953).
- 5377 H. Klumb & O. Heiligenbrunner, On the application of the resonance manometer to vacuum measurement. In German. *Glas-und-Hochvakuum Tech.* 2, 269-271 (1953).
- 5378 G. Dobke & B. Schroeder, The application of the ionization gage for the measurement of periodic pressure fluctuations and rapid pressure changes. In German. *Glas-und-Hochvakuum Tech.* 2, 285-292 (1953).
- 5379 M. M. Wolff & W. E. Stephens, A pulsed mass spectrometer with time dispersion. *Rev. Sci. Inst.* 24, 616-617 (1953).
- 5380 E. G. Johnson & A. O. Nier, Angular aberrations in sector shaped electromagnetic lenses for focusing beams of charged particles. *Phys. Rev.* 91, 10-17 (1953).
- 5381 S. Suzuki, Differential recorders of meteorological elements. *Geophys. Mag.* 24, 171-179 (1953).
- 5401 R. A. Gross, Calibration of sensitive differential pressure devices. *Rev. Sci. Inst.* 25, 218-220 (1954).
- 5402 H. S. Sicinski, N. W. Spencer, & W. G. Dow, Rocket measurements of upper atmosphere ambient temperature and pressure in the 30 to 75 kilometer region. *J. Appl. Physics* 25, 161-168 (1954).
- 5403 J. H. Leck, A quartz-coated wire Pirani gauge. *J. Sci. Inst.* 31, 226-227 (1954).
- 5404 D. J. Santeler & J. F. Norton, A graphical approach to vacuum engineering. *Vacuum* 4, 176-194 (1954).
- 5405 S. Wagener, Influence of electronic impact on the rate of sorption of gases onto getter materials. *Nature* 173, 684-685 (1954).
- 5406 S. Wagener, Relations between oxide cathodes and gases at very low pressures. *Proc. Physics Soc., London*, 67B, 369-386 (1954).
- 5407 P. Della Porta, Performance characteristics of barium getters at elevated working temperatures of the valves. *Vacuum* 4, 464-475 (1954).
- 5408 P. Della Porta, Performance characteristics of barium getters. 18 references. *Vacuum* 4, 284-302 (1954).
- 5409 G. K. T. Conn & H. N. Daglish, a thermionic ionization gage of high sensitivity employing a magnetic field. *J. Sci. Insts.* 31, 412-415 (1954).
- 5410 G. K. T. Conn & H. N. Daglish, The influence of the ballast resistance on the performance of Penning vacuum gauges. *J. Sci. Insts.* 31, 433-434 (1954).
- 5411 A. H. Beck & G. King, A sensitive leak detector using magnetron ionization gauges. *Vacuum* 4, 147-158 (1954).
- 5412 G. K. T. Conn & H. N. Daglish, The influence of electrode geometry on cold-cathode vacuum gauges. *Vacuum* 4, 136-146 (1954).
- 5413 N. A. Florescu, The ultimate vacuum obtainable in vapour pumps. 17 references. *Vacuum* 4, 30-39 (1954).
- 5414 D. A. Hockly & C. S. Bull, The ultimate vacua of two-stage rotary oil pumps. *Vacuum* 4, 40-47 (1954).
- 5415 S. Elonka, Gaskets. Power, p. 105-124 (March 1954).
- 5416 M. P. Garfunkel & A. Wexler, Measurement of high vacuum at low temperatures. *Rev. Sci. Inst.* 25, 170-172 (1954).
- 5417 C. Hayaski, On the rate of decomposition of diffusion pump oil. *J. Phys. Soc., Japan*, 9, 287-290 (1954).
- 5418 F. A. McMillan, Liquid manometers with high sensitivity and small time-lag. *J. Sci. Inst.* 31, 17-20 (1954).
- 5419 K. Phillips, Some experiments with a cold-vacuum gauge. *J. Sci. Inst.* 31, 110 (1954).
- 5420 L. Riddiford & R. F. Coe, The theory of high speed oil diffusion pumps. *J. Sci. Insts.* 31, 33-36 (1954).
- 5421 E. M. Robson, Some aspects of micro-moisture determination. *Vacuum* 4, 60-66 (1954).
- 5422 K. A. Savinskii, High vacuum equipment in Russia. 27 references. *Vacuum* 4, 326-340 (1954). (Translation from *Zavodskaya Laboratoriya*, No. 9 (1955).)
- 5423 R. S. Bradley, A thermister McLeod gauge for a pressure range $1-10^{-7}$ mm of mercury. *J. Sci. Inst.* 31, 129-130 (1954).
- 5424 R. Geller, Economical use of a leak detector spectrometer. In French. *Commis. l'Energy Atomique Report No. 256* (1954).
- 5425 H. Gruber, Remarks on a thermister Pirani-type vacuum gage. *Glas-und-Hochvakuum Tech.* 2, 302-306 (1954).

- 5426 A. M. Gurewitsch & W. F. Westendorp, Ionic pump. *Rev. Sci. Inst.* 25, 389-390 (1954).
- 5427 R. Jaeckel, H. G. Noller & H. Kutscher, The physical processes in diffusion and ejector pumps. In German. *Vakuum-Tech.* 3, 1-15 (April 1954).
- 5428 P. A. Redhead & L. R. McNarry, An ionization manometer and control unit for extremely low pressures. *Canad. J. Phys.* 32, 267-274 (1954).
- 5429 A. Venema, The determination of pump speed. 11 references. *Vacuum* 4, 272-283 (1954).
- 5430 F. de Boer & W. F. Niklas, Applications of a tracer to cathode-gettering and gas-adsorption problems. *Brit. J. Appl. Phys.* 5, 341-342 (1954).
- 5431 G. W. Hess, W. Eaton & J. Lech, The knife-edge vacuum seal. *Vacuum* 4, 438-444 (1954).
- 5432 C. S. Martin & J. H. Leck, Pumping speed fluctuations in the oil diffusion pump. *Vacuum* 4, 486-489 (1954).
- 5433 B. D. Power & D. J. Crawley, Sources, measurement and control of backstreaming in oil vapour vacuum pumps. *Vacuum* 4, 415-437 (1954).
- 5434 W. A. Rogers, R. S. Buritz & D. Alpert, Diffusion coefficient, solubility and permeability for helium in glass. *J. Appl. Phys.* 25, 868-875 (1954).
- 5435 L. J. Varnerin, Jr. & D. White, Ultimate vacuum in a vacuum-enclosed ionization gage. *J. Appl. Phys.* 25, 1207-1208 (1954).
- 5436 M. Reichardt, Investigation of glass mercury diffusion pumps. In German. *Zt. angew. Phys.* 6, 61-64, 104-108 (1954).
- 5437 Y. Takamura, A Pirani gauge combined with triode tube. In Japanese. *Oyo Butsuri*, 23, 558-560 (1954).
- 5438 D. I. Gaffee & A. G. Monroe, Measurement of small differential pressures at low absolute pressures. *Nature* 174, 756 (1954).
- 5439 R. Geller, The leak problem in vacuum engineering. Construction of a leak detector mass spectrometer. In French. *Commis. 1^{er} Energy Atomique Report No. 325* (1954).
- 5440 A. E. Cameron, A compact high-vacuum valve. *Rev. Sci. Inst.* 25, 1027-1028 (1954).
- 5441 P. E. Douglas, The vapour pressure of calcium. *Proc. Phys. Soc., London* 67, 783-786 (1954).
- 5442 A. J. Martin, Metal seals in vacuum equipment. *Atomic Weapons Res. Estab. Report No. O-40/54* (Aug. 1954).
- 5443 D. A. Lundberg, A differential leak detector for evacuated vessels. *Electronic Eng.* 26, 436-440 (1954).
- 5444 L. Landecker & J. Gray, Diffusion of gases through nickel and design of a convenient leak for hydrogen and deuterium. *Rev. Sci. Inst.* 25, 1151 (1954).
- 5445 C. W. Oatley, The experimental determination of the speed of a vacuum pump and of components of a vacuum system. *Brit. J. Appl. Phys.* 5, 358-362 (1954).
- 5446 R. W. Decker, All-glass valves for use in obtaining ultra high vacua. *J. Appl. Phys.* 25, 1441-1442 (1954).
- 5447 E. Waldschmidt, Evolution of gas and permeability to gas of constructional metals for vacuum systems. *Metall*, No. 19/20 (Oct. 1954). Translation, J. Standring, AEA Report No. IGRL-T/C 25 (1956).
- 5448 D. Alpert & R. S. Buritz, Ultra-high vacuum II. Limiting factors on the attainment of very low pressures. *J. Appl. Phys.* 25, 202-209 (1954).
- 5449 E. Brannen & H. I. S. Ferguson, A simple universal vacuum joint. *Rev. Sci. Inst.* 25, 836-837 (1954).
- 5450 P. F. Varadi, Some remarks on ion pumps. *Vacuum* 4, 66-67 (1954) (published 1956).
- 5451 R. H. Davis & A. S. Divatia, Design and operation of Evapor-ion pumps. *Rev. Sci. Inst.* 25, 1193-1197 (1954).
- 5452 G. L. Fox, A large-diameter reciprocating-action vacuum valve. *Rev. Sci. Inst.* 25, 616 (1954).
- 5453 D. T. Hurd & M. L. Corrin, A recording vacuum gauge. *Rev. Sci. Inst.* 25, 1126-1128 (1954).
- 5454 H. V. Neher & A. R. Johnston, Techniques useful in evacuating and pressurizing metal chambers. *Rev. Sci. Inst.* 25, 517-518 (1954).
- 5455 R. G. Nester, A new type of absolute manometer. *Rev. Sci. Inst.* 25, 1136-1137 (1954).
- 5456 J. R. Pappéheimer, Differential conductance manometer. *Rev. Sci. Inst.* 25, 912-917 (1954).
- 5457 H. H. Pattee, Jr., A demountable ultra-high vacuum joint. *Rev. Sci. Inst.* 25, 1132-1133 (1954).
- 5458 J. H. Reynolds & J. Lipson, A multicircuit control for ultra-high vacuum gauges. *Rev. Sci. Inst.* 25, 1029-1031 (1954).

- 5459 R. J. Richards, A high-vacuum seal-off valve. Rev. Sci. Inst. 25, 520-521 (1954).
- 5460 J. A. Stark & A. Langsdorf, Jr., A high vacuum plug valve. Rev. Sci. Inst. 25, 188 (1954).
- 5461 F. S. Stein, A three-way vacuum valve. Rev. Sci. Inst. 25, 515-516 (1954).
- 5462 M. K. Wilson, Elimination of adsorbed water in vacuum systems. Rev. Sci. Inst. 25, 1130 (1954).
- 5463 D. Alpert, Ultra-high vacuum technology. Vacuum Symp. Trans. (1954). Committee Vac. Tech., Boston, Mass., 69-75 (1955).
- 5464 C. H. Bachman & P. A. Silberg, Gas flow in capillaries of non-circular cross section. Vacuum Symp. Trans. (1954). Committee Vac. Tech., Boston, Mass., 63-64 (1955).
- 5465 R. M. Boehme, A vane type flow meter. Vacuum Symp. Trans. (1954). Committee Vac. Tech., Boston, Mass., 7-10 (1955).
- 5466 W. E. Briggs, The molecular vacuum gauge. Vacuum Symp. Trans. (1954). Committee Vac. Tech., Boston, Mass., 3-6 (1955).
- 5467 A. S. Divatia & R. H. Davis, Construction and performance of Evapor-ion pumps. Vacuum Symp. Trans. (1954). Committee Vac. Tech., Boston, Mass., 40-45 (1955).
- 5468 C. Felheimer & A. A. Litwak, Automatic valving system for vacuum apparatus. Vacuum Symp. Trans. (1954). Committee Vac. Tech., Boston, Mass., 35-39 (1955).
- 5469 W. C. Frye, Gas ballast for mechanical high vacuum pumps. Vacuum Symp. Trans. (1954). Committee Vac. Tech., Boston, Mass., 17-18 (1955).
- 5470 G. P. Gerow, Pumping systems for the 1 micron to 1 millimeter range. Vacuum Trans. (1954). Committee Vac. Tech. Boston, Mass., 23-26 (1955).
- 5471 J. J. Kinsella, The dependence of ionization gauge sensitivity on electrode geometry. Vacuum Symp. Trans. (1954). Committee Vac. Tech., Boston, Mass., 65-68 (1955).
- 5472 R. B. Lawrence, A simplified method of calculating pressure drop in vacuum piping. Vacuum Symp. Trans. (1954). Committee Vac. Tech., Boston, Mass., 55-62 (1955).
- 5473 F. J. Norton, Permeation problems in high vacuum. 14 references. Vacuum Symp. Trans. (1954). Committee Vac. Tech., Boston, Mass., 47-51 (1955).
- 5474 W. B. Nottingham, Design and properties of the modified Bayard-Alpert gauge. Vacuum Symp. Trans. (1954). Committee Vac. Tech., Boston, Mass., 76-80 (1955).
- 5475 P. A. Silberg & C. H. Bachman, Some studies of the diffusion of hydrogen through palladium. 8 references. Vacuum Symp. Trans. (1954). Committee Vac. Tech., Boston, Mass. (52-54).
- 5476 A. L. Smith & J. C. Saylor, The current status of silicone diffusion pump fluids. Vacuum Symp. Trans. (1954). Committee Vac. Tech., Boston, Mass., 31-34 (1955).
- 5477 G. A. Sofer, Some observations in the operation of vacuum diffusion pumps. Vacuum Symp. Trans. (1954). Committee Vac. Tech., Boston, Mass., 27-30 (1955).
- 5478 G. K. T. Conn & H. N. Daglish, A simple thermionic vacuum gauge. J. Sci. Inst. 31, 95-96 (1954).
- 5479 M. F. Behar, Pressure and vacuum. Chapter in Handbook of measurement and control, Part II, Instruments and automation, 27, 57-73 (Dec., 1954).
- 5480 E. W. Flasdorff, The McLeod gage. Inst. & Autom. 27, 1795-1796 (1954).
- 5481 R. T. Eckenrode & H. A. Kirshner, Measurement of pressure transients. 112 references. Rev. Sci. Inst. 25, 33-40 (1954).
- 5482 J. W. Hiby & M. Pahl, Compensated ionization gage. In German. Zt. Naturforsch. 9a, 906-907 (1954).
- 5483 Y. Sugiura, Experimental studies on the force exerted on a disc placed in a flow of rarefied gas. J. Phys. Soc., Japan 9, 244-248 (1954).
- 5484 S. Murata, Relation between gas pressure and ion current in vacuum. In Japanese. J. Inst. Elect. Comm. Eng., Japan 37, 865-870 (1954).
- 5485 R. Haefer, The current-voltage characteristics of a self-sustained gaseous discharge in a transverse magnetic field. In German. Acta Physica Austriaca 8, 213-224 (1954).
- 5486 K. D. Mielenz, Pressure measurement with a Pirani gage. In German. Zt. angew. Phys. 6, 101-104 (1954).
- 5487 E. Huebner, Measurement of low variable pressures. In German. Forsch. Gebiete Ingenieurwesens 20, 20-31 (1954).
- 5488 L. F. G. Simmons, Sensitive air manometer. J. Sci. Inst. 31, 195-197 (1954).
- 5489 N. B. Hannay, A mass spectograph for the analysis of solids. Rev. Sci. Inst. 25, 644-648 (1954).
- 5490 E. A. Flauraud, A. H. Mears, F. A. Crowley & A. P. Crary, Investigation of microbarometric oscillations in eastern Massachusetts. Air Force Cambr. Research Center Technical Report 54-11, Geophysical Research Paper No. 27, 62 p. (1954).

- 5491 R. Yamamoto, Microbarographic oscillations produced by the explosions of hydrogen-bombs. Univ. Meteoro. Research Inst. Kyoto, Meteoro. Notes Ser. 2, No. 1, 14 p. Also, Bull. Inst. Chem. Research, p. 120-123 (1954). Also, Weather, 10, 321-325 (1955).
- 5501 C. N. W. Litting, A Pirani gauge circuit. J. Sci. Inst. 32, 91-92 (1955).
- 5502 J. Morrison & R. B. Zetterstrom, Barium getters in carbon monoxide. J. Appl. Phys. 26, 437-442 (1955).
- 5503 B. J. Todd, Outgassing of glass. J. Appl. Physics 26, 1138-1243 (1955).
- 5504 E. Bouwmeester & N. Warmoltz, A simple and reliable ionization manometer. Philips Tech. Rev. 17, 121-125 (1955).
- 5505 G. Dumas, Study of gyromagnetic resonance in a Penning gauge. In French. Revue Gen. Elect. 64, 331-349 (1955).
- 5506 E. Brown & J. H. Leck, Desorption of gas in the cold-cathode ionization gauge. Brit. J. Appl. Physics 6, 161-164 (1955).
- 5507 T. B. Kent, A hydrogen Pirani leak detector using a charcoal trap. J. Sci. Insts. 32, 132-134 (1955).
- 5508 R. F. Coe & L. Riddiford, The final vacua of oil diffusion pumps. J. Sci. Insts. 32, 207-213 (1955).
- 5509 R. Thees, Roots pumps, design and performance. Vacuum 5, 25-34 (1955).
- 5510 J. G. S. Biram, Some aspects of handling mercury. 57 references. Vacuum 5, 77-92 (1955).
- 5511 A. G. Edwards, Vacuum research and the mass spectrometer. 46 references. Vacuum 5, 93-108 (1955).
- 5512 H. G. Noller, The physics of modern vapour pumps with particular reference to diffusion pumps. 26 references. Vacuum 5, 59-76 (1955).
- 5513 B. D. Power & R. A. Kenna, Vapour pumping characteristics of gas ballast pumps. Vacuum 5, 35-58 (1955).
- 5514 J. A. Becker, Ultra high vacua. Bell Lab. Record 33, 1-5 (1955).
- 5515 M. Reichardt, Investigation of glass mercury diffusion pumps. III. In German. Zt. angew. Phys. 7, 297-301 (1955).
- 5516 R. Thees & H. Treupel, Mechanical vacuum pumps. In German. Elektrotech. Zt. 7B, 321-324 (1955).
- 5517 L. J. Varnerin & J. H. Carmichael, Ionic pumping mechanism of helium in an ionisation gauge. J. Appl. Phys. 26, 782-783 (1955).
- 5518 F. M. Ernsberger & H. W. Pitman, New absolute manometer for vapour pressures in the micron range. Rev. Sci. Insts. 26, 584-589 (1955).
- 5519 A. Johannin-Gilles & P. Johannin, Apparatus for measuring vapour pressure. In French. J. Phys. Radium 16, 236-237 (1955).
- 5520 Y. Lortie, The uses of thermistors as vacuum gauges. In French. J. Phys. Radium 16, 317-320 (1955).
- 5521 L. R. Taylor, A tilting micromanometer with continuous sensitivity control. J. Sci. Inst. 32, 173-177 (1955).
- 5522 R. Geller, Sensitivity of a leak detector mass spectrometer. In French. Le Vide 10, 119-123 (1955).
- 5523 O. M. Ballentine, Procedure for determining vapour pressures of materials of low volatility. Wright Air Dev. Center Technical Report No. 54-418 (1955).
- 5524 D. G. Bills & F. G. Allen, Ultra-high vacuum valve. Rev. Sci. Inst. 26, 654-656 (1955).
- 5525 E. C. Giaimo, Jr., Ring-type teflon gasket. Rev. Sci. Inst. 26, 520 (1955).
- 5526 E. R. Harrison & L. C. W. Hobbs, Nickel diffusion leak for hydrogen. Rev. Sci. Inst. 26, 305-306 (1955).
- 5527 R. Hoerbe & O. Knacke, Vapour pressure curves for 140 materials. In German. Zt. Ergbergbau Metallhüttenw. 8, 556-561 (1955).
- 5528 O. Knapp, Chemical composition of special glasses for high-vacuum techniques. In German. Silikattech. 6, 99-104 (1955).
- 5529 R. A. Lowry, J. E. Osher & G. H. Miller, A pressure regulator for a low-pressure continuous-flow ionization chamber. Atomic Energy Com. Report No. 15C-599 (1955).
- 5530 F. L. Reynolds, The use of indium in high vacuum equipment. Atomic Energy Com. Report No. UCRL 2989, 3 p. (May 1955).
- 5531 E. Thomas, Lazy-tong linkage to obtain rectilinear movement in an evacuated chamber. Bull. Classe Sci. 839-841 (1955).
- 5532 D. W. Juenker, M. Swaay & C. E. Birchenall, On the use of palladium diffusion membranes for the purification of hydrogen. Rev. Sci. Inst. 26, 888 (1955).
- 5533 D. Alpert, Experiments at very low pressures. Science 122, 729-733 (1955).

- 5534 A. M. O. Smith & J. S. Murphy, Micromanometer for measuring boundary layer profiles. *J. Sci. Inst.* 26, 775-781 (1955).
- 5535 V. L. Stout & M. D. Gibbons, Gettering of gas by titanium. *J. Appl. Phys.* 26, 1488-1492 (1955).
- 5536 L. E. Levina, Modern methods of leak detection. In Russian. *Uspekhi Fizicheskikh Nauk* 55, 101-110 (1955).
- 5537 P. J. van Heerden, Metal gaskets for demountable vacuum systems. *Rev. Sci. Inst.* 26, 1130-1131 (1955).
- 5538 J. Horseling, A high vacuum tap with short outgassing time. *Philips Tech. Rev.* 17, 184-186 (1955).
- 5539 J. H. Leck, Modern developments in the techniques of vacuum pressure measurements. *Proc. Inst. Electronics* 38-2, 25-34 (1955).
- 5540 W. G. Brombacher & T. W. Lashof, Bibliography and index on dynamic pressure measurement. *Nat. Bur. Stds. Circ.* 558, 124 p. (1955).
- 5541 C. R. Meissner, Liquid nitrogen cold traps. *Rev. Sci. Inst.* 26, 305 (1955).
- 5542 I. Alexeff & E. C. Peterson, Evapor-ion pump performance with noble gases. *Vac. Symp. Trans.* (1955). Committee Vac. Tech. Inc., Boston, Mass. 87-90 (1956).
- 5543 G. Hees, W. Eaton & J. Lech, The knife edge vacuum seal. *Vac. Symp. Trans.* (1955). Committee Vac. Tech. Inc., Boston, Mass. 75-79 (1956).
- 5544 P. B. Kennedy & H. R. Smith, A simple two-stage mechanical refrigeration system for cold traps and boffles. *Vac. Symp. Trans.* (1955). Committee Vac. Tech. Inc., Boston, Mass., 80-82 (1956).
- 5545 H. Landsberg, E. E. Escher, & S. A. Dawkins, Continuous analysis of gases in a high vacuum furnace with a monitoring mass spectrometer. *Vac. Symp. Trans.* (1955). Committee Vac. Tech. Inc., Boston, Mass. 45-50 (1956).
- 5546 J. L. Peters, Development and performance of a new ion gauge tube and control circuit. *Vac. Symp. Trans.* (1955). Committee Vac. Tech. Inc., Boston, Mass. 71-73 (1956).
- 5547 F. L. Reynolds, All-metal vacuum valve using an indium seat. *Vac. Symp. Trans.* (1955). Committee Vac. Tech. Inc., Boston, Mass., 74 (1956).
- 5548 D. J. Santeler, A graphical solution for the analysis of vacuum systems performance. *Vac. Symp. Trans.* (1955). Committee Vac. Tech. Inc. Boston, Mass., 31-41 (1956).
- 5549 H. R. Smith, The technology of large mercury pumped vacuum systems. *Vac. Symp. Trans.* (1955). Committee Vac. Tech. Inc., Boston, Mass. p. 22-30 (1956).
- 5550 J. C. Swartz, Evapor-ion pump characteristics. *Vac. Symp. Trans.* (1955). Committee Vac. Tech. Inc., Boston, Mass., 83-86 (1956).
- 5551 R. Haefer, Methods of measurement of low gas pressures by means of a self-sustaining gaseous discharge in a transverse magnetic field. *Acta Phys. Austriaca* 9, 200-215 (1955).
- 5552 A. G. Edwards, Some properties of a simple omegatron-type mass spectrometer. *Brit. J. Appl. Phys.* 6, 44-48 (1955).
- 5553 R. Gomer, Field emission microscopy and some applications to catalysis and chemisorption. *Advances in Catalysis VII*, Academic Press, New York, p. 93-134 (1955).
- 5554 J. A. Becker, Adsorption on metal surfaces and its bearing on catalysis. *Advances in Catalysis VII*, Academic Press, New York, p. 135-211 (1955).
- 5555 N. D. Morgulis, Ionization method of obtaining very high vacuum. *J. Tech. Phys. USSR* 25, 1667-1670 (1955).
- 5556 D. G. Bills, F. G. Allen & N. P. Carleton, Measurement of the pumping speed of an ionization gauge. (Abstract). *Phys. Rev.* 99, 1662 (1955).
- 5557 J. A. Becker & R. G. Brandes, The adsorption of oxygen on tungsten as revealed in the field emission electron microscope. *J. Chem. Phys.* 23, 1323-1330 (1955).
- 5558 L. E. Bollinger, 3C24 ionization gage. *Inst. & Autom.* 28, 1507-1509 (1955).
- 5559 B. G. Childs & J. Penfeld, Automatic vacuum pump control circuit. *Rev. Sci. Inst.* 26, 235-236 (1955).
- 5560 H. Kiefer & B. Ziegler, Combined quartz-fiber and Knudsen gage for measuring vapor pressure. In German. *Zt. angew. Phys.* 7, 48-50 (1955).
- 5561 M. Varicak & B. Vosicki, Oscillographic measurement of the Penning-gauge characteristics. *J. Sci. Inst.* 32, 346-348 (1955).
- 5562 J. J. Opstelten & N. Warmoltz, A double-sided micromanometer. *Appl. Sci. Res.* 4B, 329-336 (1955).
- 5563 B. L. Harris, Adsorption. 352 references. *Ind. Eng. Chem.* 47, 508-517 (1955).

- 5564 R. W. Raible & M. K. Testermann, Ion-gage supply protects tubes. *Electronics* 28, 210-218 (Feb. 1955).
- 5565 H. Seifert, R. Buhl & K. F. Seifert, Fine structure in adsorption processes on quartz surfaces. *Kolloid Zt.* 141, 146-159 (1955).
- 5566 D. J. Wright, Hysteresis of the angle of contact of mercury against steel. *Proc. Phys. Soc., London*, 68B, 297-303 (1955).
- 5567 H. G. Noeller, The physical processes occurring in diffusion and vapor-jet pumps. I. Properties of the vapor jet stability of the forevacuum. II. Mixing of air and vapor, and the pumping speed. In German. *Zt. angew. Phys.* 7, 218-229 (1955).
- 5568 L. T. Minchen, New ideas in manometer design. *Gas J.* 283, 389 (1955).
- 5569 D. Patterson & R. C. Seymour, Automatic pressure recorder for study of gas phase kinetics. *J. Sci. Inst.* 32, 50-51 (1955).
- 5570 E. Rideal & A. J. Robertson, Sensitive manometer for rapid chemical changes. *J. Sci. Inst.* 32, 349-350 (1955).
- 5571 A. M. Thackara, Fundamentals of pressure control. *Inst. & Automation* 28, 2094-2097 (1955).
- 5572 K. Ziock, Development of a vacuum gage in the range 0.1-10 mm. In German. *Forschungsber. Wirtsch-u-Verkehrsministeriums Nordrhein-Westfalen*, No. 189, 24-28 (1955).
- 5573 H. S. Katzenstein & S. S. Friedland, New time-of-flight-mass spectrometer. *Rev. Sci. Inst.* 26, 324-327 (1955).
- 5574 E. Weissmann, Measurement of gas-kinetic cross-section by radiometric forces. *Vakuum-Tech.* 4, 152-155 (1955).
- 5575 G. H. Lee & L. M. Van der Pyl, A bibliography on diaphragms and aneroids. 426 abstracts. *Am. Soc. Mech. Eng. Paper No. 55-A-180* (1955). 60-WA-122 (1960).
- 5601 J. H. Leck & C. S. Martin, A Pirani gauge for operation up to a pressure of 10 mm of mercury. *J. Sci. Inst.* 33, 181-183 (1956).
- 5602 D. J. Santeler & T. W. Moller, Leak detection I. Fluid flow conversion in leaks and capillaries. General Engineering Lab., General Electric Co. Report No. 56-GL-261, 16 p. (Oct. 1956).
- 5603 B. J. Todd, Equilibrium between glass and water vapor at bake out temperatures. *J. Appl. Physics* 27, 1209-1210 (1956).
- 5604 J. H. Leck & A. Riddoch, Observations on the characteristics of the cold cathode ionization gauge. *Brit. J. Appl. Phys.* 7, 153-155 (1956).
- 5605 P. F. Varadi & L. G. Sebestyen, A simple vacuum detector using a radio-frequency mass spectrometer. *J. Sci. Insts.* 33, 392-394 (1956).
- 5606 R. M. Glaister, A magnetically operated vacuum valve. *J. Sci. Inst.* 33, 34-35 (1956).
- 5607 R. G. Nester, High vacuum gas valve. *Rev. Sci. Inst.* 27, 874-875 (1956).
- 5608 R. K. Smither, Controlled capillary gas leak. *Rev. Sci. Inst.* 27, 964-965 (1956).
- 5609 R. P. Henry, Absolute pressure determination with the aid of an ionization gauge. In French. *Le Vide* 11, 54-63 (1956).
- 5610 A. Beck, The stability of thermistors. *J. Sci. Inst.* 33, 16-18 (1956).
- 5611 J. Delcher, R. Geller, G. Mongodin & F. Prevot, Diffusion pump with freon-12. In French. *Le Vide* 11, 78-80 (1956).
- 5612 D. J. Harris & P. O. Hawkins, Use of Krypton 85 in measuring gas clean-up rates. *Nature* 177, 285-286 (1956).
- 5613 P. Lott, Simplified method for McLeod gauge design and calibration. *Anal. Chem.* 28, 276-277 (1956).
- 5614 S. Lynn, W. H. Corcoran & B. H. Sage, Micro-manometer of high sensitivity. *Rev. Sci. Inst.* 27, 368-369 (1956).
- 5615 P. G. Morgan, The Pirani gauge, *Elect. J.* 156, 1999-2000 (1956).
- 5616 J. J. Opstelten, N. Warmoltz & J. J. Z. van Zeist, A direct-reading double sided micro-manometer. *Appl. Sci. Res.* 6B, 129-136 (1956).
- 5617 K. M. Sancier & W. Richeson, Simple sensitive electrical pressure gage. *Rev. Sci. Inst.* 27, 134-136 (1956).
- 5618 H. Schlitt, A thermoelectric vacuum gauge. In German. *Zt. angew. Phys.* 8, 216-217 (1956).
- 5619 M. Varicak, Thermistors for the measurement of low pressures. In French. *Compte Rend.* 243, 893-895 (1956).
- 5620 J. P. Verkamp & S. L. Williams, Testing nuclear-plant leak tightness. *Nucleonics* 14, 54-57 (June 1956).
- 5621 H. A. Wyllie, A McLeod gage for measuring a wide range of pressures. *J. Sci. Insts.* 33, 317 (1956).

- 5622 H. A. Wyllie, A gas introducer for a vacuum system. *J. Sci. Inst.* 33, 360-361 (1956).
- 5623 J. Ainsworth & H. E. LaGow, Vacuum gauge chamber response time. *Rev. Sci. Inst.* 27, 653-654 (1956).
- 5624 D. T. Scag, Ultra-high vacuum with an all-metal system. Conference on controlled thermonuclear reactions, Gatlinburg, Tenn., p. 630-635 (1956). (TID-7520 Pt. 2).
- 5625 W. Espe, Copper as a high vacuum material. In German. *Nachrichtentech.* 6, 355-364 (1956).
- 5626 A. W. Knudsen, Fast-closing vacuum valve. *Rev. Sci. Inst.* 27, 148-150 (1956).
- 5627 M. Varíčák, Penning gauge as leak detector. *Rev. Sci. Inst.* 27, 655 (1956).
- 5628 T. P. Vogl & H. D. Evans, Electromagnetically operated ultra-high vacuum valve. *Rev. Sci. Inst.* 27, 657 (1956).
- 5629 O. Amself & G. Wittwer, A null method for the measurement of low vapor pressures. In German. *Zt. angew. Phys.* 8, 20-24 (1956).
- 5630 R. L. Bell, The omeagtron as a leak detector. *J. Sci. Inst.* 33, 269-272 (1956).
- 5631 W. Espe, Methods and technique of degassing metals. In German. *Vakuum-Tech.* 5, 39-53 (May 1956); 69-82 (June 1956).
- 5632 J. T. Law & E. E. Francois, Adsorption of gases on a silicon surface. *J. Phys. Chem.* 60, 353-358 (1956).
- 5633 A. S. Newton, Method of degassing liquids. *Anal. Chem.* 28, 1214-1215 (1956).
- 5634 R. N. Bloomer, Absorption of oxygen and carbon monoxide by barium getters. *Nature* 178, 1000-1001 (1956).
- 5635 W. Dong, Vacuum flow of gases through channels with circular, annular and rectangular cross sections. *Atomic Energy Com. Report No. UCRL 3353* (April 1956).
- 5636 C. Jech, Clean-up of radioactive gases used for surface studies. *Nature* 178, 1343-1344 (1956).
- 5637 F. Kirchner & H. Kirchner, On the measurement of very low gas and vapour pressures. In German. *Zt. angew. Phys.* 8, 478-481 (1956).
- 5638 G. Urry & W. H. Urry, Automatic Toepler pump of improved design. *Rev. Sci. Inst.* 27, 819-820 (1956).
- 5639 H. Moesta, The behavior of the gas discharge in the Penning vacuum gauge. In German. *Zt. angew. Phys.* 8, 598-603 (1956).
- 5640 J. H. Beynon & G. R. Nicholson, A radioactive ionization gauge and its application to the measurement of latent heat of vaporization. *J. Sci. Inst.* 33, 376-380 (1956).
- 5641 P. Hariharan & M. S. Bhalla, An improved ionization gauge control circuit. *J. Sci. Inst.* 33, 488-491 (1956).
- 5642 H. Black, A small mercury cut-off withstand-
ing large pressure differences. *Nature* 178, 1307-1308 (1956).
- 5643 G. Milazzo, The measurement of small vapour pressures. In German. 28 references. *Chem. Ing. Tech.* 28, 646-653 (1956).
- 5644 R. Millican, Low flow variable leak. *Atomic Energy Com. Report No. KY-166*, 13 p. (1956).
- 5645 C. M. Van Atta, Theory and performance characteristics of a positive displacement rotary compressor as a mechanical booster vacuum pump. *Vacuum Symp. Trans.* (1956). Committee Vac. Tech., Inc., Boston, Mass., 62-70 (1957).
- 5646 J. M. Benson, Thermopile vacuum gauges having transient temperature compensation and direct reading over extended ranges. *Vacuum Symp. Trans.* (1956). Committee Vac. Tech., Inc., Boston, Mass., 87-90 (1957).
- 5647 C. G. Blatchley, Control of ejector type vacuum pumps. *Vacuum Symp. Trans.* (1956). Committee Vac. Tech., Inc., Boston, Mass., 45-51 (1957).
- 5648 D. E. Charpentier, A simplified mass spec-
trometer type helium leak detector. *Vacuum Symp. Trans.* (1956). Committee Vac. Tech., Inc., Boston, Mass., 114-118 (1957).
- 5649 N. E. Cooke, An inherent error in the Knudsen effusion manometer and a method of correction. *Vacuum Symp. Trans.* (1956). Committee Vac. Tech., Inc., Boston, Mass., 82-86 (1957).
- 5650 B. B. Dayton, Gas flow patterns at entrance and exit of cylindrical tubes. *Vacuum Symp. Trans.* (1956). Committee Vac. Tech. Inc., Boston, Mass., 5-11 (1957).
- 5651 A. J. Gale, Cold sealed getter/ion pumped supervoltage X-ray tubes. *Vacuum Symp. Trans.* (1956). Committee Vac. Tech. Inc., Boston, Mass., 12-14 (1957).
- 5652 R. W. Griessel, Applications of the mass spectrometer to tube development. *Vacuum Symp. Trans.* (1956). Committee Vac. Tech., Inc., Boston, Mass., 101-106 (1957).
- 5653 E. A. Gulbransen & K. F. Andrews, Electron optical studies of oxidation processes occurring in high vacuum. *Vacuum Symp. Trans.* (1956). Committee Vac. Tech., Inc., Boston, Mass., 190-201 (1957).

- 5654 K. C. D. Hickman & J. J. Kinsella, A precon-ditioned vapor vacuum pump. Vacuum Symp. Trans. (1956). Committee Vac. Tech., Inc., Boston, Mass., 52-56 (1957).
- 5655 J. A. LeBlanc, Vacuum gauge calibration sys-tem. Vacuum Symp. Trans. (1956). Committee Vac. Tech., Inc., Boston, Mass., 78-81(1957).
- 5656 C. R. Meissner, A high vacuum laboratory for vapor deposition of conductors and dielec-trics. Vacuum Symp. Trans. (1956). Commit-tee Vac. Tech., Inc., Boston, Mass., 15-23 (1957).
- 5657 R. E. Moody, Versatile RF type leak detector. Vacuum Symp. Trans. (1956). Committee Vac. Tech., Inc., Boston, Mass., 119-123 (1957).
- 5658 A. Nerken, Experiments on flow of gases through leaks. Vacuum Symp. Trans. (1956). Committee Vac. Tech., Inc., Boston, Mass., 1-4 (1957).
- 5659 J. Peters & F. Raible, A new helium mass spectrometer leak detector. Vacuum Symp. Trans. (1956). Committee Vac. Tech., Inc., Boston, Mass., 107-109 (1957).
- 5660 J. A. Roberts, Precision leaks for standard-izing leak detection equipment. Vacuum Symp. Trans. (1956). Committee Vac. Tech., Inc., Boston, Mass., 124-126 (1957).
- 5661 C. E. Rufer, The measurement of pumping speeds. Vacuum Symp. Trans. (1956). Commit-tee Vac. Tech., Inc., Boston, Mass., 74-77 (1957).
- 5662 D. J. Santeler & T. W. Moller, Fluid flow conversion in leaks and capillaries. Vacuum Symp. Trans. (1956). Committee Vac. Tech., Inc., Boston, Mass., 29-36 (1957).
- 5663 H. J. Schwarz, Acoustical vacuum gauge. Va-cuum Symp. Trans. (1956). Committee Vac. Tech., Inc., Boston, Mass., 37-38 (1957).
- 5664 R. H. Vacca, Recent advances in the Alphatron vacuum gauge. Vacuum Symp. Trans. (1956). Committee Vac. Tech., Inc., Boston, Mass., 93-100 (1957).
- 5665 J. R. Young, Electrical clean-up of gases in an ionization gauge. J. Appl. Phys. 27, 926-928 (1956).
- 5666 N. Jensen, Vapour pressure of plastic mater-ials. J. Appl. Phys. 27, 1460-1462 (1956).
- 5667 R. Haefer & O. Winkler, Factors which deter-mine the final vacuum in vacuum systems equipped with oil diffusion pumps. Vakuum-Tech. 7, 149-155 (1956).
- 5668 J. H. Reynolds, High sensitivity mass spec-trometer for noble gas analysis. Rev. Sci. Inst. 27, 928-934 (1956).
- 5669 M. J. Higatsberger & W. W. Erbe, Improved metal to metal vacuum seals. Rev. Sci. Inst. 27, 110-11 (1956).
- 5670 G. Ehrlich, The mechanism of chemisorption on metals. J. Phys. Chem. Solids 1, 3-13 (1956).
- 5671 G. Ehrlich, The interaction of nitrogen with a tungsten surface. J. Phys. Chem. 60, 1388-1400 (1956).
- 5672 R. E. Sohlier & H. E. Farnsworth, Low-energy electron diffraction studies of cleaned and gas-covered germanium (100) surfaces. Semi-conductor Surface Physics, R. H. Kingston, Editor, Univ. Penna. Press, 3-22 (1956).
- 5673 H. D. Hagstrum, Effect of monolayer adsorp-tion on the ejection of electrons from metals by ions. Phys. Rev. 104, 1516-1527 (1956).
- 5674 J. M. Houston, New ultra-high-vacuum ioniza-tion gauge. (Abstract). Bull. Am. Phys. Soc., (II) 1, 301 (1956).
- 5675 J. H. de Boer, Adsorption phenomena. 407 references. Advances in catalysis, VIII Academic Press, New York, 18-161 (1956).
- 5676 V. R. Deitz, Bibliography of solid adsorbents. 13,763 references. Nat. Bur. Stds. Circ. 566, 1528 p. (1956).
- 5677 G. Milazzo, On a possible source of error in measuring pressure with a capacity micro-manometer. Zt. Elektrochemie 60, 185-188 (1956).
- 5678 W. B. Nottingham, Thermionic emission. Hand-buch der Physik, Springer-Verlag, 21, 1-175 (1956). Also Tech Report 321, Mass. Inst. Tech. Research Lab. of Electronics, 178 p. (1956).
- 5679 F. B. Jennings, Theories on Bourdon tubes. Trans. Am. Soc. Mech. Eng. 78, 55-64 (1956).
- 5680 J. B. Johnson, Convection type manometer. Rev. Sci. Inst. 27, 303-305 (1956).
- 5681 P. Tritsmans, Gas analysis with the mass spectrometer. In Dutch. Techn.-Wetensch. Tijdschrift. 25, 183-186 (1956).
- 5682 A. von Weiss, Vibration-free mountings and vibration-proof construction of instruments. In German. Ver. Deut. Ing. Zt. 98, 205-208 (1956).
- 5683 W. Schuetze & F. Bernhard, A new method of measuring very small ion currents in high vacuum. In German. Zt. Phys. 145, 44-47 (1956).

- 5684 E. W. Mueller, Field emission microscopy. 58 references. Physical methods in chemical analysis. W. G. Berl, Editor, Academic Press, vol. 3, 135-182 (1956).
- 5701 J. Drowart, P. Goldfinger & R. Van Steenwinkel, A new demountable ultra-high vacuum joint. *J. Sci. Insts.* 34, 248-249 (1957)
- 5702 G. Burrows, Some consequences of the behavior of mobile molecules. *Vacuum* 7-8, 3-18 (1957) (publ. 1959).
- 5703 N. W. Robinson, Some vacuum problems in the valve industry. 21 references. *Vacuum* 6, 21-40 (1957) (publ. 1959).
- 5704 L. Paty, High vacuum gas-leak valves. 18 references. *Vacuum* 7-8, 80-86 (1957) (publ. 1959).
- 5705 G. K. T. Conn & H. N. Daglish, A three-electrode form of cold cathode ionisation gage. *Vacuum* 7-8, 72-79 (1957) (publ. 1959).
- 5706 J. Amoignon, J. Delcher & R. Geller, Micro-leak valves. In French. *Le Vide* 12, 176-183 (1957).
- 5707 R. N. Bloomer, Barium getters and oxygen. *Brit. J. Appl. Phys.* 8, 40-43 (1957).
- 5708 R. N. Bloomer, The oxidation of evaporated barium films (getters). *Brit. J. Appl. Phys.* 8, 321-329 (1957).
- 5709 R. N. Bloomer, Barium getters and carbon monoxide. *Brit. J. Appl. Phys.* 8, 352-355 (1957).
- 5710 R. W. Cloud, L. Beckman & J. G. Trump, Barium absorption pumps for high-vacuum systems. *Rev. Sci. Inst.* 28, 889-892 (1957).
- 5711 A. R. Hamilton, Extended range thermal conductivity vacuum gage. *Rev. Sci. Inst.* 28, 693-695 (1957).
- 5712 W. J. Lange & D. Alpert, Step-type demountable metal vacuum seal. *Rev. Sci. Inst.* 28, 726 (1957).
- 5713 J. H. Leck & C. S. Martin, Feedback controlled heat conductivity gauge for measuring pressure in vacuum systems. *Rev. Sci. Inst.* 28, 119-121 (1957).
- 5714 J. A. McMillan & Tomas Buch, Wide-range thermal convection manometer. *Rev. Sci. Inst.* 28, 881-882 (1957).
- 5715 R. G. Noster, New device for measuring low gas pressures. *Rev. Sci. Inst.* 28, 577 (1957).
- 5716 C. J. Penther, Vactroller-A laboratory vacuum controller. *Rev. Sci. Inst.* 28, 460-463 (1957).
- 5717 L. Paty & P. Schürer, New ultra-high vacuum valve. *Rev. Sci. Inst.* 28, 654-655 (1957).
- 5718 G. J. Schulz & A. V. Phelps, Ionization gauges for measuring pressures up to the millimeter range. *Rev. Sci. Inst.* 28, 1051-1054 (1957).
- 5719 A. H. Spees, C. A. Reynolds, A. Boxer & G. Pearson, Vacuum gasket at low temperatures. *Rev. Sci. Inst.* 28, 1090 (1957).
- 5720 L. H. Varnerin & J. H. Carmichael, Trapping of helium ions and re-emission of trapped atoms from molybdenum. *J. Appl. Phys.* 28, 913-919 (1957).
- 5721 J. Yarwood, Ultra-high vacua. 25 references. *J. Sci. Inst.* 34, 297-304 (1957).
- 5722 R. W. Crompton & M. T. Elford, A precision capsule-type pressure gauge for the range 0-20 mm of mercury. *J. Sci. Inst.* 34, 405-407 (1957).
- 5723 L. D. Hall, Rhenium ion gauge filament. *Rev. Sci. Inst.* 28, 653-654 (1957).
- 5724 H. Ishii & K. Nakayama, High vacuum standards. I. The design and construction of a large standard McLeod gage. *J. Japanese Vacuum Soc.* 7, 113-120 (1957).
- 5725 H. Ishii & K. Nakayama, High vacuum standards. II. Factors influencing the calibration of sub-standard ionization gauges. *J. Japanese Vacuum Soc.* 7, 176-188 (1957).
- 5726 M. W. Mallett & W. M. Albrecht, Low-pressure solubility and diffusion of hydrogen in zirconium. *J. Elect. Chem. Soc.* 104, 142-146 (1957).
- 5727 H. Okamoto, On the abnormal outgassing in an ionization gauge. *J. Japanese Vacuum Soc.* 7, 71-89 (1957).
- 5728 J. S. Wagener & P. T. Marth, Analysis of gases at very low pressures by using the omegatron spectrometer. *J. Appl. Phys.* 28, 1027-1030 (1957).
- 5729 G. J. Schulz, Characteristics of the Bayard-Alpert ionization gauge at pressures above 10^{-5} mm Hg. *J. Appl. Phys.* 28, 1149-1152 (1957).
- 5730 P. E. Seiden, Wide range thermistor gauge. *Rev. Sci. Inst.* 28, 657-658 (1957).
- 5731 S. S. Stivala & V. L. Denniger, Epoxy resin as sealant for high vacuum systems. *Ind. Eng. Chem.* 49, 1106 (1957).
- 5732 Y. Tuzi & H. Okamoto, The adsorption of water vapour on glass surfaces in vacuum. *J. Japanese Vacuum Soc.* 7, 216-230 (1957).

- 5733 H. A. Adam, S. Kaufman & B. S. Liley, Indium seals for dismountable vacuum systems. *J. Sci. Inst.* 34, 123-124 (1957).
- 5734 A. E. Barrington & F. T. Turner, A controllable source of low-pressure hydrogen. *J. Sci. Inst.* 34, 286-287 (1957).
- 5735 R. N. Bloomer, Oxidation of barium: a confirmation of Mott's theory of oxidation. *Nature* 179, 493 (1957).
- 5736 C. D'Amico & H. D. Hagstrum, Improvements in the use of the porcelain rod gas leak. *Rev. Sci. Inst.* 28, 60 (1957).
- 5737 V. A. Heathcote & W. E. Read, A demountable seal for high vacuum work. *J. Sci. Inst.* 34, 247 (1957).
- 5738 S. Kobayashi & K. Yada, A standard leak utilising gas permeation. *J. Japanese Vacuum Soc.* 7, 189-196 (1957).
- 5739 S. Toby & K. O. Kutschke, Alloy-filled cut-off for high temperatures. *Rev. Sci. Inst.* 28, 470-471 (1957).
- 5740 F. J. Norton, Permeation of gases through solids. *J. Appl. Phys.* 28, 34-39 (1957).
- 5741 N. W. Robinson, Bakeable high vacuum seals. *J. Sci. Inst.* 34, 121 (1957).
- 5742 M. Sakisaka, Y. Oyama & T. Furushima, Spectral analysis-type leak detector. *J. Japanese Vacuum Soc.* 7, 121-130 (1957).
- 5743 B. W. Schumacher, Leak detector for hermetic seals. *Electronics* 30, 284-294 (March 1957).
- 5744 F. Sterzer, Simple high temperature vacuum-tight mica window. *Rev. Sci. Inst.* 28, 208-209 (1957).
- 5745 G. A. Bottomley, A valve for the grease-free manipulation of mercury. *J. Sci. Inst.* 34, 369-370 (1957).
- 5746 G. Comsa & G. Musa, A new type of ionization pump. *J. Sci. Inst.* 34, 291-292 (1957).
- 5747 G. K. T. Conn & H. N. Daglish, A vapour trap for vacuum systems. *J. Sci. Inst.* 34, 245 (1957).
- 5748 H. J. Curnow, On the high residual pressure obtained during the activation of valves containing oxide-coated cathodes. *J. Sci. Inst.* 34, 73-74 (1957).
- 5749 A. Franks, An automatic vacuum isolation valve. *J. Sci. Inst.* 34, 122 (1957).
- 5750 M. P. Reece, A simple and inexpensive emission regulator for ionization gauges. *J. Sci. Inst.* 34, 513-514 (1957).
- 5751 R. N. Edwards & J. F. Lawyer, Design criteria for accelerator vacuum systems. 16 references. *Trans. Fourth Natl. Symp., Am. Vac. Soc.* (1957) 73-82. (Pergamon Press, New York, 1958).
- 5752 V. V. Fondrk, The steam jet ejector: A versatile pump for high vacuum. *Trans. Fourth Natl. Symp., Am. Vac. Soc.* (1957) 88-94. (Pergamon Press, New York, 1958).
- 5753 A. R. Hamilton, A magnetic amplifier control circuit for a thermal conductivity vacuum gauge. *Trans. Fourth Natl. Symp., Am. Vac. Soc.* (1957) 112-114. (Pergamon Press, New York, 1958).
- 5754 C. Hayashi, Role of adsorption in production and measurement of high vacuum. *Trans. Fourth Natl. Symp., Am. Vac. Soc.* (1957) 13-26. (Pergamon Press, New York, 1958).
- 5755 A. R. Huntress, A. L. Smith, B. D. Power, & N. T. M. Dennis, A new silicon diffusion pump fluid. *Trans. Fourth Natl. Symp., Am. Vac. Soc.* (1957) 104-111. (Pergamon Press, New York, 1958).
- 5756 J. M. Kendall, Permeation of air through walls of plastic tubing used in low pressure systems. *Trans. Fourth Natl. Symp., Am. Vac. Soc.* (1957) 120-124. (Pergamon Press, New York, 1958).
- 5757 R. C. Knechtli, Distributed differential pumping. *Trans. Fourth Natl. Symp., Am. Vac. Soc.* (1957) 83-87. (Pergamon Press, New York, 1958).
- 5758 N. Milleron, Utilization of the surface tension of liquid metals in making high-vacuum seals. *Trans. Fourth Natl. Symp., Am. Vac. Soc.* (1957) 38-41. (Pergamon Press, New York, 1958).
- 5759 J. Morrison, Gas collection and analysis system employed in vacuum tube problems. *Trans. Fourth Natl. Symp., Am. Vac. Soc.* (1957) 100-103. (Pergamon Press, New York, 1958).
- 5760 H. G. Nöller, G. Reich & W. Bächler, Oil diffusion pumps for very low ultimate pressures. *Trans. Fourth Natl. Symp., Am. Vac. Soc.* (1957) 6-12. (Pergamon Press, New York, 1958).
- 5761 G. D. Perkins & D. E. Charpentier, A simple mass spectrometer for the identification of residual gases in high vacuum systems. *Trans. Fourth Natl. Symp., Am. Vac. Soc.* (1957) 125-128. (Pergamon Press, New York, 1958).
- 5762 G. Reich & H. G. Nöller, Production of very low pressures with getter-ion pumps. *Trans. Fourth Natl. Symp., Am. Vac. Soc.* (1957) 97-99. (Pergamon Press, New York, 1958).

- 5763 K. C. Taylor, Vacuum stream degassing. Trans. Fourth Natl. Symp., Am. Vac. Soc. (1957) 157-160. (Pergamon Press, New York, 1958).
- 5764 F. L. Torney, Jr., A new type of vacuum leak detector, Trans. Fourth Natl. Symp., Am. Vac. Soc. (1957) 115-119. (Pergamon Press, New York, 1958).
- 5765 N. A. Florescu, On the measurement of the speed of vacuum pumps. Appl. Sci. Res. 7B, 63-72 (1957).
- 5766 N. A. Florescu, An improvement to the vacuum vapour pump with theoretical and practical consequences. Austr. J. Appl. Sci. 8, 305-316 (1957).
- 5767 E. A. Trendelenburg & J. H. Carmichael, Ion induced re-emission of noble gases from the surface of metal wall ion gauge. (Abstract). Bull. Am. Phys. Soc. 2, 35 (1957).
- 5768 R. Barré, R. Geller & G. Mongodin, Outgassing at room temperature of materials under vacuum. Le Vide 12, 195-201 (1957).
- 5769 R. Horowitz & H. E. LaGow, Upper air pressure and density measurements from 90 to 220 km with the Viking 7 rocket. J. Geophys. Res. 62, 57-78 (1957).
- 5770 J. Schutten, A new electronic circuit for a hot-cathode ionization gauge. Appl. Sci. Res. B6, 276-284 (1957).
- 5771 F. Cordero, H. Matheson & D. P. Johnson, A nonlinear instrument diaphragm. NBS J. Res. 58, 333-337 (1957).
- 5772 W. A. Wildhack, R. F. Dressler & E. C. Lloyd, Investigation of the properties of corrugated diaphragms. 19 references. Trans. Am. Soc. Mech. Eng. 79, 65-82 (1957).
- 5773 J. Antal & A. Koenig, New acoustical method of vacuum measurement. Periodica Polytechnica, Elect. Eng. 1, 297-300 (1957).
- 5774 J. Farguharson & H. A. Kermicle, Precise automatic manometer reader. Rev. Sci. Inst. 28, 324-325 (1957).
- 5775 R. Gilmont, I. Gepner, et al, Pressure control by Cartesian diver. Inst. & Automation 30, 1486-1489 (1957).
- 5776 H. Moser & H. Poltz, A McLeod gage for low pressures. In German. Zt. Instrumenten. 65, 43-46 (1957).
- 5777 G. F. Wells & C. E. Melton, Mass spectrometer for study of ion-molecule collision processes. Rev. Sci. Inst. 28, 1065-1069 (1957).
- 5778 S. P. Wolsky, Positive-ion bombardment of germanium and silicon. Phys. Rev. 108, 1131-1136 (1957).
- 5779 R. Geller, Generalities about outgassing at room temperature. Le Vide 12, 194 (1957).
- 5780 H. Gervais & J. J. Trillat, Some devices for vacuum work. Le Vide 12, 413-418 (1957).
- 5781 G. Mongodin, Calibration of helium leak detectors. Le Vide 12, 395-397 (1957).
- 5782 J. Antal & A. Koenig, Combined vacuum meter for laboratory use. Acta Phys. Hungar. 7, 117-124 (1957).
- 5783 M. Varicak, Influence of the wall temperature on the sensitivity of the thermal manometer. In French. J. Phys. Rad. 18, Suppl. No. 7, 70A-72A (1957).
- 5784 C. T. Johnson & J. R. Chiles, Jr., The NEL T21 microbarographic recording system. Navy Electronics Lab. Res. & Dev. Report No. 773, 68 p. (1957).
- 5785 G. Reich & H. G. Noeller, Partial pressure analysis of the ultimate pressure of oil diffusion pumps with the omegatron. In German. Zt. angew. Phys. 9, 617-621 (1957).
- 5786 V. V. Mikhnevich, Measuring pressure in the upper atmosphere. Soviet Phys., Advances in Physics, SSSR Acad. Sci. 63 (Sept. 1957). Translation, Russian Literature of Satellites, Part II., Int. Phys. Index, Inc., New York, 9 p. (1960).
- 5787 B. S. Danilin, V. V. Mikhnevich, A. I. Repher & E. C. Shvidkovskii, Problem of measuring density and pressure of upper layers of the atmosphere using an artificial earth satellite. Soviet Physics, Advances in Physics, SSSR Acad. Sci. 63 (Sept. 1957). Translation, Russian Literature of Satellites, Part II., Int. Phys. Index, Inc., New York, 21 p. (1960).
- 5788 A. Herlet & G. Reich, An apparatus for measuring vapor pressure below 10^{-2} Torr. In German. Zt. angew. Phys. 9, 14-23 (1957).
- 5789 C. E. Normand, O. C. Yonts & C. W. Blue, Some observations on the pumping action of a carbon arc in vacuum. Conference on controlled thermonuclear reactions, Berkeley, Cal., p. 462-465 (1957). (TID-7536, Pt. 2).
- 5801 D. J. Santeler, General problems of leak detection and fluid flow in leaks. Gen. Engineering Lab., Gen. Electric Co. Report No. 58GL192 (July 1958).
- 5802 D. J. Santeler, Outgassing characteristics of ionization gages. General Engineering Lab., General Electric Co. Report No. 58GL-154 13 p. (May 1958).

- 5803 D. J. Santeler, Modified mass spectrometer leak detector. General Engineering Lab., General Electric Co. Report No. 58-GL-228, 10 p. (July 1958).
- 5804 D. J. Santeler, Outgassing characteristics of various materials. Gen. Engineering Lab., General Electric Co. Report No. 58GL303 13 p. (Nov. 1958).
- 5805 D. J. Santeler, Vacuum process evaluation. Gen. Engineering Lab., General Electric Co. Report No. 58GL146, 42 p. (May 1958).
- 5806 T. W. Moller & D. J. Santeler, Evaluation of barium getters using vacuum process evaluation. Gen. Engineering Lab., Gen. Electric Co. Report No. 58GL152, 13 p. (1958).
- 5807 R. J. Loneragen, Improvements in high vacuum gages. Armament Research. Dev. Estab. Gt. Brit. ARDE Memo No. MX48/58, 6 p. (1958).
- 5808 L. Amariglio & M. M. Benarie, A corrosion proof vacuum controller for pressures under 1 mm of mercury. J. Sci. Inst. 35, 385 (1958).
- 5809 A. G. Davies, A note on the use of polytetrafluoroethylene in vacuum seals. J. Sci. Inst. 35, 378-379 (1958).
- 5810 R. Eichhorn & T. F. Irvine, Jr., Description of a sensitive micromanometer. Rev. Sci. Insts. 29, 23-27 (1958).
- 5811 R. O. Jenkins, The construction of small vacuum leaks of constant value. J. Sci. Inst. 35, 428-429 (1958).
- 5812 J. R. Anderson, Pressure gauge for corrosive gases in the micron and submicron region. Rev. Sci. Insts. 29, 1073-1078 (1958).
- 5813 H. Wieder & A. W. Smith, Electrical lead for vacuum systems. Rev. Sci. Insts. 29, 794 (1958).
- 5814 J. R. Young, Vacuum limitations of rubber O-ring joints. Rev. Sci. Insts. 29, 795-796 (1958).
- 5815 A. Venema & M. Bandringa, The production and measurement of ultra-high vacua. Philips Tech. Rev. 20, 145-157 (1958).
- 5816 R. J. Corruccini, Gaseous heat conduction at low pressures and temperatures. 22 references. Vacuum 7-8, 19-29 (1958) (publ. 1959).
- 5817 P. della Porta, The gettering process in modern receiving valve manufacture. Vacuum 6, 41-58 (1958) (publ. 1959).
- 5818 J. W. L. DeVilliers, Method for making vacuum feedthrough terminals. Rev. Sci. Inst. 29, 527-528 (1958).
- 5819 N. A. Florescu, Compact oil McLeod gage. Rev. Sci. Inst. 29, 528-529 (1958).
- 5820 R. H. McFarland & D. G. McDonald, Study of the effectiveness of a copper foil trap for mercury in vacuum. Rev. Sci. Inst. 29, 530-531 (1958).
- 5821 C. C. Minter, Thermal conductivity leak detector. Rev. Sci. Inst. 29, 793-794 (1958); 31, 458-459 (1960).
- 5822 R. C. Frank, R. W. Lee & R. L. Williams, Ratio of diffusion coefficients for the diffusion of hydrogen and deuterium in steel. J. Appl. Phys. 29, 898-900 (1958).
- 5823 J. Rothstein, Rate of exhaust through a tube or orifice. Rev. Sci. Inst. 29, 243-244 (1958).
- 5824 C. Cochran, Hydrogen-sensitive McLeod gauge. Rev. Sci. Inst. 29, 69-70 (1958).
- 5825 K. W. Ehlers, Constant-pressure leak-rate gauge. Rev. Sci. Inst. 29, 72 (1958).
- 5826 L. D. Hall, Electronic ultra-high vacuum pump. Rev. Sci. Inst. 29, 367-370 (1958).
- 5827 J. H. Leck, A feedback-controlled Pirani gage. J. Sci. Inst. 35, 107-108 (1958).
- 5828 J. L. Williams & G. F. Eveson, A vibrating condenser manometer. J. Sci. Inst. 35, 97 (1958).
- 5829 E. A. Billett & J. Bishop, A greaseless vacuum seal for rotating shafts. J. Sci. Inst. 35, 70-71 (1958).
- 5830 L. Blanaru, A high-vacuum valve. J. Sci. Inst. 35, 184 (1958).
- 5831 J. O. Cope, Magnetically operated needle valve. Rev. Sci. Inst. 29, 232-234 (1958).
- 5832 E. Glueckauf & G. P. Kitt, Leak testing of vacuum plant by helium analysis. J. Sci. Inst. 35, 220-223 (1958).
- 5833 S. A. Gordon, Construction of small fixed leaks of predictable throughput. 24 references. Rev. Sci. Inst. 29, 501-504 (1958).
- 5834 C. J. Meechan & A. Sosin, Electrically-insulating thermally-conducting vacuum seal for low-temperature use. Rev. Sci. Inst. 29, 323 (1958).
- 5835 A. R. Strad, Mica window assembly for use at elevated bake-out temperatures. Rev. Sci. Inst. 29, 533 (1958).
- 5836 I. Ames, R. L. Christensen & J. Teale, Means for attaining vacua without the use of pump fluids. Rev. Sci. Inst. 29, 736-737 (1958).
- 5837 M. H. Greenblatt, Sealing a calcium fluoride window to glass. Rev. Sci. Inst. 29, 738 (1958).

- 5838 H. T. Knight, Piezoelectric detector for low pressure shock waves. *Rev. Sci. Inst.* 29, 174-175 (1958).
- 5839 J. Seehof, S. Smithberg & M. Armstrong, Electron-permeable window for cathode ray tube. *Rev. Sci. Inst.* 29, 776-778 (1958).
- 5840 H. E. Flotow, B. M. Abraham & R. D. Carlson, Differential pressure gauge for use with liquids and corrosive fluids. *Rev. Sci. Inst.* 29, 869-870 (1958).
- 5841 A. G. Kramer & P. M. Platzman, Microwave manometer. *Rev. Sci. Inst.* 29, 897-898 (1958).
- 5842 W. R. Mickelsen & J. Childs, Theoretical analysis of ultra-high vacuum condensers. *Rev. Sci. Inst.* 29, 871-873 (1958).
- 5843 G. A. Bottomley, A method of obtaining accurate relative pressures in the range 20 to 200 mm of mercury. *J. Sci. Inst.* 35, 254-257 (1958).
- 5844 W. D. Edwards, An insulated vacuum lead-in using an O ring. *J. Sci. Inst.* 35, 111-112 (1958).
- 5845 A. C. Prior, A neoprene vacuum gasket for wires. *J. Sci. Inst.* 35, 382-383 (1958).
- 5846 W. T. Davis, Lag in pressure systems at extremely low pressures. *Natl. Advisory Comm. Aeronaut. Tech. Note No. 4334*, 16 p. (1958).
- 5847 B. M. Bailey & R. L. Chuan, Cryopumping for high vacuum with low power. *Trans. Fifth Natl. Symp., Am. Vac. Soc.* (1958) 262-267. (Pergamon Press, New York, 1959).
- 5848 N. Beecher & M. P. Hnilicka, High vacuum pumping techniques. 61 references. *Trans. Fifth Natl. Symp., Am. Vac. Soc.* (1958) 94-100. (Pergamon Press, New York, 1959).
- 5849 W. A. Blonn, The evaporation of various alloys at high temperature in vacuo. *Trans. Fifth Natl. Symp., Am. Vac. Soc.* (1958) 30-34. (Pergamon Press, New York, 1959).
- 5850 W. E. Briggs, A. C. Jones & J. A. Roberts, Leak detection techniques. *Trans. Fifth Natl. Symp., Am. Vac. Soc.* (1958) 129-136. (Pergamon Press, New York, 1959).
- 5851 F. C. Brown, Basic techniques in design and construction of the vacuum plant. *Trans. Fifth Natl. Symp., Am. Vac. Soc.* (1958) 89-93. (Pergamon Press, New York, 1959).
- 5852 J. H. Carmichael & J. S. Knoll, Trapping of noble gas ions and the re-emission of the trapped atoms from nickel and molybdenum. *Trans. Fifth Natl. Symp., Am. Vac. Soc.* (1958) 18-21. (Pergamon Press, New York, 1959).
- 5853 J. H. Carmichael & W. J. Lange, The use of copper foil isolation traps with ultra-high vacuum systems. *Trans. Fifth Natl. Symp., Am. Vac. Soc.* (1958) 137-139. (Pergamon Press, New York, 1959).
- 5854 K. Diels & H. Moesta, A new high frequency mass spectrometer and its use in high vacuum technology. *Trans. Fifth Natl. Symp., Am. Vac. Soc.* (1958) 115-117. (Pergamon Press, New York, 1959).
- 5855 K. A. Geiger, An altitude chamber control. *Trans. Fifth Natl. Symp., Am. Vac. Soc.* (1958) 110-114. (Pergamon Press, New York, 1959).
- 5856 D. J. Grove, The application of ultra-high vacuum techniques to controlled thermonuclear devices. *Trans. Fifth Natl. Symp., Am. Vac. Soc.* (1958) 9-17. (Pergamon Press, New York, 1959).
- 5857 L. D. Hall, Properties and behavior of electronic ultra-high vacuum pumps. *Trans. Natl. Symp., Am. Vac. Soc.* (1958) 158-163. (Pergamon Press, New York, 1959).
- 5858 A. R. Hamilton, A pressure-responsive relay control circuit. *Trans. Fifth Natl. Symp., Am. Vac. Soc.* (1958) 123-125. (Pergamon Press, New York, 1959).
- 5859 E. G. Huschke, Jr., Simple outgassing determinations aid high temperature vacuum brazing. *Trans. Fifth Natl. Symp., Am. Vac. Soc.* (1958) 50-57. (Pergamon Press, New York, 1959).
- 5860 T. Kraus, A simple formula for the pressure-time dependence during the evacuation of vacuum systems. *Trans. Fifth Natl. Symp., Am. Vac. Soc.* (1958) 38-40. (Pergamon Press, New York, 1959).
- 5861 A. A. Landfors & M. H. Hablanian, Diffusion pump speed measurements at very low pressures. *Trans. Fifth Natl. Symp., Am. Vac. Soc.* (1958) 22-24. (Pergamon Press, New York, 1959).
- 5862 G. Lewin & R. Mark, Theory of dissimilar tubular seals of glass, ceramics and metals for critical applications. *Trans. Fifth Natl. Symp., Am. Vac. Soc.* (1958) 44-49. (Pergamon Press, New York, 1959).
- 5863 A. Lorenz, New design of mechanical vacuum pumps. *Trans. Fifth Natl. Symp., Am. Vac. Soc.* (1958) 79-82. (Pergamon Press, New York, 1959); *Le Vide* 14, 121-127 (1959).
- 5864 N. Milleron, Some component designs permitting ultra-high vacuum with large oil diffusion pumps. 11 references. *Trans. Fifth Natl. Symp., Am. Vac. Soc.* (1958) 140-147. (Pergamon Press, New York, 1959).

- 5865 N. Milleron & E. C. Popp, Gettering hydrogen at ultra-low pressures by evaporated metal coatings. *Trans. Fifth Natl. Symp., Am. Vac. Soc.* (1958) 153-157. (Pergamon Press, New York, 1959).
- 5866 P. della Porta & F. Ricca, The kinetics of the adsorption of nitrogen on barium getters. *Trans. Fifth Natl. Symp., Am. Vac. Soc.* (1958) 25-29. (Pergamon Press, New York, 1959).
- 5867 P. A. Redhead, The production and measurement of ultra-high vacuum (10^{-8} - 10^{-13} mm Hg). *Trans. Fifth Natl. Symp., Am. Vac. Soc.* (1958) 148-152. (Pergamon Press, New York, 1959).
- 5868 M. P. Rivera & R. P. LeRiche, A compensated thermocouple vacuum gauge. *Trans. Fifth Natl. Symp., Am. Vac. Soc.* (1958) 118-122. (Pergamon Press, New York, 1959).
- 5869 D. J. Santeler, Outgassing characteristics of various materials. *Trans. Fifth Natl. Symp., Am. Vac. Soc.* (1958) 1-8. (Pergamon Press, New York, 1959).
- 5870 F. W. Trabert, Effect of cooling diffuser walls on performance of a mercury ejector pump. *Trans. Fifth Natl. Symp., Am. Vac. Soc.* (1958) 101-104. (Pergamon Press, New York, 1959).
- 5871 E. A. Winzenburger, The effect of rotational speed on the performance of a Roots blower. *Trans. Fifth Natl. Symp., Am. Vac. Soc.* (1958) 83-85. (Pergamon Press, New York, 1959).
- 5872 R. H. Work, Silica-glass helium leaks as standards in leak detection. *Trans. Fifth Natl. Symp., Am. Vac. Soc.* (1958) 126-128. (Pergamon Press, New York, 1959).
- 5873 R. E. Schlier, Adsorption of oxygen and carbon oxide on tungsten. *J. Appl. Phys.* 29, 1162-1167 (1958).
- 5874 D. Alpert, Production and measurement of ultra-high vacuum. About 180 references. *Handbuch der Physik*, S. Fluegge, Editor, Springer-Verlag, Berlin, v. 12, 609-663 (1958).
- 5875 R. Jaekel, Vacuum physics, In German. *Handbuch der Physik*, S. Fluegge, Editor, Springer-Verlag, Berlin, v. 12, 515-608 (1958).
- 5876 L. D. Hall, Ionic vacuum pumps. 22 references. *Science* 128, 279-285 (1958).
- 5877 W. Becker, A new molecular pump. In German. *Vakuum-Tech.* 7, 149-152 (1958).
- 5878 J. H. Carmichael & E. A. Trendelenburg, Ion induced re-emission of noble gases from a nickel surface. *J. Appl. Phys.* 29, 1570-1577 (1958).
- 5879 J. A. Dillon, Jr. & H. E. Farnsworth, Work function and sorption properties of silicon crystals. *J. Appl. Phys.* 29, 1195-1202 (1958).
- 5880 H. E. Farnsworth, R. E. Schlier, T. H. George & R. M. Burger, Application of the ion bombardment cleaning method to titanium, germanium, silicon, and nickel as determined by low-energy electron diffraction. *J. Appl. Phys.* 29, 1150-1161 (1958).
- 5881 M. E. Haine, E. W. R. Francis & R. N. Bloomer, Removal of gases in high vacuum systems by metal abrasion. *Nature* 182, 931-932 (1958).
- 5882 P. Kisliuk, Using cathode resistance to measure adsorption of gases on metals. *Bell System Tech. J.* 37, 925 (1958).
- 5883 C. H. Rehkopf, Measurements of gas evolution or sorption of anode materials under simulated life conditions. *Sylvania Technol.* 11, 114-116 (1958).
- 5884 G. F. Wells, Precision liquid nitrogen trap level controller. *Rev. Sci. Inst.* 29, 893-895 (1958).
- 5885 D. G. Bills & N. P. Carleton, Adsorption of activated gases. *J. Appl. Phys.* 29, 692-697 (1958).
- 5886 J. H. Beynon & S. Clough, A mass spectrometer mass marker. *J. Sci. Inst.* 35, 289-291 (1958).
- 5887 F. Bernhard, & H. Bumm, The technique of brazing in vacuum. In German. *Vakuum-Tech.* 7, 153-158 (1958).
- 5888 L. Holland, L. Laurenson & J. T. Holden, A new type of titanium getter pump. *Nature* 182, 851-852 (1958).
- 5889 J. Eisinger, Properties of hydrogen chemisorbed on tungsten. *J. Chem. Phys.* 29, 1154-1160 (1958).
- 5890 W. Espe, Quartz, fused quartz and quartzlike glasses as constructional materials in high vacuum work. 63 references. In German. *Vakuum-Tech.* 7, 65-77, 101-110 (1958).
- 5891 P. A. Silberg & C. H. Bachman, Diffusion of hydrogen in palladium. 20 references. *J. Chem. Phys.* 29, 777-781 (1958).
- 5892 R. C. Frank, Some observations regarding the present status of measurement of the diffusion coefficients of hydrogen in iron and mild steel. *J. Appl. Phys.* 29, 1262-1263 (1958).
- 5893 H. Klumb & D. Fuchs, On radiometer forces in the pressure range 10^{-3} to 3 Torr. In German. *Vakuum-Tech.* 7, 131-135 (1958).

- 5894 Y. Tuzi & H. Okamoto, The adsorption of water vapour on lead borosilicate glass in vacuum. *J. Phys. Soc., Japan*, 13, 960-965 (1958).
- 5895 M. G. Manov, Mean gas flow velocity and gas flow rate in jets of high vacuum pumps. *J. Tech. Phys. USSR*, 5, 28, No. 2. Translation Sov. Phys. Tech. Phys. 3, 289-296 (1958).
- 5896 O. German, Kinetic theory of the flow of gas through a cylindrical tube. *Soviet Physics, JETP* 34, 1016-1019 (1958).
- 5897 A. Zincke, Glass problems in electron tube technology. *Vakuum-Tech.* 7, 93-100 (1958).
- 5898 G. Haase, McLeod gage with a linear scale. In German. *Chemische Tech. (Beiblatt Glas-Apparate-Technik)* 10, 37-39 (1958).
- 5899 P. Lienard, Manometer responding to a large frequency band for measuring rapidly varying pressure. In French. *NATO AGARD Rept. No. 170*, 15 p. (1958).
- 58100 A. Thom & C. J. Apelt, The pressure in a two-dimensional static hole at low Reynolds numbers. *Aero. Research Comm., Grt. Brit., Repts & Memo.*, No. 3090, 13 p. (1958).
- 58101 E. P. Muntz, Pressure measurements in free molecule flow with a rotating arm apparatus. *Univ. Toronto Inst. Aerophysics TN 22,49* p. (1958).
- 58102 L. J. Griffiths, A modified McLeod gauge for low pressure measurements. *Advances in Vacuum Science & Technology*. Proc. 1st Int. Cong. on Vac. Techniques, 263-265 (1958). (Pergamon Press 1960).
- 58103 H. Hintenberger & E. Doernenburg, Applications of mass spectroscopy to vacuum technology. 94 references. *Vakuum-Tech.* 7, 121-130, 159-171 (1958).
- 58104 British Standards Institution, Glossary of terms used in high vacuum technology. *British Std. No. 2951*, 29 p. (1958).
- 58105 D. Allenden, Control circuit for Bayard-Alpert ionization gage. In French. *Le Vide* 13, 247-255 (1958).
- 58106 H. W. Drawin, Electrical capacity-diaphragm vacuum gage. In German. *Vakuum-Tech.* 7, 177-185 (1958).
- 58107 M. Goto, The standard McLeod gauge and the calibration of ionization gauges against it. *Advances in Vacuum Science and Technology*. Proc. 1st Int. Cong. on Vac. Techniques, (1958) 266-270. (Pergamon Press, New York, 1960).
- 58108 R. Benichou, J. C. Blaire & R. P. Henry, Study on the degassing of rubber joints. In French. *Advances in Vacuum Science Technology*, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 355-363. (Pergamon Press, New York, 1960).
- 58109 D. A. Degras, Measurement of pumping speed. In French. 8 references. *Advances in Vacuum Science Technology*, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 315-322. (Pergamon Press, New York, 1960).
- 58110 H. W. Drawin, Electrical capacity-diaphragm vacuum gage. In German. *Advances in Vacuum Science Technology*, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 274-284. (Pergamon Press, New York, 1960).
- 58111 H. Ebert, On vacuum measurement with the McLeod gage. In German. *Advances in Vacuum Science & Technology*, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 260-263. (Pergamon Press, New York, 1960).
- 58112 R. P. Henry, Stabilization of power supply for ionization gages used in industry. In French. *Advances in Vacuum Science Technology*, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 299-301. (Pergamon Press, New York, 1960).
- 58113 A. M. Grigorev, Enlarging the range of the pressures measured by cold-cathode ionization gauges. *Advances in Vacuum Science Technology*, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 308-310. (Pergamon Press, New York, 1960).
- 58114 J. Groszkowski, Extension of range of a conductivity vacuum gage by compression. In French. *Advances in Vacuum Science Technology*, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 288-289. (Pergamon Press, New York, 1960).
- 58115 S. Kobayashi, High sensitive hot cathode ionization gauge. *Advances in Vacuum Science Technology*, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 271-273. (Pergamon Press, New York, 1960).
- 58116 S. Komiya & T. Ikeda, The effect on the test dome in the measuring of the speed of an oil-diffusion pump. *Advances in Vacuum Science Technology*, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 325-328. (Pergamon Press, New York, 1960).
- 58117 J. J. Opstelten & N. Warmoltz, A diaphragm manometer with a linear scale for the range 10^{-5} to 10 mm Hg. In French. *Advances in Vacuum Science Technology*, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 295-298. (Pergamon Press, New York, 1960).

- 58118 G. F. Vanderschmidt & J. C. Simons, Jr., A new radiological vacuum gauge. Advances in Vacuum Science Technology, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 305-307. (Pergamon Press, New York, 1960).
- 58119 M. Varicák & B. Saftic, The use of thermistors for low pressure-measurements. Advances in Vacuum Science Technology, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 285-287. (Pergamon Press, New York, 1960).
- 58120 N. A. Florescu, Ultra-high vacuum investigations. 28 references. Advances in Vacuum Science Technology, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 367-372. (Pergamon Press, New York, 1960).
- 58121 H. L. Eschbach, Diffusion coefficients and outgassing of helium and hydrogen for various glasses. In German. Advances in Vacuum Science Technology, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 373-377. (Pergamon Press, New York, 1960).
- 58122 S. Garbe, Analysis of residual gases with an omegatron. In German. Advances in Vacuum Technology, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 404-409. (Pergamon Press, New York, 1960).
- 58123 H. Huber & M. Warnecke, A titanium pump designed to maintain a vacuum in an electronic tube. Le Vide 74, 84-90 (1958); Advances in Vacuum Science Technology, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 457-462. (Pergamon Press, New York, 1960).
- 58124 I. A. Kaljabina & Y. A. Yakhvidin, Experience in using mass-spectrometric methods in electro-vacuum technology. Advances in Vacuum Science Technology, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 418-426. (Pergamon Press, New York, 1960).
- 58125 A. Klopfer, The omegatron as a partial pressure measuring gage. In German. Advances in Vacuum Science Technology, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 397-400 (Pergamon Press, New York, 1960).
- 58126 A. Klopfer & W. Ermrich, Experiments with titanium ion pumps. In German. Advances in Vacuum Science Technology, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 427-429. (Pergamon Press, New York, 1960).
- 58127 S. Sibata, C. Hayashi & H. Kumagai, A barium getter-ion pump. Advances in Vacuum Technology, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 430-432. (Pergamon Press, New York, 1960).
- 58128 H. Kumagai, C. Hayashi, Y. Ishibe, N. Dogi, et al, Characteristics of titanium evaporation pump. Advances in Vacuum Science Technology, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 433-438. (Pergamon Press, New York, 1960).
- 58129 J. H. Leck & G. Carter, Adsorption and desorption of positive ions on glass and metal surfaces. Advances in Vacuum Science Technology, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 463-467. (Pergamon Press, New York, 1960).
- 58130 E. Baronetzky & A. Klopfer, Influence of gas reactions in vacuum systems on the combination of residual gases. In German. Advances in Vacuum Science Technology, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 401-403. (Pergamon Press, New York, 1960).
- 58131 J. Markali, Mechanism of titanium getter and titanium evap-pump. In German. Advances in Vacuum Technology, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 450-452. (Pergamon Press, New York, 1960).
- 58132 P. Prugne & P. Garin, A getter pump with a low temperature trap. In French. Advances in Vacuum Science Technology, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 439-442. (Pergamon Press, New York, 1960).
- 58133 P. A. Redhead, The Townsend discharge in a coaxial diode with axial magnetic field. Canad. J. Phys. 36, 255-270 (1958).
- 58134 J. P. Hobson & P. A. Redhead, Operation of an inverted-magnetron gauge in the pressure range 10^{-3} to 10^{-12} mm Hg. Canad. J. Phys. 36, 271-288 (1958).
- 58135 J. P. Hobson & P. A. Redhead, Factors limiting ultimate pressure in ultra-high vacuum systems. Advances in Vacuum Science Technology, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 384-388. (Pergamon Press, New York, 1960).
- 58136 P. A. Redhead, Pressure measurements at ultra-high vacuum (10^{-8} to 10^{-14} mm Hg). Advances in Vacuum Science Technology, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 410-413. (Pergamon Press, New York, 1960).
- 58137 G. Reich & H. G. Noeller, Ion getter pump for low pressures. In German. Advances in Vacuum Science Technology, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 443-445. (Pergamon Press, New York, 1960).
- 58138 N. W. Robinson & F. Berz, Initial pumping and recovery of ionization gauges. Advances in Vacuum Science Technology, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 378-383. (Pergamon Press, New York, 1960).
- 58139 A. Schram, On a new principle of operation for the titanium getter pump. In French. Advances in Vacuum Science Technology, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 446-449. (Pergamon Press, New York, 1960).
- 58140 J. Schutten, Measurement of ultra-high vacua. 17 references. Advances in Vacuum Science Technology, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 414-417. (Pergamon Press, New York, 1960).

- 58141 A. Venema, The production of ultra-high vacua by means of a diffusion pump. Advances in Vacuum Science Technology, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 389-392. (Pergamon Press, New York, 1960).
- 58142 M. I. Winogradoff, Evapor-ion pump. Advances in Vacuum Science Technology, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 453-456. (Pergamon Press, New York, 1960).
- 58143 F. B. Newell, Diaphragm characteristics, design and terminology. Manual, Am. Soc. Mech. Eng., 74 p. (1958).
- 58144 D. J. Bogardus & J. R. Mahoney, Oak Ridge gaseous diffusion plant reports on 15 years of process mass spectrometry. Inst. Soc. Am. J. 5, 26-30 (Aug. 1958).
- 58145 R. Haefer, Progress in the design of oil diffusion pumps. In French. Revue Univ. des Mines 14, 21-29 (1958).
- 58146 W. Paul, H. P. Reinhard & U. von Zahn, Electric mass filter as mass spectrometer and isotope separator. Zt. Phys. 152, 143-182 (1958).
- 58147 K. Scheibe & W. Wuest, Liquid manometer with photoelectric sensing. In German. Zt. Instrumenten. 66, 185-188 (1958).
- 58148 American Vacuum Society, Glossary of terms used in vacuum technology. Pergamon Press, New York, 63 p. (1958).
- 58149 A. J. Rosenberg, The adsorption of krypton on germanium. J. Phys. Chem. 62, 1112-1119 (1958).
- 58150 N. Hackerman & A. C. Hall, The adsorption of water vapor on quartz and calcite. J. Phys. Chem. 62, 1212-1214 (1958).
- 58151 W. W. Willmarth, Small barium titanate transducer for aerodynamic or acoustic pressure measurements. Rev. Sci. Inst. 29, 218-222 (1958).
- 58152 R. Geller, Vacuum degassing of materials. Le Vide 13, 71-76 (1958).
- 58153 L. Holland, The cleaning of glass in a glow discharge. Brit. J. Appl. Phys. 9, 410-415 (1958).
- 58154 L. Paty & R. Neuzilová, A new construction of a high-vacuum high-speed ion pump. Czech. J. Phys. 8, 746-747 (1958).
- 58155 B. B. Dayton, International cooperation on vacuum standards and literature abstracting. Advances in Vacuum Science Technology, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 71-75. (Pergamon Press, New York, 1960).
- 58156 J. van Katwijk, Experience with the automation of mass spectrometry gas analysis. In German. Zt. Anal. Chem. 164, 73-80 (1958).
- 58157 R. Haefer, On automation of high vacuum apparatus based on the requirements for a particle accelerator. In German. Advances in Vacuum Science Technology, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 508-513. (Pergamon Press, New York, 1960).
- 58158 J. Bishop, Vacuum techniques in mass spectrometry. Advances in Vacuum Science Technology, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 484-490. (Pergamon Press, New York, 1960).
- 58159 J. Blears, E. J. Greer & J. Nightingale, Factors determining the ultimate pressure in large high-vacuum systems. Advances in Vacuum Science Technology, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 473-480. (Pergamon Press, New York, 1960).
- 58160 H. Bridge, R. Budde, A. Burger, et al, Some vacuum problems at low temperature. Advances in Vacuum Science Technology, Proc. 1st Int. Cong. on Vacuum Techniques (1958) 481-483. (Pergamon Press, New York, 1960).
- 58161 W. L. Donn, The microbarovariograph: a new instrument for measuring minute atmospheric pressure variations. Trans. Am. Geophys. Union 39, 366-368 (1958).
- 58162 I. P. Passeechnik & N. E. Fedosseenko, An electrodynamic microbarograph with galvanometer recording. Bull. (Izv.) Acad. Sci. USSR, Geophys. Ser. No. 1 (1958).
- 58163 K. E. Wakefield, An investigation of the effect of a Kovar ring on a uniform magnetic field. Princeton Univ., Proj. Matterhorn, Tech. Memo No. 21, 15 p. (NYO-6366).
- 58164 U. O. Hutton & J. F. Gilheany, A two-inch range precision mercury manometer. NBS Report No. 6193, 32 p. (1958); NBS Tech. News Bull. 43, 71 (1959).
- 5901 G. F. Vanderschmidt, Using isotopes to measure low pressures. Electronics 32, 60-61 (June 19, 1959).
- 5902 A. W. Smith, Extended range Pirani gage. Rev. Sci. Insts. 30, 485-486 (1959).
- 5903 N. de Haas, Metal-glass vacuum seal for use at low temperatures. Rev. Sci. Inst. 30, 594-595 (1959).
- 5904 W. J. Lange, Large ultra-high vacuum valve. Rev. Sci. Inst. 30, 602-603 (1959).
- 5905 L. A. Green & A. C. Richardson, A dismountable vacuum joint for bakeable glass vacuum systems. J. Sci. Inst. 36, 324-325 (1959).
- 5906 M. A. Biondi, High-speed nonrefrigerated isolation traps for ultra high-vacuum systems. Rev. Sci. Inst. 30, 831-832 (1959).

- 5907 R. A. Rapp, New techniques in the attainment of high vacuum. *Rev. Sci. Inst.* 30, 839-840 (1959).
- 5908 F. G. Allen, J. Eisinger, H. D. Hagstrum & J. T. Law, Cleaning of silicon surfaces by heating in high vacuum. 20 references. *J. Appl. Phys.* 30, 1563-1571 (1959).
- 5909 N. Beecher, High vacuum pumping for modern electronic needs. *Electronics* 32, 66-69 (Oct. 9, 1959).
- 5910 U. O. Hutton, A tilting air-lubricated piston gage for pressures below one-half inch of mercury. *NBS J. Research* 63C, 47-57 (1959).
- 5911 N. W. Spencer & R. L. Boggess, A radioactive ionization gage pressure measurement system. *J. Am. Rocket Soc.* 29, 68-71 (1959).
- 5912 J. L. Peters, Mass spectrometer leak detector with improved sensitivity. *Rev. Sci. Inst.* 30, 1093-1095 (1959).
- 5913 A. Crocker, All-metal high-conductance vacuum tap. *J. Sci. Inst.* 36, 447-448 (1959).
- 5914 N. D. Morgulis, G. Ptushinskii & B. A. Chuikov, Certain features of the partial adsorption of residual gas components at very high vacuum. In Russian. *Doklady Akad. Nauk SSSR* 128 No. 5, 930-932 (1959). Translation, *Soviet Physics, Doklady, Am. Inst. Physics* 4, 1108-1110 (1960).
- 5915 D. Alpert, Recent advances in ultra-high vacuum technology. 37 references. *Vacuum* 9, 89-96 (1959).
- 5916 N. C. Balchin & B. L. Mordike, Semi-automatic control of vacuum pumping systems. *Vacuum* 9, 264-268 (1959).
- 5917 R. C. Bradley, Secondary positive ion emission from metal surfaces. *J. Appl. Phys.* 30, 1-8 (1959).
- 5918 G. Carter, Dual pumping speeds of some ionization pumps. *Nature* 183, 1619-1620 (1959).
- 5919 G. Carter, Electrical clean-up of gases in hot cathode discharge tubes. 42 references. *Vacuum* 9, 190-200 (1959).
- 5920 C. L. Gould, Vacuum system for a thirty billion electron volt particle accelerator. *Vacuum* 9, 63-68 (1959).
- 5921 R. G. Herb, Evapor-ion pump development at the University of Wisconsin. *Vacuum* 9, 97-107 (1959).
- 5922 L. Holland, Theory and design of getter-ion pumps. 63 references. *J. Sci. Inst.* 36, 105-116 (1959).
- 5923 R. Jaeckel, The physics and techniques of diffusion pumps. In German. 24 references. *Vacuum* 9, 209-218 (1959).
- 5924 C. G. J. Jansen & A. Venema, A McLeod manometer with prescribed volumes for use as a standard instrument. *Vacuum* 9, 219-230 (1959).
- 5925 I. A. Kaljabina & Y. A. Yukhvidin, Experience in using mass-spectrometric methods in electro-vacuum technology. *Vacuum* 9, 117-125 (1959).
- 5926 M. J. D. Low & H. A. Taylor, Enhanced surface reactions. III. Adsorption of gases on prepared ruthenium surfaces. *J. Electrochem. Soc.* 106, 138-142 (1959).
- 5927 M. L. Lyubimov, K. P. Shakhev & Y. A. Yukhvidin, Experience in designing and manufacturing all-metal vacuum systems. *Vacuum* 9, 108-116 (1959).
- 5928 R. C. Marker, Vacuum techniques and components used for a continuously pumped linear electron accelerator. *Vacuum* 9, 128-133 (1959).
- 5929 L. D. Miller & P. N. Peterson, Automatic level control for liquid nitrogen trap. *Vacuum* 9, 231-232 (1959).
- 5930 D. J. Pacey, A piezoelectric oscillator manometer. *Vacuum* 9, 261-263 (1959).
- 5931 N. W. Robinson & F. Berz, Initial pumping and recovery of ionization gauges. *Vacuum* 9, 48-53 (1959).
- 5932 D. S. Stark, Measurements on the properties of a simple omegatron. *Vacuum* 9, 288-294 (1959).
- 5933 E. Thomas, R. Servranckx & R. Leyniers, On the choice of units of pressure and of flow in vacuum technique. *Vacuum* 9, 207-208 (1959).
- 5934 S. Veis, The measurement of the pressures of various gases by means of a Pirani gauge. *Vacuum* 9, 186-189 (1959).
- 5935 S. A. Vekshinsky, M. I. Menshikov & I. S. Rabinovich, High-vacuum pumps and units for accelerators. *Vacuum* 9, 201-206 (1959).
- 5936 A. Venema, The production of ultra-high vacua by means of a diffusion pump. *Vacuum* 9, 54-57 (1959).
- 5937 L. Dunoyer, The experimental basis of the kinetic theory of gases. *Vacuum* 9, 36-40 (1959).
- 5938 J. Eisinger, Adsorption of oxygen on silicon. *J. Chem. Phys.* 30, 410-412 (1959).
- 5939 J. Eisinger, Adsorption of oxygen on tungsten. *J. Chem. Phys.* 30, 412-416 (1959).

- 5940 W. Espe, Mica as constructional material for high vacuum applications. In German. 74 references. *Vakuum-Tech.* 8, 15-19, 29-38, 67-76 (1959).
- 5941 F. Engel, Gas electrolysis in electron tubes. *Vakuum-Tech.* 8, 44-47 (1959).
- 5942 D. O. Hayward & R. Gomer, Adsorption of carbon dioxide on tungsten. *J. Chem. Phys.* 30, 1617 (1959).
- 5943 J. R. Hearst, S. H. Ahn & E. N. Strait, Vacuum seals at liquid nitrogen temperatures. *Rev. Sci. Inst.* 30, 200 (1959).
- 5944 J. P. Hobson, First adsorbed layer of He at 4.2°K. *Can. J. Phys.* 37, 300-312 (1959).
- 5945 J. F. Kemp, Liquid manometer with electromagnetic balance indicator. *J. Sci. Inst.* 36, 77-81 (1959).
- 5946 H. Klumb & J. Lueckert, Two methods for measuring low vapor pressure. In German. *Vakuum-Tech.* 8, 62-66 (1959).
- 5947 T. Kraus, The pumping speed in high vacuum systems. In German. *Vakuum-Tech.* 8, 39-43 (1959).
- 5948 J. T. Law, Adsorption of hydrogen on silicon. *J. Chem. Phys.* 30, 1568-1576 (1959).
- 5949 S. Petralia & U. Valdre, On the pumping speed of oil diffusion pumps. *Il Nuovo Cimento* 12, 616-622 (1959).
- 5950 V. Roberts, Coolable vacuum-tight window seals for optical use. *J. Sci. Inst.* 36, 99 (1959).
- 5951 G. Saini, F. Ricca & A. Nasini, Adsorption of nitrogen on tungsten at ultra-vacuum. *La ricerca Scientifica* 29, 1523-1533 (1959).
- 5952 H. A. Smith, J. C. Posey & C. O. Thomas, Mercury glass check valves. *Rev. Sci. Inst.* 30, 202 (1959).
- 5953 J. R. Young, Cleaning techniques for rubber o-rings used in vacuum systems. *Rev. Sci. Inst.* 30, 291 (1959).
- 5954 F. C. Hurlbut, Electron beam density probe for measurements in rarefied gas flows. *J. Appl. Phys.* 30, 273-279 (1959).
- 5955 J. F. Kemp, Centrifugal manometer. *Trans. Am. Soc. Mech. Eng.* 81, 341-348 (1959).
- 5956 N. S. Silsby, External interference effects of flow through static-pressure orifices of an airspeed head at several supersonic Mach numbers and angles of attack. *Nat. Aero. Space Agency Memo.* 2-13-59L, 14 p. (1959).
- 5957 N. W. Spencer, R. L. Boggess, H. E. LaGow & R. Horowitz, On the use of ionization gage devices at very high altitude. 21 references. *J. Am. Rock. Soc.* 29, 290-294 (1959).
- 5958 H. Suzuki, Analysis of the air micro pressure gage by the Laplace transformation method. *Hosei U. Tech. Coll. Rept.* No. 4, 48-58 (1959).
- 5959 N. M. Wiederhorn, J. H. Vreeland & R. R. Perron, A new instrument for the determination of molecular weight by differential vapor pressure. *USAF Wright Aero. Dev. Center TR* 58-623, 32 p. (1959).
- 5960 G. N. Patterson, Theory of free molecule, orifice-type pressure probes in isentropic and nonisentropic flows. *Univ. Toronto Inst. Aerophysics Rept.* 41, 15 p. (1959).
- 5961 J. Bailleul-Langlais, A radiometer vacuum gage. *Le Vide* 14, 59-73 (1959).
- 5962 C. R. Brymmer & W. Steckelmacher, Demountable vacuum seal for operation at temperatures from -188 to 880°C. *J. Sci. Inst.* 36, 278-281 (1959).
- 5963 H. J. Bueltemann, The influence of water vapor on the readings of compression vacuum gages. *Vakuum-Tech.* 8, 104-108 (1959).
- 5964 D. A. Degras & P. Andrieux, A new thermistor vacuum gage. *Le Vide* 14, 45-58 (1959).
- 5965 J. Holden, L. Holland & L. Laurenson, Bakeable vacuum seals using aluminum-wire gaskets. *J. Sci. Inst.* 36, 281-283 (1959).
- 5966 F. Kirchner, Flow in high vacuum apparatus. In German. *Zt. f. angew. Phys.* 11, 167-169 (1959).
- 5967 M. Varicak & B. Saftic, Principles of semiconductor manometer in pressure range of 1 to 10^{-6} mm Hg. *Rev. Sci. Inst.* 30, 891-896 (1959).
- 5968 H. B. Benton, Small, light weight ionization gauge control circuit. *Rev. Sci. Inst.* 30, 887-888 (1959).
- 5969 J. P. Boulloud & J. Schweitzer, Experimental study of metal gasketed joints for ultra-high vacuum. *Le Vide* 14, 241-249 (1959).
- 5970 D. A. Degras, Evapor-ion pump with liquid helium trap. *Le Vide* 14, 128-140 (1959).
- 5971 R. P. Henry, Measurement of outgassing speed by Oatley's method. *Le Vide* 14, 226-240 (1959).
- 5972 E. C. Evans & P. E. Melroy, Cartesian manostat for precise differential pressure control. *Inst. Soc. Am. J.* 6, 39 (Oct. 1959).
- 5973 L. Holland & L. Laurenson, The performance and design of a titanium getter pump. *Le Vide* 14, 141-145 (1959).
- 5974 H. Huber, A. M. Shroff & M. Warnecke, Pumping of electron tubes with the titanium pump. *Le Vide* 14, 214-225 (1959).

- 5975 R. L. Jepson, Important characteristics of new type getter-ion pump. *Le Vide* 14, 80-94 (1959).
- 5976 B. G. Lazarev & M. F. Fedorova, Vacuum adsorption pump. In Russian. *Zhurnal Tekhnicheskoi Fiziki* 29, No. 7 862-865 (1959). Translation: Soviet Physics, Technical Physics 4, 778-780 (1960).
- 5977 A. Lorenz, New design of mechanical vacuum pump. *Le Vide* 14, 121-127 (1959).
- 5978 G. Mongodin, Welded pumping assembly for high vacuum, easy to outgas. *Le Vide* 14, 95-97 (1959).
- 5979 K. G. Muller, Description of a gauge for ultra-high vacua and remarks about ultra-high vacua techniques for all-metal mountings. *Le Vide* 14, 250-259 (1959).
- 5980 J. Schweitzer, Ultra high vacuum techniques. 22 references. *Le Vide* 14, 165-182 (1959).
- 5981 E. A. Trendelenburg, Production of ultra high vacua with oil diffusion pumps. *Le Vide* 14, 74-79 (1959).
- 5982 A. Venema, Measurement of pumping speed of vacuum pumps. *Le Vide* 14, 113-120 (1959).
- 5983 E. Wintergerst & H. Lintz, Properties and application of metal diaphragms. *Reglungs-tech.* 7, 160-165 (1959).
- 5984 D. Charles, R. J. Warnecke & J. C. Marchais, Omegaletro type low pressure gas analyzer AM 100. *Le Vide* 14, 274-289 (1959).
- 5985 M. Pequignot & M. Yerna, The use of silica seals in the production of special valves with numerous lead-in wires. *Le Vide* 14, 290-294 (1959).
- 5986 R. Servranckx & R. Leyniers, Security valve for vacuum pumping units. *Le Vide* 14, 295-299 (1959).
- 5987 J. W. Beams, Molecular pumping. *Science* 130, 1406-1407 (1959).
- 5988 R. Gomer, Adsorption and diffusion of argon on tungsten. *J. Phys. Chem.* 63, 468-472 (1959).
- 5989 M. V. C. Sastri, T. S. Viswanthan & T. S. Nagarjunan, The influence of a chemisorbed layer of carbon monoxide on subsequent physical adsorption. *J. Phys. Chem.* 63, 518-521 (1959).
- 5990 H. L. Pickering & H. C. Eckstrom, Heterogeneous reaction studies by infrared absorption. *J. Phys. Chem.* 63, 512-517 (1959).
- 5991 R. A. Pierotti & G. D. Halsey, Jr., The interaction of krypton with metals. An appraisal of several interaction theories. *J. Phys. Chem.* 63, 680-686 (1959).
- 5992 J. L. Shereshevsky & B. R. Mazumder, The adsorption of some gases on evaporated metal films and on oxidized films of nickel. *J. Phys. Chem.* 63, 1630-1638 (1959).
- 5993 S. J. Stephens, Surface reactions on evaporated palladium films. *J. Phys. Chem.* 63, 188-194 (1959).
- 5994 R. L. Stow, Titanium as a gettering material. *Nature* 184, Suppl. No. 8, 542-543 (1959).
- 5995 D. G. Bills & A. A. Evett, Glass, a disturbing factor in physical electronics measurements. *J. Appl. Phys.* 30, 564-567 (1959).
- 5996 Y. L. Sandler & M. Gazith, Surface properties of germanium. *J. Phys. Chem.* 63, 1095-1102 (1959).
- 5997 W. F. Wolff & P. Hill, Adsorption of inert gases by modified carbons. *J. Phys. Chem.* 63, 1161-1164 (1959).
- 5998 D. W. McKee, The sorption of hydrocarbon vapors by silica gel. *J. Phys. Chem.* 63, 1256-1259 (1959).
- 5999 R. Klein, Adsorption, diffusion and evaporation of carbon monoxide on tungsten. *J. Chem. Phys.* 31, 1306-1313 (1959).
- 59100 J. C. Boulassier, Vacuum outgassing of material at ambient temperature. *Le Vide* 14, 39-44 (1959).
- 59101 R. K. Burshtein & D. L. Kondrashov, Pirani gage for measuring pressure of corrosive gases. *Zhur. Fiz. Khim.* 33, 1653-1654 (1959).
- 59102 G. Carter & J. H. Leck, Bistable behavior of the Bayard-Alpert ionization gage. *Brit. J. Appl. Phys.* 10, 364-367 (1959).
- 59103 P. K. Dutt & S. K. Mukherjee, A palladium Pirani gage. In English. *Zt. angew. Phys.* 11, 470-474 (1959).
- 59104 A. M. Grigor'ev, Manometers for measuring ultra high vacuum. *Pribory i Tekh. Eksperimenta*, No. 6, 10-13 (1959). Translation, Inst. & Exp. Tech. Inst. Soc. Am. p. 870-872 (1960).
- 59105 Z. Knorr, Construction of vacuum apparatus. *Chem. Listy (Prague)* 53, 941-944 (1959).
- 59106 M. I. Menshikov, Development of the technique of obtaining vacuum. 49 references. *Pribory i Tekh. Eksperimenta* No. 4, 3-21 (1959).
- 59107 P. A. Redhead, Magnetron gage: a cold-cathode vacuum gage. *Can. J. Phys.* 37, 1260-1271 (1959).
- 59108 A. A. Sakovich, R. I. Grigor'eva, V. S. Grigor'ev & I. V. Blond, Titanium absorption pump. *Vestnik Electro-Prom* 30, No. 6, 13-16 (1959).

- 59109 E. F. Doil'nitsyn, A. I. Trubetskoi & M. Y. Shcherbakova, Miniature radio frequency mass spectrometer. *Pribory i fekh. Eksperimenta.* No. 2, 81-82 (1959). Translation, Inst. Soc. Am., Inst. & Exp. Tech. No. 2, 262-264 (1960).
- 59110 V. M. Gavril'yuk & Y. M. Kucherov, Ionization vacuum gage for measuring pressures of 10^{-4} to 10^{-10} mm Hg. *Pribory i Tekh. Eksperimenta.* No. 2, 83-85 (1959). Translation, Inst. Soc. Am., Inst. & Exp. Tech. No. 2, 264-266 (1960).
- 59111 I. O. Grishaev, B. A. Terekhov, L. K. Myakushko & G. L. Fursov, A titanium pump. *Ukrain. Fiz. Zhur.* 4, 750-754 (1959).
- 59112 I. Kanomata, T. Oguri, Y. Kaneko & T. Hayakawa, Mass spectrometer for static operation. *Oyo Butsuri* 28, 584-593 (1959).
- 59113 L. Paty, Measuring of ultra high vacuum. 35 references. *Pribory i Tekh. Eksperimenta* 6, 3-10 (1959). Translation, Inst. Soc. Am., Inst. & Exp. Tech. No. 6, 863-869 (1960).
- 59114 J. Pollard, Progress in vacuum technology. 95 references. *Reports, Progress Phys.* 22, 33-73 (1959).
- 59115 K. Thiele, Electromagnetically controlled all-glass stop-cock for very high vacuum. *Vakuum-Tech.* 8, 223-226 (1959).
- 59116 N. N. Axelrod, Ultra high-vacuum valve. *Rev. Sci. Inst.* 30, 944-945 (1959).
- 59117 H. L. Caswell, Liquid helium trap for high pumping speed at low pressures. *Rev. Sci. Inst.* 30, 1054-1055 (1959).
- 59118 M. T. Dmitriev, A convection manometer. *Pribory i Tekh. Eksper.* No. 3, 148-149 (1959). Translation, Instruments and Exp. Tech., Inst. Soc. Am. No. 3, 495-496 (1960).
- 59119 I. P. S. Fish, Method for rapid determination of vacuum outgassing rates. *Rev. Sci. Inst.* 30, 889-890 (1959).
- 59120 C. M. Haaland, Metal bakeout valve for ultra high vacuum. *Rev. Sci. Inst.* 30, 947-948 (1959).
- 59121 A. Kogan, A sensitive two-liquid micromanometer. *Bull. Research Coun. Israel* C7, No. 1, 33-36 (1959).
- 59122 V. Mizushima & Z. Oda, Nonproportionality in Bayard-Alpert ionization gauge and the ultimate vacuum determination of diffusion pumps. *Rev. Sci. Inst.* 30, 1037-1041 (1959).
- 59123 I. E. Nakhutin & E. I. Sutyagina, Absorption of hydrogen by palladium at low temperatures. *Fiz. Metallov i Metallovedenie* 7, 459 (1959).
- 59124 N. W. Robinson, All-metal bakeable taps for high vacuum. *Electronic Engg.* 31, 759-760 (1959).
- 59125 G. Strotzer, On the electrical clean-up of gases in the high-vacuum pressure range. II. *Zt. angew. Phys.* 11, 223-234 (1959).
- 59126 R. M. Barrer & W. I. Stuart, Ion exchange and the thermodynamics of intercrystalline sorption. I. Energetics of occlusion of argon and nitrogen by Faujasite-type crystals. II. Entropy of same. *Proc. Roy. Soc., London, A249*, 464-497 (1959).
- 59127 P. Schuerer & L. Eckertova, Simple construction of glass titanium pump. *Czech. J. Phys.* 9, 753-754 (1959).
- 59128 J. Yarwood, Summarized proceedings of a symposium on current developments in the production of high vacua. *Brit. J. Appl. Physics* 10, 383-391 (1959).
- 59129 E. A. Ab, R. I. Plotnikov & L. A. Khutishvili, Sorption of hydrogen by titanium and zirconium at low pressures. *Zh. Tekh. Fiz.* 29, No. 9, 1146-1151 (1959).
- 59130 Y. I. Belyakov & E. I. Agishev, The application of the pulse mass spectrometer to the study of gas evolution from metals. *Zh. Tekh. Fiz.* 29, No. 6, 796-798 (1959). Translation, Soviet Physics-Technical Physics, Am. Inst. Phys. 4, No. 6, 717-719 (1959).
- 59131 M. H. Green & K. H. Maxwell, Adsorption on clean germanium surfaces. *J. Phys. Chem. Solids* 11, 195-204 (1959).
- 59132 K. G. Guenther, Vacuum technology. Report on 1st Int. Cong. on Vacuum Technology, June 10-13, 1959, Namur. In German. 61 references. *Chem. Ing. Tech.* 31, 379-387 (1959).
- 59133 J. W. Wheeldon, Adsorption of sodium and argon by glass. *Brit. J. Appl. Phys.* 10, 295-298 (1959).
- 59134 A. J. Ahearn, Mass spectrographic studies of impurities on surfaces. Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc. (1959) 1-5. (Pergamon Press, New York, 1960).
- 59135 S. P. Wolsky & E. J. Zdanuk, The vacuum microbalance and omegatron spectrometer: study of the interaction of oxygen and clean germanium surfaces. 18 references. Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc. (1959) 6-11. (Pergamon Press, New York, 1960).
- 59136 P. A. Redhead, The desorption spectrometer as an analytic tool in ultra-high-vacuum investigations. Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc. (1959) 12-15. (Pergamon Press, New York, 1960).
- 59137 G. E. Moore, The ionization of adsorbed gas by impact of slow electrons. Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc. (1959) 16-19. (Pergamon Press, New York, 1960).

- 59138 R. E. Honig, Ultra-high vacuum studies with a small bakeable mass spectrometer. Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc. (1959) 20-26. (Pergamon Press, New York, 1960).
- 59139 A. Klopfer, S. Garbe & W. Schmidt, Residual gases in vacuum systems. Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc. (1959) 27-33. (Pergamon Press, New York, 1960).
- 59140 D. Charles & R. J. Warnecke, Jr., Experimental study of a omegatron type mass spectrometer. Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc. (1959) 34-41. (Pergamon Press, New York, 1960).
- 59141 I. Farkass & G. F. Vanderschmidt, The production of ultra-high vacuum in metal systems larger than one thousand liters. 16 references. Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc. (1959) 42-47. (Pergamon Press, New York, 1960).
- 59142 J. C. Simons, Jr., An ultra-high vacuum chamber for space simulation. Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc. (1959) 48-54. (Pergamon Press, New York, 1960).
- 59143 M. Rivera & R. Le Riche, A differentially pumped ultra-high vacuum system. Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc. (1959) 55-59. (Pergamon Press, New York, 1960).
- 59144 H. Schwarz, Ultra-high vacuum pumping by vibrating membrane. Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc. (1959) 60-65. (Pergamon Press, New York, 1960).
- 59145 H. L. Caswell, An oil-free ultra-high vacuum system for the deposition of thin films. Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc. (1959) 66-71. (Pergamon Press, New York, 1960).
- 59146 H. G. Noeller, G. Reich & W. Baechler, Diffusion pump and baffle system of large suction speeds for pressures lower than 10⁻⁸ Torr. Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc. (1959) 72-74. (Pergamon Press, New York, 1960).
- 59147 N. A. Florescu, New method for vacuum measurements in the molecular range of pressures. Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc. (1959) 75-81. (Pergamon Press, New York, 1960).
- 59148 J. R. Roehrig & G. F. Vanderschmidt, Advances in the design of vacuum gauges using radioactive materials. Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc. (1959) 82-84. (Pergamon Press, New York, 1960).
- 59149 R. L. Ramey, The theory and design of sub-miniature ionization gauge tubes. Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc. (1959) 85-88. (Pergamon Press, New York, 1960).
- 59150 P. L. Vitkus, A multi-point vacuum measuring system for low pressure wind tunnels. Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc. (1959) 89-93. (Pergamon Press, New York, 1960).
- 59151 J. L. Peters, An ultra-sensitive mass spectrometer leak detector and its application to vacuum technology. Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc. (1959) 94-96. (Pergamon Press, New York, 1960).
- 59152 C. B. Bicknell, An improved helium-only sensitive method for calibrating silica membrane helium leaks. Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc. (1959) 97-100. (Pergamon Press, New York, 1960).
- 59153 B. B. Dayton, Relations between size of vacuum chamber, outgassing rate, and required pumping speed. 45 references. Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc. (1959) 101-119. (Pergamon Press, New York, 1960).
- 59154 D. J. Santeler, Pressure simulation of outer space. Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc. (1959) 129-133. (Pergamon Press, New York, 1960).
- 59155 D. L. Stevenson, A new type of boiler that permits improvements in the performance of oil diffusion pumps. Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc. (1959) 134-139. (Pergamon Press, New York, 1960).
- 59156 H. R. Smith, Relationship of diffusion pump performance to the thermodynamics of the pumping fluid. Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc. (1959) 140-145. (Pergamon Press, New York, 1960).
- 59157 W. K. Huber & E. A. Trendelenburg, Recent developments of ultra-high vacuum systems using oil diffusion pumps. Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc. (1959) 146-149. (Pergamon Press, New York, 1960).
- 59158 W. G. Henderson, J. T. Mark & C. S. Geiger, Evaluation of large diffusion pumps and traps for the ultra-high vacuum system of the Model C-Stellarator. Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc. (1959) 170-175. (Pergamon Press, New York, 1960).
- 59159 G. E. Becker, Adsorption of gases on mercury at 77°K. Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc. (1959) 197-203. (Pergamon Press, New York, 1960).
- 59160 T. Kraus, On the use of the pumping time equation in the vacuum technique. Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc. (1959) 204-205. (Pergamon Press, New York, 1960).

- 59161 S. R. Mielczarek, D. C. Schubert & L. Marton, Apparatus for electron optical study of low-density gas flow. *Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc.* (1959) 206-209. (Pergamon Press, New York, 1960).
- 59162 F. R. Gleason, J. H. Greiner & L. R. Yetter, Gas absorption by vacuum evaporated magnetic films. *Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc.* (1959) 223-227. (Pergamon Press, New York, 1960).
- 59163 K. H. Behrndt, A demountable ultra-high vacuum glass system and its components. 28 references. *Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc.* (1959) 255-260. (Pergamon Press, New York, 1960).
- 59164 H. Ehlers & J. Moll, Results with ultra-high vacuum metal system including windows, evaporators and lead-ins. *Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc.* (1959) 261-264. (Pergamon Press, New York, 1960).
- 59165 T. H. Batzer, A large bakeable vacuum valve. *Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc.* (1959) 265-267. (Pergamon Press, New York, 1960).
- 59166 H. R. Smith & P. B. Kennedy, Ultra-low temperature mechanical refrigeration systems for high-vacuum traps and baffles. *Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc.* (1959) 271-277. (Pergamon Press, New York, 1960).
- 59167 J. A. Zollman, I. E. Martin & J. A. Powell, Ceramic, sapphire and glass seals for the model C-stellarator. *Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc.* (1959) 278-282. (Pergamon Press, New York, 1960).
- 59168 F. A. Loughridge & W. S. Wong, Improved reliability of soft glass to metal vacuum tight seals. *Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc.* (1959) 283-287. (Pergamon Press, New York, 1960).
- 59169 J. Morrison, The behavior of titanium in a high vacuum. *Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc.* (1959) 291-296. (Pergamon Press, New York, 1960).
- 59170 A. Klopfer & W. Ernrich, Properties of a small titanium-ion pump. *Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc.* (1959) 297-301. (Pergamon Press, New York, 1960).
- 59171 W. M. Brubaker, A method for greatly enhancing the pumping action of a Penning discharge. *Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc.* (1959) 302-306. (Pergamon Press, New York, 1960).
- 59172 R. Zaphiropoulos & W. A. Lloyd, Design considerations for high speed getter-ion pumps. *Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc.* (1959) 307-310. (Pergamon Press, New York, 1960).
- 59173 I. Ames & R. L. Christensen, Some studies of getter-ion pumped vacuum systems. 19 references. *Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc.* (1959) 311-316. (Pergamon Press, New York, 1960).
- 59174 P. della Porta, Recent information on the gettering of gases by barium films. *Trans. 6th Natl. Symp. on Vacuum Tech., Am. Vacuum Soc.* (1959) 317-324. (Pergamon Press, New York, 1960).
- 59175 S. P. Wolsky, Studies of semiconductor materials using vacuum microbalance. *Semiconductor Products* 2, 36-41 (1959).
- 59176 G. Ehrlich, Molecular processes at the gas-solid interface. 160 references. *Proceedings, Int. Conf. on Structure and Properties of Thin Films*, Bolton Landing, N. Y. (Sept. 1959) 423-475. (Wiley & Sons, 1959).
- 59177 G. Thuronyi, Selected annotated bibliography on propagation of acoustic and explosion waves in the atmosphere. 122 references. *Meteorological Abstracts and Bibliography, Am. Meteor. Soc.* 10, 1072-1098 (1959).
- 59178 T. Punter, Methods of cleaning glass by vapour degreasing and ultrasonically agitated solvents. *Brit. J. Appl. Phys.* 10, 332-336 (1959).
- 6001 C. Y. Bartholomew & A. R. LaPadula, Penetration depth investigation of gas cleanup with radioactive tracers. *J. Appl. Phys.* 31, 445 (1960).
- 6002 T. W. Hickmott, Interaction of atomic hydrogen with glass. *J. Appl. Phys.* 31, 128-136 (1960).
- 6003 C. C. Leiby, Jr. & C. L. Chen, Diffusion coefficients, solubilities, and permeabilities for He, Ne, H₂, and N₂ in vycor glass. *J. Appl. Phys.* 31, 268-274 (1960).
- 6004 B. J. Todd, J. L. Lineweaver & J. T. Kerr, Outgassing caused by electron bombardment of glass. *J. Appl. Phys.* 31, 51-55 (1960).
- 6005 H. D. Hagstrum & C. D'Amico, Production and demonstration of atomically clean metal surfaces. *J. Appl. Phys.* 31, 715-723 (1960).
- 6006 P. della Porta & F. Ricca, The gettering of carbon monoxide by barium films. 77 references. *Le Vide* 15, 3-27 (1960).
- 6007 M. Warnecke & P. C. Moutou, On a miniature titanium pump. *Le Vide* 15, 41-51 (1960).
- 6008 H. H. Reamer & B. H. Sage, High pressure manometer. *Rev. Sci. Inst.* 31, 337-341 (1960).

- 6009 W. G. Brombacher, D. P. Johnson & J. L. Cross, Mercury barometers and manometers. NBS Monograph No. 8, 59 p. (1960).
- 6010 J. M. Anderson, Thin vacuum-tight mica window suitable for baking at 500° C. Rev. Sci. Inst. 31, 898-899 (1960).
- 6011 L. A. Harris, Trapping with alumina in vacuum systems and its effect on cathode activity. Rev. Sci. Inst. 31, 903-904 (1960).
- 6012 G. Thomaes & R. Van Steenwinkel, Measurement of small differences in the second virial coefficient of gases below 0° C. Rev. Sci. Inst. 31, 825-827 (1960).
- 6013 N. A. Florescu, On the conductance of systems for molecular flow of gases. 12 references. Le Vide 15, 197-209 (1960).
- 6014 J. Herbert, New applications of glass in electronics. Le Vide 15, 268-285 (1960).
- 6015 W. Huber & E. A. Trendelenburg, Recent developments of ultra-high vacuum systems using oil diffusion pumps. Le Vide 15, 132-139 (1960).
- 6016 J. Pierre, Calibration systems in vacuum technique. Le Vide 15, 210-219 (1960).
- 6017 R. Rocherolles, Pumping of tubes on a double pumping unit. Le Vide 15, 112-119 (1960).
- 6018 W. Dahlke & H. J. Schuetze, Residual gas pressure in electron tubes. Method of measurement. Vacuum 10, 3-4 (1960).
- 6019 H. J. Schuetze & H. W. Ehlbeck, Residual gas in electron tubes. Experimental results. Vacuum 10, 5-6 (1960).
- 6020 A. Klopfer, S. Garbe & W. Schmidt, Residual gases in vacuum systems. Vacuum 10, 7-12 (1960).
- 6021 S. P. Wolsky & E. J. Zdanuk, The investigation of residual gases in vacuum systems. Vacuum 10, 13-21 (1960).
- 6022 J. C. Franken & J. Van Der Waal, Residual gases in picture tubes. Vacuum 10, 22-26 (1960).
- 6023 R. H. Collins & J. C. Turnbull, Evolution and absorption of gases in electron tubes. Vacuum 10, 27-30 (1960).
- 6024 W. Tretner, An electrostatic mass spectrometer. Vacuum 10, 31-34 (1960).
- 6025 G. Reich & F. Flecken, Analysis of partial pressures by means of omegatron and farvotron. Comparative view of the ranges of application. Vacuum 10, 35-39 (1960).
- 6026 J. P. Freytag, Use of a test diode as a means of controlling the materials of construction of electronic tubes. In French. 25 references. Vacuum 10, 40-48 (1960).
- 6027 R. J. Warnecke, Jr., Application of mass spectrometers in electron tube technology. In French. Vacuum 10, 49-57 (1960).
- 6028 F. A. Baker & T. A. Giorgi, The applicability of the omegatron to continuous analysis of residual gases. Vacuum 10, 58-63 (1960).
- 6029 G. Calvi, Double Pirani bridge leak detector. Vacuum 10, 64-67 (1960).
- 6030 A. Nasini, F. Ricca & G. Saini, Clean surfaces and sorption of gases. 29 references. Vacuum 10, 68-74 (1960).
- 6031 N. W. Robinson, The action of molybdenum, tungsten, tantalum and nickel on residual gases in a vacuum system. Vacuum 10, 75-80 (1960).
- 6032 S. Garbe, A. Klopfer & W. Schmidt, Some reactions of water in electron tubes. Vacuum 10, 81-85 (1960).
- 6033 S. H. Cross, System design and the choice of materials for the Nimrod vacuum system. Vacuum 10, 86-91 (1960).
- 6034 K. Hashimoto, H. Iwayanagi & H. Fukushima, Measurement of gas evolution and absorption from materials used in vacuum tubes. Vacuum 10, 92-99 (1960).
- 6035 R. W. Lawson, The influence of residual gas on the performance of the British Post Office submarine telephone repeater valve type 6PL2. Vacuum 10, 100-105 (1960).
- 6036 N. W. W. Smith, Noise reduction in microwave tubes by getter-ion pumping. Vacuum 10, 106-109 (1960).
- 6037 T. H. Briggs & S. Nadeau, Effects of continuous gas clean-up upon cathode emission and cathode interface impedance. 10 references. Vacuum 10, 112-117 (1960).
- 6038 R. A. Haefer, On the use of metal-oil diffusion pumps when operating with discharge tubes sensitive to hydrocarbons. 14 references. Vacuum 10, 118-120 (1960).
- 6039 L. Malter & H. Mandoli, Electron tube processing with getter-ion pumps. Vacuum 10, 121-127 (1960).
- 6040 A. Klopfer & W. Ernrich, Properties of a small titanium-ion pump. Vacuum 10, 128-132 (1960).
- 6041 L. Holland & A. Harfe, The gas sorption characteristics of Penning pumps and titanium films. Vacuum 10, 133-140 (1960).
- 6042 J. Bailleul-Langlais, Barium getters in electronic receiving tubes. In French. 48 references. Vacuum 10, 143-150 (1960).
- 6043 K. Hashimoto & K. Kitagawa, Some barium getter problems on the vacuum tubes. Vacuum 10, 156-161 (1960).

- 6044 J. M. Sourdillon, Use of zirconium sintered getters. In French. Vacuum 10, 162-165 (1960).
- 6045 J. H. N. van Vucht, The Ceto getter--its chemical structure and hydrogen gettering properties. Vacuum 10, 170-177 (1960).
- 6046 S. Fukagawa, Gettering activity of Zr, Ti and Ba for oxygen gas under mercury vapour. Vacuum 10, 178-180 (1960).
- 6047 P. della Porta, Apparatus and techniques for measurement of the adsorption of gases by evaporated getters. 14 references. Vacuum 10, 181-187 (1960).
- 6048 M. G. Charlton, D. Newson & P. J. Whitchurch, An automatic apparatus for the testing of getter adsorption. Vacuum 10, 189-193 (1960).
- 6049 P. della Porta, S. Origlio & E. Argano, The influence of ionizing currents and hot filaments on the gas adsorption by barium films. 13 references. Vacuum 10, 194-198 (1960).
- 6050 J. J. B. Fransen & H. J. R. Perdijk, The absorption of gases by barium getter films applied as a tool. Vacuum 10, 199-203 (1960).
- 6051 H. J. R. Perdijk, Structure of barium getter films. Vacuum 10, 204-209 (1960).
- 6052 K. M. Yazawa, Study of the surface structure of barium getter deposited film by an electron microscope. Vacuum 10, 210-211 (1960).
- 6053 M. G. Charlton & F. H. Southam, The adsorption of methane by barium films in the presence of a thermionic current. Vacuum 10, 212-214 (1960).
- 6054 F. Ricca & P. della Porta, Carbon monoxide sorption by barium films. 26 references. Vacuum 10, 215-222 (1960).
- 6055 P. della Porta & E. Argano, Nitrogen sorption by barium films. Vacuum 10, 223-226 (1960).
- 6056 P. della Porta & S. Origlio, Hydrogen sorption by barium films. Vacuum 10, 227-230 (1960).
- 6057 J. Hejzlar & V. Horáček, Selective getters. 8 references. Vacuum 10, 231-233 (1960).
- 6058 S. Jerič & E. Kansky, A method of measuring of caesium vapour pressure in photoelectric tubes. Vacuum 10, 234-239 (1960).
- 6059 E. Kansky & S. Jerič, Some results of the measurement of caesium vapour pressure in photoelectric tubes during their manufacture and life. Vacuum 10, 240-244 (1960).
- 6060 N. A. Florescu, The theoretical development of the vapour vacuum pump. Vacuum 10, 250-259 (1960).
- 6061 R. N. Bloomer, On the general principles of chemical and ionic pumping. 20 references. Vacuum 10, 260-262 (1960).
- 6062 H. Batey, Carbon contamination of glassware used for vacuum purposes. Vacuum 10, 263-265 (1960).
- 6063 L. Ellsworth, Calibration factors of ionization gauges for hydrocarbon gas mixtures. Vacuum 10, 266-267 (1960).
- 6064 G. Hinzpeter, A hot cathode ionization gage for measuring pressures to 10^{-1} Torr. In German. Experimentelle Tech. Phys. 8, 89-95 (1960).
- 6065 R. Gilmont, Improved McLeod gage. Inst. and Control Systems 33, 1350-1351 (1960).
- 6066 H. L. Eschbach & R. Jaeckel, Enamelled walls for ultra high vacuum containers. In German. Z. Naturforsch. 15a, 268-269 (1960).
- 6067 T. & A. Roth, Nomographic design of vacuum installations. Brit. Chem. Eng. 5, 392-400 (1960).
- 6068 J. Siedlewski & K. Karpinski, Adsorption methods of determining the surface area of adsorbents and catalysts. 45 references. Wiadomości Chemiczne. 14, 279-294 (1960).
- 6069 L. A. Camby & C. J. Milner, Sensitivity of the omegatron. Rev. Sci. Inst. 31, 776 (1960).
- 6070 G. Barnes, New type of cold cathode vacuum gauge for the measurement of pressures below 10^{-3} mm Hg. Rev. Sci. Inst. 31, 608-611 (1960).
- 6071 F. A. Baker, Nonproportionality in the Bayard-Alpert ionization gauge. Rev. Sci. Inst. 31, 911 (1960).
- 6072 N. A. Florescu, Design of glass oil-vapour vacuum pumps. Lab. Practice 9, 33-34 (1960).
- 6073 R. H. Goodall, Transparent electroconductive coatings on lead glass. Rev. Sci. Inst. 31, 344-345 (1960).
- 6074 B. Gorowitz, K. Moses & P. Gloersen, Magnetically driven fast-acting valve for gas injection into high vacua. Rev. Sci. Inst. 31, 146-148 (1960).
- 6075 N. R. Daly, High sensitivity mass spectrometer leak detector. Rev. Sci. Inst. 31, 720-723 (1960).
- 6076 O. M. Katz & E. A. Gulbransen, Permeability and diffusivity of hydrogen through a palladium tube. Rev. Sci. Inst. 31, 615-617 (1960).

- 6077 Westinghouse Mfg. Co., Measurement of ultra-low pressures. Electronics 33, 106 (Nov. 11, 1960).
- 6078 L. R. Linner, R. I. George & R. B. McQuistan, Automatic vacuum control in the 760 to 1 x 10⁻⁸ Torr range. Rev. Sci. Inst. 31, 650-652 (1960).
- 6079 P. A. Redhead, Modulated Bayard-Alpert gauge. Rev. Sci. Inst. 31, 343-344 (1960).
- 6080 D. E. Swets, Application of the RCA 1945 gauge to the analysis of hydrogen in metals. Rev. Sci. Inst. 31, 659 (1960).
- 6081 H. W. Drawin, The applicability of a capacity micromanometer as a vacuum gage. In German. Zt. Instrumentenk. 68, 1-8 (1960).
- 6082 D. D. Eley & P. R. Wilkinson, Adsorption and oxide formation on aluminum films. Proc. Roy. Soc., London, A254, 327-342 (1960).
- 6083 T. W. Hickmott, Interaction of hydrogen with tungsten. J. Chem. Phys. 32, 810-823 (1960).
- 6084 W. S. Kreisman, Methods of using a McLeod gauge to measure higher pressures. Rev. Sci. Inst. 31, 782-784 (1960).
- 6085 L. A. Noble, W. H. Sain & R. K. Waits, Compact palladium diffusion leak for hydrogen. Rev. Sci. Inst. 31, 789-790 (1960).
- 6086 L. Páty, An experimental equipment for obtaining very low pressures. In Czech. Slaboproudý Obzor 21, 106-109 (1960).
- 6087 H. Schwarz, Forced periodic changes of kinetic energy of gas molecules as a means of vacuum measurement. Rev. Sci. Inst. 31, 433-439 (1960).
- 6088 P. Weulersse, M. Balkanski & P. Aigrain, Study of chemisorption and photodesorption on oxidized titanium. In French. Compte Rend. Acad. Sci. 250, 1246-1248 (1960).
- 6089 Y. I. Belyakov & N. I. Ionov, Pulsed mass-spectrograph investigation of desorption of hydrogen and deuterium from palladium. Zh. Tekh. Fiz. 30, No. 2, 216-222 (1960). Translation, Soviet Physics, Technical Physics, Am. Inst. Physics, 5 No. 2, 195-200 (1960).
- 6090 K. B. Blodgett & T. A. Vanderslice, Mechanism of inert gas cleanup in a gaseous discharge. J. Appl. Phys. 31, 1017-1023 (1960).
- 6091 R. K. Burshtein, L. A. Larin & G. F. Voronina, Chemisorption of oxygen on germanium. Dokl. Akad. Nauk. SSSR 130, No. 4, 801-803 (1960).
- 6092 K. W. T. Elliott, D. C. Wilson, F. C. P. Mason & P. H. Bigg, Primary standard barometer of range 0 to 1200 mb. J. Sci. Inst. 37, 162-166 (1960).
- 6093 M. Green & K. H. Maxwell, The adsorption of oxygen on clean silicon surfaces. J. Phys. Chem. Solids 13, 145-150 (1960).
- 6094 F. A. Lewis & W. H. Schurter, Absorption of hydrogen by palladium-silver alloys. Naturwissenschaften 47, 177-178 (1960).
- 6095 W. McGowan & L. Kerwin, Some sensitivities of ion gauges. Can. J. Phys. 38, 567-569 (1960).
- 6096 L. Páty, Pumping effect of a gas discharge high-vacuum pump. Nature 185, 674-675 (1960).
- 6097 J. F. Sayers, Epoxy-resin joints for sealed-off high vacuum tubes. J. Sci. Inst. 37, 203-205 (1960).
- 6098 O. Sinanoglu & K. S. Pitzer, Interactions between molecules adsorbed on a surface. J. Chem. Phys. 32, 1279-1288 (1960).
- 6099 F. G. Allen, T. M. Buck & J. T. Law, p Layers on vacuum heated silicon. J. Appl. Phys. 31, 979-985 (1960).
- 6100 R. N. Bloomer & W. C. Brooks, Simple detector for small leaks using a thoriated tungsten emitter with oxygen as a probe gas. J. Sci. Inst. 37, 306-307 (1960).
- 6101 P. Bouyer, C. Cassignol & P. Lazeyras, An all-metal leak valve. Le Vide 15, 297-300 (1960).
- 6102 W. E. Danforth & D. L. Goldwater, Density of a thorium monolayer for maximum thermionic emission. J. Appl. Physics 31, 1715-1717 (1960).
- 6103 M. Green & K. H. Maxwell, Cut-off for the vacuum manipulation of chlorine. J. Sci. Inst. 37, 303-304 (1960).
- 6104 A. E. D. Heylen, Bakeable bellows-type differential pressure manometer. J. Sci. Inst. 37, 251-252 (1960).
- 6105 D. Lichtman, Use of the omegatron in the determination of parameters affecting limiting pressures in vacuum devices. J. Appl. Phys. 31, 1213-1221 (1960).
- 6106 G. Mesnard & R. Uzan, Temperature variations of oxide coated cathode produced by current flow. Le Vide 15, 301-312 (1960).
- 6107 J. Pierre, Fluid traps in vacuum technique. Le Vide 15, 313-323 (1960).
- 6108 P. Cannon, The submonolayer adsorption of argon and krypton on molybdenum disulphide; phenomenological comparison with studies on graphite. J. Phys. Chem. 64, 858-861 (1960).
- 6109 B. H. Clampitt & D. E. German, Adsorption on porous solids. J. Phys. Chem. 64, 284-286 (1960).

- 60110 G. L. Gaines, Jr., & P. Cannon, On the energetics of physically adsorbed films, with particular reference to the use of krypton for surface area measurement. *J. Phys. Chem.* 64, 997-1000 (1960).
- 60111 D. T. Peterson & D. G. Westlake, Diffusion of hydrogen in thorium. *J. Phys. Chem.* 64, 649-651 (1960).
- 60112 R. H. Mueller, Wide range electronic micro-manometer useful in research laboratory. *Anal. Chem.* 32, 103A-106A (Nov. 1960).
- 60113 G. Barnes, Erroneous readings of large magnitude in a Bayard-Alpert ionization gauge and their probable cause. 36 references. *Rev. Sci. Inst.* 31, 1121-1127 (1960).
- 60114 H. J. Bixler, A. S. Michaels & R. B. Parker, Use of McLeod gauges at room temperature for gases with high critical temperature. *Rev. Sci. Inst.* 31, 1155 (1960).
- 60115 A. O. Nier, Small general purpose double focusing mass spectrometer. 27 references. *Rev. Sci. Inst.* 31, 1127-1132 (1960).
- 60116 K. Hickman, Pump fluids for higher vacuums. *Nature* 187, 405-406 (1960).
- 60117 R. Schneiderreit, A vacuum gage for normal pressure to high vacuum in one range with continuous indication. In German. *Vakuum-Tech.* 9, 128-130 (1960).
- 60118 A. P. Flanick & J. Ainsworth, A thermistor pressure gauge. *Natl. Aero. Space Adm. Technical Note D-504*, 13 p. (1960).
- 60119 W. G. Van Dorn, A low frequency microbarograph. *J. Geophys. Res.* 65, 3693-3698 (1960).
- 60120 M. W. Roberts, High vacuum techniques. 44 references. *J. Roy. Inst. Chem.* 84, 275-282 (1960).
- 60121 W. B. Nottingham & F. L. Torney, Jr., A detailed examination of the principles of ion gauge calibration. *MIT Research Lab. of Electronics Tech. Report 379*, 10 p. (1960).
- 60122 L. H. Germer & C. D. Hartman, Oxygen on nickel. *J. Appl. Phys.* 31, 2085-2095 (1960).
- 60123 J. R. Friendly, Jr., Integration of current through getter-ion pumps. *Rev. Sci. Inst.* 31, 1350 (1960).
- 60124 S. Leefe & M. Liebson, Leveling system for liquid nitrogen. *Rev. Sci. Inst.* 31, 1353-1354 (1960).
- 60125 C. F. Robinson, Mass spectrometry, p. 463-544, in *Physical methods in chemical analysis*, edited by W. J. Berl, 2d rev. edition, VI, Academic Press (1960).
- 60126 N. A. Florescu, Improvement in operation with McLeod gauge. *Vacuum* 10, 329-330 (1960).
- 60127 K. G. Guenther, A partial pressure gauge working according to the principle of the electrical mass filter. *Vacuum* 10, 293-309 (1960).
- 60128 R. Hawley, Vacuum as an insulator. 85 references. *Vacuum* 10, 310-318 (1960).
- 60129 G. Horikoshi & A. Miyahara, High speed ionization gauge. *J. Vacuum Soc., Japan* 3, 13-18 (1960).
- 60130 R. O. Jenkins & W. G. Trodden, Physical processes in small titanium ion pumps. *Vacuum* 10, 319-328 (1960).
- 60131 K. Kawasaki, T. Sugita, et al, An ultra-high vacuum mass spectrometer. *J. Vacuum Soc., Japan* 3, 96-103 (1960).
- 60132 P. Schwerdtfeger, A tetrode ionization gauge. *Vacuum* 10, 330-331 (1960).
- 60133 F. A. Baker & T. A. Giorgi, Sorption and desorption in a hot-cathode ionization gage. *Brit. J. Appl. Phys.* 11, 433-436 (1960).
- 60134 L. Holland & L. Laurenson, Pumping characteristics of a titanium droplet getter-ion pump. *Brit. J. Appl. Phys.* 11, 401-407 (1960).
- 60135 H. J. Bomelburg, Miniature hot wire pressure gages for wind tunnel work. *Ballistic Res. Labs., Aberdeen Proving Ground, BRL Report No. 1095*, 25 p. (1960).
- 60136 W. S. Kreisman, A high vacuum gauge calibration system. *Geophysics Corp. of Am. Tech. Report 60-2*, 26 p. (1960). *Natl. Aero. Space Adm. Contract NAS 5-270*.
- 60137 H. R. Pass, A semi-automatic McLeod gauge. *Univ. So. Calif., Engineering Center, USCEC Report No. 56-211*, 36 p. (1960).
- 60138 L. H. Rovner, Ultra-high vacuum physics. Measurement of low pressures of oxygen. *Cornell Univ., Dept. Engineering Phys. Xerox Tech. Reprt No. 3*, 34 p. (1960). *Contract Nonr-401 (31)*.
- 60139 A. Klopfer & W. Schmidt, An omegatron mass spectrometer and its characteristics. *Vacuum* 10, 363-372 (1960).
- 60140 I. Morita, F. Kanematsu & S. Mito, Experiments on a simple getter-ion pump. *J. Vacuum Soc., Japan* 3, 263-268 (1960).
- 60141 H. H. Podgurski & F. N. Davis, A precision McLeod gage for volumetric gas measurement. *Vacuum* 10, 377-381 (1960).
- 60142 G. Schuchhardt, Ion movements in an omegatron. *Vacuum* 10, 373-376 (1960).
- 60143 E. J. Zdanuk, R. Bierig, L. G. Rubin & S. P. Wolfsky, An omegatron spectrometer, its characteristics and application. *Vacuum* 10, 382-389 (1960).

AUTHOR INDEX

- Ab 59129
 Abraham B. M. 5840
 Abraham M. 2501
 Adam 5733
 Adzumi 3716
 Agisher 59130
 Ahearn 59134
 Ahn 5943
 Aigrain 6088
 Ainsworth 5623 60118
 Aitken 5345
 Akabjanoff 5263
 Albrecht 5276
 Alers 5329
 Alexander 4621 4813
 Alexoff 5542
 Allen F. G. 5524 5556 5908 6099
 Allen J. A. 5029
 Allenden 58105
 Allwood 4810
 Alpert 5012 5051 5101 5120 5310 5330
 5434 5448 5463 5533 5712 5874
 5915
 Alterthum 3615
 Amariglio 5808
 Andure 4401
 Amer. Vacuum Soc. 58148
 Ames 5836 59173
 Amoignan 5706
 Amsel 5629
 Anderson J. M. 6010
 Anderson J. R. 5812
 Andrews K. F. 4905 4913 4920 5653
 Andrews M. R. 3208
 Andrieux 5964
 Anhorn 4615
 Anonymous 4415 5214
 Antal 5773 5782
 Apelt 58100
 Apker 4808 4811
 Archer 3803
 Argano 6049 6055
 Arizumi 5204
 Armbruster 4205 4602
 Armstrong 5839
 Asao 5346
 Ashworth B511
 Asmussen 4827
 Atanasoff 4902
 Auwaerter B572
 Axelbank 5006
 Axelrod 59116
 Ayer 5053
- Babbitt 5164
 Babelay 5324
 Bachman 4910 5464 5475 5891
 Baechler 5760 59146
 Bailey 5847
 Bailleul-Langlais 5961 6042
 Baird 4019
 Baker 6028 6071 60133
 Balchin 5916
 Baldock 5256
 Balkanski 6088
 Ballentine 5523
- Bandringa 5815
 Bangham 2404
 Banwell 4019
 Barnard B531
 Barnes 6070 60113
 Baronetzky 58130
 Barr, 4615
 Barre 5768
 Barrer B472 3409 4412
 4413 5146 5147
 59126
 Barrington 5734
 Bartholomew 6001
 Bartholomyczk 4105
 Batey 6062
 Batzer 59165
 Bauer 5265
 Baxter I. G. 5301 5327
 Baxter W. P. 2703
 Bayard 5012
 Beach 5260
 Beams 5987
 Beck 5209
 Becker D. W. 4902
 Becker E. W. 5212
 Becker G. E. 59159
 Becker J. A. 4626 5161 5514
 5554 5557
 Becker W. 5877
 Beckwith 4507
 Beckman 5710
 Beebe 4507
 Beecher 5848 5909
 Behar 5479
 Behrndt 59163
 Bell 5630
 Belyakov 59130 6089
 Benarie 5808
 Benedicks 4001
 Benedict B493
 Benichou 58108
 Benioff 4111
 Benjamin 4007
 Bennett 5057
 Benson 5646
 Benton 5968
 Bergmann 5264
 Berl 5166
 Bernhard 5683 5887
 Berz 58138 5931
 Betz 3111
 Beynon 5239 5640 5886
 Bhalla 5641
 Bicknell 59152
 Bierig 60143
 Bigg 6092
 Biguet 5030
 Bilinsky 5118
 Billet 5829
 Bills 5524 5556 5885
 5995
 Biondi 5331 5906
 Biram 5510
 Birchenall 5532
 Bishop 5829 58158
 Bixler 60114
 Black 5642

AUTHOR INDEX

Blaire	58108	Bumm	5887
Blanaru	5830	Bunge	3211
Blasco	5008	Bunt	5247
Blatchley	5647	Burch	2909
Bleakney	3004 3005	Burden	B321
Blears	4708 5112 5114 5127 58129	Burger A.	58160
Bleecher	5207	Burger H. C.	4010
Blewett	3907	Burger R. M.	5880
Blodgett	6090	Burhop	B524
Blond	59108	Buritz	5434 5448
Blomn	5849	Burmaster	5016
Bloomer	5309 5634 5707 5708 5709 5735 5881 6061 60100	Burrow	5206
Blue	5789	Burrows	4305 5213 5702
Bobenrieth	4614 5347	Burshtein	59101 6091
Boehme	5465	Burt	2404
Boer F.	5430	Bush	5248 5249
Boer H. J.	3604 3617	Butler	5017
Boer J. H.	5675	Cabrera	4610 4924
Boettcher	5246	Calvi	6029
Bogardus	58144	Camby	6069
Boggess	5911 5957	Cameron	4802 5440
Bomelburg	60135	Campbell	2102 2406
Bottomley	5745 5843	Cannon	60108 60110
Boulassier	59100	Carleton	5556 5885
Boulloud	5969	Carlson R. D.	5840
Bouwmeester	5208 5504	Carlson H. M.	4630
Bouyer	60101	Carmichael	5517 5720 5767 5852 5853 5878
Bowden	5132	Carpenter	5017
Bowie	4003 4004	Carter	58129 5918 5919 59102
Boxer	5719	Carver	2301
Boyd	5022	Cashman	3303
Bradley R. C.	5917	Cassignol	60101
Bradley R. S.	5423	Caswell	59117 59145
Brandes	5557	Champeix	5031
Brannen	5449	Charles	5984 59140
Branson	5376	Charlton	6048 6053
Bricout	3006	Charpentier	5648 5761
Bridge	58160	Chen	6003
Briegleb	4921	Cheng	4613
Briggs T. H.	6037	Cherry	4701
Briggs W. E.	5466 5850	Childs B. G.	5559
Brinkman	4923	Childs J. H.	5842
Brisbane	5209	Chiles	5784
Brit. Standards Instit.	58104	Chiozzotto	5133
Brombacher	5303 5540 6009	Christensen	5836 59173
Brooks	60100	Chuan	5914
Brow	4720	Chukov	5914
Brown C.	4308 4815	Clampitt	60109
Brown E.	5506	Clark J. W.	5018
Brown F. C.	5851	Clark R. A.	5272
Brown J.	4902	Clark R. E. D.	3509
Brown G. P.	4613	Clark R. J.	2801
Brown S. C.	5211	Clark W. J.	5019
Brubaker	59171	Cloud	5032 5710
Brueche	2603 2804	Clough	5886
Brunauer	8431 3811	Cochran	5824
Brymmer	5962	Coe	5155 5420 5508
Buch	5714	Coffin	5265
Buchmann-Olsen	4827	Collins	6023
Buck	6099	Comolet	4922
Buckley	1601	Compton	2502 2602
Budde	58160	Comsa	5746
Bueltemann	5963	Conn	5311 5409 5410 5412 5478 5705 5747
Buhl	5565		
Bull	5414		

AUTHORS INDEX

Cook 5302
 Cooke 5649
 Coolidge 2302
 Cope 5831
 Copley 3501
 Corcoran 5614
 Cordero 5102 5771
 Corrin 5453
 Corruccini 5816
 Cox 4902
 Coyle 5049 5211
 Craig 5160
 Crary 5001 5490
 Crawley 5433
 Crocker 5913
 Crompton 5722
 Cross J. L. 6009
 Cross S. H. 6033
 Crowley 5490
 Curnow 5748
 Cyr 4901
 Dacey 4627
 Daglish 5311 5409 5410 5412 5478 5705 5747
 Dahlke 6018
 Dalton 2703
 Daly 6075
 Dame1 4203
 D'Amico 5736 6005
 Danby 5302
 Danforth 60102
 Danilin 5787
 Dartnell 5148
 Dash 5163
 Davies 5809
 Davis F. N. 60141
 Davis R. H. 5369 5451 5467
 Davis W. T. 5846
 Davy 8513
 Dawkins 5545
 Dayton 4719 4816 4820 5166 5650 58155 59153
 Decker 5446
 DeGraaf 4201
 Degras 5216 58109 5964 5970
 Deitz 3611 5676
 Delcher 5611 5706
 Denniger 5731
 Dennis 5123 5228
 Deryagin 4717
 Destappes 5370
 Deutsch 5020
 DeVilliers 5818
 DeVoe 3608
 Dibeler 5102
 Dichburn 4104
 Dickey 4811
 Dickins 3401
 Diels 5854
 Dillon 5879
 DiNardo 4613
 Divatia 5369 5451 5467
 Dmitriev 59118
 Dobke 5378
 Dock 3804
 Doernenburg 58103
 Dogi 58128
 Doil'nitsyn 59109
 Dong 5635
 Donn 58161
 Doughty 4620
 Douglas 5441
 Dow 5402
 Downing 4608
 Drawin 58106 58110 6081
 Dressler 5772
 Drowart 5701
 Dryer 4715
 DuBridge 3206
 Duckworth 5021
 Duesing 5348
 Dumas 5505
 DuMond 3504
 Dunlap 3703
 Dunoyer B261 B506 4903 5033 5937
 Dupont 5370
 Dushman B491 2101 2402 3109 4503
 Dutt 59103
 Dvorak 5128
 East 4601
 Eaton 5431 5543
 Eberhardt 5126
 Ebert B515 5134 58111
 Eckenrode 5481
 Eckertora 59127
 Eckstein 5022
 Eckstrom 5989
 Economas 5349
 Ede 4721
 Eden 4721
 Edwards A. G. 5511 5552
 Edwards R. N. 5751
 Edwards W. D. 5844
 Eggers 4802
 Eggleton 5203
 Ehlbeck 6010
 Ehlers 5825 59164
 Ehrke 4002
 Ehrlich 5670 5671 59176
 Eichborn 4408
 Eichhorn 5810
 Einstein 2407
 Eisinger 5889 5908 5938 5939
 Eley 6082
 Elford 5722
 Elkin 4604
 Ellett 3101 3602
 Elliott 6092
 Ellsworth 6063
 Elonka 5415
 Embree 3701
 Emmett 3811 4508 4916
 Engel 5941
 Erbe 5669
 Ermrich 58126 59170 6040
 Ernsberger 5518

AUTHOR INDEX

- Errington 4112
 Eschbach 58121 6066
 Escher 5545
 Espe B593 5010 5625 5631 5890 5940
 Estermann 4622
 Evans E. C. 5016 5972
 Evans H. D. 5628
 Everett B583
 Eveson 5828
 Evett 5995
 Eyring 4014
- Fagan 5176
 Fairbanks 5148
 Farkas B391
 Farkass 59141
 Farnsworth 5672 5879 5880
 Farguharson 5774
 Fast 3604 3616
 Fedorova 5976
 Fedosseenko 58162
 Feher 2905
 Fein 5027
 Felheimer 5468
 Ferguson 5449
 Filosofo 4711 5034
 Firth 1406
 Fish 59119
 Fitzgerald 5022
 Fitz Osborne 5350
 Flanagan 4612
 Flanick 60118
 Flauraud 5490
 Flecken 6025
 Flood 4627
 Florescu 5217 5250 5413 5765 5766 5819
 58120 59147 6013 6060 6072 60126
 Flosdorf 3802 4502 5480
 Flotow 5840
 Fogel 4616
 Fondrk 5752
 Foord 3405
 Forman 5332
 Foster A. G. 4509
 Foster J. S. 5218 5219 5323 5333
 Found 2101 2402 2604
 Fowler 3508 3614
 Fox 5452
 Francis M. 3505
 Francis E. W. R. 5881
 Francais 5632
 Frank 5822 5892
 Franken 6022
 Frankenberg 4410
 Franks 5749
 Franzen 6050
 Franzen 5007
 Fredlund 3204 3205 3710 3806 4005
 Freytag 6026
 Friedland 5573
 Friendly 60123
 Fritz 5220
 Frohmann B523
 Fryburg 4909
 Frye 5469
- Fuchs 5893
 Fukagawa 6046
 Fukushima 6034
 Furry 4623
 Fursov 59111
 Furushima 5742
 Furuya
- Gaede 1305 3406 4723
 Gaffee 5438
 Gagos 4303
 Gaines 60110
 Gale 5651
 Garbe 58122 59139 6022 6032
 Garfunkel 5416
 Garin 58132
 Garrod 4809 5023 5049 5135
 Gavrilyuk 59110
 Gazith 5996
 Geballe 5220
 Geiger 5855 59158
 Geller 5424 5439 5522 5611 5706 5768
 5779 58152
 George R. I. 6078
 George T. H. 5880
 Gepner 5775
 German D. E. 60109
 German O. 5896
 Germann 4303
 Germer 60122
 Gerow 5470
 Gervais 5780
 Giaimo 5525
 Giauque 5220
 Gibbons 5535
 Gilmont 5136 5775 6065
 Gilmour 4104
 Gilroy 5272
 Gimeniz 5111
 Giorgi 6028 60133
 Glaister 5606
 Glasser 3501
 Glasstone 4014
 Gleason 59162
 Glockler 2703 3209 5251
 Gloersen 6074
 Glueckauf 5832
 Goalwin 5305
 Goddard 5149
 Goerke 4208
 Goldanskii 4717
 Goldfinger 5701
 Goldschwartz 5137
 Goldwater 60102
 Gomer 5117 5259 5367 5553 5942 5988
 Goodall 6073
 Gordon 5833
 Gorowitz 6074
 Gote 58107
 Gould C. L. 5920
 Gould F. A. 5221
 Graves B523
 Gray J. 5444
 Gray T. S. B542
 Green C. B. 4626
 Green L. A. 5905

AUTHOR INDEX

- Green M. H. 59131 6093 60103
 Greenblatt 5837
 Greenough 5103
 Greer 58159
 Gregg B341 B514
 Gregory 3804
 Greiner 59162
 Giessel 5652
 Griffiths 58102
 Grigor'ev 58113 59104 59108
 Grigorovici 3904
 Grishaev 59111
 Gross K. A. 4809
 Gross R. A. 5401
 Groszkowski 4911 58114
 Grove D. J. 5856
 Grove D. M. 5146 5147
 Gruber 5425
 Guenther 59132 60127
 Guggenheim 4822
 Gulbransen 4206 4821 4905 4913 4920 5653
 6076
 Gruewitsch 5426
 Gutenberg 4111 5150
 Guthrie B492
- Haaland 59120
 Haas 5903
 Haase G. 4306 4309 4915 4917 5035 5236 5898
 Haase T. 3207 3612 3613
 Haber 1404
 Hablanian 5861
 Hackerman 58150
 Haedrich 3908
 Haefer 5344 5485 5551 5667 58145 58157 6038
 Hagstrum 4018 5042 5314 5368 5673 5736 5908 6005
 Haine 5309 5881
 Hale 1103
 Hall A. C. 58150
 Hall L. D. 5723 5826 5857 5876
 Halliday 4801
 Halsey 5991
 Halsted 5043
 Hamacher 4617
 Hamaker 4201
 Hamilton 5711 5753 5858
 Hannay 5489
 Hamlin 2503
 Hariharan 5641
 Harries 5351
 Harris B. L. 4916 5563
 Harris D. J. 5612
 Harris J. E. 2303
 Harris L. A. 6011
 Harrison E. R. 5352 5526
 Harrison G. O. 2901
 Hart 4604
 Harte 6041
 Hartel 5374
 Hartman 5047 5313 60122
 Hashimoto 6034
 Havens 5002 5201
 Hawkins 5612
 Hawley 60128
- Hayakawa 59112
 Hayashi 4907 5417 5754 58127 58128
 Hayward 5222 5942
 Hearst 5943
 Heathcote 5737
 Hecker 3701
 Hees 5543
 Heiligenbrunner 5377
 Heinze 3603
 Hejzlar 6057
 Henderson 59158
 Henry 5036 5609 58108 58112 5971
 Herb 5369 5921
 Herbert 6014
 Herlet 5788
 Herrmann 4906
 Hertel 4013
 Hess 5431
 Hettner 2401
 Heuse 0902 0903
 Heylen 60104
 Hibi 4912
 Hiby 5482
 Hickam 4914
 Hickey 4814
 Hickman 2903 3609 3610 3701 4414 5138 5223 5224
 5225 5654 60116
 Hickmott 6002 6083
 Higatsberger 5669
 Higginbotham 4102
 Hill P. 5997
 Hill R. D. B473
 Hindley 4702
 Hintenberger 5119 58103
 Hinzpeter 6064
 Hippie 4618 5015 5121
 Hirst 2902
 Histake 5353
 Hnilicka 5848
 Hoag 3714
 Hobbs 5526
 Hobson 58134 58135 5944
 Hockley 5414
 Hodgins 4627
 Hodgson 2910
 Hoerbe 5527
 Holden 5888 5965
 Holland 5888 58153 5922 5965 5973 6041 60134
 Holland-Merten B504 5354
 Holmes 5356 5357
 Honig J. M. 4507
 Honig R. E. 4510 5044 59138
 Hopfield 2601 5037
 Hopke 5040
 Horacek 6057
 Horikoshi 60129
 Horowitz 5769 5957
 Horseling 5538
 Horst 5251
 Horton 5007
 Houston 5674
 Huber 58123 5974 59157 6015
 Huebner 5487
 Huggill 5226
 Hughes 2704 3709
 Hukagawa 4107

AUTHOR INDEX

- Hulm 5259 5367
 Hunsmann 3810
 Huntsoon 3602
 Huntress 5755
 Hurd 5453
 Hurlbut 5954
 Huschke 5859
 Hutton 5910
 Huxford 3303
- Ibbetson 4412
 Iberall 5051
 Ikeda 58116
 Ilfeld 5024
 Ionov 6089
 Irvine 5810
 Ishibe 58128
 Ishii 5355 5724 5725
 Isikawa 4912
 Iwayanagi 6034
- Jackson 5213
 Jacobs J. A. 5329
 Jacobs R. B. 4713 5139
 Jaechel B502 4207 5252 5427 5875 5923 6066
 Jansen 5924
 Jaycox 3105
 Jech 5636
 Jenkins R. O. 4007 5811 60130
 Jenkins W. A. 5129
 Jenks 5045
 Jennings 5679
 Jensen H. G. 5227
 Jensen N. 5666
 Jepson 5975
 Jeric 6058 6059
 Jnanananda B471
 Johannin-Gilles 5519
 Johnson C. B. 5145
 Johnson C. T. 5784
 Johnson D. P. 5771 6009
 Johnson E. G. 5380
 Johnson F. M. G. 0901
 Johnson J. B. 5680
 Johnson M. C. 2901
 Johnston A. R. 5454
 Johnston J. E. 5003
 Jolly 5028
 Jones A. C. 5850
 Jones F. L. 5316
 Jones H. A. 2802
 Jones R. C. 4623
 Jones W. M. 5231
 Jonker 4504
 Jordan B541
 Jossem 5234
 Jost B522
 Juenger 5532
 Jura 5165
- Kaechle 5303 5305
 Kaljabina 58124 5925
- Kaneko 5342 59112
 Kanematsu 60140
 Kanomata 59112
 Kansky 6058 6059
 Karaser 4717
 Karpinski 6068
 Katan 5122
 Katayama 5342
 Katwijk 58156
 Katz 6076
 Katzenstein 5573
 Kaufman 5733
 Kawasaki 60131
 Keeson 4108 4109 4110
 Keevil 4112
 Kelly 5011
 Kemball 4625 4628 4718 4822
 Kemp 5945 5955
 Kendall 5756
 Kenna 5513
 Kennard B381
 Kennedy 5544 59166
 Kent 5507
 Kenty 4008 4705 5130 5140
 Kermiele 5774
 Kern H. 5126
 Kern H. E. 5266
 Kerr 6004
 Kerschbaum 1404
 Kersten 4825 4923
 Kerwin 5046 6095
 Knutsishvili 59129
 Kidd 5337
 Kiefer 5560
 King A. H. 4607
 King E. B. 2504
 King G. 5411
 Kington 5356 5357
 Kinsella 5471 5654
 Kirby 4301
 Kirchner 5637 5966
 Kirshner 5481
 Kisliuck 5882
 Kistemaker 5154
 Kitagawa 6043
 Kitt 5832
 Klages 3612
 Klein 5999
 Klemperer 4402
 Klingler 2904
 Klopfer 58125 58126 58130 58139 59170 6020
 6032 6040 60139
 Klumb 3207 3612 3613 4407 5126 5317 5318
 5358 5377 5893 5946
 Knacke 5527
 Knapp 5528
 Knechtli 5757
 Knight 5838
 Knoll J. S. 5852
 Knoll M. B591
 Knoll W. 5010
 Knorr 59105
 Knudsen A. W. 5626
 Knudsen M. B501 1001 1002 1101 1403 3002
 Kobayashi A. 5162
 Kobayashi S. 5738 58115
 Koehler 5148

AUTHOR INDEX

- Koenig 5315 5773 5782
 Kogan 59121
 Koell 5002 5201
 Kollmansperger 5318
 Komiya 58116
 Kondrashow 59101
 Kornfeld 2904
 Kotani 5204
 Kramer 5841
 Kratz 2907
 Kraus 5860 5947 59160
 Kreisman 6084 60136
 Krieg 4906
 Kucherov 59110
 Kuhn 4601
 Kumagai 5237 58127 58128
 Kunz 3506
 Kuper 3407 3714
 Kutschcer 5427
 Kutschke 5739
- Labeyrie 5111
 Lacher 3715
 LaGow 5002 5201 5623 5769 5957
 Laidler 4014
 Lampson 3707
 Landecker 5444
 Lander 5013 5260
 Landfors 5861
 Landsberg 5545
 Lane 4606
 Lange 5712 5833 5904
 Langmuir 1301 1302, 1304 1401 1501 1502 1802 1907
 2802 3307 4015
 Langsdorf 5460
 LaPadula 6001
 Larin 6091
 Lashof 5540
 Latham 5123 5228
 Laurenson 5888 5973 60134
 Lavender 4805
 Law 5632 5908 5948 6099
 Lawrence 5472
 Lawrence E. O. 5219 5333
 Lawrence J. B. 5229
 Lawrenson 5965
 Lawson 6035
 Lawton 4009
 Lawyer 5751
 Lazarev 5976
 Lazeyras 60101
 LeBlanc J. A. 5655
 LeBlanc M. B512
 Lech 5431 5543
 Leck B571 5114 5127 5202 5312 5403 5432 5506
 5539 5601 5604 5713 5827 58129 59102
 Lederer 3708
 Leduc 4908
 Lee G. H. 5575
 Lee R. W. 5822
 Leefe 60124
 Legallais 4701
 Legault 4807
- Leiby 6003
 LeRiche 5868 59143
 Levina 5536
 Lewin 5862
 Lewis 6094
 Leyniers 5933 5986
 Lichtman 60105
 Liebson 60124
 Lienard 5899
 Liley 5733
 Lilly 4701
 Lind 5359
 Lineweaver 6004
 Linner 6078
 Lintz 5983
 Lipson 5458
 Litting 5210
 Little 5128
 Littwin 2804
 Litwak 5468
 Livingston 4411
 Lloyd W. A. 59172
 Lloyd E. C. 5772
 Lloyd J. T. 5025
 Lockenwitz 3807
 Lofgren 5218 5219 5333
 Lompe 3615
 Loneragen 5807
 Long J. S. 2505
 Long R. A. K. 5304
 Longim 5141
 Lorenz 5863 5977
 Lortie 5520
 Los 5104
 Lott 5613
 Loughridge 59168
 Low 5926
 Lowry H. H. 2702
 Lowry R. A. 5529
 Lueckert 5946
 Lukirsky 3110
 Lundberg 5443
 Lynn 5614
 Lyon D. N. 5220
 Lyon K. S. B592
 Lyubimov 5927
- Mackay 1401
 Madden 5151
 Magnus 2907 2908
 Mahoney 58144
 Makinson 4826
 Makower 4807
 Mallard 5160
 Malmberg 5329
 Malter 6039
 Mandoli 6039
 Manley 2405 2701
 Mann 3402 3702
 Manov 5895
 Marchais 5984
 Mark J. T. 59158
 Mark R. 5862

AUTHOR INDEX

- Markali 58131
 Marker 5928
 Marshall 3906 4416
 Marth 5728
 Martin A. J. 5442
 Martin C. S. 5432 5601 5713
 Martin I. E. 59167
 Martin J. H. 4812
 Martin L. H. B473
 Martin S. T. 3909
 Marton B511 59161
 Maslach 5230
 Mason 6092
 Massey B524
 Matheson 4803 5771
 Matland 5051 5101
 Matsuda 5353
 Mazumder 5992
 Maxwell 59131 6093 60103
 McBain B321
 McCouhrey 5051 5101
 McCulloch 5247
 McDonald 5820
 McFarland 5820
 McGowan 6095
 McIlwraith 4709
 McIntosh 0901
 McKee 5998
 McLeod 7501
 McMillan F. A. 5418
 McMillan J. A. 5713
 McNarry 5428
 McQuistan 6078
 Meakin 5152
 Mears 5490
 Meechan 5834
 Meissner 5541 5656
 Mellen 4608 4609 4828
 Mellott 5726
 Mellville B391
 Melroy 5972
 Melton 5777
 Menshikov 5935 59106
 Merlin 5034
 Mesnard 60106
 Metson 5054 5106
 Meyer 3408
 Michaels 60114
 Michijima 5321
 Mickelsen 5842
 Mielczarek 59161
 Mielenz 5319 5486
 Mierdel 2803
 Mikhnevich 5786 5787
 Milazzo 5643 5677
 Miller A. R. B495
 Miller G. H. 5334 5529
 Miller L. D. 5929
 Milleron 5758 5864 5865
 Millican 5644
 Milner 4918 5115 6069
 Minchen 5568
 Minter 5821
 Miranda 5008 5231
 Mitchell E. W. J. 5206
 Mitchell J. W. 5029
 Mitogoad
 Miyahara 60129
 Mizushima 59122
 Moench
 Moeneh B503 5232
 Moesta 5639 5854
 Moll J. 59164
 Moll W. J. H. 4010
 Moller 5662 5806
 Molnar 5047
 Mongodin 5611 5768 5781 5978
 Monk 4824
 Monroe 5438
 Montgomery 3805
 Moody 5657
 Moore A. R. 5163
 Moore G. E. 59137
 Mordike 5916
 Morey B543
 Morgan 5615
 Morgulis 3404 5555 5914
 Morita 60140
 Morrison 5104 5325 5335 5502 5759 59169
 Morse 4003
 Moser 3507 5776
 Moses 6074
 Mott 4722
 Moutou 6007
 Mueller C. 2906
 Mueller E. W. 3605 3606 3711 3712 3809 5684
 Mueller R. H. 60112
 Muendel 1306
 Mukherjee 59103
 Muller 5979
 Muntz 58101
 Muramatsu 5346
 Murata 5484
 Murmann 3304 3305
 Murphy 5534
 Musa 5746
 M'yakushko 59111
 Nadeau 6037
 Nagaeda 5052
 Nagarjunan 5989
 Nakayama 5724 5725
 Nakhutin 59123
 Nambo 4107
 Nash 5026
 Nasini 5951 6030
 Naval Ord. Lab. 4703
 Neher 5454
 Nelson H. 4505
 Nelson R. B. 4202 4506
 Nerken 5658
 Nester 5455 5607 5715
 Neumann K. 3210
 Neumann R. 4817
 Neuzilora 58154
 New 3406
 Newberry 3201
 Newell F. B. 58143

AUTHOR INDEX

- Newell H. E. 8532
 Newell W. C. 3702
 Newnam 4112
 Newsom 6048
 Newton 5633
 Nicholson 5640
 Nienhuis 4904
 Nier 4011 5043 5361 5380 60115
 Nightingale 58159
 Niklas 5430
 Nilsson B603
 Nisbet 4919
 Noble 6085
 Noeller 5252 5427 5512 5567 5760 5762 5785
 58137 58146
 Norman 4818
 Normand B505 5789
 Norton 4416 5261 5362 5404 5473 5740
 Nottingham 3717 5474 5678 60121
- Oatley 5445
 Ochert 5233
 Oda 59122
 Ogure 59112
 Okamoto 5727 5732 5894
 Olmer 4302
 Olmstead 2702
 Olsen 2902
 Opdyke 2508
 Opstelten 5562 5615 58117
 Origlio 6049 6056
 Osher 5529
 Overbeck 3408
 Ownes 2507
 Ower B496
 Oyama 5038 5742
- Pacey 5930
 Pahl 5482
 Palme 5253
 Palmer 3509
 Pannell B241
 Pappenheimer 5456
 Parker 60114
 Parkins 4102
 Parrott 5234
 Pass 60137
 Passtechnik 58162
 Patrick 2505 2507 2508
 Patee 5457
 Patterson D. 5569
 Patterson G. N. B561 5960
 Patterson J. L. 5271
 Paty 5704 5717 58154 59113 6086 6096
 Paul 58146
 Pauling 4631
 Pearson G. L. 4526
 Pearson T. G. 3106
 Peck 5167
 Penfold 5509
 Penning 3705 3706 4904
 Panther 5716
 Pequignot 5985
 Perdijk 6050 6051
- Perkins 5761
 Perls 5305
 Perron 5959
 Peters 5546 5659 5912 59151
 Peterson D. T. 6017
 Peterson E. C. 5542
 Peterson P. N. 5929
 Petralia 5949
 Petushinskii 5914
 Pfund 2103
 Phelps 5718
 Phillips 5419
 Philp 5032
 Phipps 3501
 Picard 4605
 Pickels 3504
 Pickering 5990
 Pierotti 5991
 Pierre 6016 60107
 Pilny 5306
 Pirani 0601
 Piret 5151
 Pitman 5518
 Pitzer 6098
 Platzman 5841
 Plotnikov 59129
 Podgurski 60141
 Pollard 5336 59144
 Poltz 5776
 Popp 5865
 Porta 5407 5408 5817 5866 59174 6006 6047
 6049 6055 6056
 Porter 3301
 Posey 5952
 Power 5123 5228 5433 5513
 Poweil 59167
 Pressey 5307
 Preston 2507
 Prevot 5611
 Pringle 5337
 Prior 5845
 Prugne 58132
 Prytz 0501
 Ptizyn 3110
 Puddington 4829
 Punter 59178
 Pupp 5269 5270
- Rabinovich
 Rae B533
 Raible 5020 5564 5569
 Raines 3902
 Ramaswamy 3312
 Ramey 59149
 Ransley 3607
 Rao 4106
 Rapp 5907
 Ratchford 5027
 Razouk 4823
 Read 5737
 Reamer 6008
 Reddan 5153
 Redhead 5254 5428 5867 58133 58134 58135 58136
 59107 59136 6079
 Reece 5750

AUTHOR INDEX

- Rehkopf 5883
 Reich 5760 5762 5785 5788 58137 59146 6025
 Reichardt H. 3510 3511
 Reichardt M. 5436 5515
 Reilly E. G. 5338
 Reilly J. B533
 Reimann B521 3306 3403
 Reinders 5154
 Reinhard 58146
 Repner 5787
 Reuter 4705
 Reuther 5354
 Reynolds C. A. 5719
 Reynolds F. H. 5373
 Reynolds F. L. 5530 5547
 Reynolds J. H. 5458 5668
 Reynolds N. B. 2604 3102
 Ricca 5866 6951 6006 6030 6054
 Richards P. A. 5108
 Richards R. J. 5459
 Richardson A. C. 5905
 Richardson L. F. 1904
 Richeson 5607
 Riddiford 5109 5116 5155 5235 5420 5508
 Riddoch 5604
 Rideal 4628 4822 5570
 Ridenour 3707 4103
 Rittner 4603
 Rivera 5868 59143
 Robens 5358
 Roberts J. A. 5660 5850
 Roberts J. K. 3001 3202 3302
 Roberts M. W. 60120
 Roberts V. 5950
 Robertson 5570
 Robinson C. F. 60125
 Robinson H. 4612
 Robinson N. W. 5703 5741 58138 5931 59124 6031
 Robson 5421
 Rocherolles 6017
 Roehr 3206
 Roehrig 59148
 Rogers 5434
 Rohn 1405
 Romand 5142
 Romann 4804
 Rosenberg A. J. 58149
 Rosenberg P. 3801 3901
 Rostagni 4304 4711 5034
 Roth 6067
 Rothstein 5823
 Rouse 5153
 Rovner 60138
 Kowe 2606
 Rubin 60143
 Rufer 5661
 Rumpf 2605
 Rusch 3211
 Russell 5360
 Ryder 1901

 Saftic 5967 58119
 Sage 5614 6008
 Sain 6085
 Saini 5951 6030
 Sakisaka 5742
 Sakovich 59108
 Salem 4823
 Sancier 5617
 Sandler 5996
 Santeler 5404 5548 5602 5662 5801 5802 5803
 5804 5805 5806 5869 59154
 Sarbey 3103
 Sastri 5989
 Savage 4815
 Savinskii 5422
 Sayers 6097
 Saylor 5476
 Saxer 4501
 Saxson 5369
 Scag 5624
 Scheel 0902 0903
 Scheibe 58147
 Schlier 5672 5873 5880
 Schlitt 5618
 Schmidt E. 3601
 Schmidt W. 59139 5020 5032 50139
 Schneiderreit 50117
 Schoenheit 5319
 Scholz 5358
 Schram 58139
 Schriever 5339
 Schroeder 5378
 Schubert 59161
 Schuchhardt 60142
 Schuerer 59127
 Schuetze H. J. 6018 6019
 Schuetze W. 5683
 Schulz 5718 5729
 Schumacher 5743
 Schurter 6094
 Schutten 5154 5770 58140
 Schwabe 2906
 Schwartz C. M. 4805
 Schwartz S. B602
 Schwarz 4017 4405 4407 5105 5255 5340 5663
 59144 6087
 Schweers 4108 4109 4110
 Schweitzer 5969 5980
 Schwerdtfeger 60132
 Schwertz 4720
 Schwetzoff 5142
 Scott 3905
 Sears 5040
 Sebestyen 5605
 Seddig 4917 5236
 Sederholm 4001
 Seehof 5839
 Seiden 5730
 Seifert 5565
 Seliger 3615
 Servrankx 5933 5986
 Seymour 5569
 Shakhov 5927
 Shcherbakova 59109
 Shereshefsky 5992
 Sherman 5328
 Sherwood R. G. 1801
 Sherwood T. K. 4613
 Shrader 1801 1901 1906

AUTHOR INDEX

- Shroff 5974
 Shridkovskii 5787
 Sibata 5237 58127
 Sicinski 5402
 Siedlewski 6068
 Silberg 5464 5475 5891
 Silsby 5956
 Simmons 5488
 Simon 2403 2905
 Simons J. C. 58118 59142
 Simons J. H. 4909
 Simpson 4403
 Sinanoglu 6098
 Sites 5256
 Sitney 5238
 Skellet 2704
 Slack 4002
 Slavianskii 5257
 Slavik 3506
 Sliwinski 5354
 Smith A. L. 5476 5755
 Smith A. M. O. 5534
 Smith A. W. 5813 5902
 Smith H. A. 5952
 Smith H. R. 5544 5549 59156 59166
 Smith L. A. 5324
 Smith N. M. 3714
 Smith N. W. W. 6036
 Smith P. C. 4605
 Smith P. T. 3003 3104 3203
 Smithberg 5839
 Smithells 3607
 Smither 5608
 Snavely 4902
 So 1902
 Sofer 5477
 Sommer 5121
 Sommermeyer 3107
 Sosin 5834
 Sourdillon 6044
 Southram 6053
 Spalding 5056
 Spees 5719
 Spencer 5402 5911 5957
 Spiers 5028
 Sproull 5163
 Stanier 5239
 Stanley 2805
 Stanworth 5050
 Stark D. S. 5932
 Stark J. A. 5460
 Steckelmacher 5014 5113 5125 5233 5962
 Stehl 5212
 Stein 5461
 Steinhaus 5359
 Stephens S. J. 5993
 Stephens W. E. 5379
 Stern 5131
 Sterzer 5744
 Stevens 5341
 Stevenson 59155
 Stewardson 3007
 Stewart 5048
 Stinnett 5326
 Stivala 5731
 Stone B583
 Stout 5535
 Stow 5994
 Strad 5835
 Strait 5943
 Strong J. B382
 Strong J. D. 5240
 Strotzer 59125
 Stuart 59126
 Stull 4712
 Sturdivant 4631
 Sugita 60131
 Sugiura 5375 5483
 Sullivan H. M. 4819
 Sutyagina 59123
 Suzuki 5381 5958
 Swaay 5532
 Swartz 5550
 Swets 6080
 Taft 4811
 Tajima 5342
 Takamura 5437
 Talburtt 4807
 Tarbes 4632
 Tate 3203 4018
 Taylor H. A. 5926
 Taylor K. C. 5763
 Taylor L. R. 5521
 Taylor R. C. 4716
 Teale 5836
 Tellegen 4504
 Teller 3811
 Terekhov 59111
 Terrien 4610
 Testermann 5564
 Thackara 5571
 Thees 5509 5516
 Theodorsen 3108
 Thiele 59115
 Thom 58100
 Thomaes 6012
 Thomas C. O. 5952
 Thomas E. 5363 5370 5531 5933
 Thomas H. A. 4618 5121
 Thomas L. B. 4302
 Thuronyi 59177
 Toby 5739
 Todd B. J. 5503 5603 6004
 Todd G. W. 1905
 Tolstoi 5262
 Tomkins 5203
 Torney 5764 60121
 Torpey 5343
 Trabert 5870
 Treacy 4826
 Trendelenburg 5767 5878 5981 59157 6015
 Tretner 6024
 Treupel 5516
 Trevoy 5224 5225 5343
 Trillat 5780
 Tritmans 5681
 Trodden 60130
 Trubetskoi 59109
 Trump 3703 5710
 Trumpler 4624

AUTHOR INDEX

- Tsukakoshi 5266 5372
 Turnbull A. H. 5004
 Turnbull J. C. 6023
 Turner 5734
 Tuthill 5108
 Tuzi 5237 5732 5894
 Tyler 5163
- Umblia 5143
 Urry 5638
 Utterback 3201
 Uyeda 5375
 Uzan 60106
- Vacca 5664
 Valdre 5949
 Valle 5267
 Van Atta 5645
 Van Der Meer 5014
 Van der Pyl 5371 5575
 Van der Scheer 5039
 Vanderschmidt 58118 5901 59141 59148
 Vanderslice 6090
 Vanderveer 5258
 Van der Waal 6022
 Van Dorn 60119
 Van Heerden 5537
 Van Koppen 5364
 Van Steenwinkel 5701 6012
 Van Valkenburg 4619
 Van Voorhis 2502 2602
 Van Vucht 6045
 Varadi 5450~ 5605
 Varicak 5561 5619 5627 5783 58119 5967
 Varnerin 5435 5517 5720
 Veis 5934
 Veith 4409
 Vekshinsky 5935
 Venema 5429 5815 58141 5924 5936 5982
 Verhoek 3906
 Verkamp 5620
 Vermande 5242
 Verna 5985
 Vickers 5221
 Viswanthan 5989
 Vitkus 59150
 Vodar 5142
 Voege 0602
 Voelker 3210
 Vogel 5628
 Volcker 5157
 Volmer 2506
 Von Angerer 3103
 Von Dardei 5215 5365
 Von Eichborn 4408
 Von Engel 5124 5351
 Von Friesen 4016
 Von Meyern 3308 3410
 Von Smuluchowski 1102
 Von Ubisch 4704 4806 5156 5158 5215 5241
 Von Weiss 5682
 Von Zahn 58146
 Voronina 6091
 Vosicki 5561
- Vreeland 5959
 Wade 5144
 Wagener J. S. 5728
 Wagener S. 5009 5107 5145 5205 5308 5366 5405
 5406
 Wagner 3603
 Waits 6085
 Wakefield 58163
 Wakerling B492
 Walden 3713
 Waldron B594
 Waldschmidt 5447
 Wallace 5258
 Walmsley 3708
 Warmoltz 5159 5208 5504 5562 5616 58117
 Warnecke M. 58123 5974 6007
 Webber 4606
 Weber 1701 3708 4406 4710
 Weidemann 4101
 Weinhardt 3105 5042
 Weinreich 5110 5207
 Werner 3910
 Weise 4307
 Weissmann 5317 5574
 Weiss 4012
 Wells 5777 5884
 Wenk 5005
 Werlein 5167
 Werner 5055
 Wessel 5322
 West 1903
 Westendorp 5426
 Westinghouse Mfg. Co. 6077
 Westlake 60111
 Westmeyer 4012
 Wetterer 3903
 Weulersse 6088
 Wexler 5416
 Weyl 4714
 Wheeldon 59133
 Wheeler 5243
 Whitechurch 6048
 White D. 5435
 White W. C. 4814
 Wickers 4204
 Wieder 5813
 Wiederhorn 5959
 Wiedmann 4624
 Wilder 5010
 Wildhack 4208 5772
 Wilkins 3812 3813
 Wilkinson 6082
 Williams C. B493
 Williams J. L. 5828
 Williams R. L. 5822
 Williams S. E. 4611
 Williams S. L. 5620
 Williams T. W. 4618
 Williams W. E. 5103
 Willmarth 58151
 Wilson D. C. 6092
 Willson J. L. 3209
 Wilson M. K. 5462
 Wing 4202

AUTHOR INDEX

- Winkler 5667
Winogradoff 58142
Wintergerst 5983
Winzenberger 5871
Witman 5268
Witts 5018
Wittwer 5629
Witty 4511 5041
Wolff M. M. 5379
Wolff W. F. 5997
Wolsky 5778 59135 59175 6021 60143
Wong 59158
Wood 4631
Woodrow 1402
Wooten 4308
Worcester 4620
Work L. T. 3958
Work R. H. 5872
Wouters 4404
Wright 5566
Wuest 5273 58147
Wyllie 5621 5622
Wysong 4821
Yada 5738
Yakhividin 58124
Yamamoto 5491
Yarnold 4629
Yarwood B551 5320 5721 59128
Yazawa 6052
Yetter 59162
Yonts 5789
Young A. H. 4503
Young J. R. 5665 5814 5953
Young J. E. 5132
Young W. S. 4716
Youngs 5160
Yukhvidin 5925 5927
Zabel 3101 3309
Zaphiropoulos 59172
Zdanuk 59135 6021 60143
Zeise 2806
Zelst 5616
Zemany 5244
Zetterstrom 5502
Zincke 5897
Ziock 5245 5572
Zollers 4605
Zollman 59167
Zuhr 4713

4. SUBJECT INDEX

The subject index covers the material in the references as completely as possible, based mostly on a perusal of the reference, in some cases on an abstract and rarely only on the title.

The headings require some discussion. Outgassing and degassing are indexed under "Degassing" for convenience, since the phenomena are in many cases too closely related to be easily separated. For the same reason, papers on permeability and diffusion are indexed under "Diffusion of gases".

Gettering action has been covered under five headings: "Getters," under which gettering materials are covered; "Ion pumps" and "Getter-ion pumps," under which specific designs are covered; "Gettering action, ionization gages," the importance of which seemed to warrant a separate heading; and last, "Clean-up of gases, electrical," under which gettering action not otherwise covered is indexed.

Micromanometers cover the class of low pressure

instrumentation which it is desired to discuss. Two headings are used, "Micromanometers, liquid type" and "Mechanical pressure and vacuum gages." The latter heading is preferable to "Micromanometers" because many designs of mechanical micromanometers have possible application to the vacuum range.

Finally, a distinction has been made between gaskets and seals. Mainly the design or physical properties of the gaskets are covered under "Gaskets," and the application and assemblies under "Seals."

In using the index, note that under the heading "Pressure measurement" all types of vacuum gages and micromanometers are listed under the various nomenclatures in use, with a reference to the heading under which it may be located in the index. The same has been done for pumps under the heading "Pumps."

Accommodation coefficient (cont'd)

- Nitrogen 1501 3401
- Platinum 3813 4401
- Temperature coefficient 3813
- Nitrous oxide 3401
- Organic compounds, low vapor pressure 3906
- Oxygen 3401
 - Platinum 3402 3813
 - Temperature coefficient 3813
- Review B571 1101
- Significance in heat conduction 1101
- Sulfur dioxide 3401
- Temperature coefficient 3302 3804 3813 3902 4205 4302
- Theory 3202 3302 3401 3813
- Xenon
 - Platinum 4401
- Acoustical vacuum gage 5663 5773
- Adsorbing materials, characteristics of
 - Barium, see Getters
 - Carbon, see
 - Charcoal, see
 - Crystals, porous B583
 - Energetics B583
 - Gases adsorbed, see Adsorption
 - Getters, see
 - Palladium, see Hydrogen, Palladium
 - Pore structure B583
 - Silica gel, see
 - Theory, see Adsorption
 - Titanium, see Getters, Getter-ion pumps
 - Zeolites, see
 - Zirconium, see
- Adsorption, see also Getters, Adsorption, activated
 - Acetic acid
 - Glass 4717
 - Acetone
 - Silica 3509
 - Acetonitrile
 - Silica 3509
 - Acetylene
 - Charcoal B491
 - Air
 - Mercury B321

- Adsorption (cont'd)
 Alcohol vapor
 Germanium 5931
 Silica gel 2508
 Ammonia
 Charcoal B491 2907
 Glass powder B491
 Graphite 2907
 Argon
 Carbon, modified active 5997
 Charcoal B491
 Glass B491 1802 58129 59133
 Iron B491
 Mica 1802
 Molybdenum 5852
 Molybdenum disulphide 60108
 Nickel 5852 5878 58129
 Platinum B491 3813 58129
 Silicon 5632
 Silver B491 4205
 Tungsten 58129 5988
 Zeolites 59126
 Mechanism 59126
 Benzene
 Glass 4916
 Mercury 4628
 Silica 3509
 Silica gel 2508 5998
 Bibliography 5563 5675 5676
 Butane
 Oxide coated cathodes 4308
 Silica gel 2505
 Zeolites 4412
 Cesium
 Tungsten 5554
 Carbon dioxide
 Carbon dust 4815
 Carbon filament 3307
 Chabasite B491
 Charcoal B491 2907
 Glass 1802 1906 2404 5052
 Powder B491
 Pressure effect 2404
 Graphite 2907
 Dust B491
 Mica 1802
 Silica gel B491 2507
 Silver 4205
 Titanium 6034
 Tungsten 5942
 Zirconium, see Getters
 Carbon disulphide
 Glass 4916
 Silver 4916
 Carbon monoxide
 Carbon dust 4815
 Charcoal B491
 Cobalt B491 5989
 Glass B491
 Graphite dust B491
 Iron B491
 Mica 1802
 Nickel B491 5990
 Palladium B491
 Ruthenium 5926
 Silicon 5632
 Silver B491 4205
 Titanium 6034
 Tungsten 5873 5999 6030
 Adsorption (cont'd)
 Carbon monoxide (cont'd)
 Zirconium, see Getters
 Carbon tetrachloride vapor
 Silica gel 2508 4106 5998
 Charcoal, see
 Chloroform
 Silica 3509
 Cross sectional area, adsorbed molecules, see
 Molecules
 Ethane
 Analcite 4412
 Chabazite 4412
 Copper thin films 5992
 Nickel thin films 5992
 Zeolites 4412
 Ethyl acetate
 Glass 4717
 Ethyl alcohol
 Glass 4717
 Ethylene
 Charcoal B491
 Oxide coated cathode 4308
 Rhodium 5990
 Ethyl iodide
 Glass 4916
 Experimental techniques B495
 Forces holding adsorbed atoms B491
 Heat of sorption B491
 Helium
 Glass 4109 58129 5944
 Lucite 5220
 Molybdenum 5720 5852
 Nickel 5852 5878 58129
 Platinum 58129
 Plexiglass 5220
 Solidified gases
 Hydrogen 4110
 Neon 4110
 Nitrogen 4110
 Oxygen 4110
 Tungsten 58129
 Henry's law B491
 Hydrocarbon vapors
 Silica gel 5998
 Hydrogen
 Aluminum 6082
 Barium, see Getters
 Carbon dust 4815
 Chabasite B491
 Charcoal B491 1406
 Copper, see also Traps 5356
 Glass 4108 4717
 Graphite dust B491
 Iron B491
 Molybdenum 5865
 Nickel B491
 Copper .8% 5356
 Palladium, see
 Palladium-silver alloys, see
 Platinum 2906 3402
 Ruthenium 5926
 Carbon dioxide preadsorbed 5926
 Silicon 5632 5948
 Silver 4205
 Tantalum 3208
 Thorium 5366
 Titanium, see also Getters 59169 6034
 Tungsten 3307 5914 6083

- Adsorption (cont'd)
 Hydrogen (cont'd)
 Tungsten (cont'd)
 Crystal 5889
 Powder B491 4410
 Zirconium, see Getters
- Hydrogen sulphide
 Charcoal B491
 Glass 4916
- Krypton
 Charcoal B491
 Copper 5356 5357
 Thin films 5992
 Germanium 58149
 Glass 58129
 Molybdenum 5852
 Molybdenum disulphide 60108
 Nickel 5852 5818 58129
 Penetration depth 6001
 Thin films 5992
 Nickel oxide thin films 5992
 Platinum 58129
 Tungsten 58129
- Mechanism B495 1502 5029 5675 6034
 Carbon dioxide on tungsten 5942
 Germanium 5672
 Glass 58129
 Hydrogen on tungsten 6083
 Noble gases on metals 58129
 Oxygen on tungsten 5939
- Measurement, see Adsorption and degassing measurement
- Methane
 Carbon dust 4815
 Charcoal B491
 Copper thin films 5992
 Glass B491 1802 2806
 Graphite dust B491
 Mica 1802
 Nickel thin films 5992
 Nickel oxide films 5992
 Zeolites 4412
- Methyl alcohol
 Silica 3509
- Methyl chloride
 Charcoal B491
- Monolayers of gases on solids
 Atoms B491
 Molecules B491
 Number of molecules, various gases B491
 Theory B491 4822
 Time to form 5314
- Multimolecular layers of gases on solids
 Glass 2405
 Silica 3509
- Neon
 Charcoal B491
 Glass 4109 58129
 Iron 5203
 Molybdenum 5852
 Nickel 5852 5878 58129
 Platinum 58129
 Tungsten 58129
- Nitrogen
 Aluminum 6082
 Carbon dust 4815
 Carbon, modified active 5997
 Charcoal B491
- Adsorption (cont'd)
 Nitrogen (cont'd)
 Cobalt 5989
 Glass B491 1802 2806 4916
 Graphite dust B491
 Iron B491
 Layers absorbed, metals 5313
 Mica B491 1802
 Molybdenum 5882
 Monolayer, time to form 5314
 Platinum 3813
 Silicon 5632
 Silver B491 4205 4916
 Tantalum 3208
 Titanium 6034
 Tungsten B491 5554 5671 5882 5914 5951 6030
 Zeolites 59126
 Zirconium, see Getters
- Nitrous oxide
 Aluminum 6082
 Glass 2404
 Silica gel 2507
- Oxygen
 Aluminum 6082
 Carbon dust 4815
 Chabasite B491
 Charcoal B491
 Copper 5029 5357
 Germanium 59135 6091
 Glass B491 2806 3209
 Graphite dust B491
 Mica B491
 Molybdenum 5882
 Nickel 60122
 Platinum 1802 3813
 Silicon 5632 5879 5908 5938 6093
 Silver 4205
 Tantalum 3208
 Titanium 6034
 Tungsten 3307 5554 5557 5873 5882 5938
 Zirconium, see Getters
- Pentane
 Glass 4916
 Silver 4916
- Pressure effect B491 2402
 Henry's law B491
- Propane
 Zeolites 4412
- Rate B491
- Reviews, see Books and surveys
- Silica gel, see
- Sulfur dioxide
 Charcoal B491
 Glass 2404 5052
 Glass powder B491
- Surface area of absorber, see Surface area of solids and gases
- Temperature effect 1802
 Adhesive forces B491
 Critical temperature of adhesion B491
 Multimolecular layers B491
 Sticking probability B491
 Theory B491 2702
- Theory
 Bibliography 5676
 Brunauer-Emmett-Teller B601 3811 4916 60109
 Freundlich equation B431 B491
 Harkins-Jurs B601 4916

SUBJECT INDEX (cont'd)

- Adsorption (cont'd)**
- Theory (cont'd)
 - Hyperbolic isotherm B341 B491 2506 3508 3614 4041
 - Combined with parabolic B491 2806 2906
 - Tungsten-hydrogen 4410
 - Interactions between molecules 6098
 - Langmuir (monomolecular layer) B601 1502 1802 3307 3508 4015
 - Monomolecular layer 2908 4822
 - Langmuir, see above
 - Temperature effect 2908
 - Monomolecular layer on metals
 - Atoms B491
 - Molecular B491 3307
 - Physical basis B491 1502
 - Temperature effect B491
 - Multimolecular layers B321 B431 B491
 - Brunauer-Emmett-Teller B431 B491 B601 3811
 - Condensable vapors 4509
 - Nitrogen on various materials, below -183°C B491
 - Palmer, virteous silica B491
 - Patrick, silica gel B491
 - Polanyi B321 B431 B491 B601 2702
 - Organic vapors by silica 3509
 - Parabolic isotherm B431 B491
 - Persorption B491
 - Porous solids 60109
 - Potential, see Multimolecular layers above
 - Review B491 B495 B601
 - Statistical basis B491 3812 4015
 - Temperature effects B491
 - Thermodynamic basis 3812
 - Toluene
 - Glass 4916
 - Water vapor, see also
 - Chabasite B491
 - Glass
 - Experimental data B491 1802 1906 4417 4916 5732 5894
 - Temperature effect 5732
 - Mechanism B491 5246 5894
 - Theory 5246
 - Quartz B491 58150
 - Silica gel B491
 - Hysteresis loop 4106
 - Steel 4602
 - Tantalum 3208
 - Zeolites B491
 - Xenon
 - Charcoal B491
 - Adsorption, activated or chemisorption, see also
 - Gettering action, ionization gages
 - Carbon dioxide
 - Produced on glass by activated oxygen 4018
 - Carbon monoxide
 - Aluminum 6082
 - Molybdenum 6031
 - Produced on glass by activated oxygen 4018
 - Tantalum 6031
 - Chlorine
 - Dissociation by tungsten cathode 1502
 - Ethylene
 - Aluminum 6082
 - Getters, see
 - Hydrogen
 - Breakdown to atomic
 - Electron bombardment 2703 2704
 - Adsorption, activated or chemisorption (cont'd)
 - Hydrogen (cont'd)
 - Breakdown to atomic (cont'd)
 - Tungsten filament 1401 1502
 - Characteristics for classes of metals B472 B491
 - Tungsten filament 6083
 - Zirconium 4905
 - Mechanism 1301 58130
 - Metals 5670
 - Methane
 - Various cathodes 58130
 - Nitrogen B491
 - Magnesium 3110
 - Molybdenum filament 1907
 - Tantalum 3208
 - Tungsten filament 1302 1304 1401
 - Zirconium 4905
 - Nitrogen oxide
 - Aluminum 6082
 - Oxide films
 - Formation and stability 4206
 - Iron
 - Location by electron microscope 5653
 - Tungsten 4821
 - Oxygen
 - Activated by hot filament 4018
 - Barium, see also Getters 5204
 - Germanium 5996 6091
 - Iron 5653
 - Magnesium 3303
 - Tantalum 3208
 - Tungsten filaments B491 1301 1304 1502
 - Zirconium 4905
 - Review B472
 - Theory B601 1502
 - Sorption by metals B491 5670
 - Water vapor
 - Barium 6032
 - Produced by activated oxygen on glass walls 4018
 - Tantalum 3208
 - Tungsten 1304
 - Adsorption and degassing measurement
 - Accumulation method 6034
 - Applications
 - Adsorption 3712 5312 5430 5554 5778 5882 5914 5948 5951 5990 59135 59136 59175 6023 6030 60122
 - Electron tubes 6018 6020 6034
 - Glass 4714
 - Silicon 5632
 - Degassing 2302 4824 5312 5612 5759 5768 5778 5882 58121 58124 58159 5925 5971 59119 59136 59153 59157 6001 6023 6034 6080 60123
 - Diffusion 58121
 - Gettering 3209 5009 5162 5205 5430 59136 6046 6047 6048 6053
 - Compression of gas
 - Capillary tube, in 5759
 - Conductivity of nickel oxide determines gettering of oxygen 6046
 - Contact resistance, measures adsorption of gases on molybdenum and tungsten 5882
 - Diffraction, low energy electrons 60122
 - Electron tubes
 - Ionization gage circuit measures residual gas pressure 6018
 - Field emission microscope 3712 5554 5988

SUBJECT INDEX (cont'd)

- Adsorption and degassing measurement (cont'd)
 Flash filament techniques
 Adsorption 5948 59136
 Residual gases by tungsten 5914 59136
 Number of gas layers absorbed 5313
 Mass spectrometer plus pressure drop measures adsorption 5632
 Flowmeter, microvane deflection 6034
 Gas analysis, see
 Getter-ion pump, current integration 60123
 Infrared spectrum of freshly formed metal films in presence of gas 5990
 Mass spectrometer, see
 Oatley method 5445
 Omegatron, see Mass spectrometers
 Polarized light
 Multimolecular layers absorbed 4717
 Pressure change vs time 2303 3209 5162 5883
 Differential pressure, pump operating through known conductance 5009 5162 5205 5768 58121 5951 59119 6030 6034 6053
 Theory 5768 6034
 Pressure change in system, pump operating through orifice of known conductance 5445 5971
 Theory 5445 5971
 Pressure drop in reservoir getter chamber pressure held constant 6047 6048
 Pressure rise
 In orifice of known conductance 58159
 Ionization gage, palladium window admitting hydrogen only 6080
 Radioactive tracer 5430
 Krypton 85, 5612
 Penetration depth in nickel 6001
 Surface area of solids, see
 Weighing
 Electrically operated beam balance 4824
 Microbalance 5778 59135 59175 6021
 Zabel method 59153
 Theory 59153
 Alphatron, see Radioactive ionization gages
 Amplifiers, electronic
 Electronic B542
 Transistor B602
 Analcite, see Zeolites
 Anode materials
 microwave tubes 6026
 Anemometers, vacuum, see Flowmeters, vacuum
 Argon
 Adsorption, see
 Degassing, see
 Diffusion, see
 Atmospheric pressure oscillations, measurement of, see Pressure measurement, Microbarographs
 Bibliography
 Acoustic and explosion waves 59177
 Backstreaming, see Pumps, diffusion
 Ballast gas, mechanical pumps, see Pumps, mechanical
 Barium
 Contact potential, tungsten 3502
 Getter, see
 Melting point curve 6050
 Oxidation
 Mechanism 5735
 Theory 5708
 Barium (cont'd)
 Photo absorption 5030
 Purity 6050
 Structure, getter films 6051 6052
 Surface area, active 6050 6051
 Work function 3502 3808
 Barometers, see also Manometers
 Aneroid, null type 5490
 Review 6009
 Standard NPL 6092
 Vacuum valve 5455 60126
 Barostat, see Pressure regulator
 Batalum getter 3708
 Bayard-Alpert gage, see Ionization gage, Bayard-Alpert
 Bibliographies
 Acoustic and explosion wave propagation in atmosphere 59177
 Adsorption 5563 5676
 Altimeters 5575
 Aneroid barometers 5575
 Bourdon tubes and gages 5371
 Diaphragms 5575
 Diaphragm pressure gages 5575
 Electrical clean-up of gases by hot cathodes 5919
 Gas analysis 1949 5026
 Getters,
 Barium for carbon monoxide 6006
 Electron tubes 5010
 Leak detection 5233
 Mass spectrometers B594 5015 (1949)
 Applications 58103
 Materials
 Electron devices B591
 Mica 5940
 Vacuum applications B593
 Molecular beams 4622
 Molecular processes, gas-solid interface 59176
 Pirani gages 4704
 Pressure measurement, dynamic 5481 5540
 Quartz 5890
 Radiometer gages 5125
 Surface area of solids 5165
 Vacuum insulation, electrical 60128
 Vacuum measurement B571 5105 5113
 Ultra high 5874
 Vacuum pumps 4817 5848
 Vacuum techniques B591 5166 59114
 High 60120
 Ultra-high 5874
 Valves 5320
 Vapor pressure 4712
 Bimetal strip Pirani gage, see Expansion gages, thermal
 Books and Surveys
 Adsorption B321 B341 B431 B491 B495 B514 B521 B581 B601 3307 5675 59176
 Chemisorption B601 5675
 Monolayers on solids 4015
 Theories B431 B495 B601 4015
 Ultra-high vacuum 5874
 Cathodes, oxide coated 3907
 Conductance of tubes and orifices B491 B492 B501 B506 B512 B581
 Desorption (Degassing) B491 B581 B591 3109
 Glass B543
 Metals 5631

SUBJECT INDEX (cont'd)

Books and Surveys (cont'd)

Diffusion of gases, thermal 4623
 Diffusion through solids B472 B522 B581
 Electrical discharges in vacuum 5316
 Electronic and ionic impact phenomena B524
 Electronics, applied B542
 Evaporation rates, metals B491
 Field emission microscopy B511 5684
 Fluid velocity and pressure B241
 Gas analysis 1949, 5026
 Gases, Kinetic theory B381 B471 B491 B501 B502
 B506 B512 B581
 Molecular flow B561
 Getters B581 B591 4415 5010
 Barium for carbon monoxide 6006
 Glass, Properties of B543
 Metallising 5143
 Handbook, vacuum B504
 Ionization gages 5105 5113 5144
 Cold cathode 5311
 Ultra-high vacuum 5874
 Ionization phenomena B603
 Leak detection B491 B492 B493
 McLeod gage B491 B515 B571 4615 5105 5113 5166
 Mass spectrometry B531 B582 B594 60125
 Applications 58103
 Materials, vacuum applications B593
 Materials, vacuum tubes B591
 Mercury barometers and manometers 6009
 Mica 5940
 Micromanometers B391 B496 B533 5105
 Tilting B241 B496
 Molecular beam techniques 4622
 Outgassing, see Desorption
 Pirani gages B491 B571 4704 4903 5105 5113 5144
 Pressure gages, low B391
 Pressure measurement, dynamic 5481
 Pump oils 4414
 Pumps, see Vacuum pumps below
 Radiometer gages B491 B571 5105 5113 5125
 Seals, glass to metal 5348
 Solubility of gases in solids B522
 Sorption of gases and vapors, see Adsorption above
 Surface area of absorbents 4508
 Surface chemistry B514 B601
 Surface physics 59176
 Surface tension B494
 Thermionic emission 5678
 Transducers B592
 Vacuum evaporation and metallurgy B513 B572
 Vacuum distillation, pump oils 4414
 Vacuum gages B382 B391 B491 B492 B506 B521 B551
 B571 B581 4615 5105 5113 5144 5875
 Calibration methods B491 B501 B502 B571 4615
 Ionization gages, see above
 McLeod, see above
 Pirani, see above
 Radiometer, see above
 Upper atmosphere pressure B532
 Vacuum insulation, electrical 60128
 Vacuum pumps B382 B491 B492 B502 B506 B512 B521
 B551 B572 B581 3109 4817 5149 5848 5875
 Pumping speed B506 B512 B551
 Vacuum techniques B261 B382 B473 B491 B492 B502
 B503 B504 B505 B521 B523 B551 B581 3109 5134
 5166 59106 59114 59132
 Ultra-high vacuum 5874 5915

Books and Surveys (cont'd)

Valves 5320
 Vapor pressure
 Inorganic compounds 4712
 Organic compounds B541 4712
 Pump oils B581
 Solids B491 5527
 Viscosity gages B491 5113
 Bourdon tube gages
 Bibliography 5371
 Glass B391
 Collapsible 3405
 Light beam B491 0901
 Pointer B491 3405
 Quartz B491
 Light beam B491
 Review, vacuum measurement 4615
 Silica B391
 Bourdon tubes
 Bibliography 5371
 Theory 5272 5273 5679
 Brazing techniques
 Nickel 5258
 Vacuum 5859 5887
 Buna rubber, see Rubbers
 Butyl rubber, see Rubbers
 Calibration techniques, vacuum gages
 Constant leak, orifice in two positions
 Pumping speed known, pressure gage linear 59147
 Expansion of gas method B391 B491 B501 B571 1403
 3212 4909 5310
 Florescu 59147
 Flow-pressure drop method B491 B501 B571 2101
 3709 5124 5874 59147
 Across aperture in diaphragm 58155
 Theory 2101
 Ionization gages
 Expansion of gas method 5310
 Location in vacuum system 6016
 Pumping speed and gas flow measured at gas exit 5609
 Secondary standard 5725 58107
 Magnetron
 Using Bayard-Alpert gage 5944
 McLeod gages 5474
 As standard, see McLeod gages
 Expansion of gas method 3212
 Review B491 B571 4615
 Measured gas volume added to system 5242
 Radiometers
 As standard, see Radiometer gages, applications
 Review 6016
 System
 Comparison method, pressure rise technique 60136
 Capillary depression, see Surface tension, mercury
 Carbon
 Adsorbed layer in vacuum systems 5315
 Carbon dioxide
 Adsorption, see
 Degassing, see
 Getters, see
 Origin in vacuum systems 5308

SUBJECT INDEX (cont'd)

- Carbon adsorber B583
 - Modified active
 - Argon 5997
 - Nitrogen 5997
- Carbon monoxide
 - Adsorption, see
 - Degassing, see
 - Getters, see
 - Origin in vacuum systems 5308
- Cartesian diver, see Micromanometer, liquid type, gasometers, Pressure controllers
- Cast metals
 - Effect of adsorbed gases B491
- Catalysis
 - Carbon and oxygen on tungsten 5554
 - Hydrogen and oxygen on tungsten 5554
- Cathodes
 - Iridium
 - Performance 5110
 - Oxide coated
 - Degassing, using cold trap for CO₂ 5748
 - Electron emission, see Electron emission from cathodes
 - Properties 3907
 - Thoria covered iridium and rhodium
 - Performance 5110
 - Rhodium
 - Performance 5110
- Cellulose, sorption and desorption B491
- Cements, properties B551
 - Vapor pressure, see
- Centrifugal manometer, see Mechanical pressure and vacuum gages
- Ceramics, properties, see Materials
- Chabasite absorber, see Zeolites
- Charcoal absorber
 - Absorption of gases vs pressure and temperature B491
 - Activation methods B491
 - Ammonia 2907
 - Carbon dioxide 2606 2907
 - Polanyi potential theory 2702
 - Carbon monoxide 2606
 - Liquid air temperatures 1801
 - Carbon monoxide 2606
 - Hydrogen 1406 2606
 - Nitrogen 2606 5976
 - Nitrogen 2606 5976
 - Oxygen 2606
 - Physical characteristics B491 1406
 - Porosity, see
 - Pump 6039
 - Liquid nitrogen temperature 5976
 - Review B321 B491
 - Surface area B491
 - Theory, absorption in vacuum systems B491 3811
 - Time lag B491
- Chemisorption, see Adsorption, activated or chemisorption
- Clean surfaces, see Surface reaction phenomena and techniques
 - Glass, see
 - Nickel, see
 - Silicon, see
 - Titanium, see
 - Tungsten, see
- Clean-up of gases, electrical, see also Degassing, Getters
- Clean-up of gases, electrical (cont'd)
 - Carbon arc
 - Air, argon, hydrogen 5789
 - Electrical discharge, cold cathode
 - Clean-up by cathode sputtering B491
 - Clean-up by positive ions entering cathode
 - Helium 5153
 - Neon 3615
 - Rare gases B491
 - Review B491
 - Electrodless discharge
 - Air, hydrogen, nitrogen, oxygen clean-up B491 2803
 - Argon 2803
 - Mechanism of clean-up B491
 - Hot cathode, see also Gettering action, ionization gages
 - Air 3308
 - Bibliography 5919
 - Helium 3410
 - Hydrogen 3308
 - Magnetic field effect 3308 3410
 - Mechanism 5919
 - Nitrogen 3410
 - Review 5919
 - Sealed systems, data 5309
 - Theory 59125
 - Triode
 - Mechanism 2406
 - Ionization gages, see Gettering action, ionization gages
 - Cold traps, see Pumps, cryogenic, Traps
 - Compression type vacuum gage, see also McLeod gages
 - Differential pressure measurement 5438
 - Condensation coefficient
 - Carbon dioxide B491
 - Carbon monoxide
 - Mercury 59159
 - Tungsten 6030
 - Hydrogen B491
 - Glass 2806
 - Mercury 59159
 - Silicon 5948
 - Tungsten 5206 5889 6083
 - Methane B491
 - Glass 2806
 - Nitrogen B491
 - Glass 2806
 - Mercury 59159
 - Metals 5313
 - Tungsten 5206 5951 6030
 - Oxygen B491
 - Copper 5206
 - Glass 2806
 - Mercury 59159
 - Silicon 5938
 - Tungsten 5206 5557 5938
 - Review 5915
 - Temperature effect B491
 - Theory B491
 - Conductance of tubes and orifices, see Flow of gases
 - Controlled gas leaks, see Leaks, controlled gas
 - Controller, liquid level, see Traps
 - Controller, pressure, see Pressure controllers
 - Convection manometer
 - Thermocouples measure temperature above and below heated strip 5680 59118
 - Cryogenic pumps, see Pumps, cryogenic

SUBJECT INDEX (cont'd)

- Degassing, see also Getters, Clean-up of gases, electrical, Residual gases
 Aluminum 58152 58159 59153
 Composition of gases B491
 Oxide film effect B491
 Water vapor 5360
 Anode materials, long periods of time 5883
 Araldite 58152 58159 59100
 Brass 5804 59153
 Brazing, vacuum 5859
 Buna rubber, see Rubbers
 Cements 5321
 Ceramics 5925 59153
 Copper 5804 59153
 Composition of gases B491
 Embrittlement by sorbed gases B491
 Enameled 59100
 Copper-coated nickel iron alloy B491
 Dural 59153
 Elastomers 59153
 Electron tubes, see Vacuum tubes, below
 General considerations, room temperature 5779
 Germanium 59135
 By ion bombardment 5672 5880
 Glass, see also
 Acetylene 2404
 Air
 Dry B491
 Moist B491
 Argon 58129
 Carbon dioxide 1906 2303 2404
 Composition of absorbed gases B491
 Composition of glass 2303
 Sealing to metals 5528
 Vacuum applications 5528
 Degassing techniques B491 B591 2303 2405
 Electron bombardment 6004
 Infrared heat 5048
 Helium 58121 58129
 Hydrogen 58121 6032
 Induced by electrical discharge B491
 Krypton 58129
 Neon 58129
 Nitrous oxide 2404
 Oxygen 6004
 Preheat effect
 Review B382 B491 B543 5703 5897
 Silicone 5804
 Sorption, solution effects B491
 Sputtered metal film reduces 5703
 Sulfur dioxide 2404
 Temperature effect 2303 58121
 Water vapor B491 1906 2303 6032
 Ion bombardment 5246
 Mechanism 5503
 Various glass compositions 5503
 Glyptol 5869
 Graphite
 Composition of gases B491 4415
 Techniques B491 4415
 Volume, adsorbed gases 4415
 Greases, vacuum, see
 Insulators 59100
 Ionization gages 5350 5802
 Bayard-Alpert 5310
 Cold cathode 5312 5347 5506
 Oil vapor causes abnormal 5727
 Degassing (cont'd)
 Iron 6034
 Composition of gases B491 4416
 Nickel plated 6034
 Oxygen content B491
 Techniques B491 5203
 Volume of adsorbed gases 4416
 Lead gaskets 5032
 Liquids
 Refluxing through cold trap 5633
 Measurement of gas evolved, see Adsorption and degassing measurement
 Metals
 Re-emission, noble gases, caused by ionic impact 5767
 Review 5631
 Mica 5940
 Molybdenum 59153
 Composition, adsorbed gases B491 4415
 Helium 5720
 Mechanism 5720
 Nitrogen 5882
 Oxygen 5882
 Techniques B491 3206 4415 5368
 Volume, adsorbed gases 4415
 Monel metal wires B491
 Mylar 5804 5869
 Neoprene, see Rubbers
 Nickel 58152 59153 6034
 Argon 58129
 By ion bombardment 5852 5878 5880
 Carbon monoxide source of 3607
 Composition of gases B491 4416 59130
 Helium 58129
 Krypton 58129 6001
 Neon 58129
 Oxygen 60122
 Techniques B491 4416 58129 59130 6035
 Volume of adsorbed gases 4416
 Nylon 58159
 Palladium
 Deuterium 6089
 Hydrogen 6089
 Perbunan, see Rubber
 Plastics (46) 59153
 Platinum
 Argon 58129
 Helium 58129
 Krypton 58129
 Neon 58129
 Plexiglas 5804 58152
 Polyvinyl chloride 5804 5869
 Porcelain, enameled 58152
 Pump oils, see
 Resin
 Epoxy 5804 5869 6033
 Review
 Analysis 5805
 Data B581 5804
 Techniques B471 B491 B551 5805
 Metals B591
 Ultra-high vacuum 5874
 Rubbers, see
 Silicon
 By ion bombardment 5880
 By heating under ultra-high vacuum 5908
 Silver 58152 59153
 Silver chloride 60103

- Degassing (cont'd)
 Steel 59153
 Chrome plated 59153
 Composition of gases B491
 Molten steel 5763
 Nickel plated 58159 59153
 Oxygen content B491
 Plated 5971
 Rate at room temperature 5768
 Rusty 58159 59153
 Stainless 58159 5971 59153
 Techniques B491
 Varnished 58159
 Tantalum 58152 59153
 Embrittlement by sorbed hydrogen B491
 Techniques 3502 3717 5034 5805
 By ion bombardment 5672 5880
 Germanium 59135
 Mass spectrometer 60131
 Metals 4416
 Nickel 6035
 Tungsten 5673 59136
 Ultra-high vacuum 5867 5980 59136
 Teflon, see
 Theory, rate 59153
 Titanium 6034
 By ion bombardment 5880
 Titanium oxide
 By ultraviolet light 6088
 Tungsten 58152 59153
 Argon 58129
 Barium 5554
 Carbon monoxide 5673 5999
 Composition of gases B491
 Helium 58129
 Hydrogen 4015 5673
 Krypton 58129
 Neon 58129
 Nitrogen 5672
 Oxygen 4015
 Techniques B491 4808 58129
 Vacuum systems
 Review 59153
 Water vapor
 Methylchlorosilane Dri-film 5462
 Vacuum tubes
 Gas composition and volume against time 5759
 6035
 Oxide coated cathodes, cold trap for CO₂ 5748
 Travelling wave tube 5925
 Vinyl acetate 5032
 Zirconium 58152 59153
 Density of rarefied gas
 Electron beam attenuation 5954
 Desorption, see Degassing
 Dewar flasks, see Traps
 Diaphragm vacuum gages, see Mechanical pressure and vacuum gages
 Diaphragms
 Corrugated
 Design 4208 5772 5983
 Handbook 58143
 Performance 4208 5772
 Review 5983
 Theory 5772
 Terminology 58143
 Flat
 Design 3108 5983
 Diaphragms (cont'd)
 Flat (cont'd)
 Performance 3108
 Temperature effects 3108
 Theory 3108
 Differential multiple pumping 5757
 Diffusion of electrons
 Window for 5839
 Diffusion of gas mixtures
 Isothermal
 Coefficients, various gas mixtures B491
 Measurement B491
 Theory B381 B491
 Rate, theory B491
 Thermal
 Data, various mixtures B491
 Theory B491 4623
 Diffusion of gases into or through solids
 Aluminum
 Hydrogen B551 59153
 Bakelite 59153
 Copper
 Hydrogen B551 59153
 Enamelled iron
 Helium, hydrogen 6066
 Glass
 Air 3409
 Argon 3409 5473
 Deuterium 5740
 Helium B491 B581 3409 5261 5362 5434 5463
 5473 5740 58121 59153
 Hydrogen 3409 5261 5473 58121
 Limiting molecular diameter of gas 5740
 Mechanism 4714
 Neon 5473 5740
 Nitrogen 3409 5473
 Oxygen 3409 5473
 Review 5897 59153
 Temperature effect 5740 58121
 Water vapor 5603 59153 6032
 Glass, pyrex
 Helium B491 B581 5261 5361
 Iron
 Carbon monoxide 59153
 Helium 6066
 Hydrogen B551 5261 5473 5892 59153 6066
 Nitrogen 5261 5473 59153
 Measurement, see also Adsorption and desorption
 measurement
 Plastic tubing 5756
 Pressure drop vs time 5756
 Mechanism 3409 5473
 Metals
 Argon 6090
 Carbon monoxide B491
 Hydrogen B491 B522 B551
 Oxygen B491
 Theory B491
 Molybdenum
 Hydrogen 59153
 Nitrogen 59153
 Nickel
 Carbon 3607 5260 6035
 Carbon monoxide 59153
 Carbon monoxide production mechanism 3607
 Helium 5444
 Hydrogen B551 5444 5526 59153
 Oxygen 3607

SUBJECT INDEX (cont'd)

- Diffusion of gases into or through solids (cont'd)
 Palladium, see
 Platinum
 Hydrogen 59153
 Polymers 5740
 Air
 Vinyl tubing 5756
 Argon B522
 Carbon monoxide B522
 Carbon dioxide B522
 Hydrogen B522 5261
 Helium B522
 Nitrogen B522
 Water vapor B522
 Porcelain 59153
 Pyrex, see Glass, above
 Quartz
 Air 3409
 Argon B472 B491 B581 3409
 Deuterium B581
 Helium B491 B581 3409
 Hydrogen B472 B491 B581 3409
 Mechanism B472 B491
 Neon B472 B491 B581
 Nitrogen B472 B491 B581 3409
 Oxygen B491 B581 3409
 Temperature effect B491
 Review B472 B491 B522
 Rubber, see
 Silicon dioxide (Silica)
 Argon B581
 Helium B581 5362
 Hydrogen B581
 Neon B581
 Nitrogen B581
 Silver
 Oxygen B551
 Steel
 Deuterium 5822
 Hydrogen 5822 5892
 Oxygen 59153
 Temperature effect B551 B581 3409
 Theory B472 B491 B522 5164
 Vycor 6003
 Thorium
 Hydrogen 60111
 Vycor
 Helium 5362 6003
 Hydrogen B491 6003
 Neon 6003
 Nitrogen 6003
 Oxygen B491
 Zirconium
 Hydrogen 5726
 Diffusion pumps, see Pumps, diffusion
 Displacement measurement, see Transducers
 Draft gages, see Manometers, liquid type, Mechanical pressure, and vacuum gages
 Dubrovic manometer, see Micromanometers, liquid type
 Dynamic pressure measurement
 Barium titanate crystals, see Piezoelectric gages
 Bibliography 5540
 Piezoelectric gages, see
 Review 5481 5540
 Theory
 Diaphragm plus pressure line 5487
 Dynamic pressure measurement (cont'd)
 Theory (cont'd)
 Earth satellite 5787
 Rockets 5623
 Time lag 5846
 Ejector pumps, see Pumps ejector
 Electrical analogue, vacuum systems 5345
 Electrical discharge in gases
 Breakdown, coaxial cylinders, magnetic field
 Data, various cases 5344
 Theory 5344
 Classes 5316
 Clean-up, See Clean-up of gases, electrical
 Glow discharge, magnetic field effect 5264
 Ionization, see
 Magnetic field effect 5316 5551
 Argon 5485
 Theory 5485
 Mechanism B491
 Pressure indicated B491 B581 4305 5144
 By color, particular gas 4305
 By discharge current or voltage drop in magnetic field 5551
 By magnetic field strength at which discharge starts 5551
 Glow geometry 5055
 Review 5316
 Electrical mass filter partial pressure gage, see Mass spectrometers
 Electron emission from cathodes
 Cold cathodes 5316
 Columbium B491
 Current to positive grid in electron tubes 4504
 Theory 4504
 Molybdenum B491
 Effect of adsorbed gases 5368
 Oxide coated cathode B491 3907
 Barium-strontium carbonates coated nickel and platinum 5406
 Effect of various gases 5406
 Barium-strontium oxide coated nickel
 Effect of various gases 4906
 Emission improved by hydrogen 6057
 Review 5678
 Temperature variation by current flow 60106
 Review B491
 Space-charge B491
 Tantalum B491
 Theory B491
 Discharge potential, magnetic field 5267
 Review 5678
 Thoriated tungsten B491
 Tungsten B491
 Effect of adsorbed gases 5673
 Thorium coverage for maximum emission 60102
 Electronic impact phenomena B524
 Collision scattered electrons actuate photo plate 59161
 Electrolysis of glass 5941
 Glass
 Degassing 6004
 Ionization of adsorbed gases 59137
 Oxygen 3209
 Pump oils
 Decomposition 5353
 Secondary electrons
 Produced by electron impact on wall 5351

SUBJECT INDEX (cont'd)

- Electronic impact phenomena (cont'd)
 - Sorption of gases, effect on 5405
- Evaporation, liquids
 - Pump oils
 - Effect of surface impurities 5223
 - Maximum rate
 - Octoil 5224
 - Octoil-s 5224
 - Method of measurement 5224 5343 60117
 - Theory 5225
 - Evaporation, metals
 - Alloys
 - Inconel 5849
 - Multimet 5849
 - Stainless steel 5849
 - Cobalt 5849
 - Chromium 5849
 - Iron 5849
 - Molybdenum 5849
 - Nickel 5849
 - Pressure effect B491
 - Review B491
 - Tantalum B491 5849
 - Temperature effect 5849
 - Titanium 5849
 - Theory B491
 - Tungsten B491 5849
 - Zirconium 5849
 - Evapor-ion pumps, see Getter-ion pumps
 - Expansion gages, thermal
 - Bimetal
 - Design B491
 - Performance B491
 - Theory B491
 - Filament expansion B491
 - Farvitron, see Mass spectrometers
 - Fiber suspensions, see Instrument suspensions
 - Field emission microscopy
 - Applications 5553 5554 5684
 - Adsorption 5999 6038
 - Ultra high vacuum measurement 4203 5161 5637
 - Description B511 3605 3712 3809 5553
 - Emission pattern varies with pressure
 - Thoriated tungsten 4203
 - Tungsten 4203
 - Phthalocyanine dye 5117
 - Field emission data
 - Adsorbed gas effect 3605
 - Barium layer on tungsten 3809 5161
 - Molybdenum 4007
 - Nickel 4007
 - Nitrogen sticking probability 5313
 - Tantalum 5259
 - Tungsten 4007 4203 5161
 - Barium desorption 5554
 - Carbon monoxide, adsorption, diffusion, desorption 5999
 - Oxygen 5557
 - Surface mobility of oxygen 5367
 - Thoriated 3711 4203
 - Vacuum measurement 5637
 - Ultra-high vacuum 5161 5637
 - Work function ion effect 3606
 - Review 5684
 - Techniques 5313 5553 5554
 - Theory 3605 5553 5684
 - Field ion microscopy
 - Review 5684
 - Flash filament techniques, see Surface reaction phenomena
 - Flowmeters, vacuum 5417
 - Disk, suspended 5375
 - Deflection measured 6034
 - Force balanced by torsion fiber 5465
 - Impact forces 54183
 - Vane, a c generator
 - Measures pressure, evaporating liquids 5343 60117
 - Flow of gases
 - Force on disk
 - Investigation 5483
 - Free molecular, see Flow of gases, free molecular
 - Intermediate flow, free-viscous
 - Capillary tubes
 - Argon 5226
 - Carbon dioxide 5226
 - Ethylene 5226
 - Helium 5226
 - Hydrogen 5226
 - Nitrogen 5226
 - Nomographs 6067
 - Tubing
 - Conductance
 - Data 4715
 - Theory 4715 5043
 - Ion flow
 - In mass spectrometer 4510
 - Measurement 5683
 - Leaks, controlled gas, see Leaks, controlled
 - Porous medium, see Porosity
 - Review B491 B581
 - Theory B471
 - Applied to Mass spectrometer 4510
 - Knudsen B491 1305
 - Tubing
 - Conductance B491
 - Measured by pressure drop method 5445
 - Flow of gases, free molecular
 - Adsorption effects 5966
 - Theory 5966
 - Aperture, see Orifices, below
 - Capillary tubing
 - Flattened 5658
 - Theory 5658
 - Conductance, see also Tubing below
 - Graphical presentation 5404 5472 5548
 - Flow patterns
 - Ends of tubes 5650
 - Force on disk 5483
 - Isentropic flow B561
 - Leaks, controlled, see Leaks, controlled gas
 - Liquid air trap
 - Conductance B491
 - Mechanics of rare gases B561
 - Non-isentropic flow B561
 - Nomographs 5404 5548 6067
 - Orifices
 - Pressure probes
 - Theory 5960
 - Theory B491 4818 5823 6013
 - Pressure limit, upper 1305
 - Review B491 B492 B561 B581 6013
 - Stopcocks
 - Conductance for various gases B491
 - Thermomolecular B491

SUBJECT INDEX (cont'd)

- Flow of gases, free molecular (cont'd)
- Tubing
 - Annular 5635
 - Conductance 4715 5635
 - Nomograms 5472
 - Various gases B491 5635
 - End correction B491
 - Long B491 B581
 - Mass spectrometer inlet 5244
 - Rate of exhaust B491
 - Rectangular 4818 5635
 - Short B491 B581 4818
 - Tapered B491
 - Theory B382 B491 B492 B506 B512 B581 4715
4815 5033 5244 5635 5823 5896 6013
- Flow of gases, viscous
- Annular, circular and rectangular channels
 - Data various gases 5635
 - Theory 5635
 - Capillaries
 - Graphs for computing 5602 5662
 - Noncircular cross section 5464
 - Reynolds number B491
 - Theory B491 B581 3716
 - Turbulent flow B491
 - Earthenware plate, unglazed
 - Various gases 3716
 - Elbows 4613
 - Force on disk 5483
 - Nomographs 6067
 - Pipes, see Tubing below
 - Porous media, see Porosity
 - Review B491 B581
 - Static tube
 - Theory 58100
 - Tubing
 - Conductance
 - Data 4613 4715
 - Theory 4715 5033
 - Poiseuilles modified 4613
 - Rate of exhaust B491
- Force-pressure balances, see also Vapor pressure measurement, Torque-pressure balances
- Input pressure operates force balance, controls flapper valve
 - Output pressure proportional to input 5214
 - Manometer, tilting, weights balance pressure
 - Float operated electromagnetic pickup, indicates null 5945
 - Force on disk, flowing gas 5483
- Free molecular flow, see Flow of gases, free molecular
- Friction of metals
- Effect of adsorbed gases 5132
- Gas analysis in vacuum systems, See also Adsorption and degassing measurement, Leak detection, Mass spectrometers
- Chemical methods
 - Bibliography 5026
 - Review 1949, 5026
 - Dewpoint method 5166
 - Mass spectrometer, see Review 5166
- Gas flow, see Flow of gases
- Gaskets, see also Seals
- Application
 - High temperature 5962
 - Liquid helium temperature 5719
- Gaskets (cont'd)
- Application (cont'd)
- Liquid nitrogen temperature 5943 5962
 - Mass spectrometry 58158
 - Ultra high vacuum 5979
- Degassing properties
- Buna rubber 5032
 - Lead 5032
 - Neoprene 5814
 - Rubber 5032 58108
 - Teflon 5032 5814
 - Vinal acetate 5032
- Dumbbell cross section, copper 5737
- Metal
- Aluminum, cupped 5979
 - Between stainless steel flanges 5962
- O-rings
- Cleaning techniques
 - Neoprene 5953
 - Silicone rubber 5953
 - Copper 5163 5537
 - Double, space between evacuated 5339
 - Lead 5905
- Review B492 B502 B551 B581 5415
- Step-type, copper 5712
- Teflon
- Gasket, thin 5809
 - Low temperature operation 5943
 - Ring, spring held 5525
- Wire gaskets
- Aluminum 5719 5965
 - Gold 4914 5856 58158
 - Indium 5733 58158
- Gasometer gage, see Mechanical pressure and vacuum gages
- Germanium
- Adsorption, see also
 - Alcohols 59131
 - Gases not adsorbed 59131
 - Mechanism 59131
 - Oxygen 6091
 - Degassing, see
 - Surface properties 5996
 - Gettering action, ionization gages, see also Clean-up of gases, electrical, Getters, Ion pumps
 - Amoil-s B491
 - Bayard-Alpert gage 5533 5556
 - Argon
 - Two pumping speeds 5918
 - Helium 5556
 - Nitrogen 5556 5885
 - Oxygen 5885
 - Pumping speed, ultra-high vacuum 5310 5721
 - Theory 5885 59122
 - Butyl sebacate B491
 - Chemical reactions, see Adsorption, activated
 - Cold cathode gage
 - Argon 60138
 - Mechanism 59171
 - Titanium film 6041
 - Nitrogen 60138
 - Oxygen 60138
 - Performance 5242 59171
 - Pumping speed, various gases 6041 60138
 - Three-electrode gage 59171
 - Hot cathode, see also Bayard-Alpert gage, above
 - Air B491 5031
 - Argon B491 4405
 - Carbon dioxide B491 6049

SUBJECT INDEX (cont'd)

Gettering action, ionization gages (cont'd)

Hot cathode (cont'd)

Carbon monoxide B491 6049

Glow phenomena B491

Helium B491 5556

Hydrogen B491 B571 1401 4405

Magnetic field effect B491

Mercury vapor releases hydrogen B491

Metal wall tube, no clean up B491 4017

Methane 6053

Nitrogen B491 1302 4405 6049

Oxygen B571 1301 4405 6049 60138

Theory 59125

Variation with pressure, voltage etc B491

Hydrocarbons B571 4708

Magnetron gage 58136

Helium 58135

Nitrogen 58135

Measurement techniques

Differential pressure measured 4708

Gas leak measured, pressure constant 5885

Pressure change measured 4405

Mechanism B491 B571 1502 4017 5031 5109 5665

5919 6049 60138

Helium 5517

Molybdenum cathode

Hydrogen B491 1502

Nitrogen B491 1907

Naphthalene B491

Octoil-s B491

Performance

Pumping and pressure recovery, initial 5813
5931

Temperature effect, ambient 59138 5931

Ultra high vacuum 5463 5555

Palladium cathode

Hydrogen dissociation B491

Platinum cathode

Hydrogen

Dissociation B491

Pump oil vapors B571 4708

Review B491 B571 5874 5919

Silicone oil B491

Tantalum cathode

Hydrocarbons decomposed B491

Hydrogen B491

Oxygen B491

Water vapor

Decomposed B491

Theory 5665 5703 58138 5931

Bayard-Alpert 5721

Tungsten cathode

Argon 1502

Bromine 1502

Carbon dioxide 1502

Carbon monoxide B491 1502

Chlorine dissociation 1502

Dissociation B491 1502

Cyrogen 1502

Hydrogen 1502

Dissociation B491 1502

Hydrocarbon decomposition B491

Iodine 1502

Mercury 1502

Methane 1502

Nitrogen B491 1502

Combines with tungsten vapor 1502

Gettering action, ionization gages (cont'd)

Tungsten cathode (cont'd)

Oxygen B491 1301 1502 5109

Dissociation B491 1502

Water vapor

Dissociation B491

Getter-ion pumps, see also Ion pumps

Application

Electron tubes 5974 6039

Electrostatic accelerator 5467

Microwave tubes 58123 6036

Particle accelerator 5920

Thin films by evaporation 58132

Very high vacuum 59145

Ultra-high vacuum 5867 5876 5915 6040

Design

Barium 5372 58127

Cold cathode type 5826 5922 60130

Cold cathode ionization gage, modified 5826

Cold trap used

Liquid helium 5970 59145

Liquid hydrogen 58132

Titanium 5451 5467 5542 5550 5826 5857 5888

58123 58126 58128 58131 58132 58137 58139

58142 5921 5970 5973 5974 5975 59108 59111

59127 59170 59172 59173 6007 6039 6040

60130 60134

Four electrodes used 59170

High pumping speed 58137 59172

Method of evaporating 58137 58142 5973
6040

Miniature 6007 6040

Water cooled walls 59111

Evapor-ion 5369 5451 5467 5542 5550 58131 58142

5920 5921 5970 6036 60130

Hall Vac-ion 5876

Herb, see Evapor-ion above

Mechanism of operation 5876 58128 58131 5922
60130

Performance 5459 58123 5921 5922 5973 59170
6040 60130 60134

Cold trap used 58126 5970 59145 59173

Life of components 5550 5974

Poisoning by hydrocarbons 5973 60134

Pumping speed 5467 58126 58128 58132 58138
5921 5922 5970 5974 5975 59111 59172 6007

6039

Air 5550 5867 58132 5921 5973 6039 60134

Ammonia 5921

Argon 5451 5542 5867 58128 59138 59108
6039 6040

Carbon dioxide 5550 58138 5921

Carbon monoxide 5550

Helium 5451 5867 59108 6039 6040

Hydrogen 5451 5550 5867 58128 58132 5921

5973 59108 60134

Methane 5550 6040

Neon 6040

Nitrogen 5451 5550 58128 58132 58138 5921
5973 6039 60134

Organic vapors 5467

Oxygen 5451 5550 58127 58128 58132 58138
5921 5973 6039 60134

Water vapor 5909

Review 5909

Temperature of gettering surface 5922

Vacuum limit, mm Hg

10^{-7} , 5451 5462 58132 5970

5×10^{-8} , 58138

- Getter-ion pumps, (cont'd)**
- Performance, (cont'd)
 - Vacuum limit, mm Hg (cont'd)
 - 10^{-8} , 58123 58126 58127 5973 60134
 - 5×10^{-9} , 59145
 - 10^{-9} , 5974 59127 6036
 - 10^{-10} , 5867 5975 59170 59173 6040
 - Vacuum limitations 59170
 - Review 5848 5857 5876 58131 5922 59114
 - Theory
 - Titanium pump 58139 6040
 - Tsukahoshi 5876
 - Vac ion 5876 5975 59145 59172 6039
 - Operating techniques
 - Ultimate vacuum 59173
 - Performance 6039
- Getters, see also Gettering action, ionization gages, Getter-ion pumps**
- Abrasion, of metals, continuous 5881
 - Aluminum
 - Carbon dioxide 4002
 - Hydrogen 4002
 - Nitrogen 4002
 - Oxygen 4002
 - Review B491
 - Aluminum-barium mixture 3717
 - Applications
 - Vacuum tubes 5817
 - X-ray tube, sealed in getter
 - Performance, various gases 6043
 - Barium
 - Acetylane 6042
 - Air 5407 5408 5710 5806
 - Area 6050
 - Argon 5710
 - Black and bright B491 3403
 - Carbon dioxide 4002 4201 5107 5407 5408 5710 5806 6042 6049
 - Carbon monoxide 4201 5107 5308 5407 5408 5502 5634 5709 5806 59174 6006 6042 6049 6054
 - Efficiency 5035 5994
 - Evaporated in argon atmosphere improves gettering B491 4201
 - Evaporated in mercury vapor atmosphere destroys gettering 4002
 - Gettering capacity defined 5408
 - Helium 4201
 - Hydrogen 3403 4002 5107 5407 5408 5710 5806 59174 6042 6049 6056
 - Mechanism 5107 5866 59174 6042 6049
 - Methane 6042 6053
 - Nitrogen 3403 4002 4201 5107 5407 5408 5710 5806 5866 59174 6042 6049 6055
 - Oxygen 4002 5107 5162 5204 5308 5407 5634 5707 5710 5806 6042 6049
 - Mercury vapor present 6046
 - Review B491 5205 5308 5408 5817 6006
 - Structure, evaporated films 6051 6052
 - Techniques B491 5710 59174 6043
 - Liquid air trap 59174
 - Temperature effect
 - Air 5407
 - Carbon dioxide 5407
 - Carbon monoxide 5407 5709 6054
 - Hydrogen 5407 6056
 - Nitrogen 5407 5866 6055
 - Oxygen 5407 5708
 - Water vapor 5407
 - Getters, (cont'd)
 - Barium (cont'd)
 - Theory B491 5866
 - Oxidation 5708
 - Vacuum tubes
 - Life 6042
 - Water vapor 5107 5407 5408 5806 6032 6042
 - Barium-aluminum
 - Performance 6043
 - Mercury vapor effect 6043
 - Barium-strontium carbonate mixture (Batalum) 3708
 - Carbon dioxide poisoning 5430
 - Radioactive tracer used 5430
 - Calcium
 - Hydrogen 3403
 - Nitrogen 3403
 - Review B491
 - Techniques B491
 - Carbon arc
 - Air, argon, hydrogen 5789
 - Ceto, see Thorium-aluminum below
 - Evapor-ion pump, see Getter-ion pumps
 - Gettering capacity defined 5408
 - History 5817
 - Incandescent lamps
 - Various getters used B491
 - Ionization gage, see Gettering action, ionization gages
 - Magnesium
 - Air 4002
 - Carbon dioxide 3403 4002
 - Carbon monoxide 3403
 - Hydrogen 3306 3403 4002
 - Mercury vapor effect 4002
 - Nitrogen 3110 3403 4002
 - Oxygen 3403 4002
 - Review B491 5205
 - Measurement, gettering, see Adsorption and degassing measurement
 - Mechanism, see also Barium, above
 - Clean-up by sputtered metal 6090
 - Misch metal (rare earth alloy)
 - Carbon dioxide 4002
 - Hydrogen 4002
 - Mercury vapor effect 4002
 - Nitrogen 4002
 - Oxygen 4002
 - Review B491
 - Selective getter
 - Desorbs hydrogen slowly 6057
 - Molybdenum
 - Hydrogen 5865
 - Phosphorous pentoxide
 - Hydrogen gettered by vapor B491
 - Review B471 B491 B581 B591 4415 5010 5848
 - Patents 4415
 - Ultra-high vacuum 5874
 - Sodium, during evaporation B491
 - Thorium
 - Carbon dioxide 4002
 - Hydrogen 4002 5366
 - Oxygen 4002 5366
 - Review B491 4002 5205
 - Tromium-aluminum (Ceto)
 - Performance, hydrogen 6045
 - Physical properties 6045

SUBJECT INDEX (cont'd)

- Getters (cont'd)**
- Titanium
 - Air 5535 5826 6041
 - Argon 5826
 - Bibliography 4913
 - Carbon dioxide 4913 5535 6034
 - Carbon monoxide 4913 6034
 - Helium 5826
 - Hydrogen 4913 5535 5826 59129 59136 6034 6041
 - Nitrogen 4913 5535 6034 6041
 - Oxygen 4913 5535 6034 6041
 - Mercury vapor present 6046
 - Performance
 - Compared to barium 5994
 - Porosity 5994
 - Review B491 4913
 - Techniques 5762 5857
 - Vacuum attainable 5762 5994
 - Uranium
 - Hydrogen 4002
 - Oxygen 4002
 - Review B491
 - Zirconium
 - Carbon dioxide 4002
 - Carbon monoxide 4107
 - Hydrogen 3616 4002 4107 4905 59129
 - Nitrogen 3604 4002 4107 4905
 - Oxygen 3604 4002 4107 4905
 - Mercury vapor present 6046
 - Rare gases 4107
 - Review B491
 - Sintered 6044
 - Techniques 4107
 - Vacuum tubes
 - Life in 6044
 - Glass
 - Adherence to metals
 - Monel 5148
 - Nickel 5148
 - Steel 5148
 - Tungsten 5148
 - Adsorption of gases, see also Adsorption
 - Argon B491 58129 59133
 - Benzene 4916
 - Carbon dioxide B491 1906 2303 2404 5052
 - Moist 5052
 - Pressure effect 2404
 - Carbon disulphide 4916
 - Carbon monoxide B491
 - Composition of glass, effect of 2303
 - Ethyl alcohol 4717
 - Ethyl iodide 4916
 - Helium 58129
 - Low temperature 5944
 - Hydrogen 4717
 - Hydrogen sulphide 4916
 - Krypton 58129
 - Mechanism 2405
 - Methane B491 2806
 - Neon 58129
 - Nitrogen B491 2806 4916
 - Nitrous oxide 2404
 - Oxygen B491 2806
 - Pentane 4916
 - Sodium 59133
 - Sulfur dioxide B491 5052
 - Moist 5052
 - Surface area, effective
 - Fibers, powder, microspheres 4823
 - Cleaning method effect 4823
 - Glass (cont'd)
 - Adsorption of gases (cont'd)
 - Theory B491 2404 2806 4916
 - Toluene 4916
 - Vacuum tubes, in 5703
 - Water vapor B491 1906 2303 4409 4916 5894
 - Decreased by molybdenum film 6031
 - Mechanism 5246 5894
 - Equilibrium pressure, various temperatures 5603
 - Borosilicate
 - Decomposes under ion bombardment 5995
 - Source of boron on silicon 6099
 - Carbon contamination, source, removal 6062
 - Cleaning surface
 - By ion bombardment 58153
 - Defined by coefficient of friction 58153
 - Isopropyl alcohol 59178
 - Ultra sonic agitation 59178
 - Degassing, see Diffusion
 - Diffusion, see also Diffusion of gases through solids
 - Sodium into glass 59133
 - Electroconductive coating, transparent, tin salts 5073
 - Electrolysis in electron tubes 5941 5995
 - Electron-bombardment outgases oxygen 6004
 - Hydrochloric acid evolved at high temperatures B491
 - Hydrogen
 - Atomic, produced by hot filament, reacts with glass 6002
 - Metallizing
 - Cathode sputtering 5143
 - Spraying 5143
 - Vacuum evaporation 5143
 - Properties B543 B551 B581 B591
 - For electron tubes 5897
 - Mechanical 4714
 - New glass compositions 6014
 - Sintered glass plug
 - Gas flow 4627
 - Sorption
 - Review B321
 - Water vapor B491
 - Surface area, effect of chromic acid wash B491
 - Vycor
 - Diffusion of gases, see Solubility of gases, see
 - Wettability by mercury
 - Caused by hydrofluoric acid wash 60141
 - Wettability by water
 - Cleanliness effect 5322
 - Composition of glass 5322
 - Glossary of terms, see Terminology
 - Glow discharge, see Electrical discharge in gases
 - Gmelinite, see Zeolites
 - Graphite
 - Adsorption of gases B491
 - Ammonia 2937
 - Carbon dioxide 2907
 - Greases, vacuum
 - Degassing 5804 5869
 - Molecular weight 5213 5788
 - Vapor pressure B581 5788
 - Handbook, vacuum B504 B581

SUBJECT INDEX (cont'd)

- Heat conductivity gages, see Expansion gages, thermal, Pirani gages, Thermocouple gages
 Review, see Books and surveys
- Heat conductivity of gases
 Accommodation coefficient, see
 Data 1101 1701 5215
 Air 5167
 Helium 5167
 Hydrogen 3804
 Hydrogen-deuterium mixtures 3803
 Free molecule conductivity B491 5215
 Temperature discontinuity B491
 Theory 5816
 Various gases B491
 Theory B491
 Between
 Concentric cylinders 1101 1501
 Parallel plates 1102
 Rough surfaces 1101
 Langmuir film B491
- Heat conductivity from wires to gases
 Data, 25 gases 5156
 Effect, wire diameter 5151
 Theory 5151
 Binary gas mixtures 5156
- Helium
 Adsorption on solids, see Adsorption
 Degassing, see
 Diffusion, see Diffusion of gases
 Heat conductivity, see
 Helium ions and molybdenum cathode 5368
 Solubility
 Glass 5434
- Hydrogen
 Accommodation coefficient, see
 Adsorption, see
 Degassing, see
 Diffusion through solids, see Diffusion of gases
 Palladium, see
 Dissociation
 Electron bombardment 2703 2704
 Hot tungsten cathode 1401 1501
 Reacts with glass 6002
 Getters, see
 Heat conductivity, see
 Origin in vacuum systems 5308
 Solubility
 Elastomers B522
 Metals B491 B522
 Palladium B491
 Theory 3715
 Polymers B522
 Theory B522
 Vycor 6003
 Zirconium 5726
 Sticking probability, see Condensation coefficient
- Indium, see Gaskets, Seals
- Instrument suspensions
 Metal wires 3713 5125
 Quartz fibers 5126
 Silica fibers 3713 5125
- Insulation, vacuum, electrical
 Review 60128
- Insulation materials, thermal
 Breelite (volcanic mineral) 5122
 Magnesium carbonate 5122
- Insulation materials, thermal (cont'd)
 Silica aerogel 5122
 Stag wool 5122
- Ion current measurement, see also Ionization gages
 Accelerated to metal plate, secondary electrons fall on ZnO scintillator
 Scintillations detected by photo multiplier 5683
- Ion impact phenomena
 Ion emission
 Platinum 5917
- Ionization
 Efficiency 3203
 Electron bombardment
 Acetylene 3203
 Adsorbed gases 59137
 Argon 3003 3005
 Carbon monoxide 3203
 Helium 3003 3005
 Hydrogen 3004 3203
 Mercury 3104
 Neon 3003 3005
 Nitric oxide 3203
 Nitrogen 3203
 Oxygen 3203
 Probability B491 2502 2802
 Argon 3005
 Helium 3005
 Hydrogen 3004
 Mercury 3104
 Neon 3005
 Review B524 B603
 Theory, see also Ionization gages, probability of ionization 2802 3404
 Various gases 2802
- Ionization gages
 Alphatron, see Radioactive ionization gages
 Bayard-Alpert, see Ionization gages, Bayard-Alpert
 Calibration techniques, see
 Cold cathode, see Ionization gages, cold cathode
 Hot cathode, see Ionization gages, hot cathode
 Magnetron, see Ionization gages, Magnetron
 Penning, see Ionization gages, cold cathode
 Philips, see Ionization gages, cold cathode
 Photomultiplier, see Ionization gages, photomultiplier
 Radioactive ionization gages, see
 Reviews B471 B491 B571
 Ultra-high vacuum 5874
- Ionization gages, Bayard-Alpert
 Adsorption, residual gases 60133
 Application
 Electron ejection 5314
 Ultra-high vacuum 58140 5979 59104 59110 6079
- Calibration
 Linearity at ultra-high vacua, controlled rate of change of pressure 5448
 Degassing 5310 60133
 Design 5012 5013 5106 5310 5428 5474 5478 5546
 5674 5721 5815 58105 58140 5979 59104 59110
 59149 6079
 Collector area small 5012 5428 5815
 Electrical charge on glass envelope prevented 59102
 Electron current control 58105
 Evacuated space around instrument 5435

SUBJECT INDEX (cont'd)

- Ionization gages, Bayard-Alpert (cont'd)
 Design (cont'd)
 Integrates output, measures ratio ion to electron current 58140
 Modified to lower vacuum range 5474 5721 59110
 Additional collector, two ion currents measured 6079
 Long electron trajectories 5674
 Power supply regulated 5546
 Review B571
 Subminiature 59149
 Thorium coated iridium filament 5546
 Gettering action, see Gettering action, ionization gages
 Performance 5012 5013 5106 5310 5815 59110 59122 6071 60121
 Linearity 5729
 Low pressure limit 5448
 Limiting vacuum
 Helium diffusion through glass 5435
 Sensitivity, bistable
 Caused by static electricity 59102
 Sensitivity ratio, ion to electron current 5266 58140
 Not constant 60121
 Sensitivity, various gases 5729
 Argon 5474 60121
 Helium 60121
 Neon 5474
 Nitrogen 5314 5474 60121
 Propane-butane (calor gas) 6063
 Review 5310
 Source of large errors
 Glass encased 60113
 Pressure range, high, mm Hg
 10^{-4} , 5478 59110
 10^{-1} , 5729
 Pressure range, low, mm Hg
 10^{-5} , 5729
 5×10^{-9} , 5478
 10^{-9} , 5106
 10^{-10} , 5012 5013 5314 5428 58105 58140 59110
 5×10^{-11} , 5310
 10^{-11} , 5435 5533 5721 6079
 10^{-12} , 5674 5815
 10^{-13} , 5474
 10^{-14} , 5428
 Review
 Ultra-high vacuum 5874 59113
 Theory 5474 59149 60121
 Additional ion collector 6079
 Linearity limits 59122 6071 60121
 Ionization gages, cold cathode
 Applications
 Leak detection 5627
 Ultra-high vacuum 59104
 Upper atmosphere 5769
 Degassing
 Cathode material effect 5312
 Mechanism 5506
 Methods 5347 5506
 Design 3705 3706 4403 4809 4904 4907 4908 5016 5124 5242 5311 5347 5409 5410 5412 5604 5627 5639 5705 5769 5782 58113 59104 6070
 Cathode materials 5311 5312 5604
 Circuit
 Ballast resistance controls current 5410
 Ionization gages, cold cathode (cont'd)
 Design (cont'd)
 Circuit (cont'd)
 Control, voltage supply 5782
 Electron current separated from ion current by phosphor screen 6070
 Safety against overpressure 4810
 Combined with thermocouple gage B491 4809 5782
 Electrode geometry 5412
 Extend pressure range 58113
 Third electrode added 5705
 For easy degassing 5347
 High sensitivity 5409
 Indication method
 Potentiometer, galvanometer 5627
 Scintillation probe for phosphor screen 6070
 Ionization methods 5311
 Operates safety relay 4907
 Penning B491 B571 3705 3706 4904 5242
 Review B491 B571
 Gettering action, see also Gettering action, ionization gages
 Air B571
 Review B571
 Performance 3705 4404 5016 5242 5311 5409 5410 5412 5561 5639 6070
 Discharge initiation, low pressures B571
 Discontinuities in calibration curve B571
 Electrode geometry effect 5412
 Filament materials, effect of B571 4404 5604.
 Magnetic field
 Materials 5639
 Strength effect 4908 5419 5561
 Radiation detected from gage 5505
 Sensitivity 5016 5409 5627
 Air 5311
 Helium 5311
 Hydrogen 5311
 Nitrogen 5311
 Oxygen 5311
 Propane-butane (calor gas) 6063
 Pressure range, high, mm Hg
 10^{-3} , 5782
 10^{-2} , 5311 5561
 10^{-1} , 5016
 1, 58113
 Pressure range, low, mm Hg
 10^{-5} , 5782
 2×10^{-6} , with microammeter 5409
 10^{-6} , 4904
 10^{-7} , 5016 5311 5604
 10^{-10} , 6070
 Review B491 B571 5311 5539
 Starter of discharge 4709 4809
 Theory 4809 58113
 Ionization gage, hot cathode
 Applications
 Industrial vacuums 5376
 High pressure 5718 6064
 Leak detection 60100
 Pressure fluctuations 5378
 Rockets 5957 5968
 Secondary standard 58107
 Bayard-Alpert, see Ionization gages, Bayard-Alpert
 Calibration techniques, see

SUBJECT INDEX (cont'd)

Ionization gages, hot cathode (cont'd)

Degassing, see

Design 1601 1902 2101 2604 3102 3602 3707 3805
4003 4102 4103 4202 4607 4616 4617 4619 4826
5003 5011 5137 5206 5207 5208 5237 5254 5269
5365 5378 5471 5504 5558 5641 5718 5723 58115
6064

Anode

Platinum film on glass envelope 4002
Thorium film on glass envelope 3501

Audio frequency monitor 4617

Combined with Pirani gage 5365

Contamination indicator

Additional heated tungsten strip 5206

Demountable 5269

Diode 5137

Electrode geometry 58115

Short electron path 6064

Various 5471

Electron current control B491 B571 2604 4004

4506 4619 5014 5208 5237 5254 5350 5365

5376 5482 5504 5564 5750 5968

Cathode follower 5376

Double grid in ionization gage 3805 5003
5208 5504

Electronic feedback 3707 4103 4202 4607

5014 5504 5564 5641 5750

Transistor 5968

Gas tube voltage regulator, negative
feedback 4004

Grid current control, automatic 5458

Relay 3105 3407 5458

Saturable core transformer 3408

Thyatron 3704 5108

Wheatstone bridge circuit 5482

Electron tube itself 3103

Filament

Lanthanum boride-coated tantalum

Prevents dissociation of hydrogen 6002

Oxide coated 4616

Rhenium 5723

Thoria coated

Iridium 5207

Rhodium 5207

Indication, mode of

Amplifier used B571 2604 5208 5254 5641

Cathode ray oscilloscope 5378

Galvanometer B571

Ion current measured 3102 3407 3408 3704

3707 3805

Magic eye 4102 4103

Ratio, ion to electron current 5237 5350
5770

Wheatstone bridge, unbalanced 5504

Iova 5269

Magnetic field to lengthen electron trajectories 4826

Metal, all 5011

Palladium window to admit hydrogen probe gas
4505

Power supply stabilized 4619 5039 58112

Circuit theory 58112

Review B491 B571

Safety, see below

Small volume case 3501

Tetrode gage 5208

Extra grid stabilizes electron current
5003 60132

Ionization gages, hot cathode (cont'd)

Design (cont'd)

Tube geometry

Barkhausen effect avoided 3105

Gettering action, see Gettering action, ionization gages

Installation

Location 5206 60129

Magnetron, see Ionization gage, magnetron

Operating techniques B571 60129

Degassing 60132

Performance 1601 2101 5365 5378 5725 58115 6064

Calibration 1601 2101 4826

Cathode, see also

Chemical reaction with gases B491

Decomposition of hydrocarbons 5333

Life 1501 5110

Review B571

Collector potential against output 4826

Control of electron current 3408 3707 4103
4202 4607

Electrode geometry effect 5471 6064

Experiments to verify theory 5484

Gettering, see Gettering action above

Oscillating circuit, undesirable B491

Pressure fluctuations 5378

Ratio, positive ion to electron current, see
Vacuum factor below

Review B491 B571 4614

Rhenium filament 5723

Sensitivity, general

Data, various designs B491 B571 6095

Proportional to electrons per molecule
B491 2402

Sensitivity ratio 2403 4503 6095

Fogel type gage 5266

Theory B491 B571 1902

Sensitivity, various gases 6095

Air, dry B571 5109 6064

Argon B471 B571 2403 3102 4503 5109 6064

Carbon dioxide B571 5145

Carbon monoxide B571 2402

Coal gas 6063

Helium B491 B571 2402 3102 4503 5109

Hydrogen B491 B571 2402 2403 4503 5109 5145

Krypton B491 B571 4503

Mercury B491 B571 3102 4503

Neon B491 B571 2402 4503 6064

Nitrogen B491 B571 2402 2403 4503 5109
5145 6064

Oxygen B571 5109 5145 60100

Propane-butane (calor gas) 6063

Water vapor B571

Xenon B491 B571 4503

Time lag

Data 2101

Theory 2101

Vacuum factor (positive ion to electron current ratio) 5350 5770

Oxide coated filament 5054

Pressure range, high mm Hg

10^{-4} , 4616 5109

10^{-3} , 1601 1902 4102 5641 5770

2×10^{-3} , 4826

5×10^{-3} , 5269

10^{-2} , 5504

0.1, 6064

1, 5718

SUBJECT INDEX (cont'd)

- Ionization gages, hot cathode type (cont'd)**
- Pressure range, low, mm Hg
 - 10^{-4} , 5718
 - 10^{-5} , 1902 4826 6064
 - 4×10^{-6} , 1601
 - 10^{-6} , 4003
 - 10^{-7} , 4102 5269 5641
 - 10^{-8} , 4616 5504
 - 10^{-10} , 5770
 - Review B491 B571
 - Probability of ionization of various gases B491 2502 2802
 - Dependence on electron energy 2602 3104
 - Dependence on anode voltage 4614
 - Reduction in sensitivity, causes of 4719
 - Review B471 B491 B571 5105 5113 5144 5539
 - Russian 5422
 - Safety**
 - Control circuit prevents filament burnout 4619 4918 5039 5269 5458 58157
 - Thorium coated iridium or rhodium filament prevents burnout 5207
 - Theory** B491 2501 3102 5484
 - Discharge potential, magnetic field 5267
 - Heat conduction from hot filaments 1501
 - Probability of ionization 3404
 - Rocket use 5957
 - Sensitivity 3404
 - Ionization gages, magnetron**
 - Application
 - Leak detection 5209 5411
 - Ultra-high vacuum 5867 58134 58136 59107
 - Calibration technique 5944
 - Design 5209 5867 58134 58136 59107
 - Inverted 58134 58136
 - Performance 5209 5411 5867
 - Linearity 58135 59107
 - Ultra-high vacuum 58134 58135 58136 59107
 - Pressure range, high, mm Hg
 - 10^{-4} , 5209
 - 10^{-3} , 59107
 - Pressure range, low, mm Hg
 - 10^{-8} , 5209
 - 10^{-12} , 58134 58135 59107
 - 10^{-13} , 5867
 - 10^{-14} , 58136
 - Theory
 - Inverted magnetron 58133
 - Ionization gages, photomultiplier**
 - Ultraviolet light on metal supplies electrons 6077
 - Ultimate vacuum, 10-10 mm Hg 6077
 - Ion pumps, see also Gettering action, ionization gages, Getter-ion pumps**
 - Application
 - Ultra high vacua 5826 58120
 - Design 5255 5333 5340 5426 5746 5826 58120
 - 58154 6096 60140
 - Cathode
 - Carbon 5426
 - Cold 60140
 - Heated by radiation to secure long life 5249
 - Titanium 60140
 - Glass adsorbs ions 5746
 - Glass fibers increase surface 58120
 - High speed, high capacity 5219 5333 6096
 - Magnetic field, axial 58154
 - Miniature 60140
- Ion pumps (cont'd)**
- Evapor-ion pump, see Getter-ion pump
 - Mechanism of operation 5255 5333 5340 5450 6096
 - Performance 5255 5848
 - Carbon cathode type 5426
 - Compared to diffusion pump 5218 5235
 - High capacity 5219 5323 5333
 - Pumping speed 5323 5333 5848 60140
 - Effect, axial magnetic field 58154
 - Ionization gage
 - Ambient temperature effect 59138 5931
 - Review 5848 6061
 - Theory 5255 5340
 - Vacuum, ultimate, mm Hg
 - 10^{-6} , 5323 5333 5340
 - 10^{-9} , 60140
 - 5×10^{-12} , 5463
- Joints, see Gaskets, Seals**
- Kinetic theory of gases**
- Experimental basis, 5933
 - Flow see Flow of gases
 - Forces between molecules
 - Effects of 5702
 - Pressure of impacting gas B381
 - Pressure-temperature relation, impacting gas 1001
 - Reviews, see Books and surveys
- Knudsen effusion manometer, see Vapor pressure, methods of measurement**
- Knudsen gage, see Radiometer gage**
- Krypton**
- Adsorption, see
 - Degassing, see
 - Interaction with metal films
 - Theory 5991
- Leak detection methods**
- Absorber, charcoal, isolates helium and neon, ionization gage detects 5832
 - Bibliography 5233 5874
 - Calibration
 - Helium leak detectors 5781
 - Definitions, performance 59114
 - Differential pressure
 - Condensable tracer gas, cold trap, two gages 5127 5443
 - Two Pirani gages across restriction 6029
 - Electrical discharge
 - Discharge tube B491
 - Emission analyzed by optical spectrometer 5742
 - Oscillator circuit, loud speaker 5025
 - Tesla spark tube B491
 - Faryvitron
 - Performance 6025
 - Florescence of probe materials under ultraviolet light 5157
 - Joints
 - Ultra-high vacuum
 - Data 5969
 - Test method 5969
 - Mass spectrometer, see Tracer gas, below
 - Nuclear plants 5620
 - Omegatron
 - Performance 5630 5932 59140 6025
 - Pirani gage 5821 6029

SUBJECT INDEX (cont'd)

- Leak detection methods (cont'd)**
- Positive ions for halogen compounds
 - Diode 5850
 - Platinum hot filament B491 4814
 - Probe gases, see Tracer gases, below
 - Review B491 B492 B551 4713 5536 5620 5801 5850
 - English 59114
 - Merits of various vacuum gages 3504
 - Russian 5422
 - Ultra-high vacuum 5874
 - Rise in pressure
 - Evacuated space external to sealed container 5743
 - Ionization gage 59124
 - Audio frequency change-ether probe gas 4617
 - Palladium barrier, hydrogen 4505
 - Magic eye ionization gage
 - Halogens 4103
 - Oxygen 4103
 - Pirani-loud speaker 3714
 - Sensitivity of detection B491 4713 5114
 - Diode 5114 5764
 - Ionization gage 5114
 - Magnetron 5411
 - Mass spectrometer, see Omegatron 5630
 - Pirani 5114
 - Soluble dye 5620
 - Techniques 4713 5114 5801 5963
 - Ionization gage, cold trap 5832
 - Magnetron ion gage 5411
 - Mass spectrometer 4620 5154 5912
 - Omegatron 59140
 - Spectrometer 5742
 - Theory B492 5801
 - Tracer gases
 - Air
 - Charcoal absorber leaves helium and neon, Ionization gage detector 5832
 - Argon
 - Mass spectrometer 5803 59140
 - Butane 5114 5127
 - Carbon dioxide 5002
 - Halogens
 - Ionization gage B491
 - Sensitive diode 5764
 - Helium
 - Electrodeless discharge analyzed by spectrometer 5742
 - Ionization gage B491
 - Mass spectrometer, see also
 - Aluminum foil trap, heavy ions 6075
 - Design 4618 5020 5648 5657 5659 5912
 - Nier 4620 5020
 - Review B491 B493 5424 5536 5620 5850
 - Techniques 5850
 - Hydrogen
 - Electrodeless discharge analyzed by spectrometer 5742
 - Hydrogen-palladium method, survey 5233
 - Ionization gage B491 5536
 - Cold cathode 5627
 - With palladium window 4505
 - Pressure rise while pumping 5329
 - Mass spectrometer 5154
 - Pirani B491 5233
 - Charcoal trap absorbs other gases 5507
 - Palladium barrier 5233 59103
- Leak detection methods (cont'd)**
- Tracer gases (cont'd)
 - Low mass numbers
 - Omegatron 5630
 - Organic vapors
 - Ionization gage B491
 - Oxygen
 - Ionization gage B491
 - Thoriated tungsten filament 60100
 - Tungsten filament 4009 4506
 - Ultraviolet light absorption, photocell 5142
 - Leaks, controlled gas
 - Application
 - Corrosive gases 5352
 - Mass spectrometer 5644
 - Leak detection standard 5872
 - Bubble counter, gas 5129
 - Calibration methods 5706
 - Capillary with mercury slug 5660
 - Capillary tube
 - Flattened
 - Various gases 5658
 - Heated electrically 5608
 - Length adjustable
 - Needle 2601
 - Platinum wire, heated 4812
 - Method of measurement 5658
 - Multiple 5833
 - Restriction in 5660
 - Slug of mercury, position controlled by piston 5825
 - Compression
 - Rubber disks with slot 5118 5706
 - Solder powder 5811
 - Differential expansion 5704
 - Glass tube, metal plug 5607
 - Two glass tubes control seal position 5352
 - Diffusion
 - Helium
 - Glass, see Diffusion, Helium
 - High silica 5872
 - Silica 5045 5872 59152
 - Calibration by mass spectrometer 59152
 - Hydrogen
 - Nickel 5444
 - Temperature controls leak 5734
 - Zirconium powder getters impurities 5734
 - Palladium, see Hydrogen, Palladium
 - Silicone rubber sheet 5738
 - Expansion, nickel cylinder, controls leak 5332
 - Graphs for computing flow 5602
 - Microdoser 5026
 - Misch metal
 - Desorbs hydrogen slowly 6057
 - Needle valve
 - Solenoid, controlled 5831
 - Spring controlled 5324
 - Vibrated, amplitude controls leak 5326
 - Porcelain, porous, mercury level control 5042
 - 5047 5335 5736
 - Review B492 B551 B581 5704
 - Slide, glass, covers various holes 5325
 - Slit in glass tube
 - Adjustable 2601 3506 5037
 - Mercury covered 5706
 - Trapped in capillary by mercury column 5622

SUBJECT INDEX (cont'd)

- Leaks, controlled gas (cont'd)
 Valve
 Flapper
 Intermittent, rotary, with slots 4910
 Liquid level control, see Traps
 Low temperature melting alloys
 Physical properties 5758
 Lucite, see Materials
- Magnesium
 Adsorption, activated, see
 Gettering action, see Getters
 Photoelectric sensitivity
 Nitrogen present 3303
 Oxygen present 3302
 Magnetron ionization gages, see Ionization gages,
 Magnetron
 Manometers, liquid type, see also Micromanometers,
 liquid type
 Compression of gas
 Differential pressure 5438
 Plunger forces gas into manometer tube 5715
 Draft gage 4630
 Inclined tube B496
 Alcohol 5418
 Butyl phthalate 5306
 Range variable 4630
 Time lag 5418
 Xylene 4630
 Meniscus height, detection of
 Capacity pickup, micrometer 58164
 Electrical resistance across compressible
 gas bubble 4922
 Gamma rays through steel tube 5152
 Optical reflection 6092
 Photocell, precision screw, servo motor 5774
 58147
 Review 6009
 Sharp edged disk, mercury 6012
 Tungsten point indices 5843
 Vacuum thermocouple-light-lens-slit system
 4921
 Wire index, micrometer controlled 5027
 Movable cistern type B496 58164
 Null type
 Mercury, volume measured, added to cistern
 holds diaphragm deflection constant 6008
 Review, mercury 6009
 Two-liquid type, see Micromanometers, liquid
 type
 U-tube,
 Apiezon oil 4305
 Compression type, low differential pressures
 5438
 Octoils
 Degassing 5331
 Design 5331
 Photo cells 5529
 Manometers, mechanical type, see Mechanical pres-
 sure and vacuum gages
 Manostat, see Pressure controllers
 Mass spectrometers, see also Gas analysis, Leak
 detection
 Application
 Gas analysis 5112 5448 5511 5668 5681 5761
 5874 58124 58144 58156 5925 59112 6015 6031
 60131
 Degassing B491 5759 58124 58129 5925
 59162 6023
 Mass spectrometers (cont'd)
 Application (cont'd)
 Gas analysis (cont'd)
 Farvitron, see below
 High vacuum furnace 5545
 Impurities on surfaces 59134
 Omegatron, see below
 Residual gases 59157
 Upper atmosphere 60115
 Vacuum tubes 6023
 Degassed 5652
 Ion beam characteristics 5314 5777
 Leak detection 4618 5020 5115 5154 5159 5424
 5439 5522 5536 5648 5659 5803 5912 59151
 6075
 Omegatron, see below
 Partial pressure measurement 60127
 Helium in heat insulation space 5416
 Mercury 59138
 Upper atmosphere 60115
 Pumping speed, Evapor-ion pumps 5550
 Review 58193
 Argon probe gas
 Performance 5803 59140
 Automation for gas analysis 58156
 Continuous recorder 58144
 Bakeable 6015
 Bibliography B531 5015
 Cathode, hot, tungsten
 Carbon monoxide produced from water vapor
 and hydrocarbon 5333
 Cold cathode ion source 5115 5154 5159
 Deflection instruments B582 4011 4618 5046 5115
 5361 5439 5489 5511 5545 5657 5668 5681 5886
 58124 59158 5925 59112
 All metal 58144 60131
 Bakeable, small 59138
 Double focussing 5021 5761 59134 60115
 Theory 5380
 Magnetic mass marker 5886
 Two analyzers in series 5912 59151
 Dempster 5021
 Electrical mass filter type
 Design, performance, theory 60127
 Electric quadrupole lens mass filter 58146
 Electrostatic type, see Farvitron, below
 Farvitron
 Applications
 Gas analysis 6025
 Leak detection 6025
 Design 6024 6025
 Performance 6025
 Gas flow problems 4510 6043
 System design 4510
 Helium tracer gas
 Design, special 4618 5648 5647
 Portable 5020
 Review B491 B492
 Sensitivity 5522 5648 5657
 Omegatron 5932
 Hydrogen tracer gas 5154
 Magnetic field varied and measured 5886
 Matauch 5489 59134
 Metal construction 4914
 Nier 4620 5020
 Omegatron
 Applications 5448 5620 5721 5760
 Gas analysis 5721 5728 5785 5984 59135
 59139 59140 6020 6021 6022 6024 6027
 6028 60133 60139

- Mass spectrometers (cont'd)
 Omegatron (cont'd)
 Applications (cont'd)
 Gas stream monitor 60139
 Leak detection 5630 5932 59140 6025
 Partial pressure measurement 58125 6069
 60125 60138 60143
 Design 5448 5511 5728 5785 58125 60139 60143
 French 5984 59140
 Ion movements 60142
 Performance 5448 5552 5728 5760 58122 58125
 5932 5984 59140 6025 6027 60105 60138 60139
 60143
 Degassing characteristics 58122
 Gettering oxygen 60138
 Sensitivity 6069
 Performance
 Gas analysis 5112 5545 5668 5681 5760 59112
 59134 60115
 Leak detection 4618 5114 5154 5439
 Radio frequency 5057 5511 5605 5854 59109 6027
 Degassing measurement 6089
 Performance 5854 59109 6027
 Theory 6027
 Recording 5024 5489
 Review B531 B582 B594 5361 59114 60125
 Applications 58103
 For 1949, 5015
 Techniques 58158
 Time-of-flight type B572 5511
 Application
 Gas analysis 59130
 Design 5573
 Oscillograph indication 4802 5379
 Theory 5573 59114
 Vacuum lock 5341
 Materials for vacuum applications
 Adsorption of gases, see Adsorption
 Anodes, microwave tubes 6026
 Bibliography B591
 Copper 5625
 Degassing properties, see Degassing
 Diffusion properties, see Diffusion
 Enamelled iron 6066
 Metals B593 5447
 Mica
 Review 5940
 Nickel cathode
 Getter gas cleanup prolongs life 6037
 Physical properties B551 B581 B591
 Ceramics B551 B581 B591
 Elastomers B581
 Glass, see
 Lucite 5220
 Kovar, magnetic 58163
 Metals B581 B591
 Mica B581
 Organic materials B591
 Plastics B581
 Plexiglass 5220
 Quartz 5890
 Semiconductors
 Surface properties 59175
 McLeod gages
 Adsorption effects, see Performance, below
 Applications
 Calibration standard 5655 5724 5924
 Ionization gages 4809 5109 58107 60136
- McLeod gages (cont'd)
 Applications (cont'd)
 Differential pressure 5438
 Higher pressure 6084
 Hydrogen partial pressure 5824
 Vapor pressure 5629 5643
 Water 5374
 Volume measurement 4112
 Wind tunnel 60137
 Calibration techniques, see also
 Boyles law assumption B261
 Expansion of gas method B391 B491 3212
 Review B491 B571 4615
 Two gages, capillary diameters different 5104
 Volume measurements 4112 60141
 Capillary B261 2801
 Capillarity effects B491 B571
 Depression measurement 4112 60141
 Mercury vapor effect 4309
 Reduction by roughing glass surface B491 B571
 3801 3901 4306 4402 60141
 Reduction by using seasoned glass 4309
 Degassing techniques B261 4306
 Design 7401 2801 3901 5328 5621 5724 5807 5819
 5824 5898 58102 58107 5924 59105 6065 60136
 60137 60141
 Capillary tube
 Flat closure 2801
 Flat meniscus obtained 5776
 Open, for evacuating 6065
 Plug seal 60141
 Rough surface, see Capillarity effects,
 above
 Sharp edge closure (Moser) 5776 58111
 Three used 5924
 Compression ratio
 Large 3901 5724
 Multiple 4911 5621 5924
 Electrical contact in capillary 5140
 Evacuation of both legs simultaneously 60126
 Gas and vapor measured
 Cold trap used 4721
 Hydrogen partial pressure measured 5824
 Linear scale 5807 5898
 McLeod-Pirani B491 2103 5423
 McLeod-U-tube (Vacustope) B391 3507
 Multirange B261 B571 4632 4804 5250 5621 5807
 5898 5924 59105 60136
 Oil type 5819
 Heater incorporated 5819
 Inverted cup with capillary, movable into
 reservoir 58102
 Palladium tube above capillary to absorb
 hydrogen 5824
 Piston type 4706 4707
 Reviews B261 B471 B491 B515 B571 4615
 Scale movable 4632
 Semi-automatic 60137
 Swivelling type B491 B571 4502 5480
 Butyl sebacate filled 4301
 Portable 3802 5006
 Vacustat B391 3507
 Thermistor in capillary
 Volume cut-off 2801
 Nomograph
 For design 5613
 For obtaining pressure 60121
 pressure 5423

SUBJECT INDEX (cont'd)

- McLeod gages (cont'd)**
 Performance B491 4615 60137
 Accuracy 3901 4705 4804 5104 5328 5724 5776
 5807 5924 60114 60141
 Adsorption effects 60136
 Ammonia B491 3505
 Carbon dioxide B491 3505
 Hydrocarbons B491 3505
 Nitrogen 58107
 Sulfur dioxide B491 3505
 Boyles law departure 3505 5924
 Capillary depression error 4112 5924 60141
 Condensable gases B391
 Correction method 58111 5963
 Cyclopropane 60114
 Propane 60114
 Water vapor B491 4502
 Effect avoided by heating gage 4602
 Multiple compression ratios detects 5963
 Effect of cold trap 3211
 Helium diffusion effect 60141
 Hysteresis 5140
 Oil McLeod 5819
 Oxidation of mercury B491 1305
 Permanent gases B491 5924
 Carbon dioxide 60114
 Hydrogen 1305
 Nitrogen 1305 60114
 Oxygen 1305
 Pressure range, high, mm Hg
 10^{-2} , 3901 5006 5724
 10^{-1} , 011, 5819
 1, 3507 5328 5423
 3, 4721
 3.5, 5924
 Pressure range, low, mm Hg
 10^{-3} , 5328
 10^{-4} , 1305 3507
 10^{-5} , 3901 5724 5924
 10^{-6} , 011 5819
 2×10^{-6} , 5006
 3×10^{-7} , 4306
 10^{-7} , 5423
 10^{-8} , 5776
 Review B491 B515 B571
 Reviews, see also Books and surveys B261 B491
 B515 B571 5105 5113 5166 5479
 Techniques of operation 3901 4306 4309 60121
 Measuring higher pressure 6084
 Trapping condensable gases 5480
 Theory B491 B515 B571 4615 4804 5924
 Volume determination
 Capillary tube B261 5124 60121
 Mean free path B381 B471 B491
 Gases in oil vapors B491
 Mechanical refrigeration system
 For cold traps 5544
 Mechanical pressure and vacuum gages, see also
 Vapor pressure, methods of measurement
 Acoustical
 Loud speaker, microphone measures received
 energy 5773
 Oscillating diaphragm, amplitude varies with
 vacuum 5663
 Applications
 Atmospheric pressure oscillations 4019 4111
 4501 5490
 Ultrasonic 4703 4902 5001 5784
- Mechanical pressure and vacuum gages (cont'd)**
 Applications (cont'd)
 Chemical reactions 5570
 Affected by mercury 2904
 Corrosive materials 5617 5840
 Para and ortho hydrogen differential 5212
 Physiology 4701 5307 5456
 Blood pressure 5301
 Standard 5401 5955
 Vacuum 5102 5303 5562 5663 5773 58106 58110
 58117 6081
 Vapor pressure 3611 3701 3906 5629 5959
 Wind tunnel 4801 4803
 Bellows element
 Capacity pickup
 Differential pressure 60104
 Inductance pickup, bridge mechanically
 balanced 4801
 Optical lever (East & Kuhn) B571 4601
 Performance 4601
 Transformer, differential 5019 5617 5840
 Two bellows, linear transformer
 Differential pressure 5840
 Vibrating disk, fixed, electrical capacity
 changes 5828
 Bourdon tube gages, see
 Centrifugal manometer
 Air 5401 5955
 Deadweight disk valve
 Force balanced electrically B491 3611
 Force balanced by tilt B491 3701 3906
 Diaphragm element, corrugated
 Beryllium copper 5337
 Capsule, optical lever 5722
 Copper 5302
 Diaphragm capsule, nesting 4803
 Diaphragm nesting 5303 5305
 Null type
 Secondary measure pressure restores zero
 deflection 5629
 Precision screw measures restoring motion
 5490
 Silver 5302
 Transducer
 Electrical capacity B571
 Capacitance bridge 5101
 Frequency measured 5302 5337
 Resonant bridge carrier system 5305
 Inductance 5103
 Mutual 5102 5303
 Strain gage, unbonded 4803
 Diaphragm element, flat
 Electrostatic force restores to zero 5562
 5616 58106 58110
 Material
 Aluminum 5212 5784
 Copper B491 0902
 Dural 4019
 Glass B491 2902 3007 3904
 Mica 3007
 Platinum-iridium 2904
 Quartz 4008
 Stainless steel 5570 58117 60112
 Performance 3904 4008 4701 5005 5212 5327
 5562 5616 5784 58106 58110 6081 60112
 Dynamic 5005 5271 5570 5784 60112
 Error due to adsorbed dipole gases in
 electrical capacity type 5677
 Theory 5677

SUBJECT INDEX (cont'd)

- Mechanical pressure and vacuum gages (cont'd)
- Diaphragm element, flat (cont'd)
 - Theory
 - Electrical capacity gage 4701 5307
 - Transducer
 - Electrical capacity B491 B571 2902 3107
4019 4501 4701 4703 4902 5001 5212 5301
5305 5307 5327 5562 5570 5616 5784 58106
58110 58117 5959 6081 60112
Frequency change measured 5959 60112
 - Oscilloscope indicator 5570
 - Theory B571
 - Inductance 5271
 - Mutual B571
 - Light beam B491 3007 3904 4008
 - Newton's rings B491 0902 4008
 - Optical lever 2904
 - Permanent magnet, moving conductor, loud speaker
 - Electrical recorder 4111
 - Strain gage 5005
 - Differential pressure 5840 60104
 - Electrical conductance
 - Differential in liquid as diaphragm deflects 5456
 - Microbarographs, see
 - Microwave
 - Cavity resonance frequency measured 5841
 - Multirange 60112
 - Pendulum type, see Deadweight disc valve, above
 - Piston gages, see
 - Pressure range, high, mm Hg
 - 10^{-2} , 5305
 - 5×10^{-2} , 5303
 - 0.15, 4803
 - 0.2, 58106 58110 5959
 - 0.4, 2904
 - 0.6, 5019 5616
 - 1, 3611 5562 5570 6081
 - 2, 3107 4801
 - 5, 3904
 - 10, 3007 58117
 - 20, 5302 5722
 - 60, 5840
 - Pressure range, low, mm Hg
 - 6, 5840
 - 0.1, 3007 5302 5722
 - 5×10^{-2} , 5773 5102
 - 3×10^{-2} , 3611 3701 5490
 - 5×10^{-3} , 5617 4803 5959
 - 10^{-4} , 5570 5663 58106 5303
 - 7×10^{-5} , 5305
 - 10^{-5} , 5401 5562 58117 6081
 - Review B491 B571 5113 5539
 - Sensitivity, mm Hg
 - 0.1, 4008 5841
 - 10^{-2} , 5019 5101
 - 2×10^{-3} , 3904
 - 3×10^{-4} , 2902 5629
 - 5×10^{-4} , 3007 4601 5102 60104
 - 2×10^{-6} , 5212
 - Theory
 - Diaphragms and pressure line 5487
 - Micro pressure gage 5958
 - Meniscus position in manometer, determination, of
see Manometers
- Mercury
- Adsorption
 - Acetone 4718
 - Air B321
 - Alcohols 4718
 - Benzene 4628
 - Carbon monoxide 59159
 - Glass 4915
 - Heptane 4628
 - Hydrogen B321 59159
 - Nitrogen 59159
 - Oxygen 59159
 - Toluene 4628
 - Water vapor 4718
 - Amalgams, vapor pressure of 59138
 - Capillarity
 - Angle of contact hysteresis, steel-air-mercury 4629 5566
 - Capillary depression in glass tubes 5221
 - Reduction in capillary tubing by roughing surfaces 3801
 - Condensation of vapor
 - Chemically clean glass 4917
 - Baked glass 4917
 - Density 6009
 - Distillation apparatus 5243
 - Flow velocity in capillary tubes 5262
 - Handling safely 5510
 - Properties
 - Chemical 5229
 - Physical 6009
 - Pure 4204 5229
 - Surface tension B494
 - Vapor detector 5510
 - Vapor pressure 3210 5518
 - Water drops, evaporated from mercury surface
 - Adhesion and hysteresis 4408
 - Wetting of glass
 - Caused by adsorbed mercury film 4915
 - Mercury vapor pump, see Pumps, diffusion
 - Mica,
 - Adsorption of gases, see Adsorption
 - Degassing, see
 - Physical properties, see Materials
 - Seals 5940
 - Microbalances, see Adsorption and degassing measurement
 - Microbarographs
 - Atmospheric pressure oscillations 4019 4111 4501
4703 4902 5001 5150 5490 5491 5784 58161 58162
60119
 - Micromanometer, air column
 - Two air columns, temperature different 5488
 - Micromanometers, liquid type, see also Manometers
 - Butyl phthalate 5230
 - Carver B391 2301
 - Sensitivity 2301
 - Vibration absorbing mount 2301
 - Chattuck gage B241
 - Design elements
 - Electrical capacity
 - Detected change in mercury level 5104 58164
 - Tin foil around tube 2905
 - Electrical resistance B491
 - Tungsten wire in mercury in tube 3207
 - Float position
 - Eccentrically pivoted, tilting mirror, oil 5810

SUBJECT INDEX (cont'd)

- Micromanometers, liquid type (cont'd)
 Design elements (cont'd)
 Float position (cont'd)
 Microscope 3111
 Mirror 3201
 Optical lever B391 B491 1901 2301 2901
 5056
 Two U-tubes, two floats, tilting mirror
 5056
 Gas bubble, horizontal, separates two liquid
 columns 5614
 Gasometer (inverted bell)
 Double bell
 Ascot-Casella 5305
 Torsion, suspending strip, measured
 4702
 Dubrovin 4303 4807 5479
 Mellville B391 B533
 Theory 4303
 Hook gage B496
 Interferometer (Michelson) 2701
 Fixed indices used 5263
 Vibration effect makes impractical 2701
 Linear magnification of column height
 Area ratio 3106 4829
 Movement of gas bubble in capillary
 (Roberts) B531
 Two U-tubes, auxilliary liquid 4716
 Pearson B391 3106
 Puddington 4829
 Micrometer measure changes in mercury level
 0903
 Microscope on lead screw counter 5230
 Movable cistern, fixed liquid level in tube
 B496
 Capacity pickup, micrometer measures
 motion 58164
 Flexible tube error 5834
 Microscope sighting, temperature control-
 led 5534
 Mulder draft gage 5568
 Newton's rings indicate change in liquid
 level 0501
 Plunger in cistern brings liquid to index
 on tube 2910
 Temperature control 5257
 Tilting type, see below
 Vibration isolated 5257
 Differential pressure of two gas columns
 Two columns of methyl alcohol, gas bubble
 in a horizontal section 5614
 Dubrovin 4303 4807 5479
 Liquids, physical properties 5534
 Wetting agent for mercury 2903
 Mellville B391 B533
 Movable cistern type B496
 Pendulum vapor pressure gage, see Vapor pres-
 sure measurement
 Pearson B391 3106 5257
 Rayleigh type B391 B491 B533 0501 0903
 Review B391 B471 B491 B496 5105
 Ring manometer, see Tilting type, below
 Roberts B531
 Shrader-Ryder B391 B533 1901
 Tilting type B491 B496
 Compression by tilt, angle measured 2503
 Chattuck B241 B496
 Micrometer measures tilt to maintain cistern
 zero reading 5521
- Micromanometers, liquid type (cont'd)
 Tilting type (cont'd)
 Ring gage, tilts as mercury flows, records
 tilt on drum
 Performance 2903
 Spring restrained, deflection measured
 2903
 Unbalanced by pressure
 Tilt recorded 2903
 Weights restore to zero, indicates pres-
 sure 2903
 U-tube
 Amyl phthalate 4414
 Mercury, sharp edged disk holds meniscus
 flat 6012
 Micrometer indicates change in mercury
 level 1306
 Two indices, optical lever indicates tilt
 angle (Rayleigh) B391 B491 B533 0903
 Weights tilt manometer, indicate pressure
 5945
 Two-liquid 4001
 Alcohol-Kerosine 4720 59121
 Capacity pickup, operates lead screw, auto-
 matic 5304
 Theory B496 4720 59121
 Micromanometers, mechanical, see Mechanical pres-
 sure and vacuum gages
 Microphones
 Pressure fluctuations measured
 Aeronautical research 5899
 Piezoelectric crystal unit 5265
 Misch metal
 Gettering action, see Getters
 Molecular beam techniques B491 4622
 Bibliography 4622
 Molecular drag pumps, see Pumps, mechanical
 Molecules
 Area of adsorbed gas molecules
 Determination of 4411
 Heptane 4411
 Nitrogen 4411
 Propyl alcohol 4411
 Review B491
 Water vapor 4411
 Diameter
 Determination of B491
 Gases B491
 Effects of attractive force 5702
 Number per gram, 11 gases B491
 Packing factor theory B491 4411
 Velocities B491
 Molvakumeter (Combined viscosity gage and radiom-
 eter)
 Design B491 3406
 Theory 3406
 Molybdenum
 Adsorption, see
 Trapping and re-emission noble gases 5852
 Degassing, see
 Helium cleanup
 Mechanism 5720
 High temperature reactions in vacuum
 Acids 5253
 Air 5253
 Alkalies 5253
 Carbon 5253
 Nitrogen 5253

SUBJECT INDEX (cont'd)

- Molybdenum (cont'd)
 - Surface cleaning techniques 3206 4007
 - Work function 3206
- Mordenite, see Zeolites
- Motor, for vacuum use 5017
- Neon
 - Adsorption, see
 - Degassing, see
- Neoprene, see Rubbers
- Nickel
 - Adsorption of gases, see
 - Cathode life prolonged by getter gas clean-up 6037
 - Degassing, see
 - Diffusion of carbon 5260
 - Diffusion of gases, see
 - Single crystal
 - Cleaning surface techniques 4007 5880
 - Solubility of
 - Carbon 5260
 - Trapping and re-emission, noble gases 5852 5875
- Nitrogen
 - Adsorption, see
 - Area, adsorbed molecules 4411
 - Degassing, see
 - Diffusion, see
 - Gettered, see Gettering action, ionization gages, Getters
 - Origin in vacuum systems 5308
 - Solubility, see Solubility of gases
 - Sticking probability, see also Metals 5313
- Omegatron, see Mass spectrometer
- Orifices
 - Conductance, see Flow of gases
- Outgassing, see Degassing
- Oven, infrared 5780
- Oxide films, formation and stability, see also Adsorption, activated 4206
 - Iron, chrome iron 4206
 - Mechanism 4722
 - Radiation effect
 - Aluminum 4924
 - Stainless steel 4206
 - Theory 4722 4924
 - Tungsten 4821
- Oxides, refractory, reaction with metals at high temperature 5349
- Oxygen
 - Activated by hot filament 4018 60138
 - Adsorption, see
 - Adsorption, activated, see
 - Degassing, see
 - Dissociation, electron impact 3209
 - Gettered by, see Gettering action, ionization gages, Getters
 - Origin in vacuum systems 5308
 - Sticking probability, see
- Oxygen partial pressure gage
 - Magnetic susceptibility of oxygen (Pauling)
 - Design 4631
 - Performance 4631
 - Temperature effect 4631
 - Pressure range 4631
- Palladium, see Hydrogen also Deuterium adsorption 3715
 - Palladium (cont'd)
 - Hydrogen adsorption 59123
 - Hydrogen diffusion
 - Applications 5532
 - Data 5363 5475 5532 5891 6076 6089
 - Controlled leak 6085
 - Temperature effect 5475 5891 6076
 - Theory 5363 5891 6076
 - Surface reactions, various gages 5993
 - Palladium-silver alloys
 - Adsorption of hydrogen 6094
 - Pauling gage, see Oxygen partial pressure gage
 - Penning gage, see Ionization gage, cold cathode
 - Perbunan, see Rubbers
 - Permeability of gases into solids, see Diffusion of gases through solids, Porosity
 - Permeation, see also Diffusion
 - Definition, difference from diffusion 5473
 - Review 5473
 - Persorption in zeolites B491
 - Philips vacuum gage, see Ionization gage, cold cathode
 - Photomultiplier ionization gage, see Ionization gages, photomultiplier
 - Piezoelectric gages
 - Barium titanate
 - Aerodynamic use, sensitivity 12 dynes/cm² 5851
 - For weak shock waves 5838
 - Quartz
 - Damping of oscillation indicates pressure Range, 0.1-760 mm Hg 5930
 - Pirani gages
 - Advantages and disadvantages B491 5251
 - Applications
 - Chemical 5241
 - Corrosive gases 59101
 - Leak detection 5004 59103 6029
 - Van der Graff accelerator 6029
 - Wind tunnel 5615 60135
 - Supersonic 4901
 - Bimetal gages, see Expansion gages, thermal
 - Calibration techniques, see
 - Combined Pirani-thermocouple gage 4605
 - Combined Pirani-ionization gage 5365
 - Design 4828 4903 5158 5251 5306 5365 5373 5437 5486 5501 5601 5711 5713 5753 5807 5827 59101 59103 60135
 - Control circuits B571
 - Feedback to hold filament temperature constant 5241 5501 5711 5713
 - Magnetic amplifier 5753
 - Power supply 4805 4806 5008
 - Safety from high pressure damage 4605 4805
 - Thyratrons-relay 5007
 - Cyclic volume changes 5002 5201
 - Convection a maximum 5714
 - Differential, two gages, same Wheatstone bridge 5004
 - Electronic amplification
 - Controls linearity of output 5437
 - Filament or sensitive element 4704
 - Bimetal strip 3613
 - Glass covered 5008 59101
 - Helical 4704 5373
 - Liquid in glass tube 2504
 - Long wire to increase range 5601
 - Molybdenum B571
 - Nickel B491 3101

SUBJECT INDEX (cont'd)

- Pirani gages (cont'd)
 Design (cont'd)
 Filament or sensitive element (cont'd)
 Platinum B571 0601 1103 5202 5251 5902
 Quartz coated 5403
 Review B491 B571
 Spring tension supported 3810
 Thermistor, see below
 Tungsten B491 B571 4603 5202 5251
 Indication, mode of
 Bimetal strip deflection 3613
 Electrical output for control purposes 4605
 Galvanometer, output first amplified 3905
 Linear expansion of filament measured 3305
 Loud speaker 3714
 Oscilloscope 5619
 Thermocouple measures filament temperature 0602 3612 3703
 Wheatstone bridge, see below
 Linearity achieved by electrical compensation 5373
 Miniature 60135
 Palladium barrier 59103
 Pirani effect, thermionic tube
 Emission current held constant 5028
 Pressure range
 High pressure 5241
 Multiple 5807
 Various 5202
 Recorder
 Multipoint (16) potentiometer 4901
 Records Wheatstone bridge current 5713
 Sensitivity, maximum B491 B571 3101
 Small size 5615
 Two grain-of-wheat lamps 5306
 Temperature compensation B491 B571 60135
 Duplicate Pirani 1103 2805 3613 3810 4923
 5306 5425 5501 5615
 Thermistor type, see below
 Vacuum range extended by gas compression 58114
 Voltage compensation B571
 Wall temperature control B491 2805 3306 3612
 3613 5373
 Wheatstone bridge
 Balanced 1103 3810 4806 5486 5615 5827
 Automatic 5501 5713
 Constant filament current 0601 2805
 Constant filament temperature B571 0601
 2102 5827
 Constant voltage B571 0601
 Review B491 B571
 Unbalanced 0601 3101 3306 4704 4805 4923
 5306 5711 5934
 Zero shift indicator 4923
 Expansion gages, thermal, see
 Gettering
 Oxygen by barium 5162
 Performance 2805 4903 5215 5365 5403 5486 5601
 5753
 Accommodation coefficient, see
 Filament
 Ageing B571
 Constant current vs constant temperature 4825
 End losses B571
- Pirani gages (cont'd)
 Performance (cont'd)
 Filament (cont'd)
 Diameter B491 B571 3304 5151
 Length B491 B571 4903
 Temperature B491 B571 3101 3304 5202
 Wall distance 4825
 Linearity 5373 5437 5501
 Pressure range
 Distance, filament to wall effect 4603
 4704
 Sensitivity, various gases B491 B571 5156
 Air 4307 4806 4903 4923
 Argon 4806 5251 5373 5934
 Carbon dioxide 4806 4903
 Helium 4903 5251 5934
 Hydrogen 4307 4806 4903 4923 5251
 Krypton 5251 5934
 Mercury 4923
 Neon 5251 5373 5934
 Nitrogen 5251
 Review B491 B571 4704
 Xenon 5251 5934
 Stability
 Corrosive gages 59101
 Thermistor gage, see below
 Wall temperature
 Controlled 3101 3612
 Effect 2805 3304 5202
 Pressure range, high, mm Hg
 6×10^{-3} , 1103
 10^{-3} , 2805 3905
 0.15, 2102
 0.10, 3703 4805 4923
 5, 5202 5403
 10, 4806 5306 5365 5601 5615
 50, 5711
 160, 4603
 760, 5714
 1000, 3612 5753
 Review B471 B491 B571
 Thermistor type, see Thermistor, below
 Pressure range, low, mm Hg
 10^{-1} , 5306 5615
 2×10^{-2} , 4603
 10^{-3} , 2102 3305 3612 5365 5403 5711
 10^{-4} , 3703
 10^{-5} , 1103 3905 4923 5002 5496 5902
 4×10^{-6} , 2805
 10^{-6} , 3306
 10^{-8} , 3101
 Review B471 B491 B571 4704 4903 5113 5144 5539
 Theory B391 B491 B571 2102 4903 5156 5934
 Ambient temperature effect B571
 Bimetal strip type 3613
 Filament
 Length and diameter 3101 3304
 Temperature 3202 3304
 Heat conduction along filament B571 1701 3202
 4704
 Radiation losses 3202 4704
 Sensitivity 4903 5156 5486
 Thermistor gage, see below
 Thermistor type
 Design B491 4307 4626 5425 5520 5619 58119
 5902 5964 5967 60118
 Recorder
 Voltage balance 5902

- Pirani gages (cont'd)
 Thermistor type (cont'd)
 Design (cont'd)
 Recorder (cont'd)
 Voltage unbalanced 60119
 Temperature compensated 5967
 Ventilated above 10 mm Hg 5730
 Wheatstone bridge 5425
 Balanced 5520
 Unbalanced 60118
 Performance 4307 5520 5619 5730 58119 5964
 5967 60118
 Duplicate element for temperature compensation 58119
 Time lag 5783 60118
 Wall temperature effect 5783
 Pressure range, high, mm Hg
 1, 58119 5967
 10, 5425 5730 60118
 20, 5964
 760, 4307 5902
 Pressure range, low, mm Hg
 10^{-2} , 5964 60118
 5×10^{-3} , 5520
 10^{-3} , 5425
 10^{-6} , 4307 5619 58119 5967
 Theory 58119 5964
 Wall temperature effect 5783
 Thermocouple vacuum gage, see
 Upper air application 5002
 Piston gage, micropressures
 Air lubricated
 Tilting 5910
 Compression of gas 4706 4707
 Mica, quartz helical spring 5518
 Torsion balance 3510 3511
 Sensitivity, 10^{-4} mm Hg
 Pitot tube
 Calibration, free molecular flow
 Rotating arm 58100
 Plastics, see Materials
 Plexiglass, see Materials
 Platinum
 Adsorption, see also
 Hydrogen 2906 3402
 Oxygen 1802
 Degassing, see
 Ion emission, bombarded with inert ions 5917
 Surface contamination, hot filament 3402
 Porosity, see also Leaks, controlled gas
 Analcite crystal
 Ten gases 5146 5147
 Theory 5146 5147
 Charcoal
 Argon B583
 Helium B583
 Methane B583
 Neon B583
 Earthenware plate, unglazed 3716
 Evaporated films, see Thin films
 Glass beads & fibers 4013
 Glass wool
 Theory 5051
 Mechanism B583
 Porous diaphragms
 Conductance data B491 3716
 Theory, flow rate B491
 Silica gels, see
- Porosity (cont'd)
 Sintered glass
 Theory 4627
 Various gases 4627
 Symposium B583
 Pressure controllers
 Barostat
 Barometer, electrical contact, relay, solenoid 5027
 Bellows, evacuated, weights 6009
 Control circuit, magnetic amplifier, vacuum gage 5858
 Gasometer (bell), balanced beam, controls air supply to gas flame
 Photocell, feedback to air valve 4919
 Gasometer (Cartesian diver)
 Bell position controls light beam into photocell 5160
 Bell position controls valve 5136 5775 5972
 Ionization gage
 Electronic circuit controls safety valve 58157
 Gage bucks set voltage, differential caused to operate valve 6078
 Manometer
 U-tube, photocells, controls leak
 Octoil-s 5529
 Silicone 703, 5808
 Pirani gage
 Output, through solenoid, controls gas leak 5716
 Output controls valves and pump operation 5133
 Review 5571
 Thermocouple gage-electronic circuit controls safety valve 58157
 Vacuum pump operation
 Electrical circuit, thermocouple gage 5559
 Pneumatic controller, alphatron gage, controlled leak 5855
 Semi-automatic 5916
 Pressure measurement
 Acoustical vacuum gage, see Mechanical pressure and vacuum gages
 Air column manometer, see Micromanometers, air column
 Alphatron gage, see Radioactive ionization gages
 Atmospheric pressure oscillations 4019 4111 4501
 4703 4902 5150 5490 5491 5789
 Barometers, see
 Bibliographies, see
 Bimetal gages, see Expansion gages, thermal
 Bourdon gages, see
 Bourdon tubes, see
 Centrifugal manometers, see Mechanical pressure and vacuum gages
 Convection manometer, see
 Deadweight disc valve, see Mechanical pressure and vacuum gages
 Diaphragm gages, see Mechanical pressure and vacuum gages
 Diaphragms, see
 Differential electrical conductance manometer 5456
 Differential pressures at high absolute pressure 3601 6008
 Dynamic, see Dynamic pressure measurement

- Pressure measurement (cont'd)
- Effusion method, vapor pressure, see Vapor pressure, methods of measurement
 - Electrical discharge in gases varies with pressure, see Electrical discharge in gases
 - Electrical mass filter gage, see Mass spectrometers
 - Evaporation gage 5105
 - Expansion gages, thermal, see
 - Field emission phenomena, see Field emission microscope, Surface reaction phenomena
 - Flowmeter, vapor pressure, see Flowmeters
 - Force-pressure balances, see
 - Gasometer, see Micromanometers, liquid type
 - Gravity disc valve, vapor pressure, see Vapor pressure, methods of measurement
 - Ionization gages, see
 - Bayard-Alpert
 - Cold cathode
 - Hot cathode
 - Magnetron
 - Photomultiplier
 - Knudsen gages, see Radiometer gages
 - McLeod gages, see
 - Manometers, see
 - Magnetic susceptibility of oxygen, see Oxygen partial pressure gage
 - Mass spectrometers, see
 - Mechanical pressure and vacuum gages, see
 - Microbarographs, see
 - Micromanometers, see
 - Microphones, see
 - Microwave 5841
 - Piezoelectric gages, see
 - Pirani gages, see
 - Piston gages, see
 - Pressure balance, automatic, constant volume system 5569
 - Radiometer gages, see
 - Radioactive ionization gages, see
 - Rate of change, see Rate of change of pressure measurement
 - Reviews, vacuum and pressure measurement, see Books and surveys
 - Ring manometers, see
 - Surface reaction techniques, see
 - Thermistor gages, see Pirani gages
 - Thermocouple gages, see
 - Torque-pressure balances, see
 - Upper atmosphere B532 5201 5402 5769 5786 5787
 - Ionization gage 5769
 - Response time in rockets 5623
 - Theory, rockets 5769
 - Vacuum measurement, general, see
 - Vapor pressure measurement, vacuum range, see
 - Viscosity gages, see
 - Work function of tungsten, see Tungsten
 - Zirconium reactivity, high vacuum
 - Gain in weight indicates furnace pressure 4920
 - Pressure range of vacuum gages, see also various gage headings
 - Chart B491 B581
 - Pressure regulators, see Pressure controllers
 - Pressure simulation, outer space 59154
 - Design 59142
- Pumping speed, see also Getter-ion pumps, Pumps, diffusion
 - Back diffusion or streaming, see Diffusion pumps
 - Data on pumps B581 5848
 - Diffusion pumps
 - Mercury 4820 5936
 - Large 5359
 - Oil 4820 5228 59156
 - Dependence on heat input 5949
 - Evapor-ion pump 5451 5550
 - Rotary pumps 5036
 - Cenco 5661
 - Fluctuations, cause of
 - Oil vapor pump 5432
 - Measurement B491 B506 B512 B551 5036 5949 5975 5982 59147
 - Circulatory method B491 4816
 - Constant leak, position of orifice varied
 - Pressure measured at two orifice positions 59147
 - Constant pressure method B491 B551 5661
 - Constant volume method B491 B551 5661
 - Dayton's techniques 4816 58109 58116
 - Mass spectrometer used 5550
 - Metered multiple leak method 5765
 - Oatley method 5445 5609 58109
 - Pressure drop across conductance 5429 5445 5609 5861 58128
 - Review B491 58109 5982
 - Sources of error 4816
 - Test dome size effect 58116 5982
 - Test gas selection 4816
 - Theory B382 B491 58116 58120 6060
 - Ultra high vacuum 5463 58120
 - Pumping down time 5404
 - Theory 5860 59160
 - Rate of exhaust, free molecular flow
 - Orifices
 - Theory B491 5823
 - Tubes
 - Theory B491 5823
 - Review
 - Methods of measurement 58109
 - Standard method 58155
 - Theory 58109 58116 58120 6002
 - Adsorption effect 5947 59153
 - Gas velocities in pump jets 5895
 - Pressure-time 5860 5947 59153 59160
 - Pump oils
 - Additives to prevent decomposition 5414
 - Adsorbed on glass and metal B491
 - Apiezon A
 - Molecular weight 5213
 - Vapor pressure B491 B581
 - Apiezon B
 - Molecular weight 5213
 - Vapor pressure B491 B581 5228 5508
 - Apiezon C
 - Molecular weight 5213 5788
 - Vapor pressure B581 5228 5788
 - Apiezon E
 - Molecular weight 5788
 - Vapor pressure 5788
 - Apiezon G
 - Vapor pressure 5228
 - Arochlor
 - Vapor pressure B491 B581

SUBJECT INDEX (cont'd)

- Pump oils (cont'd)
 - Breakdown, electron impact, see Electronic impact phenomena
 - Degassing data B581
 - i-Diamyl phthalate (Amoil)
 - Physical properties B491
 - Vapor pressure B491 B581
 - i-Diamyl sebacate (Amoil-s)
 - Physical properties B491
 - Vapor pressure B491 B581
 - n-Dibutyl sebacate
 - Physical properties B491
 - Vapor pressure B491
 - n-Dioctyl hexa hydro phthalate
 - Decomposition rate 5417
 - Di-2-ethyl hexyl phthalate (Octoil)
 - Molecular weight 5213 5788
 - Physical properties B491
 - Vapor pressure B491 B581 3609 5788
 - Di-2-ethyl hexyl sebacate (Octoil-s)
 - Molecular weight 5213 5788
 - Physical properties B491
 - Vapor pressure B491 B581 5508 5788
 - Diffeln
 - Vapor pressure B581
 - Di-n-nonyl phthalate
 - Vapor pressure B581 3609
 - Di-n-octyl phthalate
 - Molecular weight 5788
 - Vapor pressure B581 3609 5788
 - Di-3-5-5-tri methyl hexyl phthalate (Narcoil)
 - Molecular weight 5788
 - Vapor pressure B581 5228 5788
 - Evaporation, see
 - Litton oil
 - Vapor pressure B491 B581
 - Mean free path of gases in oil vapors B491
 - M-phenoxy phenoxy (m-bio-benzene)
 - Ultimate vacuum 60116
 - Vapor pressure 60116
 - Physical properties 4819
 - Purity
 - n-dibutyl phthalate 3610
 - Review B491 B581 4414 4819 5228
 - Silicones
 - Decomposition rate DC703, 5417 5508
 - Molecular weight DC702, 5213; DC703, 5788
 - Physical properties B491 5354 5476
 - Vapor pressure DC703, 5508 5788
 - Vapor pressure B491 B581 5228
 - Stability on heating B491
 - Test methods 3610
 - Ultimate vacuum
 - Various oils B491 4819 5228
 - Vacuum distillation 4414 5223 5224 5225
 - Vapor pressure B491 B581 3609 5508
 - Pumps
 - Ballast, gas, see Pumps, mechanical
 - Cryogenic, see Pumps, cryogenic
 - Diffusion, see Pumps, diffusion
 - Ejector, see Pumps, ejector
 - Evap-*ion*, see Getter-*ion* pumps
 - Getter-*ion* pumps, see
 - Getters, see
 - Ion pump, see
 - Mechanical, see Pumps, mechanical
 - Mercury vapor, see Pumps, diffusion
 - Molecular drag, see Pumps, mechanical
 - Piston, see Pumps, mechanical
 - Pumps (cont'd)
 - Pumping speed, see
 - Reviews, see Books and surveys, Pumps, diffusion
 - Roots type, see Pumps, mechanical
 - Rotary, vane type, see Pumps, mechanical
 - Traps, see
 - Venturi, see Pumps, ejector
 - Pumps, cryogenic, see also Traps
 - Application
 - Vacuum wind tunnel 5847
 - Helium, liquid 5367 5553 5836 5867 59117
 - Ultimate vacuum, 10-9 mm Hg 59117
 - Hydrogen, liquid
 - Continuously produced 5847
 - Nitrogen, liquid 5867
 - Pumps, diffusion
 - Application
 - Accelerators 5935
 - Coating conductors and dielectrics 5656
 - Differential multiple pumping 5757
 - Ultra high vacuum 5364 58141 5981 59146 60116
 - Backstreaming 4820 5228 5234 5413 5812 5935
 - Causes 5433
 - Control 5433
 - Detection B572
 - Measurement methods 5433
 - Prevented by baffles 5141 60107
 - Reduction by pump design 5234 5935
 - Theory 5038
 - Vacuum limitation 5980
 - Baffles, refrigerated 58159 59146
 - Freon vapor, cold cycle
 - Closed and open circuit 5611
 - Performance 5611
 - Gaede
 - Design B491
 - Performance B491
 - Theory B491
 - Glycerol vapor
 - Performance 4813
 - Langmuir condensation pumps
 - Designs B491
 - Performance B491
 - Mechanism of operation 5427 5512
 - Mercury, vapor
 - Design
 - Chemical absorber B491
 - Factors to obtain maximum pumping speed 5436 5515
 - High speed 4621 5359 5549
 - Mercury trap B491
 - Refrigerating means B491
 - Gaede B491
 - Glass 5515
 - Langmuir B491
 - Mechanism of operation B491 4621 5567
 - Multistage B491
 - Nozzle design B491
 - Performance 4621 4816 4820 5359 5515
 - High speed 5549
 - Ultimate vacuum 58141 5936
 - Ultra-high vacuum 58141 5936
 - Theory, see below
 - Oil vapor B382 B491 2909 5354
 - Design B491 5420 5654 58145 5935 59144 6072 60116
 - Jet and baffle B491
 - Baffles 60107
 - Baffles refrigerated 59146

SUBJECT INDEX (cont'd)

- Pumps, diffusion (cont'd)
 Oil vapor (cont'd)
 Design (cont'd)
 Jet and baffle (cont'd)
 Hot, for decomposing oil 59146
 Multistage B491 5138 5981 6072
 Cold trap needed 5138 5981
 Non fractionating B491 2909 5766
 Oil vapor heated 59155 59156
 Quick start and shut off 5654
 Water cooled
 Baffles 6038
 Diffusor 5654
 Flow pattern 5923
 Limitations 3610
 Metal 4207
 Cleans oil by distillation 4207
 Limiting vacuum 5667
 Performance B491 2909 4816 4820 5420 5654
 5667 5760 5766 58145 59146 59155
 Backstreaming 5234 5413 59158
 Cooling temperature effect 5355
 Optimum operating conditions 4912 5667
 Pump fluids require purifying 5138
 Silicone oil 5354
 DC704, 5755
 Ultimate vacuum 5512 5760 59146 59155
 59156 59158
 Decomposition effect 5508 5667
 Gas analysis, residual 5785
 Limiting factors 5413 5667
 Various oils 4708 5116 5123 5355 5476
 5508
 Theory, see below
 Performance, general
 Backing pressure 5041
 Tolerance 5477
 Choke-up time 5477
 Efficiency 5041
 Heat input 5041
 Jet and slot design 5041
 Pumping speed 5477
 Review 5909
 Vapor speed supersonic 5038 5358 5567
 Pumping speed, see
 Reviews B491 B492 B502 B506 B512 B521 B551 B581
 4817 4819 5149 5512 5848 5875 5909 5923 59114
 Dutch designs 4817
 English designs 4511 4817 59114
 German 5923
 Russian 5422
 Ultra-high vacuum 5874
 Safety circuit against overpressure 4810
 Theory
 Baffles 60107
 Gaede B491
 Jet velocities 5895
 Mercury vapor 4621 5567 59122
 Oil vapor 5420 5567 59122
 Gas removed by collisions 6060
 Thermodynamics, pump fluid 59156
 Vapor speed, supersonic 5567
 Backstreaming effect 5038
 Demonstrated 5358
 Welded, all-metal
 Stainless steel 5978
 Pumps, ejector
 Mechanism of operation 5427
 Pumps, ejector (cont'd)
 Mercury
 Performance
 Cooling diffuser walls 5870
 Oil vapor 5252 5470
 Performance 5342
 Performance
 Function of molecular weight of vapors 3908
 Steam
 Design B491 5752 59114
 Controls 4819
 Performance B491 5647 5752
 Vacuum limit, 10^{-2} mm Hg 5752
 Pumps, ion, see Ion pumps
 Pumps, mechanical
 Ballast, gas B581 5469 59114
 Design 4723 5469
 Performance 5252 5513
 Theory 5513
 Diaphragm pump
 Design 59144
 Theory 59144
 Gaede rotary pump
 Mercury B491 B551
 Oil B491
 Molecular drag
 Beams
 Design 5987
 Ultimate vacuum 5987
 Becker 5877
 Gaede
 Design B491
 Performance B491 5139
 Theory B491 5139
 Holweck B551
 Siegbahn
 Design B491 4016
 Large capacity 4016
 Performance B491 4016
 Piston
 Design 5516
 Double piston, balanced 5863 5977
 Performance 5516 5863 5977
 Reviews B491 B492 B502 B506 B512 B521 B551 B581
 5848 5875
 Russian 5422
 Roots type
 Design 5509 59114
 Performance 5509 5645 5854 5871
 Theory 5645
 Rotary vane type
 Cenco
 Design B491 4819
 Performance B491 4819
 Review B491 5516
 Stokes
 Design B491
 Performance B491
 Ultimate vacuum 5414
 Welch
 Design B491
 Performance B491
 Toeppler B491
 Automatic 5638
 Quartz see also Silica
 Adsorption, see also
 Fine structure 5565
 Surface area 5565

SUBJECT INDEX (cont'd)

- Quartz (cont'd)
 - Properties
 - Review B581 B591
 - Vacuum applications 5890
- Radioactive ionization gages
 - Alphatron 4608 4609 4828 5402 5664 58118
 - Applications
 - Rockets 5911
 - Upper air 5901 59148
 - Vapor pressure 5640
 - Wind tunnel 59150
 - Design B491 B571 4608 4609 4828 5111 5402 5640
5911 59150
 - Improved Alphatron 5664
 - Multipoint measurement system 59150
 - Permits heating 5640
 - Radioactive material
 - Po 5111
 - Radium 226, 59150
 - Tritium 5818 5901 59148
 - Performance B491 4608 4609 5664 58118 5901
59148 59150
 - Sensitivity
 - Air 4608
 - Argon 4608
 - Carbon dioxide 4608
 - Helium 4608
 - Hydrogen 4608
 - Neon 4608
 - Time response 5664
 - Pressure range, high, mm Hg
 - 0.75, 5911
 - 7.5, 5402
 - 10, 4608
 - 30, 59150
 - 100, 5111
 - 200, 59148
 - Pressure range, low, mm Hg
 - 10^{-1} , 5111 59150
 - 4×10^{-2} , 5402 5901
 - 10^{-3} , 4608 5911
 - 10^{-5} , 59148
 - Review B491 5113
 - Theory 5664
- Radiometer gages
 - Accommodation coefficient, see
 - Applications
 - Calibration standard
 - Ionization gages 5145
 - Gas kinetic cross section 5574
 - Molecular weight determined 5560
 - Vapor pressure measurement 5946
 - Bibliography 5125
 - Calibration, see also Calibration methods
 - Capillary leak method 3709
 - Expansion of gas method 1403 4909
 - Design 5034 5125 5317 5946
 - Damping of vanes
 - Electromagnetic 1402 3504 5961
 - Magnetic 5227
 - Du Mond-Pickels 3504 4611
 - Fiber suspensions 3713 5125 5126
 - Force balanced by gravity
 - Vane, suspended
 - Instrument rotated to vane zero 4304
 - Lamp and scale 5227
 - Microscope 3709 3807 3910 4907
- Radiometer gages (cont'd)
 - Design (cont'd)
 - Heats gas periodically, strike vane in resonance
 - Measures amplitude of vane vibration 6087
 - Static charges
 - Glass envelope coated with silver 3910
 - Vane grounded 4909 5560
 - Temperature control
 - Electrical 4909
 - Water bath 3910 4827
 - Temperature of heated strip by measuring resistance 1402
 - Torque balanced
 - Beam balance 4824
 - Electromagnetic B391 B491 1904 3204 3205
3710 4407
 - Electrostatic 3006
 - Automatic, photocell feedback 5210
 - Torque measured
 - Torsion wire 5321
 - Microscope 5961
 - Mirror and scale 1002 1303 1402 1801
3504 4407 4611 5946
 - Vanес around a cylinder 4407
 - Viscosity-radiometer gages combined
 - Vane in resonant vibration, amplitude measured 5560
 - Performance 3709 3910 4827 5210 5317 5961
 - Adsorption effects 4711
 - Envelope diameter effect 3910
 - Radiometric force
 - Effect, design and size of elements 2804
3503
 - Gas composition effect, see Sensitivity, below
 - High pressure B571
 - Pressure at maximum, various gases B571
2804
 - Pressure relation 4407 5893
 - Review B491 B571
 - Sensitivity, various gases B571 2804 3204
3910
 - Air 4304
 - Argon 3710
 - Butane 4909
 - Deuterium 3710
 - Helium 3710 3806 4005 4303
 - Hydrogen 3710 3806 4005 4304 4909
 - Methane 4909
 - Nitrogen 3710 3806 4005 4909
 - Oxygen 3710 4909
 - Temperature difference effect 3910
 - Time constant B571
 - Du Mond-Pickels gage 4610
 - Pressure-force data 3002
 - Pressure range, high, mm Hg
 - 10^{-4} , 3504 3709
 - 5×10^{-4} , 5961
 - 10^{-3} , 3204 3807 4909 5227 5946
 - 10^{-2} , 5034 5125 5317
 - 0.15, 5321
 - 1, 4304
 - 10, 5210
 - Pressure range, low, mm Hg
 - 10^{-5} , 4909 5227
 - 10^{-6} , 3504 3709 3807 5034 5317 5946
 - 8×10^{-7} , 1801

SUBJECT INDEX (cont'd)

- Radiometer gages (cont'd)**
- Pressure range, low, mm Hg (cont'd)
 - 10⁻⁷, 4304 5317 5961
 - 10⁻⁸, 4407 5125 5210
 - Review B471 B491 B571
 - Review B261 B471 B491 B571 5105 5113 5125
 - Theory B261 B491 B571 5125
 - Knudsen
 - Departures from 3710
 - Pressure-force relation 1903 2401 2407 3204 3807 4406 4710
 - Pressure-temperature relation 1001 1002 1905 3205
 - Time lag 4610
 - Radon, clean-up 5636
 - Rate of change of pressure measurement
 - Capillary tube restriction
 - Barograph 5381
 - U-tube manometer, float, recorder 58161
 - Microbarographs, see
 - Rayleigh gage, see Micromanometers, liquid type
 - Rectifiers, semiconductor B542
 - Refractory oxides, reaction with metals at high temperature 5349
 - Residual gases, see also Adsorption and degassing measurement
 - Amalgamated metals 59138
 - Electron tubes 59139 6019 6020 60105
 - Pressure-measuring method 6018
 - Glass-metal system 59139
 - Investigation, vacuum systems 6021
 - Picture tubes 6022 6023
 - Ionization gage 6028 60133
 - Mass spectrometer 60133
 - Metal filaments, interaction with 6031
 - Ultra-high vacuum system 59157 6015
 - Resonance manometer 5560
 - Ring manometer
 - Differential pressures at high absolute pressures 3601
 - Micromanometer 2903
 - Theory 4101
 - Rubbers
 - Cleaning techniques
 - Neoprene 5953
 - Degassing
 - Buna 5032
 - Butyl 59100
 - Crepe 59100
 - Joints 58108
 - O-rings 5032
 - Neoprene 5804 5814
 - Perbunan 59100
 - Rate 5768
 - Red vacuum tubing 5804 5869
 - Review 59153
 - Silicone 5256 5804 5869
 - Techniques 5953
 - Vulcanized 59100
 - Diffusion through
 - Neoprene
 - Hydrogen 59153
 - Nitrogen 59153
 - Oxygen 59153
 - Perbunan
 - Helium 59153
 - Hydrogen 59153
 - Nitrogen 59153
 - Rubbers (cont'd)
 - Diffusion through (cont'd)
 - Rubber
 - Carbon dioxide 59153
 - Helium 5261 59153
 - Hydrogen 5261 59153
 - Nitrogen 5261 59153
 - Oxygen 59153
 - Vapor pressure 5666
 - Safety against overpressure, see Diffusion pumps, Ionization gages, hot cathode, Pressure controllers
 - Seals, vacuum, see also Gaskets
 - Brazing high nickel alloys 5258
 - Electrical leads
 - Cement insulation 5231
 - Glass to metal, demountable 5128
 - Kovar-glass-kovar-aluminum gasket 5818
 - Multiple, molybdenum strips between two silica tubes 5985
 - Neoprene gasket 5845
 - O-ring, demountable 5844
 - Sapphire rod to copper, low temperature 5834
 - Techniques 5454
 - Tungsten wire through glass 5813
 - Epoxy resin
 - Degassing, see, under Resin
 - Low temperature operation 5943
 - Performance 5731
 - Techniques 6097
 - Gaskets, see
 - Glass to glass
 - Lubricated, ground joint, refrigerated 5907
 - Glass to metal, permanent
 - Coatings to increase electrical conductivity 5348
 - Design 5669 5862
 - Low temperature 5903
 - Demet to glass in vacuum tubes 59168
 - Kovar, magnetic properties 58163
 - Nickel-chromium-iron alloy 5050
 - Review B521 5348 5897
 - Silver paint 5022
 - Techniques 5348
 - Theory 5862
 - Knife edge type 5543 59163
 - Applications 5543
 - Ultra-high vacuum 5457 59163
 - Gaskets
 - Aluminum 5119 5431 5442
 - Copper 5431 5457 5537 5741 60105
 - Nickel 5431
 - Knife
 - Ceramics 5431
 - Glass 5431
 - Metals 5431
 - Quartz 5431
 - Sapphire 5431
 - Steel ring, double knife 5741
 - Tube wall into saw tooth on base 5701
 - Two tubes 5457
 - Leakage rate 5537
 - Low melting point solids
 - Gallium, indium and tin alloy
 - Seal by surface tension of liquid 5758 59163

- Seals (cont'd)**
- Low melting point solids (cont'd)
 - Indium 5442 5530 58158
 - Wire gasket 5733
 - Mercury 5442
 - Low temperature use 58160
 - Metal to metal 5669
 - Oil seal 4305
 - Performance
 - Ultra high vacuum 5969
 - Rectilinear motion in vacuum system
 - Bellows seal 5531
 - Requirements 5543
 - Review B581 5533
 - Russian 5422 5927
 - Ultra-high vacuum 5874 5915
 - Retatable continuously 5222
 - Ball and socket 59164
 - Steel washers, compressed 5829
 - Two seals, vacuum between 5238
 - Sliding
 - Pipe flanges, O-rings 5135
 - Windows
 - Calcium fluoride
 - Glass 5837
 - Electron permeable
 - Nickel screen, Bentonite clay filler 5839
 - Mica 5744
 - Differential expansion, high temperature use 5835
 - Solder-glass seals to titanium
 - Bakeable, ultra vacuum 6010
 - Polyethylene gasket
 - For liquid helium temperature 5950
 - Radial compression seal, glass, ceramic, sapphire windows 59167
 - Sapphire 59164
 - Silica, see also Quartz
 - Adsorption of gases, see Adsorption
 - Organic vapors 3509
 - Fibers 3713
 - Coated 3713
 - Silica gel absorber
 - Alcohol vapor 2508
 - Benzene vapor 2508
 - Butane 2505
 - Theory 2505
 - Carbon dioxide 2507
 - Carbon tetrachloride 2508
 - Hysteresis loop 4106
 - Hydrocarbon vapors (15) 5998
 - Hysteresis B491
 - Nitrous oxide 2507
 - Review B491
 - Structure B583
 - Theory 2507 2508 3811 5998
 - Water vapor 2508
 - Hysteresis loop 4106
 - Silicon
 - Adsorption, see
 - Borosilicate glass causes boron deposit 6099
 - Cleanliness of crystal surface 5880 5908
 - Degassing, see
 - Work function, crystals 5879
 - Silicone rubber, see Rubbers
 - Solubility of gases in solids
 - Elastomers
 - Argon B522
- Solubility of gases in solids (cont'd)
- Elastomers (cont'd)
 - Hydrogen B522
 - Theory B522
 - Nitrogen B522
 - Glass
 - Helium 5434
 - Metals
 - Carbon monoxide B491
 - Hydrogen B491 B522
 - Nitrogen B491
 - Oxygen B491
 - Palladium
 - Hydrogen B491 3715
 - Polymers B522
 - Review B491 59153
 - Vycor
 - Helium 6003
 - Hydrogen 6003
 - Neon 6003
 - Nitrogen 6003
 - Zirconium
 - Hydrogen 5726
- Sorption, see Adsorption, Degassing
- Cellulose B491
- Space simulator, see Pressure simulator, outer space
- Static tube
 - External interference effects, supersonic speed 5956
 - Theory, low Reynolds Nos. 58100
- Steel
 - Degassing, see
 - Diffusion, see
 - Sticking probability, see Condensation coefficient
 - Surface area of solids and gases
 - Barium getter 6050 6051
 - Bibliography 5165 6068
 - Glass 4823
 - Measurement 6050 6051 6068 6082
 - Low temperature adsorption of a gas (Brunauer-Emmett) 4411 4508 6093
 - Adsorption of Krypton used 4507 60110
 - Oxide-coated cathodes 4308
 - Review B491 B514 B601 4508 5165
 - Small areas B491 4507
 - Molecular areas, see Molecules
 - Ratio true to apparent B491
 - Review B491 B514 B601 5165 6068
 - Silicon 6093
 - Theory 5165
 - Surface chemistry of solids B514 B601
 - Surface reaction phenomena and techniques
 - Electron emission, strong electric fields, see Field emission Microscope
 - Field emission microscope, see
 - Flash filament techniques
 - Adsorption measured
 - Hydrogen and nitrogen on tungsten 5914
 - Residual gases on metal filaments 6031
 - Flash filament techniques, ionization gage
 - Adsorbed nitrogen on tungsten measured 5671
 - Detecting contaminating gases 5873
 - Indicator of ultra high vacuum 4007, 4808 5314 5474 5874
 - Work function of tungsten strip observed by photocell 5236

SUBJECT INDEX (cont'd)

- Surface reaction phenomena and techniques (cont'd)
- Oxide cathodes
 - Thoriated-tungsten filament
 - Argon, hydrogen and nitrogen ion impact removes thorium 3711
 - Oxygen inactivities 3711
 - Variations in emitting area 3603
 - Palladium evaporated films
 - Various gases 5993
 - Review B511 B571 59176
 - Surface cleanliness
 - Crystals, determined by electron diffraction 5880
 - Field emission microscope detects oil molecules 6038
 - Tungsten, determined by change in emission after flashing 6005
 - Surface tension
 - Low temperature melting alloys 5758
 - Mercury B494
 - Organic vapors in contact 3301
 - Review B494
 - Water
 - Saturated with organic compounds 3301
 - Tantalum
 - Adsorption, see
 - Degassing, see
 - Field emission
 - Oxygen mobility 5259
 - Filament, hot, adsorbing action
 - Hydrogen 3208
 - Nitrogen 3208
 - Oxygen 3208
 - Water vapor 3208
 - Teflon
 - Degassing data B581 5032 5256 5804 5869
 - O-rings 5814
 - Gaskets, see
 - Physical properties B581
 - Vapor pressure 5666
 - Terminology
 - American Vacuum Soc. 58148
 - British 58104
 - German B581
 - Symbols, German B581
 - Vacuum grades 58148 58155
 - Thermal conductivity, see Heat conductivity of gases
 - Thermal conductivity gages
 - Bimetal gages, see Pirani gages
 - Expansion gages, see
 - Pirani, see Pirani gages
 - Reviews, see Books and surveys
 - Thermister, see Pirani gages
 - Thermocouple, see Thermocouple vacuum gages
 - Thermionic emission, see Electron emission from cathodes
 - Thermistors
 - Physical properties 4626
 - Pirani gage, see
 - Stability 5610
 - Thermocouples
 - Welding techniques 4604
 - Thermocouple vacuum gages
 - Design 5618 5782 5868
 - All metal 4612
 - Combined with ionization gage 4809
 - Thermocouple vacuum gages (cont'd)
 - Design (cont'd)
 - Maximum sensitivity 5216 5217
 - Resistor in parallel with filament 5217
 - Multiple pressure ranges 5245 5646
 - Theva 5270
 - Mode of heating couple
 - Electrical 4010 4012 4105 4606 5572
 - Automatic control 5868
 - Radiation
 - Electric light 1405
 - Wire spiral 2605
 - Mode of indication
 - Galvanometer 4012 4605
 - Milliammeter 4606
 - Millivoltmeter 4010 4105
 - Output operates controller 4605
 - Performance 4809 5245 5572 5618 5646 5868
 - Calibration not linear 4606
 - Heating current effect B491
 - Radiation effects 2605
 - Review B491 B571
 - Sensitivity, various gases
 - Argon 4705 5216
 - Carbon dioxide 4705
 - Carbon monoxide 4705
 - Ethane 4704
 - Hydrogen 4704 5216
 - Methane 4704
 - Nitrogen 4704
 - Oxygen 4704
 - Water vapor 4704 5216 5270
 - Xenon 4704 5216
 - Temperature, ambient, effect of 5270
 - Pressure range, high, mm Hg
 - .1, 4809
 - .2, 4612
 - 1, 4605 4606 5782
 - 3, 5618
 - 5, 5868
 - 10, 4010 4105 5646
 - Pressure range, low, mm Hg
 - 10⁻¹, 4105
 - 5 x 10⁻², 5618
 - 10⁻², 5868
 - 5 x 10⁻³, 4605
 - 10⁻³, 4606 4612 4809 5646 5782
 - 3 x 10⁻⁴, 2605
 - 10⁻⁴, 4010
 - 10⁻⁵, 4012 5216
 - Review B391 B491 B571 3109 5144
 - Theory 4809 5216 5217
 - Thermocouple materials
 - Chromel-alumel B491
 - Constantan-manganin 4010
 - Copper-constantan B491 2605
 - Wall temperature control B491
 - Thermomolecular flow theory B491
 - Thin films, evaporated
 - Adsorption, see
 - Degassing of melted metal B572
 - Gas content 59162
 - Interaction with krypton
 - Theory 5991
 - Palladium
 - Surface reaction, various gases 5993
 - Porosity B583

- Thin films, evaporated (cont'd)
 Production B513 59162
 Review B572
 Vacuum effects B572
- Thorium, see Adsorption, Diffusion, Getters
- Titanium
 Cleanliness of crystal surface 5880
 Gettering action, see Getters
 Hydrogen adsorption 59169
 Vapor pressure 59169
- Titanium oxide
 Photo desorption 6088
- Torque-pressure balances, see also Flowmeters, Vapor pressure measurement
 Pressure measured by reaction of flowing gas 3210
- Radiometer application, see Radiometers
- Transducers, see also Piezoelectric gages
 Inductance 5103
 Review B592
- Transistors B542
 Circuits B602
- Traps, see also Pumps, cryogenic
 Alumina pellets
 Absorbs oil vapor products 6011
 Carbon 58159
- Cold
 Coil, liquid nitrogen 5541
 Conduction type
 Copper rod in liquid 5336 5747
- Dewar flasks
 Design improvements 5232
 Performance 5232
 Theory, gaseous heat conductivity 5816
- Effect on pressure indicated by McLeod gage 3211
- Insulation materials, see
 Leaks in stainless steel 5155
- Light beam passes through 5334
- Liquid air 1402
- Liquid nitrogen 5864 5935 5936 5981 59141 59158
 Level controller 5884 5929 60124
 Stainless steel corrugated sheet in liquid 5370
- Copper foil
 Cooled by liquid nitrogen 59143
 Design 5853
 Performance 5330 5463 5853
 Mercury 5820
 Ultra-high vacuum 5853 5864 5981 59143
- Mechanical refrigeration system 5544
 Ultra-low temperature 59166
- Review
 English 59114
 Russian 5927
 Ultra-high vacuum 5874
- Zeolite, artificial
 Design
 Ultra high vacuum 5906
 Performance 5906
- Tubing
 Conductance of, see Flow of gases
 Coupling for 5457
- Tungsten, see also Gettering action, ionization gages
 Adsorption of gases, see
 Caesium film 3307 5554
- Tungsten (cont'd)
 Cleanliness of surface
 Determined by emission change after flashing 6005
- Condensation coefficient, see Sticking coefficient
- Contact potential, barium 3502
- Degassing, see
 Filaments
 Produce hydrogen and carbon monoxide 59136
- High temperature reactions in vacuum, see also
 Adsorption, activated, Electron emission
 Air 5253
 Acids 5253
 Alkalies 5253
 Carbon 5253
 Nitrogen 5253
- Oxide
 Formation 4821 5253
 Reduction 4821
- Photoelectric emission 4808 4811
- Rate of evaporation B491
- Single crystal
 Adsorption
 Barium 3909 5161
 Caesium 3809
 Hydrogen 5889
 Tungsten 5161
 Cleaning surface techniques 4007 5161
- Thorium film 3307
- Vapor pressure, see
 Work function 1304 3502 3808
 Indicates pressure 3808 4006 4811
- Units, pressure
 Conversion table B581 6009
 Gaede (micro Newtons /m²) 5933
 Pascal (Newton/m² = 10 dynes/cm²) 5933
 Review B491
- Units, flow
 Clusec 5933
 Lusec 5933
 Review B491
- Universal vacuum joint
 For rotating apparatus 5449
- Upper atmosphere
 Pressure measurement, see
- Vacuscope (Swivelling McLeod gage), see McLeod gages
- Vacuum controllers, see Pressure controllers
- Vacuum distillation 4414 5223 5224 5225
 Evaporator 5780
 Review B581
- Vacuum engineering
 Design data, graphical 5404 5548 6067
- Vacuum gages, see Pressure measurement
 Calibration, see Calibration methods
 Reviews, see Books and surveys
- Vacuum lock
 Mass spectrometer, solid samples 5341
- Vacuum measurement, see Pressure measurement
- Vacuum measurement, general
 Merits of various type gages B491
 Pressure range of various gages, see
 Review 5875
 Ultra-high 5874 59113 59114

SUBJECT INDEX (cont'd)

- Vacuum measurement, general (cont'd)
- Theory
 - Time lag 5846
 - Thermomolecular flow, effect B491
 - Vacuum metallurgy B513 5572
 - Vacuum production, high
 - Adsorption effects 5754
 - Charcoal traps B491
 - Clean-up methods B491 3808
 - Cold traps B491
 - Getter-ion pumps 5920
 - Symposium summary 59128
 - Theory
 - Leaks 5754
 - Techniques B491 B502 B503 B504 B505
 - Vacuum production, very high 3717
 - Booster oil diffusion pump used 59157
 - Lubricated joint frozen, high temperature furnace 5907
 - Vacuum production, ultra-high
 - Electron tubes 6017
 - Large volume systems 5864 59141 59158
 - Limiting factors 5448 5533 5514 58141
 - Mercury vapor pump used, no getter 5815 5936
 - Review 5874 5915
 - Techniques 4007 5161 5463 5514 5533 5555 5815 5867 58120 59114 59157 59158 59163 6015 6017 6038 6086
 - Mercury diffusion pump 58144
 - Titanium getter 6086
 - Theory 58141 59143
 - Vacuum system within another 5533 59143
 - Vacuum standards
 - Calibration of gages 58155
 - Pumping speed 58155
 - Terminology, see
 - Vacuum systems
 - All metal
 - Techniques to reduce wall impurities 5624
 - Aluminum, welded and brazed 5360
 - Causes of failure 5248
 - Coating dielectrics and conductors 5656
 - Conductance problems, see also Flow of gases
 - Nomographs 5404 5548 6067
 - Theory 4818 5247
 - Control, vacuum, see also Pressure controllers
 - Alphatron gage, pneumatic controls 5855
 - Ionization gage, circuit 5018 58157
 - Thermocouple gage, circuit 58157
 - Degassing, see
 - Design 59105 59163
 - Accelerator system 5751 5928
 - Valves 5928
 - Evaporation apparatus, bakeable, all metal 5240
 - Large volume 59141
 - Metal chamber 5851
 - Proton-synchrotron 6033
 - Pumping systems
 - Ultra-high vacuum 5864 59141
 - Very high vacuum 5928
 - Review B382 B491 B581 5247 5248
 - Vacuum system within another 5533 59143 59164
 - Differential multiple pumping 5757
 - Electrical analogue 5345
 - Leak detection, see
 - Materials, see
 - Mercury vapor suppression 5053
 - Motor for 5017
 - Vacuum systems (cont'd)
 - Particle accelerator
 - Getter-ion pumps used 5920
 - Pressure simulation, outer space 59142 59154
 - Protective devices 5247
 - Circuits 4810 4918 5039 58157
 - Seals, see
 - Space simulation, see Pressure simulation, above
 - Transfer of motion into, see Seals
 - Traps, see
 - Ultimate vacuum techniques, large volumes 58159
 - Ultra-high vacuum 5533 5624 5867 5874 59143 59157 59158 59163 59164 6015 6086
 - Residual gases, see
 - Valves, see
 - Vacuum techniques
 - Bibliography B581 5166 59106
 - Clean surfaces 5314
 - Degassing, see
 - Differential vacuum maintained 5777
 - High vacuum 60120
 - Leak detection, see
 - Low temperature 58160
 - Mass spectrometry, see
 - Pumping, see Getter-ion pumps, Pumps diffusion
 - Reviews, see Books and surveys
 - Seals, see
 - Surface phenomena 4808 5314
 - Ultra-high vacuum 5161 5463 5514 5874 5915 5936 5979 5980 5949 59164 6038
 - Valves, see also Seals, Leaks, controlled gas
 - Applications
 - Accelerator system 5928
 - Barometer tube 5455
 - Diffusion pump line 5440
 - Flow control 5607 60101
 - Chlorine 60103
 - Gas injection 6074
 - Low temperature 58160
 - Mercury manipulation 5745
 - Safety, see below
 - Stellerators 5856
 - Ultra-high vacuum 5446 5524 5628 5717 5979 59116 59120
 - Automatic, pressure controlled 5468
 - Ball check valves, control mercury flow 5745
 - Bibliography 5320
 - Indium seal
 - Float controls level 5717 59116
 - Mechanical
 - All metal 5533 5927 60101
 - Aluminum seal, valve stem compresses 5979
 - Bakeable 5310 5856 59124
 - Ball and socket, solenoid operated 5628 59115
 - Bellows seal
 - Mechanically operated
 - All metal 5913
 - Ultra-high vacuum 5904
 - Operated by air pressure
 - Seats metal disk on O-ring 5440
 - Cone seal 5927
 - Copper seat
 - Kovar cone 5120
 - Metal cone 59124
 - Monel metal nose 5346
 - Differential expansion, glass and metal plug 5607

- Valves (cont'd)
- Mechanical (cont'd)
 - Disk, material
 - Brass, magnetically seated, fast-acting 6074
 - Copper, large, sealed by high fluid pressure 59165
 - Indium seal 5547
 - Neoprene seal 5459
 - Gate valve, large 5346
 - Electrically triggered 5626
 - Glass seat, teflon cone 5455
 - Indium gasket 5530 5547
 - High gas conductance 5023
 - Multiple 5049
 - Disk, rotating, metal 5364
 - Piston, position controlled 5461
 - Needle valve
 - Diaphragm deflection control 60101
 - Solenoid controlled 5831
 - Spring controlled 5324
 - Vibrated, amplitude controls leak 5326
 - Piston position controlled
 - Glass, magnetic force 5446
 - Large diameter, multiple 5452
 - O-ring seal 5131 5461
 - Pressure controlled 5749
 - Plug valve 5460
 - Silver ring, monel nose 5524
 - Spring closure, solenoid opens 5040
 - Stopcock
 - Glass, end cover seal 5538
 - Mercury sealed 5239
 - Metal, O-ring seal 5460
 - Teflon disk, bellows controlled 5338
 - Teflon seat 6074
 - Mercury level, control
 - Magnetically operated float 5130 5606
 - Pressure controlled
 - Sintered disk mercury seal 5044 5606 5642
 - Performance
 - Leakage 5524 59124
 - Magnetically operated disk valve 6074
 - Review B492 B551 B581 5320
 - Ultra-high vacuum 5874 58120
 - Safety against sudden pressure changes
 - Gate type, electrically triggered 5626
 - Piston, closed by atmospheric pressure 5986
 - Silver chloride in capillary 60103
 - Theory, fast-acting magnetic valve 6074
 - Tin seal
 - Melted by hf current 5830
 - Molten, cup lowered into tin for seal 59120
 - Wood's metal seal 5739
 - Vapor condensation
 - Cold surface, ultra-high vacuum
 - Theory 5842
 - Vapor pressure
 - Alcohols, low temperature 5946
 - Alloys B491
 - Low temperature melting 5758
 - Amalgams 59138
 - Bibliography 4712
 - Caesium 6058
 - Calcium 5441
 - Cements, vacuum 3309
 - Chlorides 5527
 - Greases B491
- Vapor pressure (cont'd)
- Inorganic compounds B491 4712
 - Low temperature data B491
 - Mercury 3210
 - Amalgams 59138
 - Metals B491 B551 B581 5447 5527
 - Monatomic vapors 4104
 - Organic substances B541 B581 4712
 - Butyl phthalate 3906
 - Tri cresyl phosphates 3906
 - Oxides B491 5527
 - Plastics 5666
 - Pump oils, see
 - Review B491
 - Silicone 5354
 - Review B491 5527
 - Sulphides 5527
 - Theory B491
 - Titanium 59169
 - Tungsten 1302 5448
 - Waxes B491
 - Vapor pressure measurement, vacuum range
 - Caesium, collected on tungsten, measured by flash technique 6058 6059
 - Dead weight disc valve, see Mechanical pressure and vacuum gages
 - Effusion, two reservoirs connected by tube of known conductance 5268 5441 5523 5649
 - Error, usually neglected 5649
 - Gasometer, Dubrovin 4807
 - Microbalance, impact on 5788
 - McLeod gage
 - Measures pressure restoring diaphragm to null position 5629
 - Technique for condensable vapors 5643
 - Molecular beam impact
 - Streaming vapor twists vane and torsion wire 5946
 - Pendulum gage, see Gravity disc valve, above
 - Piston, mica, quartz spring 5518
 - Pumping against restriction until pressure constant 3309
 - Radioactive ionization gage 5640
 - Radiometer gage 5034
 - Combined with viscosity gage 5560
 - Review 5643
 - Vibration-free mountings for instruments 5682
 - Viscosity
 - Dependence on mean free path and molecular diameter B491
 - Low pressures B491
 - Gases B491
 - Temperature effect B491
 - Exponential equations B491
 - Sutherland's equation B491
 - Viscosity vacuum gage
 - Decrement type
 - Disc, angular oscillations B491
 - Fiber, oscillating B491
 - Bifilar 5318 5819
 - Design B391 B491 1404 2504 3903 5319 5453
 - Performance B491 5319
 - Molecular weight effect 5318
 - Recorder
 - Capacitance pickup, decay of frequency 5453
 - Theory 1404 5318 5319

SUBJECT INDEX (cont'd)

- Viscosity vacuum gage (cont'd)
 - Decrement type (cont'd)
 - Membrane, oscillating
 - Bifilar suspension
 - Design B491 2302 2603 5560
 - Photocell pickup 5812
 - Performance B491 2302 2603 5812
 - Theory B491 2302 2603
 - Galvanometer suspension
 - Design 3503 5377
 - Theory B491 2302
 - Pressure range, high, mm Hg
 - 2×10^{-4} , 5377
 - 2×10^{-2} , 2603
 - 10^{-2} , 5812
 - 20, 5466
 - Pressure range, low, mm Hg
 - 10^{-3} , 5466
 - 5×10^{-4} , 2603
 - 10^{-5} , 5812
 - 2×10^{-6} , 2504
 - 10^{-7} , 3903 5318 5377
 - Radiometer gage, combined with 5560
 - Review B261 B471 B491 5113 5479
 - Resonance manometer, torsional oscillations
 - Amplitude proportional to pressure and molecular weight 5377
 - Rotating disk or cylinder (viscous drag)
 - Design B491 5466
 - Performance B491 5466
 - Calibration, various gases 5466
 - Theory B491 5466
 - Theory B261 B491
 - Langmuir B391
 - Vycor, see Glass

 - Water vapor
 - Adsorption on solids, see Adsorption
 - Area, adsorbed molecules 4411
 - Degassing, see
 - Diffusion, see Diffusion of gases
 - Equilibrium pressure on glass surface 5603
 - Gettered by, see Getters
 - Methyl chlorosilane (Dri-film) 5462

 - Water vapor (cont'd)
 - Origin in vacuum systems 5308
 - Measurement in vacuum apparatus 5374
 - Biological materials 5421
 - Reactions in electron tubes 6032
 - Thickness of film on glass 4409
 - Weighing under vacuum 4824
 - Welding
 - Stainless steel joints 5978
 - Thermocouple welding techniques 4604
 - Windows
 - For electrons 5839
 - For microwaves 5856
 - Sealing techniques, see Seals

 - Zeolites
 - Adsorption
 - Characteristics B491
 - Mechanism 59126
 - Chabasite and analcite
 - Data, absorption vs size of molecule B491 4412
 - Persorption B491 4412
 - Physical characteristics B491 4412
 - Sorption of gases B491
 - Hydrocarbons 4412
 - Gmelinite and Mordenite, adsorption
 - Hydrocarbons 4413
 - Nitrogen 4413
 - Oxygen 4413

 - Zinc
 - Photoelectric properties 3608
 - Work function 3608

 - Zirconium
 - Adsorption of gases
 - Carbon monoxide 4107
 - Hydrogen 3616 4107 4905 59128
 - Nitrogen 3604 4107 4905
 - Oxygen 3604 4107 4905
 - Pressure effect 4905
 - Review B491
 - Techniques 4107 4905
 - Temperature effect 4905
 - Diffusion of gases, see
 - Solubility of gases, see

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