

United States of Standard  
Library, N. W. Bldg.

JUL 1 1960

NBS CIRCULAR 502

Ref.

# Bibliography of Electron Microscopy

UNITED STATES DEPARTMENT OF COMMERCE

NATIONAL BUREAU OF STANDARDS



UNITED STATES DEPARTMENT OF COMMERCE • Charles Sawyer, *Secretary*  
NATIONAL BUREAU OF STANDARDS • E. U. Condon, *Director*

# Bibliography of Electron Microscopy

by

Claire Marton, Samuel Sass, Max Swerdlow  
Alan VanBronkhorst, and Harold Meryman



National Bureau of Standards Circular 502  
Issued August 1, 1950

---

For sale by the Superintendent of Documents, U. S. Government Printing Office  
Washington 25, D. C. - Price 25 cents

## Foreword

Since publication of previous bibliographies<sup>1 2</sup> the electron microscope has been further developed and applied to new and expanding fields of research and industrial technology. Because of this fact many users of the instrument both here and abroad urged us repeatedly to resume our effort to publish an up-to-date and convenient compilation of the literature dealing with electron microscopy.

For the convenience of the user the titles have been grouped into the following broad categories: Books, survey articles, instrumentation, electron optics, related instruments, and applications. Within each group the arrangement is chronological, and within each year alphabetical by author. Further breakdown of grouping into the various fields of application did not seem desirable because the inter-dependent nature of the many phases of applied electron microscopy would make such groups of limited aid at best. The authors believe that the individual worker in a particular field is best qualified to select those references that best satisfy his needs.

All references are consecutively numbered, and an alphabetical author index refers to these numbers. It is hoped that this index will greatly increase the usefulness of the bibliography.

This bibliography is intended to contain only those papers that were published in scientific periodicals prior to January 1, 1950. Semiscientific, popular accounts, and patent literature have been omitted. Only those papers dealing with general electron optics that have a direct bearing on electron microscopy have been included. Electron diffraction work has in general been omitted, but where it is combined with studies in electron microscopy, it has been carried along.

Following the practice of Chemical Abstracts and Science Abstracts, the titles of all of the foreign language papers have been translated into English. The abbreviations of journals are, in general, those used by Chemical Abstracts. For journals that Chemical Abstracts does not include, the abbreviations are either those used by Science Abstracts, or they are so obvious that the journal can be easily recognized.

---

<sup>1</sup> Marton, C., and Sass, S. A bibliography of electron microscopy. I, II, III. *J. Applied Phys.* **14**, 522-531 (1943); **15**, 575-579 (1944); **16**, 373-378 (1945).

<sup>2</sup> Rathbun, M. E., Eastwood, M. J., and Arnold, O. M. Supplementary bibliography of electron microscopy. *J. Applied Phys.* **17**, 759-762 (1946).

While every effort has been made to prepare this bibliography as completely and accurately as possible, that aim may not have been always achieved, and the authors invite the users of this bibliography to notify them of any omissions or errors.

The generous assistance of Dr. L. Marton, especially in making available his extensive files and reprint library, is gratefully acknowledged. The authors also thank Mrs. M. Cushing, Miss M. Krauss, and Miss P. Ashley for clerical help.

Claire Marton, Samuel Sass, Max Swerdlow,  
Alan VanBronkhorst, Harold Meryman.

## **C o n t e n t s**

	Page
Foreword	II
I. Bibliography	1
1. Books	1
2. Survey articles	2
3. Instrumentation	10
4. Electron optics	14
5. Related instruments	22
6. Applications	27
II. Author index	68

# Bibliography of Electron Microscopy

by

Claire Marton, Samuel Sass,<sup>1</sup> Max Swerdlow,  
Alan VanBronkhorst, and Harold Meryman <sup>2</sup>

## 1. BOOKS

1934

1. Brüche, E. and Scherzer, O. Geometrische Elektronenoptik. J. Springer, Berlin, 1934.

1935

2. Marton, L. Le microscope electronique et ses applications; suivi de: Henriot, E. L'Optique electronique des systèmes centrés. Rev. d'Optique, Paris, 1935.

1936

3. Brüche, E. and Henneberg, W. Geometrische Elektronenoptik. Ergebnisse exakten Naturwissenschaften **15**, 365–421. J. Springer, Berlin, 1936.

1937

4. Busch, H. and Brüche, E. Beiträge zur Elektronenoptik. J. A. Barth, Leipzig, 1937.

1939

5. Klemperer, O. Electron optics. Cambridge University Press, Cambridge, 1939.
6. Myers, L. M. Electron optics. Chapman and Hall, London, 1939.
7. Picht, J. Einführung in die Theorie der Elektronenoptik. J. A. Barth, Leipzig, 1939.

1940

8. AEG Forschungs-Institut. Jahrbuch. Sonderheft: Übermikroskop. J. Springer, Berlin, 1940.
9. Ardenne, M. v. Elektronen Übermikroskopie. J. Springer, Berlin, 1940.
10. Ramsauer, C., Editor. Das Freie Elektron in Physik und Technik. J. Springer, Berlin, 1940.
11. Zworykin, V. K. and Morton, G. A. Television. John Wiley and Sons, N. Y., 1940.

1941

12. Das Übermikroskop als Forschungsmittel. Walter de Gruyter and Co., Berlin, 1941.
13. Brüche, E. and Recknagel, A. Elektronengeräte, Prinzipien und Systematik. J. Springer, Berlin, 1941.

1942

14. Ramsauer, C. Elektronenmikroskopie. Bericht über Arbeiten der AEG-Forschungs-Instituts 1930 bis 1941. Second edition. J. Springer, Berlin, 1942.

<sup>1</sup> General Electric Co., Pittsfield, Mass.

<sup>2</sup> Naval Medical Research Institute, Bethesda, Md.

15. Brüche, E. Electron optics. Deutscher Akademischer Austauschdienst, Heidelberg, 1943.
16. Dosse, J. and Mierkel, G. Der elektrische Strom in Hochvakuum in Gasen. Einführung in die physikalischen Grundlagen. S. Hirzel, Leipzig, 1943.
17. Gard, S. Purifications of poliomyelitis viruses experiments on murine and human strains. Institute of Physical Chemistry and Department of Hygiene and Bacteriology, University of Uppsala, Sweden, 1943.

## 1944

18. Hatschek, P. Electron-optics, trans. by Artur Palme. Amer. Photogr. Pub. Co., Boston, 1944.

## 1945

19. Hawley, G. G. Seeing the Invisible. Alfred A. Knopf, New York, 1945.
20. Zworykin, V. K., Morton, G. A., Ramberg, E. G., Hillier, J. and Vance, A. W., Electron optics and the electron microscope. John Wiley and Sons, N. Y., 1945.

## 1946

21. de Broglie, L. L'Optique électronique. Ed. Revue d'Optique, Paris, 1946.
22. Burton, E. F. and Kohl, W. H. The electron microscope, an introduction to its fundamental principles and applications. Second Edition, Reinhold Publishing Corporation, New York, 1946.
23. Cosslett, V. E. Introduction to electron optics. Oxford University Press, London, 1946.
24. Gabor, D. The electron microscope: its development, present performance, and future possibilities. Hulton Press, London, 1946.

## 1948

25. Frey-Wyssling, A. Submicroscopic morphology of protoplasm and its derivatives. Elsevier, New York, 1948.
26. Gabor, D. The development, present performance and future possibilities of the electron microscope. Chemical Publishing Co., Brooklyn, N. Y., 1948.

## 1949

27. Borries, B. v. Die Übermikroskopie. Editio Cantor, Aulendorf, Würt. 1949.
28. Schmitt, F. O. Chemistry and physiology of growth. Princeton University Press, Princeton 1949.
29. Wyckoff, R. W. G. Electron microscopy. Interscience Publishers, New York, 1949.
30. Sushkin, N. G. Elektronnyi Mikroskop. Gos. Izd-vo Tekh. Teoret. Lit-ry, Moscow, 1949.

## 2. SURVEY ARTICLES

## 1933

31. Valle, G. Electron microscope. Elettrotecnica **20**, 697-705 (1933).

## 1934

32. Sommerfeld, A., and Seherzer, O. Description of an electron microscope. Munch. Med. Wochschr. **81**, 1859-1860 (1934).

## 1935

33. Boutarie, A. The electron microscope. La Nature, **2953**, 450-454 (1935).
34. Knoll, M. The electron microscope. Zeits. f. arztl. Fortbild. **32**, 644-678 (1935).
35. Starks, H. J. H. The electron microscope. Reports on Progress in Physics, **2**, 283-291 (1935).

36. Fritz, R. The electron microscope. *Rev. Gén. Sci.* **47**, 338–342 (1936).
37. Marechal, J. R. The electron microscope. *Rev. universelle mines* **12**, 325–330 (1936).
38. Marton, L. The electron microscope. *Rev. Microbiol. Appl.* **3**, 117–124 (1936).

## 1937

39. Anon. Electron microscope. *Oil Colour Trades J.* **104**, 837 (1937).
40. Gallarati, G., and Madia, G. Electron microscopes and telescopes. *Televisione* **1**, 59–71 (1937).

## 1938

41. Anon. Electron microscopes. *Electronics* **11**, 30–33 (1938).
42. Anon. Development and uses of the electron microscope. *Chem. Fabrik* **11**, 478–479 (1938).
43. Anon. The Siemens electron microscope. *Engineering* **146**, 474–475 (1938).
44. Borries, B. v., and Ruska, E. The electron microscope as an extension of the light microscope. *Verh. d. Ges. deut. Naturf. u. Arzte, Versammlung Stuttgart* 18–21, 72–77, (1938).
45. Borries, B. v., Ruska, E. and Ruska H. Status of the supermicroscope. *Z. ver. deut. Ing.* **82**, 937–941 (1938).
46. Castner. The super microscope. *Apparatebau* **50**, 221–226 (1938).
47. Müller, H. O. Principles and development of the supermicroscope. *Elektrotech. Z.*, **59**, 1189–1195 (1938).
48. Martin, L. C. Electron microscope. *Nature* **142**, 1062–1065 (1938).
49. Rayleigh, Lord. Vision in nature and vision aided by science. *Nature* **142**, 309 (1938).
50. Ruchardt, E. New developments in electron microscopy and their results. *Münch. Med. Wochschr.* **85**, 1832–1837 (1938).
51. Ruska, H. The invisible becomes visible. *Kosmos* **35**, 346–350 (1938).
52. Ruska, E. The electron microscope. *Engineering* **146**, 474 (1938).
53. Trian, L. The most recent realization of the electron microscope. *Rev. Gén. Élec.*, **44**, 841–847 (1938).

## 1939

54. Borries, B. v., and Ruska, E. An electron supermicroscope for research institutes. *Naturwissenschaften* **27**, 577–582 (1939).
55. Moulton, F. R. The electron microscope. *Sci. Monthly* **49**, 189–192 (1939).
56. Renner, J. The electron microscope. *Természettud. Közlöny*, **71**, 285–294 (1939).
57. Sterckx, R. Some new methods of investigation applied in biological sciences. *Ann. Zymol.* **6**, 337–354 (1939).

## 1940

58. Anon. A new electron microscope. *J. Applied phys.* **11**, 629–630 (1940).
59. Borries, B. v. Development and results of electron microscopy. *Glaser's Ann.* **64**, 163–168; 179–182 (1940).
60. Borries, B. v., and Ruska, E. Development and introduction of a new method of research—the electron microscopy of transparent objects and its application in technology. *Deutsche Technik* **8**, 172–178 (1940).
61. Borries, B. v., and Ruska, E. Microscopy of high resolving power by means of fast electrons. *Ergeb. exakten Naturwissenschaften* **19**, 237–322 (1940).
62. Borries, B. v., and Ruska, E. New paths of microscopy. *Vierjahresplan* **4**, 504–507 (1940).
63. Brüche, E. Ten years of development of the AEG electron microscope. *Jahrb. AEG Forsch. Sonderheft Übermikroskop* **7**, 2–8 (1940).
64. Burton, E. F. The Electron microscope. *Proc. Roy. Can. Inst.* **5**, 35–36 (1939–1940).
65. Dorgelo, H. B. Types of electron microscopes. *Nederland. Tijdschr. Natuurk.* **7**, 157–170 (1940).

66. Dosse, J. Electron ray microscope. *Umschau* **44**, 548–553 (1940).
67. Gaede, R. The electron microscope, *Deut. med. Wochschr.* **66**, 858–860 (1940).
68. Harrington, J. Seeing with electricity. *Sci. American* **163**, 20–22 (1940).
69. Henneberg, W. The supermicroscope. *Elektrotech. Z.* **61**, 773–776 (1940).
70. Klemperer, O. Electron microscopes of high magnification. *Reports on Progress in Physics* **7**, 107–129 (1940).
71. Martin, L. C. The present position regarding the development of the electron microscope. *J. Soc. Glass. Technol.* **24**, 97–100 (1940).
72. Martin, L. C. Ultraviolet and electron microscopy. *Nature* **146**, 288–292 (1940).
73. Pupko, S. L. Electron microscope. *Uspekhi Fiz. Nauk* **24**, 487–513 (1940).
74. Renner, J. New applications of electron microscopy. *Természettud. Közlöny* **72**, 48–50 (1940).
75. Ruska, H. Supermicroscopy. *Nederland Tijdschr. Natuurk.* **7**, 179–191 (1940).
76. Ruska, H. Significance and results of the electron microscope. *Siemens-Z.* **20**, 228–234 (1940).
77. Ruska, H. and Frühbrodt, E. Supermicroscopy as a method of investigation. *Biologe* **9**, 69–75 (1940).
78. Stokley, J. The electron microscope and television. *Science* **92**, 8 (1940).
79. Zworykin, V. K. An electron microscope for the research laboratory. *Science* **92**, 51–53 (1940).
80. Zworykin, V. K. The electron microscope. *Instruments* **13**, 151 (1940).
81. Zworykin, V. K. Electrons extend the range. *Elec. Eng.* 441–443 (1940).

#### 1941

82. Alyea, H. N. The electron microscope. *J. Chem. Education* **18**, 236–237 (1941).
83. Borries, B. v. The supermicroscope. *Stahl u. Eisen* **61**, 725–735 (1941).
84. Beckert, J. A. and Ahearn, A. J. Electron microscopes and their uses. *Sci. Monthly* **53**, 309–324 (1941).
85. Boersch, H. and Mahl, H. Electron microscopy in the AEG. *J. Springer*, Berlin (1941).
86. Brüche, E. The development of the electron microscope with electrostatic lenses. *Z. Ver. deut. Ing.* **85**, 221–229 (1941).
87. Brüche, E. From microscope to electron microscope. *Schweiz. Arch. angew. Wiss. u. Tech.* **7**, 46–54 (1941).
88. Erkama, J. The electron microscope and its applications. *Suomen Kemistilehti* **14A**, 47–53 (1941).
89. Hamly, D. H. and Watson, J. H. L. Potentialities of optical and electron microscopes. *Trans. Roy. Soc. Can.* **35**, 61–65 (1941).
90. Henneberg, W. Electron microscope, ultramicroscope and metallography. *Stahl u. Eisen* **61**, 769–776 (1941).
91. Lundgren, E. H. The electron microscope. *Tek. Tid. Uppl. A-e, Kemi* **71**, 20–35 (1941).
92. Marton, L. The electron microscope. *J. Bact.* **41**, 397–413 (1941).
93. Morton, G. A. A survey of research accomplishments with the RCA Electron Microscope. *RCA Rev.* **6**, 131–166 (1941).
94. Mudd, S. The electron microscope. *J. Franklin Inst.* **231**, 496–498 (1941).
95. Rees, A. L. G. The electron microscope. *Chemistry and Industry* **60**, 335–337 (1941).
96. Rhea, H. E. The electron microscope. *Science* **93**, 357–358 (1941).
97. Rosengarten, G. The electron microscope. *Am. J. Pharm.* **113**, 358–363 (1941).
98. Smith, T. A. The electron microscope. *Sci. Monthly* **52**, 337–341 (1941).
99. Vallejo, A. The electron microscope. *O. Hospital* **19**, 905–928 (1941).
100. Zworykin, V. K. Image formation by electrons. *Cold Spring Harbor Symposia Quant. Biol.* **9**, 194–196 (1941).

#### 1942

101. Anderson, T. F. The application of the electron microscope to biology. *Collecting Net* **17**, 4–6 (1942).
102. Anderson, T. F. The study of colloids with the electron microscope. *Advances in Colloid Science*, Interscience, N. Y. **1**, 353–390 (1942).

103. Anderson, T. F. and Richards, A. G., Jr. Nature through the electron microscope. *Sci. Monthly* **55**, 187-192 (1942).
104. Ardenne, M. v. Significance of the electron microscope for biology and medicine. *Pharm. Ind.* **9**, 163-167 (1942).
105. Barnes, R. B. and Burton, C. J. The electron microscope. *Am. Dyestuff Rep.* **31**, 254-262 (1942), Errata *Idem* **31**, 313-314 (1942).
106. Barnes, R. B. and Burton, C. J. The electron microscope and its uses. *A. S. T. M. Bull.* **116**, 34-41 (1942).
107. Barnett, J. M. Electron microscopy. *Industria y química* **4**, 138-140 (1942).
108. Calfas, P. The electron microscope for 45,000 X magnification. *Genie civil* **119**, 313-315 (1942).
109. Fullam, E. F. Gateway to new knowledge. *Interchem. Rev.* **1**, 20-21 (1942).
110. Hillier, J. The RCA electron microscope. *Science Education* **26**, 132-137 (1942).
111. Marton, L. Applications of the electron microscope in colloid chemistry. *J. Phys. Chem.* **46**, 1023-1032 (1942).
112. Marton, L. and McBain, J. W. The electron microscope and its developments. *Chem. Products* **5**, 61-67 (1942).
113. Matthias, A. Remark on the origin of the electron microscope. *Physik. Z.* **43**, 129-130 (1942).
114. Prebus, A. The electron microscope. *Ohio State Univ. Eng. Exp. Sta. News* **14**, 3, 6-32 (1942).
115. Schmitt, F. O. As boundaries break. *The Technol. Rev.* **44**, 2-4 (1942).
116. Vouk, V. The electron microscope. *Kem. Vjestnik (Zagreb)* **15/16**, 80-91 (1941-1942).
117. Wilson, W. Applications of the cathode ray tube in industry. VII. The electron microscope and diffraction camera. *Beama J.* **49**, 300-305; 325-328; 384-388 (1942).
118. Winterfeld, E. v. The universal electron microscope. Recent results of electron microscopy. *Messtech.* **18**, 98-102 (1942).

### 1943

119. Anon. The electron microscope. *Chem. Age* **49**, 5-7 (1943).
120. Bachman, C. H. Simplified electron microscopy. *Electronics* **16**, 78-81; 195-200 (1943).
121. Beischer, D. Results of electron microscopy. *Kolloidchemisches Taschenbuch*, second edition, 425 (1943).
122. Big, E. J. The electron microscope: an opening to new scientific frontiers. *Bios* **14**, 128-138 (1943).
123. Borries, B. v. The supermicroscope. Fundamental principles and results in research. *Appareils de mesure et contrôle* **2**, 165-195 (1943).
124. Bragg, L. Seeing ever-smaller worlds. *Nature* **151**, 545-547 (1943).
125. Bravo, R. A. The electron microscope in chemical and technical problems. *Ion* **3**, 478-483 (1943).
126. Bravo, R. A. The supermicroscope. *Ion* **3**, 8-17 (1943).
127. Brüche, E. Glass lenses and electron lenses. *Wissen-u. Fortschritt Technik. f. All.* **1**, 176-180 (1943).
128. Brüche, E. The development of the electron microscope. *Physik. Z.* **44**, 176-180 (1943).
129. Clark, G. L. and Baylor, M. R. B. Electron microscope in X-ray diffraction laboratory. *Phys. Rev.* **64**, 314-315 (1943).
130. Csokan, P. Electron microscopy. *Magyar Chem. Folyoirat* **49**, 121-136 (1943).
131. Hagemann. The electron microscope and motion picture camera. *Kinotechnik* **25**, 14-15 (1943).
132. Marton, L. A new world beyond. *Stanford Alumni Review* **44**, 7-9 (1943).
133. Marton, L. The electron microscope in biology. *Ann. Rev. Biochem.* **12**, 587-614 (1943).
134. Quarrell, A. G. Electron microscope and its application to engineering problems. *Engineer* **176**, 498-502; 526-528 (1943).
135. Rees, A. L. G. Electron microscopy. *Sci. J. Roy. Coll. Sci.* **12**, 1-15 (1942).
136. Rüdenberg, R. The early history of the electron microscope. *J. Applied Phys.* **14**, 434-436 (1943).
137. Ruska, E. Physical considerations on electron microscopy and the development of the instruments to practical application. *Jahrb. d. Auslands-amtes d. deut. Dozentenschaft.* 54-64 (1943).

138. Ruska, H. Aims and results of supermicroscopy in medical research. *Scientia* **37**, 16–21 (1943).
139. Semmler-Alter, E. Methods and results of electron microscopy applied to metallurgy. *Rev. Met.* **40**, 301–309 (1943).
140. Stuart, A. H. The electron microscope. *Mfg. Chemist* **14**, 198–200 (1943).
141. Stuart, A. H. The electron microscope. *Paint Manuf.* **13**, 158–160 (1943).
142. Thomson, G. P. The electron microscope. *Endeavour* **2**, 125–135 (1943).
143. Watson, J. H. L. Applied electron microscopy. *Can. J. Research* **21**, 89–98 (1943).
144. Wilson, W. The cathode ray tube in industry. Chap. XI, 112–126, Chapman and Hall, London (1943).
145. Zworykin, V. K. Electron microscope in chemistry. *Electronics* **16**, 64–68; 190–196 (1943).
146. Zworykin, V. K. Electron microscope: most recent research tool. *Electronics* **16**, 146–147; 254 (1943).

## 1944

147. Anon. Progress in electron microscopy and new results with the Siemens electron microscope. *Schweiz. Arch. angew. Wiss. u. Tech.* **10**, 86–88 (1944).
148. Anon. Chemical analysis by electron microscopy. *Elec. Ind.* **3**, 110–111 (1944).
149. Anon. Electron microscopes for production research and analysis. *Electronics* **17**, 184 (1944).
150. Anon. Recent developments in the electron microscope. *Science and Culture* **10** (1), 42 (1944).
151. Banca, M. C. The electron microscope. *Can. Chem. Process Ind.* **28**, 10–12 (1944).
152. Bensen, I. B. Electron microscopy. *Gen. Elec. Rev.* **47**, 6–14 (1944).
153. Borries, B. v. and Ruska, E. New additions to the historical development of the electron microscope and the supermicroscope. *Physik. Z.* **45**, 314–326 (1944).
154. Bravo, R. A. Biological problems before the supermicroscope. *Ion* **4**, 173–181 (1944); *Chem. Zentr. II*, 1069 (1944).
155. Callick, C. J. Historical background of electron optics. *J. Applied Phys.* **15**, 685–690 (1944).
156. Donovan, G. E. Biological applications of the electron microscope. *Nature* **154**, 356–358 (1944).
157. Donovan, G. E. The electron microscope: its applications to medicine. *Proc. Roy. Soc. Med.* **37**, 708–716 (1944).
158. Goldsztaub, S. Simple means of observation of electronic images. *Compt. rend.* **219**, 445–446 (1944).
159. Hillier, J. Electron microscopy. *Can. Chem. Process Inds.* **28**, 728–736 (1944).
160. Kupfmuller, K. History of the electron microscope. *Physik. Z.* **45**, 47–51 (1944).
161. Lauffer, M. A. and Stanley, W. M. The colloid chemistry of purified viruses. *Colloid Chemistry*, Rheinhold, N. Y., **5**, Ch. 36, 785–807; (1944).
162. Meziker, A. G. Electronics in medicine. *Hygeia* **22**, 16 (1944).
163. Morton, G. A. Research accomplishments in biology. *Med. Physics*, 396–403 (1944).
164. Munday, G. L. The electron microscope: principles and applications. *Petroleum* **7**, 41–42; 75–82 (1944).
165. Picard, R. G. and Smith, P. C. The electron microscope for metals. *Metals and Alloys* **20**, 636–641 (1944).
166. Potter, E. J. Electronic devices aid metallurgical research. *Elec. Eng.* **63**, 175–185 (1944).
167. Prebus, A. F. The electron microscope. *J. Colloid Chemistry*, Rheinhold, N. Y. **5**, 152–235 (1944).
168. Preston, G. D. Microscopy with light, electrons, and X-rays. *J. Sci. Instruments* **21**, 205–213 (1944).
169. Rayner, E. H. The electron microscope. *Elec. Times* **105**, 4–8; 39–41 (1944).
170. Rees, A. L. G. The electron microscope and its applications. *Paper-Maker* **107**, 11–14 (1944).
171. Rees, A. L. G. Electron microscope and its applications. *Proc. Tech. Sect. Paper Makers' Assoc. G. Brit. & Ireland* **25**, 53–64 (1944).

172. Ruska, E. The development of electron microscopy and its relation to colloid research. *Kolloid-Z.* **107**, 2-16 (1944).
173. Seidel, R. D. and Winter, M. E. The new microscopes. *J. Franklin Inst.* **237**, 103-130 (1944).
174. Schwartzman, G. Recent advances in research with special references to electron microscopy. *J. Mt. Sinai Hosp.* **11**, 137-158 (1944).
175. Smith, P. C. and Picard, R. G. Two new RCA electron microscopes. *Radio News* **32**, 41-43 (1944).
176. Thomson, G. The electron microscope. *J. Incorp. Brewers' Guild* **30**, 118-137 (1944).
177. Wilson, W. The electron microscope. *Electronic Eng.* **16**, 414-420 (1944).
178. Wilson, W. Electron microscope I-II. *Elec. Review (London)* **134**, 218-222; 254-257 (1944).
179. Zworykin, V. K. and Hillier, J. Electronic microscopy. *Sci. Monthly* **59**, 165-179 (1944).
180. Zworykin, V. K., Hillier, J., and Smith, P. C. Electron microscopy in the field of bacteriology. *J. Baet.* **47**, 431-432 (1944).

#### 1945

181. Anon. Photography with the electron microscope. *Nature* **155**, 68-69 (1945).
182. Anon. Electron micrography of atoms. *Electronics* **18**, 276 (1945).
183. Anon. Methods that offer new tools for process control; chemical and metallurgical report. *Chem. and Met. Eng.* **52**, 125-126 (1945).
184. Anon. Electron microscopy. *Aircraft Prod. (London)* **17**, 451-453 (1945).
185. Borries, B. v., and Ruska, E. New contributions to the history of the development of electron microscopy and supermicroscopy. *Physik. Z.* **45**, 314-326 (1945).
186. Cuckow, F. W. Electron microscope and its applications. *Proc. Phys. Soc.* **57**, 564 (1945).
187. Drummond, D. G. The electron microscope. *J. Textile. Inst.* **36**, 131-142 (1945).
188. Dupouy, G. The electron microscope and its use for the study of surface conditions. *Comm. tech. états propriétés surface métaux, Journées états surface (Paris)*, 15-33 Oct. (1945).
189. Electron microscope Society of America Second Meeting, *J. Applied Phys.* **16**, 263-266 (1945).
190. Fischer, R. D. Electron microscope as a tool in chemical research. *Trans. Illinois State Acad. Sci.* **38**, 74-78 (1945).
191. Induni, G. The Swiss electron microscope. *Vierteljahrsschr. naturforsch. Ges. Zürich* **90**, 181-195 (1945).
192. Jupe, J. H. Electron microscope. *Brit. Med. J.* **2**, 500 (1945).
193. Mudd, S. Electron microscopy. *Puerto Rico J. Pub. Health Trop. Med.* **21**, 83-113 (1945).
194. Neurath, F. A new Swiss electron microscope. *Electronic Eng.* **17**, 610 (1945).
195. Nelson, W. L. Electron microscope. *Oil Gas J.* **43**, 123 (1945).
196. Ockenden, F. E. J. Introduction to the electron microscope. *J. Microscope Club* **2**, 43-62 (1945).
197. Picard, R. G. Developments in electron microscopy. *J. Franklin Inst.* **239**, 421-436 (1945).
198. Sharp, D. G. Electron microscope, new tool for research. *Modern Hosp.* **65**, 81-83 (1945).
199. Smith, P. C. RCA electron microscopes. *J. Eng. Education* **35**, 382-384 (1945).
200. Sneddon, R. Petroleum research goes electronic. *Petroleum Eng.* **17**, 59-60 (1945).
201. Staley, F. R. Electronics, its application to petroleum technology. *Oil Gas J.* **44**, 127-128 (1945).
202. Vertsner, V. N. Electronic microscopy. *Zavodskaya Lab.* **11**, 543-544 (1945).

#### 1946

203. Electron Microscope Society of America. Third Annual Meeting. *J. Applied Phys.* **17**, 66-68 (1946).
204. FIAT final report No. 765. Electrostatic electron microscope. Joint Intelligence Objectives Agency, Washington, D. C. (1946).

205. FIAT final report No. 769. Electron microscopy, infrared and other branches of applied physics. Joint Intelligence Objectives Agency. Washington, D. C. (1946).
206. Froula, H. C., Jr. Electron microscopy. *The Frontier* **9**, 9–11 (1946).
207. Grivet, P., and Bruck, H. The electrostatic electron microscope. *Ann. Radioélectr.* **1**, 293–310 (1946).
208. Hall, C. E. The electron microscope. *Am. Ann. Phot.* **61**, 19–39 (1946).
209. Hillier, J. Electron microscopy. *Am. Ceram. Soc. Bull.* **25**, 438–448 (1946).
210. Marton, L. Electron microscopy. *Reports on Progress in Physics* **10**, 204–252 (1946).
211. Mudd, S. Electron microscopy. *Medicina Mexico* **26**, 19–40 (1946).
212. Mudd, S., and Anderson, T. F. Electron microscopy. *Medicina Mexico* **26**, 9–19 (1946).
213. Pirie, N. W. The viruses. *Ann. Rev. Biochem.* **15**, 573–592 (1946).
214. Pollicard, A. Review of the present state of electron microscopy. *Bull. histol. appl. Lyon* **23**, 164–170 (1946).
215. Rees, A. L. G. The electron microscope and its industrial applications. *Proc. Soc. Chem. Ind. Victoria* **46**, 794–813 (1946).
216. Schafer, H. E. The electron microscope, instrumentation and application. *Schweiz. Chem. Ztg.* **29**, 369–372 (1946).
217. Sen, A. N. The electron microscope and its use in biology. *Indian Med. Gaz.* **81**, 247–250 (1946).
218. Swinton, K. R. Use of radio and electronics in the pulp and paper industry. *Pulp and Paper Mag. Can.* **47**, 184–187 (1946).
219. Uchastkina, Z. V. Electron microscope in the paper industry. *Bumazh. Prom.* **21**, 38–39 (1946).
220. Weil, B. H. Electron microscope at Georgia Inst. of Tech. State Eng. Exp. Sta. (Atlanta, Ga.) Reprint Circ. 4, 1–5 (1946).
221. Weil, B. H., Rosselot, G. A., and Koza, R. W. The electron microscope. *Southern Power and Ind.* **64**, 46–50 (1946).
222. Wyckoff, R. W. G. Some recent developments in the field of electron microscopy. *Science* **104**, 21–26 (1946).
223. Zworykin, V. K., and Hillier, J. Some practical aspects of electron microscopy. *Colloid Chemistry*, Reinhold, N. Y. **6**, 118–159 (1946).

#### 1947

224. Barrett, C. S. The electron microscope and its application to metals. Electronic methods of inspection of metals. *Am. Soc. Metals.*, 107–150 (1947).
225. Cosslett, V. E. Recent advances in electron microscopy in the United Kingdom. *Research* **1**, 293–304 (1947).
226. De Heer, H. J. The electron microscope. *Metalen* **1**, 101–104 (1947).
227. Electron Microscope Society of America, Fourth Meeting. *J. Applied Phys.* **18**, 269–273 (1947).
228. Frey-Wyssling, A. The Swiss Trüb, Täuber and Co. electron microscope. *Schweiz. Apoth. Ztg.* **85**, 133 (1947).
229. Grivet, P. The electron microscope. *Bull. Soc. franc. élec.* **7**, 1–9 (1947).
230. Hall, C. E. The electron microscope. *Am. Ann. Phot.* **61**, 19–39 (1947).
231. Hillier, J. Present status and future possibilities of the electron microscope. *RCA Rev.* **8**, 29–42 (1947).
232. Kondriskii, E. I. The work of USSR scientists on ferromagnetism. *Uspekhi Fiz. Nauk* **22**, 194–217 (1947).
233. Kushnir, Y. M. Physical and technical principles of electron microscopy. *Elektrichestvo* **5**, 3–16 (1947).
234. Ledon, A. G. The electron microscope and its industrial applications. *Rev. Soc. Cubana Ing.* **44**, 941–962 (1947).
235. Marty, C. Electron microscopy. *Concours méd.* **69**, 1079 (1947).
236. Reed, R. Progress in electron microscopy. *Nature* **160**, 762 (1947).
237. Riso, M. Microscope images corresponding to an illuminated electron. *J. phys. Radium* **8**, 123–128 (1947).
238. Selme, The electron microscope. *Sciences, Paris* **74**, 272–287 (1947).
239. Scott, R. A. Electron microscopy. *Science Progress* **35**, 638–651 (1947).
240. Williams, R. C. The electron microscope in biology. *Growth* **11**, 205–222 (1947).

#### 1948

241. Anon. 50-kv electron microscope. *Engineering* **166**, 152–153 (1948).
242. Anon. Experimental electron microscope. *Engineer* **185**, 517 (1948).

243. Anon. 100 kv electron microscope. Engineer **185**, 421–422 (1948).  
 244. Anon. New electron microscope: a versatile aid to research. Chem. Age (London) **58**, 558–560 (1948).  
 245. Berta, L. Electron microscopy in microbiology. Orvosok Lapja Népegészségügy, Budapest **2**, 977–982 (1948).  
 246. Borries, B. v. Energy data and limitations of electron microscopy. I–II. Optik **3**, 321–377; 389–412 (1948).  
 247. Bryner, J. S. Correlation of optical and electron microscopy. Metals tech. **15**, 1–7 (1948).  
 248. B. I. O. S. final report no. 1671. Electron micrography in Germany. British Objectives Intelligence Objectives Subcommittee (1948).  
 249. Coheur, P. The electron microscope and its industrial applications. Rev. universelle mines **91**, 313–327 (1948).  
 250. Coslett, V. E. Recent advances in electron microscopes in the United Kingdom. Research (London) **1**, 293–304 (1948).  
 251. Diniehert, P. and Kellenberger, E. Electron microscopy. Experientia **4**, 449 (1948).  
 252. Dorgelo, H. B. Electron microscopy in Holland. Instr. Meas. Conf. Stockholm 1947. Transact. Norrkoping Tidningars Aktiebolag 211–215 (1948).  
 253. Electron Microscope Society of America, proceedings. J. Applied Phys. **19**, 118–126 (1948).  
 254. Electron Microscopy Conference, London, summarized proceedings. J. Sci. Instruments **25**, 328–331 (1948).  
 255. Electron microscope symposium integrates light and electron microscope results. Chem. and Eng. News **26**, 1907 (1948).  
 256. Electron Microscopy Conference Leeds, proceedings. J. Sci. Instruments **25**, 167–170 (1948).  
 257. Electron Microscope Conference Lond. Report. J. Sci. Instruments **25**, 23–27 (1948).  
 258. Exterman, R. C. The electron microscope. Theories and applications. Trüb, Taäber, & Cie S. A., Zürich (1948).  
 259. FIAT Review of German Science (1939–1946). Office Military Gov. Germany, I, II. 20–146 (1948).  
 260. Gootee, T. Exploring the infinitesimal. Radio N. **39**, 39–42 (1948).  
 261. Hillier, J. New worlds for sight. Physics Today **1**, 18–25 (1948).  
 262. Mahl, H. Surface electron microscopy. Phys. Blätter **5**, 194–197 (1948).  
 263. Möllenstedt, G. Z. Demonstration of electron diffraction and electron microscopy. Optik **3**, 221–232 (1948).  
 264. Trabacchi, G. C. The electron microscope. Elettrotecnica **35**, 313–319 (1948).

### 1949

265. Anon. The electron microscope in medical research. Electronic Engineering **21**, 2, 1949.  
 266. Anon. The capacity of the electron microscope. Priroda **36**, No. 1 (1947) Research Information Service, New York (1949).  
 267. Alexander, A. E. and Johnson, P. Electron microscope. Colloid Science. Clarendon Press, Oxford. **1**, 458–461 (1949).  
 268. Conference on Electron Microscopy, Delft. Nature **164**, 481–483 (1949).  
 269. Kellenberger, E. Electron microscopy. Experientia, Basel **5**, 253 (1949).  
 270. Kinder, E. The development of electron microscopy in the U. S. A. Grenzgeb. Med. **2**, 54, (1949).  
 271. König, H. New results of electron microscopy. Optik **5**, 460–465 (1949).  
 272. Mahl, H. The use of the electron microscope in metallurgical research in Germany during and since the war. Inst. Metals, London, Tech. Pub. 1195, 37–41 (1949).  
 273. Möllenstedt, G. The first meeting of the German Electron Microscope Society in Mosbach (Baden). Naturwiss. Rundschau **7**, 322–323 (1949).  
 274. OANAR Tech. Report, Conference on Electron Microscopy, Delft, Holland July 4–8 1949. U. S. Office of the Assistant Naval Attaché for Research. (1949).  
 275. Ruska, E. Opening address to Mosbach meeting of German Society for Electron Microscopy on 23 April 1949. Optik **5**, 457–460 (1949).  
 276. Scherzer, O. Can atoms be seen in the electron microscope? Phys. Blätter **10/11**, 460–463 (1949).

### 3. INSTRUMENTATION

1931

277. Knoll, M. and Ruska, E. The electron microscope. *Z. tech. Physik* **12**, 394 (1931).

1932

278. Brüche, E. Electron microscope. *Naturwissenschaften* **20**, 49 (1932).  
279. Knoll, M. and Ruska, E. The electron microscope. *Z. Physik* **78**, 318–339 (1932).

1934

280. Borries, B. v. and Knoll, M. Blackening of photographic emulsions by electrons and electron excitation of phosphors. *Physik Z.* **35**, 279–289 (1934).  
281. Ruska, E. Advances in building and performance of the magnetic electron microscope. *Z. Physik* **87**, 580–602 (1934).  
282. Ruska, E. Magnetic objective for the electron microscope. *Z. Physik* **89**, 90–128 (1934).  
283. Ruska, E. The electron microscope as a supermicroscope. *Forschungen u. Fortschr.* **10**, 8 (1934).

1935

284. Borries, B. v. and Ruska, E. Electron microscope and its uses. *Z. Ver. deut. Ing.* **79**, 519–524 (1935).

1937

285. McMillen, J. H. and Scott, G. H. A magnetic electron microscope of simple design. *Rev. Sci. Instruments* **8**, 288–290 (1937).  
286. Martin, L. C., Whelpton, R. V. and Parnum, D. H. A new electron microscope. *J. Sci. Instruments* **14**, 14–24 (1937).

1938

287. Borries, B. v. and Ruska, E. Development and present efficiency of the electron microscope. *Wiss. Veroffent. Siemens-Werken* **17**, 99–106 (1938).  
288. Nuttall, A. K. An electron microscope for high magnifications. *Metro.-Vickers Gaz.* **17**, 256–259 (1938).

1939

289. Ardenne, M. v. Single crystal fluorescent screens for super-microscopy. *Z. tech. Physik* **20**, 235–239 (1939).  
290. Ardenne, M. v. An electrostatic high voltage lens of short focal distance. *Naturwissenschaften* **27**, 614–615 (1939).  
291. Borries, B. v. and Ruska, E. Development and efficiency of the Siemens ultramicroscope. *Z. wiss. Mikroskop* **56**, 317–333 (1939).  
292. Burton, E. F., Hillier, J. and Prebus, A. A report on the development of the electron microscope at Toronto. *Phys. Rev.* **56**, 1171–1172 (1939).  
293. Mahl, H. The electrostatic electron microscope. *Z. tech. Physik* **20**, 316–317 (1939).  
294. Martin, L. C. The electron microscope. *J. Roy. Microscop. Soc.* **59**, 217–231 (1939).  
295. Martin, L. C., Parnum, D. H. and Speak, G. S. Report on experimental work on the development of the electron microscope. *J. Roy. Microscop. Soc.* **59**, 203–216 (1939).  
296. Marton, L. On the sensitivity of photographic emulsions for electrons between 50 and 100 kv. *Phys. Rev.* **56**, 290 (1939).  
297. Prebus, A. F. and Hillier, J. Construction of a magnetic electron microscope of high resolving power. *Can. J. Research* **17**, 49–63 (1939).  
298. Wambacher, H. Action of corpuscular rays on the photographic emulsion. *Z. wiss. Phot.* **38**, 39–61 (1939).

1940

299. Ardenne, M. v. A universal electron microscope for bright field, dark field and stereoscopic use. *Z. Physik* **115**, 339–368 (1940).

300. Ardenne, M. v. Stereo-ultramicroscopy with the universal electron microscope. *Naturwissenschaften* **28**, 248–252 (1940).
301. Borries, B. v. Higher resolving power at the formation of images of surfaces by the supermicroscope. *Z. Physik* **116**, 370–378 (1940).
302. Borries, B. v. and Ruska, E. Technique of the Siemens electron microscope. *Siemens-Z.* **20**, 217–227 (1940).
303. Borries, B. v., Ruska, E., Krumm, J. and Muller, H. O. Supermicroscopic imaging by magnetostatic lenses. *Naturwissenschaften* **28**, 350–351 (1940).
304. Brüche, E. The two pole system as the aim of pure electrical image apparatus. *Jahrb AEG. Forsch. Sonderheft, Übermikroskop* **7**, 9–14 (1940).
305. Brüche, E. and Golz, E. Insertion of object and photographic plate. *Jahrb. AEG Forsch. Sonderheft Übermikroskop* **7**, 60–66 (1940).
306. Charlesby, A. Action of electrons and x-rays on photographic emulsions. *Proc. Phys. Soc. (London)* **52**, 657–700 (1940).
307. Hurst, W. The construction of an electron microscope and auxiliary equipment. *Phys. Rev.* **57**, 571 (1940).
308. Kinder, E. A new high-potential ultramicroscope. *Z. tech. Physik* **21**, 222–223 (1940).
309. Mahl, H. Stereoscopic photographs with the electrostatic supermicroscope. *Naturwissenschaften* **28**, 264 (1940).
310. Mahl, H. The electrostatic electron ultramicroscope. *Jahrb. AEG Forsch. Sonderheft Übermikroskop* **7**, 43–56 (1940).
311. Marton, L. A new electron microscope. *Phys. Rev.* **58**, 57–60 (1940).
312. Marton, L. Banca, M. C., and Bender, J. F. A new electron microscope. *RCA Rev.* **5**, 232–243 (1940).
313. Prebus, A. F. Improved pole piece construction of the objective lens of a magnetic electron microscope. *Can. J. Research* **18**, 175–177 (1940).
314. Ruska, E. Performance and constancy of the current supply for the high resolution electron microscope. *Elektrotech. Z.* **61**, 889–891 (1940).

#### 1941

315. Ardenne, M. v. Testing of short focus electron lens. *Z. Physik* **117**, 602–611 (1941).
316. Ardenne, M. v. 200 kv. universal electron microscope with an object screen. *Z. Physik* **117**, 657–688 (1941).
317. Ardenne, M. v. Supplement to the papers: "The testing of electron lenses of short focal length" and "A 200 kv universal electron microscope with an object screen". *Z. Physik* **118**, 384–388 (1941).
318. Harvey, G. G. and Sullivan, L. J. A magnetic electron microscope. *Phys. Rev.* **59**, 929 (1941).
319. Hillier, J. and Vance, A. W. Recent developments in the electron microscope. *Proc. Inst. Radio Engrs.* **29**, 167–176 (1941).
320. Houston, W. V. and Bradner, H. A two-stage electron microscope. *Phys. Rev.* **59**, 219 (1941).
321. Müller, H. O. and Ruska, E. A supermicroscope for 220 kv beam potential. *Kolloid Z.* **95**, 21–25 (1941).
322. Vance, A. W. Stable power supplies for electron microscopes. *RCA Rev.* **5**, 293–300 (1941).
323. Zworykin, V. K., Hillier, J., and Vance, A. W. A preliminary report on the development of 300 kv magnetic electron microscope. *J. Applied Phys.* **12**, 738–742 (1941).
324. Zworykin, V. K., Hillier, J., and Vance, A. W. An electron microscope for practical laboratory service. *Trans. Am. Inst. Elec. Engrs.* **60**, 157–162 (1941).

#### 1942

325. Ardenne, M. v. Further development of the universal electron microscope. *Physik. Z.* **43**, 11–15 (1942).
326. Ardenne, M. v. Recent research on the universal electron microscope. *Fortschungen u. Fortschr.* **18**, 32–35 (1942).
327. Bachman, C. H. and Ramo, S. Simplified electron microscope. *Phys. Rev.* **62**, 494 (1942).
328. Boersch, H. Construction and possibilities of application of an electron microscopical arrangement. *Physik. Z.* **43**, 515–520 (1942).
329. Borries, B. v. On the intensity relations in the electron microscope. I. The blackening of photographic plates by electron beams. *Physik. Z.* **43**, 190–204 (1942).

330. Borries, B. v. On the intensity relations in the electron microscope. II. Magnification, graininess, and resolving power of electron-exposed photographic plates. *Z. angew. Phot.* **4**, 3-4 (1942).
331. Borries, B. v. On the intensity relations in the electron microscope. III. Suitability and limits of sensitivity of photographic plates for electrod micrographs. *Z. Physik* **119**, 498-521 (1942).
332. Baker, R. F., Ramberg, E. G., and Hillier, J. The photographic action of electrons in the range between 40 and 212 kilovolts. *J. Applied Phys.* **13**, 450-456 (1942).
333. Frey, F. Application and construction of a plateholder for two exposures with the Siemens electron microscope in its normal construction. *Z. tech. Physik* **23**, 176-177 (1942).
334. Hinderer, H. Research on the resolving power of fluorescent screens. *Z. Physik* **119**, 397-405 (1942).
335. Ruska, E. Lenses for electron microscopes of high resolving power. *Arch. Elektrotech.* **36**, 431-454 (1942).

### 1943

336. Bachman, C. H., and Ramo, S. Electrostatic electron microscopy. I. *J. Applied Phys.* **14**, 8-18 (1943).
337. Bachman, C. H., and Ramo, S. Electrostatic electron microscopy. II. *J. Applied Phys.* **14**, 69-76 (1943).
338. Bachman, C. H., and Ramo, S. Electrostatic electron microscopy. III. *J. Applied Phys.* **14**, 155-160 (1943).
339. Baker, R. F., Ramberg, E. G., and Hillier, J. Erratum: The photographic action of electrons in the range between 40 and 212 kilovolts. *J. Applied Phys.* **14**, 39 (1943).
340. Mahl, H., and Pendzich, A. Electron-mirror microscope: a new electron microscope. *Z. tech. Physik* **24**, 38-42 (1943).
341. Zworykin, V. K., and Hillier, J. A compact high resolving power electron microscope. *J. Applied Phys.* **14**, 658-673 (1943).

### 1944

343. Ardenne, M. v. A new universal electron microscope with a high capacity magnet objective and increased thermal lens loading. *Kolloid Z.* **108**, 195-208 (1944).
344. Borries, B. v. Favorable processing and the limiting resolving power of photographic plates for electron micrographs. IV. *Z. Physik* **122**, 539-572 (1944).
345. Kinder, E. The yoke lens combination supermicroscope for transmission and emission micrography. *Z. Physik* **122**, 192-208 (1944).
346. Marton, L. A 100 kv electron microscope. *Science* **100**, 318-320 (1944).
347. Ruska, E. Design and calculation of pole piece lenses for high resolution electron microscopy. *Arch. Elektrotech.* **38**, 102-130 (1944).
348. Schulz, L. G. Design of a vacuum photographic plate chamber. *Rev. Sci. Instruments* **15**, 78-80 (1944).
349. Vertsner, V. N. Electron microscope of State Optical Institute. *Bull. acad. sci. URSS. ser. phys.* **8**, 232-234 (1944).

### 1945

350. Crane, H. R. Additional stabilization for the beam current in the RCA type B electron microscope. *Rev. Sci. Instruments* **16**, 58 (1945).
351. Crook, E. M., Sheffield, F. M. L., and Chilton, L. V. Photographic plates for use in the RCA electron microscope. *Phot. J.* **85B**, 6-12 (1945).
352. Cuckow, F. W. Beam current stability in RCA electron microscopes. *Rev. Sci. Instruments* **16**, 293 (1945).
353. Marton, L. A 100 kv electron microscope. *J. Applied Phys.* **16**, 131-138 (1945).
354. Samuel, A. L. Some notes on the design of electron guns. *Proc. Inst. Radio Engrs.* **33**, 233 (1945).
355. Smith, P. C., Picard, R. G., and Runge, F. E. Specimen stage for the electron microscope. *Electronics* **18**, 234-258 (1945).

356. Berqvist, A. The Swedish electron microscope. *Tekn. Tidskr.* **76**, 649-655; *Ind. Norden* **33**, 323-327 (1946).
357. Bocciarelli, D. and Trabbacchi, G. C. The electron microscope of the Institute of Health. *Rend Ist. super. sanità Roma* **9**, 762-768 (1946).
358. Dupouy, G. A magnetic electron microscope with high resolving power. *J. phys. radium* **7**, 320-329; *Metal Treatment* **13**, 153-168 (1949).
359. Grivet, P. C. S. F. electrostatic microscope. *Le Vide* **1**, 29-47 (1946).
360. Howlett, L. E. Photographic resolving power. *Can. J. Research A* **24**, 15-40 (1946).
361. Kinder, E. A stereo-electron microscope. *Naturwissenschaften* **33**, 367-369 (1946).
362. Kopp, C., and Mollenstedt, G. The properties of very fine grain photographic emulsions under electron bombardment. *Optik* **1**, 327-342 (1946).

## 1947

363. Bruck, H., and Grivet, P. Improvements in the electrostatic microscope. *Ann. Radioélectricité* **2**, 244-248 (1947).
364. Ellis, S. G. The use of diaphragms in the electron microscope. *Can. J. Research* **25**, 322-337 (1947).
365. Haine, M. E. Design and construction of a new electron microscope. *J. Inst. Elec. Engrs.* **94**, 447-459 (1947).
366. Hall, C. E. Objective aperture system for the electron microscope. *J. Applied Phys.* **18**, 588-589 (1947).
367. Hillier, J., and Ramberg, E. G. Magnetic electron microscope objective: contour phenomena and the attainment of high resolving power. *J. Applied Phys.* **18**, 48-71 (1947).
368. Induni, G. An electron source for electron microscopes. *Helv. Phys. Acta* **20**, 463-466 (1947).
369. Kopp, C., and Mollenstedt, G. Single stage electron microscopy, with fine grain photographic layers and high resolution fluorescent screens. *Optik* **2**, 283-300 (1947).
370. le Poole, J. B. New electron microscope with continuously variable magnification. *Philips Tech. Rev.* **9**, 33-45 (1947).
371. Mahl, H. On a new electrostatic small electron microscope. *Optik* **2**, 190-195 (1947).
372. van Dorsten, A. C., Oosterkamp, W. J., and le Poole, J. B. An experimental electron microscope for 400 kilovolts. *Philips Tech. Rev.* **9**, 193-201 (1947).

## 1948

373. Ardenne, M. v. A new arrangement of the universal electron microscope for almost eliminating heat damage to mounts. *Kolloid Z.* **111**, 22-30 (1948).
374. Das Gupta, N. N., De, M. L., Bhattacharya, D. L., and Chaudhury, A. K. A new horizontal electron microscope. *Indian J. Phys.* **31**, 497-513 (1948).
375. Grivet, P. French electrostatic microscope. *Ann. Radioélectricité* **3**, 144-145 (1948).
376. Liebmann, G. New experimental electron microscope. *J. Sci. Instruments* **25**, 37-43 (1948).
377. Quinn, J. T. Adjustable aperture for electron microscope RCA Type EMU. *Rev. Sci. Instruments* **19**, 472-473 (1948).
378. Rakhimov, S. M. and Sushkin, N. G. Selection of the material for pole pieces of the electron microscopes. *J. tech. Phys. USSR* **18**, 1166-1172 (1948).
379. Van Dorsten, A. C. Stabilization of the accelerating voltage in an electron microscope. *Philips Tech. Rev.* **10**, 135-140 (1948).
380. Van Dorsten, A. C., le Poole, J. B., and Verhoeff, A. A new electron microscope; the Philips EM 100. *Trans. Instrum. Meas. Conf. Stockholm* (1947) Norrkopings Tidningars Aktiebolag 216-218 (1948).

## 1949

381. Borries, B. v. A magnetostatic objective projector system for the electron microscope. *Kolloid Z.* **114**, 164-167 (1949).
382. Grube, W. L. The effect of multiple grounds on electron microscope images. *J. Applied Phys.* **20**, 125 (1949).

383. Haine, M. E. Discussion of the design and construction of a new electron microscope. I. E. E. Proc. **96**, 303–304 (1949).  
 384. Mahl, H. Electron diffraction investigations in the electron microscope. Phys. Blätter **5**, 76–78 (1949).  
 385. Merling, K. B. A new fluorescent screen for the electron microscope. Nature **163**, 541–542 (1949).  
 386. Meryman, H. T. Electromagnetic focusing device for the electron microscope. Rev. Sci. Instruments **20**, 995 (1949).  
 387. Mollenstedt, G., and Heise, F. A new method for producing stereoscopic images in the electron microscope. Optik **5**, 531–534 (1949).  
 388. Ruhle, R. Stereoscopic images in electron microscopy. Optik **5**, 534–549 (1949).  
 389. Sharpe, J. W. A graticule for particle size analysis with the electron microscope. J. Sci. Instruments **26**, 308 (1949).  
 390. Steigerwald, K. H. A new electron gun for electron microscopy. Optik **5**, 469–479 (1949).

#### 4. ELECTRON OPTICS

1926

391. Busch, H. Calculation of the trajectory of cathode rays in electromagnetic fields of axial symmetry. Ann. Physik **81**, 974–993 (1926).

1927

392. Busch, H. On the action of the concentration coil in Braun tubes. Arch. Elektrotech. **18**, 583–594 (1927).

1931

393. Davisson, C. J., and Calbick, C. J. Electron lenses. Phys. Rev. **38**, 585 (1931).

1932

394. Brüche, E., and Johannson, H. Electron optics and electron microscope. Naturwissenschaften **20**, 353–358 (1932).  
 395. Davisson, C. J., and Cablick, C. J. Electron lenses. Phys. Rev. **42**, 580 (1932).  
 396. Knoll, M., and Ruska, E. Contribution to geometrical electron optics. I. Ann. Physik **12**, 607–640 (1932).  
 397. Knoll, M., and Ruska, E. Contribution to geometrical electron optics. II. Ann. Physik **12**, 641–661 (1932).  
 398. Picht, J. Theory of geometrical optics for electrons. Ann. Physik **15**, 926–964 (1932).  
 399. Ruska, E., and Knoll, M. The magnetic concentration coil for fast electrons. I. Z. tech. Physik **12**, 389–399 (1932).  
 400. Ruska, E., and Knoll M. The magnetic concentration coil for fast electrons. II. Z. tech. Physik **12**, 448 (1932).  
 401. Rüdenberg, R. The electron microscope. Naturwissenschaften **28**, 522 (1932).

1933

402. Brüche, E. Fundamentals of geometrical electron optics. Z. tech. Physik **14**, 49–58 (1933).  
 403. Glaser, W. Theory of the electron microscope. Z. Physik **83**, 104–122 (1933).  
 404. Glaser, W. Geometrical optics of electron rays. Z. Physik **80**, 451–464 (1933).  
 405. Glaser, W. Geometrical electron optics of the axial symmetrical electromagnetic field. Z. Physik **81**, 647–686 (1933).  
 406. Glaser, W. Optical imagery by mechanical systems and the optics of non-homogeneous isotropic media. Ann. Physik **18**, 557–586 (1933).  
 407. Marton, L., and Nuyens, M. Geometrical electron optics. Wis. Natuurk. Tijdschr. **6**, 159–170 (1933).  
 408. Picht, J. Theory of electron optics. Z. tech. Physik **14**, 239–241 (1933).  
 409. Posener, L. Theory of the electron microscope. Z. Physik **80**, 813–818 (1933).

410. Scherzer, O. Theory of electric electron condensing lenses. *Z. Physik* **80**, 193–202 (1933).  
411. Zworykin, V. K. On electron optics. *J. Franklin Inst.* **215**, 535–555 (1933).

1934

412. Brüche, E. Electron optics and electron microscopy. *AEG Mitt.*, 45–47 (1934).  
413. Henneberg, W. On achromatic electrostatic electron lenses. *Z. Physik* **90**, 742–747 (1934).  
414. Seeman, H. Conditions and limits of correct representation by electron projection. *Z. Physik* **92**, 253–273 (1934).

1935

415. Brüche, E. Theory of applied geometric electron optics. *Arch. Elektrotech.* **29**, 80–107 (1935).  
416. Glaser, W. Theory of image defects of an electron microscope. *Z. Physik* **97**, 177–201 (1935).  
417. Henneberg, W. The resolving power of the electron microscope for transparent objects. *Z. Instrumentenk.* **55**, 300–305 (1935).  
418. Henneberg, W. Discussion on "Note on a Demonstration of a Low-Voltage Electron Microscope Using Electrostatic Focusing". *J. Inst. Elec. Engrs.* **76**, 1–2 (1935).  
419. Henriot, E. Electron optics of centered systems. First approximation of Gauss. *Rev. optique* **14**, 146–158 (1935).  
420. Koch, J., and Walcher, W. Ion-optical image formation with electric lenses. *Z. Physik* **97**, 131–137 (1935).  
421. Martin, L. C. Electron optics. *Science Progress*, **115**, 426–437 (1935).  
422. Stabenov, G. Magnetic electron lens without image rotation. *Z. Physik* **96**, 612–619 (1935).  
423. Wallauschek, R., and Bergmann, P. Theory of electron microscope using purely magnetic fields. *Z. Physik* **94**, 329–347 (1935).

1936

424. Boersch, H. On the primary and secondary image in the electron microscope. I. *Ann. Physik* **26**, 631–644 (1936).  
425. Boersch, H. On the primary and secondary image in the electron microscope. II. *Ann. Physik* **27**, 75–80 (1936).  
426. Borries, B. v. and Ruska, E. Applied electron optics. *Z. Ver. deut. Ing.* **80**, 989–995; 1075–1083 (1936).  
427. Brüche, E. Review of electron optics and its application. *Z. tech. Physik* **17**, 588–593 (1936).  
428. Brüche, E. Exhibit electron optics. *Z. tech. Physik* **17**, 622–623 (1936).  
429. Brüche, E., and Recknagel, A. On electrostatic and magnetic field representations in electron optics. *Z. tech. Physik* **17**, 126–134 (1936).  
430. Dosse, J. Graphical determination of electron trajectories in magnetic field. *Z. tech. Physik* **9**, 315–318 (1936).  
431. Gratsiatos, J. On aberration theory of electron optical systems. *Z. Physik* **102**, 641–651 (1936).  
432. Marton, L. Some considerations concerning the resolving power in electron microscopy. *Physica* **3**, 959–967 (1936).  
433. Scherzer, O. On some defects of electron lenses. *Z. Physik* **101**, 593–603 (1936).  
434. Scherzer, O. The weak electric single lens of least spherical aberration. *Z. Physik* **101**, 23–26 (1936).  
435. Zworykin, V. K. Electron optical systems and their applications. *J. Inst. Elec. Engrs.* **79**, 1–10 (1936).

1937

436. Diels, K. and Wendt, G. Eight third-order aberrations of magnetic electron lenses. *Z. tech. Physik* **18**, 65–69 (1937).  
437. Luft, F. Practical uses of electron optics. *Röntgenpraxis* **9**, 384–394 (1937).  
438. Rebsch, R., and Schneider, W. Spherical aberration of weak electron lenses. *Z. Physik* **107**, 138–143 (1937).  
439. Rogowski, W. Defects in electron images. *Arch. Elektrotech.* **31**, 555–593 (1937).

440. Ardenne, M. v. Limits of the resolving power of the electron microscope. *Z. Physik* **108**, 308–338 (1938).
441. Ardenne, M. v. The image errors of the electron microscope caused by electron scattering in the object and their relation to each other. *Z. Physik* **111**, 152–157 (1938).
442. Becker, E. and Wallraff, A. On spherical aberration of magnetic lenses. *Arch. Elektrotech.* **32**, 664–675 (1938).
443. Borries, B. v. and Dosse, J. Scattering of electrons due to their own space charge. *Arch. Elektrotech.* **32**, 221–232 (1938).
444. Borries, B. v. and Ruska, E. Image formation in the supermicroscope. *Z. tech. Physik* **19**, 402–407 (1938).
445. Fritz, R. Review on electron optics. *Rev. gén. Sci.* (1938).
446. Glaser, W. Short magnetic lens with small spherical aberration. *Z. Physik* **109**, 700–721 (1938).
447. Glaser, W. Concerning the aberrations due to deflection in electric and magnetic deflection systems. *Z. Physik* **111**, 357–372 (1938).
448. Malatesta, S. Experiments on electron optical magnetic systems. *Alta Frequenza* **7**, 447–458 (1938).
449. Marton, L. A note on the article: "Practical uses of electron optics," by Fritz Luft. *Röntgenpraxis* **10**, 352–353 (1938).
450. Rebsch, R. Theoretical resolving power of the electron microscope. *Ann. Physik* **31**, 551–560 (1938).

## 1939

451. Ardenne, M. v. On the magnitude of the aperture defect in the electron microscope. *Z. tech. Physik* **20**, 289–290 (1939).
452. Ardenne, M. v. Intensity and resolving power of the electron microscope. *Z. Physik* **112**, 744–753 (1939).
453. Ardenne, M. v. Chromatic errors in the electron microscopes. *Z. Physik* **113**, 257–259 (1939).
454. Ardenne, M. v. The resolving power of photographic emulsions for electron beams. *Z. Physik* **114**, 379 (1939).
455. Becker, H., and Wallraff, A. The curvature of image plane of magnetic lenses. *Arch. Elektrotech.* **33**, 491–505 (1939).
456. Borries, B. v., and Ruska, E. The resolving power of the supermicroscope. *Z. tech. Physik* **20**, 225–235 (1939).
457. Borries, B. v. and Ruska, E. Properties of the supermicroscopical image formation. *Naturwissenschaften* **27**, 281–287 (1939).
458. Diels, K., and Knoll, M. Proof of the aberrations of an electron lens by point imagery. *Z. tech. Physik* **16**, 621–623 (1939).
459. Hillier, J. Effects of chromatic error on the electron microscope. *Can. J. Research* **A17**, 64–69 (1939).
460. Jacob, L. Electron distribution in electron optically focused electron beams. *Phil. Mag.* **28**, 81–98 (1939).
461. Klemperer, O., and Wright, W. D. The investigation of electron lenses. *Proc. Phys. Soc. London* **51**, 296–317 (1939).
462. Nesslering, A. On achromatic properties of electron lenses. *Jahrb. AEG Forsch.* **6**, 83–85 (1939).
463. Ramberg, E. G. A simplified derivation of the general properties of an electron optical image. *J. Optical Soc. Am.* **29**, 79–83 (1939).
464. Ramberg, E. G., and Morton, G. A. Electron optics. *J. Applied Phys.* **10**, 465–478 (1939).
465. Savchenko, F. The dependence of certain optical parameters on the electric and geometric parameters of electric immersion lens. *J. Tech. Phys. USSR* **9**, 2211–2219 (1939).
466. Scherzer, O. The theoretically attainable resolving power of the electron microscope. *Z. Physik* **114**, 427–434 (1939).
467. Sugata, E. The limit of magnification by a magnetic lens for an electron microscope. *Electrotech. J. (Japan)* **3**, 271–275 (1939).
468. Voit, H. Third order electron optical aberrations. *Z. Instrumentenk.* **59**, 71–82 (1939).

## 1940

469. Becker, H., and Wallraff, A. Investigation of aberration in a rotation-free magnetic lens. *Arch. Elektrotech.* **34**, 115–120 (1940).
470. Becker, H., and Wallraff, A. Astigmatism of magnetic lenses. *Arch. Elektrotech.* **34**, 43–49 (1940).

471. Becker, H., and Wallraff, A. On measurement of image error of an ironelad lens with variable air-gap. *Arch. Electrotech.* **34**, 230–237 (1940).
472. Boersch, H. Fresnel diffraction effect in the ultramicroscope. *Naturwissenschaften* **28**, 711–712 (1940).
473. Boersch, H. The problem of image formation. *Jahrb. AEG. Forsch. Sonderh. Übermikroskop* **7**, 27–33 (1940).
474. Borries, B. v., and Ruska, E. The effect of the potential difference on the supermicroscopic image. *Z. Physik* **116**, 249–256 (1940).
475. Borries, B. v., and Ruska, E. The influence of electron interferences on the image formation of crystals in the electron microscope. *Naturwissenschaften* **28**, 366–367 (1940).
476. Brüche, E. On the application of electric and magnetic fields in electron optics. *Telegr.-Fernspr. Funk. u. Fernsehtech.* **29**, 1–5 (1940).
477. Glaser, W. Chromatic aberration of electron lenses. *Z. Physik* **116**, 56–67 (1940).
478. Glaser, W. On a magnetic field free from spherical aberration. *Z. Physik* **116**, 19–33 (1940).
479. Glaser, W. On aperture defect of electron lenses. *Z. Physik* **116**, 734–735 (1940).
480. Goltz, E. Investigations on dielectric strength of electrode materials for the lens of the electron microscope. *Jahrb. AEG. Forsch. Sonderh. Übermikroskop* **7**, 57–59 (1940).
481. Hillier, J. Fresnel diffraction of electrons as a contour phenomenon in electron supermicroscope images. *Phys. Rev.* **58**, 842 (1940).
482. Kato, N. and Inone, T. Aberration of the electron microscope. *Elektrotech. J. (Japan)* **4**, 219–222 (1940).
483. Kinder, E. and Penzdich, A. A new magnetic lens of short focal length. *Jahrb. AEG. Forsch. Sonderh. Übermikroskop* **7**, 23–26 (1940).
484. Kronig, R. Theoretical basis of electron optics. *Nederland. Tijdschr. Natuurkunde* **7**, 171–178 (1940).
485. Rebseh, R. On aperture defect of electron lenses. *Z. Physik* **116**, 729–733 (1940).
486. Recknagel, A. On aberrations of electron lenses. *Jahrb. AEG. Forsch. Sonderh. Übermikroskop* **7**, 15–22 (1940).
487. Wendt, G. Chromatic aberration of electron optical image systems. *Z. Physik* **116**, 436–443 (1940).

### 1941

488. Ardenne, M. v. Determination of the resolving power of electron microscopes. *Physik. Z.* **42**, 72–74 (1941).
489. Borries, B. v., and Ruska, E. Microscopy of high resolving power by means of fast electrons. *Ergeb. exakt. Naturw.* **19**, 237–322 (1941).
490. Dosse, J. Supplement to the paper: "Optical characteristics of strong electron lenses". *Z. Physik* **118**, 375–383 (1941).
491. Dosse, J. Precise computation of unsymmetrical field form  $H = H_0/1 + (z/a)^2$ . *Z. Physik* **117**, 316–321 (1941).
492. Dosse, J. Optical constants of strong electron lenses. *Z. Physik* **117**, 722–753 (1941).
493. Dosse, J. Calculation of the field of magnetic electron lenses. *Z. Physik* **117**, 437–443 (1941).
494. Dosse, J., and Schelling, H. v. On the intensity distribution in electron ray cross sections. *Physik. Z.* **42**, 399–405 (1941).
495. Glaser, W. Chromatic aberrations of electron lenses. *Z. Physik*, **117**, 56–67 (1941).
496. Glaser, W. On the distribution of the ampere turn density of a given magnetic field produced by a cylindrical coil. *Z. Physik* **118**, 264–268 (1941).
497. Glaser, W. Precise computation of magnetic lenses with the field form  $H = H_0/1 + (z/a)^2$ . *Z. Physik* **117**, 285–315 (1941).
498. Glaser, W. and Lammel, E. For which electromagnetic fields is Newton's image equation valid? *Ann. Physik*, **40**, 367–384 (1941).
499. Gobrecht, R. Experimental investigations of spherical aberration in electrostatic lenses. *Arch. Elektrotech.* **35**, 672–685 (1941).
500. Hillier, J. A discussion of the fundamental limit of an electron microscope. *Phys. Rev.* **60**, 743–745 (1941).
501. Hughes, A. L. The magnetic electron lens. *Am. J. Phys.* **9**, 204–207 (1941).
502. Kato, N. and Inone, T. Discussion about the aberration formula of geometrical electron optics. *Elektrotech. J. (Japan)* **5**, 21–68 (1941).

503. Kinder, E. The magnetic yoke lens supermicroscope and some applications in colloid chemistry. *Kolloid Z.* **95**, 326–336 (1941).
504. Kompfner, R. On a method of correcting the spherical error of electron lenses, especially those employed with electron microscopes. *Phil. Mag.* **32**, 410–416 (1941).
505. Marton, L., and Schiff, L. I. Determination of object thickness in electron microscopy. *J. Applied Phys.* **12**, 759–765 (1941).
506. Picht, J. and Himpan, J. Contributions to the theory of electrostatic deflection of electron beams. I, II, III. *Ann. Physik* **5**, 409–501 (1941).
507. Ruthemann, G. Discrete energy losses of fast electrons in solids. *Naturwissenschaften* **29**, 648 (1941).
508. Scherzer, O. The lower limits of focal distance and of chromatic defect of magnetic electron lenses. *Z. Physik* **118**, 461–466 (1941).

### 1942

509. Bertram, S. J. Calculation of axially symmetric fields. *J. Applied Phys.* **13**, 496–502 (1942).
510. Brüche, E. The limit of resolution of the emission electron microscope. *Kolloid Z.* **100**, 192–206 (1942).
511. Copeland, P. L. Thin electrostatic lenses for electrons. *Am. J. Phys.* **10**, 236–246 (1942).
512. Craggs, J. D. The electrostatic focusing of high speed ion and electron beams. *J. Applied Phys.* **13**, 772–786 (1942).
513. Glaser, W. Electron optical imaging with distorted rotational symmetry. *Z. Physik* **120**, 1–15 (1942).
514. Gobrecht, R. Curvature of the image field with electrostatic lenses. *Arch. Elektrotech.* **36**, 484–492 (1942).
515. Grivet, P. Electron optics. *Rev. gén. électr.* **51**, 473–484 (1942).
516. Henneberg, W. and Brüche, E. Concepts and notation in geometrical electron optics. *Arch. tech. Messen* **138**, 113–134 (1942).
517. Joos, G., and Köhler, A. Concerning the Abbe microscope theory and the associated coherence problems. *Naturwissenschaften* **30**, 553–563 (1942).
518. Plass, G. N. Electrostatic electron lenses with a minimum of spherical aberration. *J. Applied Phys.* **13**, 49–55 (1942).
519. Plass, G. N. Errata: Electrostatic electron lenses with a minimum of spherical aberration. *J. Applied Phys.* **13**, 524 (1942).
520. Rambberg, E. G. Variation of the axial aberrations of electron lenses with lens strength. *J. Applied Phys.* **13**, 582–594 (1942).
521. Schiff, L. I. Atomic images with the electron microscope. *Phys. Rev.* **61**, 391 (1942).
522. Schiff, L. I. Ultimate resolving power of the electron microscope. *Phys. Rev.* **61**, 721–722 (1942).
523. Svartholm, N. Calculation of magnetic lenses with a given field distribution. *Arkiv. Mat. Astron. Fysik* **16**, 1–8 (1942).

### 1943

524. Boersch, H. Fresnel diffraction in the electron microscope. *Physik. Z.* **44**, 202–211 (1943).
525. Boersch, H. Edge diffraction of electrons. *Physik. Z.* **44**, 32–38 (1943).
526. Boersch, H. Secondary images in electron microscopy. *Z. Physik* **121**, 746–754 (1943).
527. Gabor, D. Electron optics. *Electronic Eng.* Jan. & Feb. (1943).
528. Glaser, W. Image formation and resolving power of the electron microscope from the point of view of wave mechanics. *Z. Physik* **121**, 647–667 (1943).
529. Glaser, W., and Lammel, E. Exact calculation of the electron optical aberration curves of a typical magnetic field. *Arch. Elektrotech.* **37**, 347–356 (1943).
530. Kossel, W. Lines of uniform thickness of crystals in the electron microscope. *Naturwissenschaften* **31**, 323–324 (1943).
531. Müller, E. W. Velocity distribution of electrons for field emission. *Z. Physik* **120**, 261–269 (1943).
532. Picht, J. Improvement of the resolving power in the emission electron microscope. *Z. tech. Physik* **24**, 211–216 (1943).
533. Ruska, E. The origin of the fringes around particles in electron micrographs, and their variation with the optical focus. *Kolloid Z.* **105**, 43–52 (1943).

534. Seeman, H. Migratory schlieren in electron optical pictures of single crystals, especially molybdenum oxide. *Naturwissenschaften* **31**, 415–416 (1943).
535. Siegbahn, K. Formation of image in a strong magnetic lens. *Arkiv Mat. Astron. Fysik* **30A**, 1–12 (1943).
536. Wendt, G. The dioptrics of electron optical instruments with arbitrarily curved optical axis. *Z. Physik* **120**, 720–741 (1943).

#### 1944

537. Boersch, H. On edges in electron microscope imaging. *Kolloid Z.* **106**, 169–174 (1944).
538. Bruck, H., and Romani, L. On properties of some single electrostatic lenses. *Cahiers de Physique* **24**, 15–28 (1944).
539. Goddard, L. S. The computation of electron trajectories in axially symmetric fields. *Proc. Phys. Soc. London* **61**, 372–396 (1944).
540. Mahl, H., and Recknagel, A. Spherical aberrations of electrostatic electron lenses. *Z. Physik* **122**, 660–679 (1944).
541. Marton, L., and Hutter, R. G. E. On apertures of transmission type electron microscopes using magnetic lens. *Phys. Rev.* **65**, 161–167 (1944).
542. Marton, L., and Hutter, R. G. E. The transmission type of electron microscope and its optics. *Proc. Inst. Radio Engrs.* **32**, 3–12 (1944).
543. Marton, L., and Hutter, R. G. E. Optical constants of a magnetic type electron microscope. *Proc. Inst. Radio Engrs.* **32**, 546–552 (1944).
544. Opatowski, I. Refractive index in electron optics. *Phys. Rev.* **65**, 54–55 (1944).
545. Schlesinger, K. A mechanical theory of electron image formation. *Proc. Inst. Radio Engrs.* **32**, 483–493 (1944).
546. Siegbahn, K. Formation of image in a strong magnetic lens. *Arkiv Mat. Astron. Fysik* **30A**, 1–12 (1944).

#### 1945

547. Brown, F. G. Exact addition formulae for the axial spherical aberration and curvature of field of an optical system of centered spherical surfaces. *Proc. Phys. Soc. London* **57**, 403 (1945).
548. Cosslett, V. E. Resolving power of the magnetic electron microscope. *J. Sci. Instruments* **22**, 170–174 (1945).
549. Hillier, J., and Baker, R. F. Discussion of the illuminating system of the electron microscope. *J. Applied Phys.* **16**, 469–483 (1945).

#### 1946

550. Boersch, H. The possibility of observing atoms in the electron microscope. I. Contrast produced by elastic scattering. II. Contrast produced by inelastic scattering. *Monatsh.* **76**, 86–92; 163–167 (1946).
551. Cosslett, V. E. The variation of resolution with voltage in the magnetic electron microscope. *Proc. Phys. Soc. London* **58**, 443–455 (1946).
552. de Broglie, L. On an effect limiting the possibilities of the particle microscope. *Compt. rend.* **222**, 1017–1019 (1946).
553. de Broglie, L. On the study of very small structures with the particle microscope. *Compt. rend.* **223**, 490–493 (1946).
554. Electron Microscope Society of America's report of the Committee on Resolution. *J. Applied Phys.* **17**, 989–996 (1946).
555. Gabor, D. Zonally corrected electron lens. *Nature* **158**, 198 (1946).
556. Hillier, J. Study of distortion in electron microscope projection lenses. *J. Applied Phys.* **17**, 411–419 (1946).
557. Hillier, J. Further improvements in the resolving power of the electron microscope. *J. Applied Phys.* **17**, 307–309 (1946).
558. Liebmann, G. The limiting resolving power of the electron microscope. *Phil. Mag.* **37**, 677–685 (1946).

#### 1947

559. Bertein, F. Relation between lens defects and image clarity. *Ann. Radioélectricité* **2**, 379–408 (1947).
560. Bertein, F. A method of calculation of aberrations of the shape of electrostatic lenses. *Compt. rend.* **225**, 863–865 (1947).
561. Bertein, F. On structural imperfections in electron optical instruments. *Compt. rend.* **224**, 106–107 (1947).

562. Bertein, F. On the potential perturbation due to elliptic deformation of electrostatic lenses. *Compt. rend.* **224**, 560–562; 737–739 (1947).
563. Bertein, F. A corrective system in electron optics. *Compt. rend.* **225**, 801–803 (1947).
564. Bertein, F., Brück, H., and Grivet, P. Influence of mechanical defect of the objectives on the resolving power of the electrostatic microscope. *Ann. Radioélectricité* **2**, 249–252 (1947).
565. Bertein, F., and Regenstreif, E. On the aberration of the elliptic deformation of electrostatic lenses. *Compt. rend.* **224**, 737–739 (1947).
566. Brück, H. Limit of resolution of electrostatic objectives. *Compt. rend.* **224**, 1818–1820 (1947).
567. Brück, H. The limit of resolution of the electron microscope. Asymmetric lens. *Compt. rend.* **224**, 1628–1629 (1947).
568. Brück, H. The limit of resolution of the electron microscope. Round lens. *Compt. rend.* **224**, 1553–1555 (1947).
569. Brück, H. and Grivet, P. The limit of resolution of the electrostatic objective with a central oval hole. *Compt. rend.* **224**, 1768–1769 (1947).
570. Chanson, P. Optics of electrostatic lenses and the proton microscope. *Ann. Phys.* **2**, 333–413 (1947).
571. Cosslett, V. E. Conditions for extending the resolution limit of the electron microscope. *J. Sci. Instruments* **24**, 40–43 (1947).
572. de Broglie, L. Coherent diffusion and the particle microscope. *Compt. rend.* **224**, 1743–1745 (1947).
573. de Broglie, L. The formation of images in particle optics. *Rev. optique* **26**, 397–410 (1947).
575. Ellis, S. G. Optics of three electrode electron guns. *J. Applied Phys.* **18**, 879–890 (1947).
576. Kinder, E. and Recknagel, A. On Fresnel diffraction in light- and electron-microscopes. *Optik* **2**, 346–363 (1947).
577. Laplume, J. Electron lenses in relativistic mechanics. *Cahiers de physique* **29–30**, 1–12 (1947).
578. Marton, L. and Bol, K. Spherical aberration of compound magnetic lenses. *J. Applied Phys.* **18**, 522–529 (1947).
579. Ments, M. v. and le Poole, J. B. Numerical computation of the constants of magnetic electron lenses. *Appl. Sci. Res.* **B1** 1–17 (1947).
580. Seherzer, O. Spherical and chromatic corrections on electron lenses. *Optik* **2**, 114–132 (1947).

## 1948

581. Bertein, F. Effect of defect of shape of the simple electrode in electron optics. *J. Phys. Radium* **9**, 104–112 (1948).
582. Boersch, H. The removal of incoherent scattering in electron microscopic images and electron diffraction patterns by means of electron filters. *Naturwissenschaften* **35**, 26–28 (1948).
583. Borgnis, F. General properties of paraxial electron optical image formation. *Helv. Phys. Acta* **21**, 461–479 (1948).
584. Borries, B. v. Energy data and limits of electron microscopy. *Optik* **3**, 321–377; 389–412 (1948).
585. Brüche, E. Dimensional aspects of the motion of charged particles in electric and magnetic fields. *Optik* **3**, 413–418 (1948).
586. Ehrenberg, W., and Siday, R. E. The refractive index in electron optics and the principles of dynamics. *Proc. Phys. Soc. London* **B62**, 8–21 (1948).
587. Finch, G. I., and Wilman, H. Electron optics. *Sci. Progress* **36**, 1–12 (1948).
588. Gabor, D. A new microscopic principle. *Nature* **161**, 177–180 (1948).
589. Glaser, W. Centering and resolving power in electron microscopes. *Ing. Arch. Austria* **3**, 39–46 (1948).
590. Glaser, W. Maxwell's "fisheye" as an ideal electron lens. *Nature* **162**, 455–456 (1948).
591. Golz, E., and Recknagel, A. Resolving power of the electron microscope. *Arch. tech. Messen* **154T**, 63–64 (1948).
592. Green, T. A., and Weigle, J. Theory of the "moire" effect. *Helv. Phys. Acta* **21**, 217 (1948).
593. Jacob, L. Variation of beam angle with modulation in electron optical immersion systems. *Phil. Mag.* **39**, 400–408 (1948).
594. Liebmann, G. Electrostatic field distribution near a circular aperture or short cylinder. *Phil. Mag.* **39**, 281–296 (1948).

595. Ramberg, E. G., and Hillier, J. Chromatic aberration and resolving power in electron microscopy. *J. Applied Phys.* **19**, 679–682 (1948).
596. Rüdenberg, R. Electron lenses of hyperbolic field structure I–II. *J. Franklin Inst.* **246**, 311–408 (1948).
597. Sorokina, V. V., and Timofeev, P. V. On the form of the field for an electrostatic lens. *J. tech. phys. USSR* **18**, 509–516 (1948).
598. Spivak, G. V., and Lutskaya, R. A. The second limiting case of electron optics. *Dokl. Akad. Nauk SSSR* **60**, 375–378 (1948).
599. Sturkey, L. Index of refraction for electrons in crystalline media. *Phys. Rev.* **73**, 183 (1948).
600. Veith, W. The electron optics of the image convertor. *Rev. Sci. Paris* **86**, 67–76 (1948).

### 1949

601. Bertein, F. Field asymmetry in electrostatic lenses due to the high tension lead. *Compt. rend.* **229**, 291–293 (1949).
602. Bertein, F., and Regenstreif, E. Use of marginal rays for the study of asymmetry in electrostatic lenses. *Compt. rend.* **228**, 1854–1856 (1949).
603. Borgnis, F. On paraxial electron-optical image formation. *Helv. Phys. Acta* **22**, 261–264 (1949).
604. Borries, B. v. Electron scattering and image formation in the electron microscope. *Z. Naturforsch.* **4a**, 51–70 (1949).
605. Ehrenberg, W., and Siday, R. E. The refractive index in electron optics and the principles of dynamics. *Proc. Phys. Soc. London* **62B**, 8–21 (1949).
606. Glaser, W. Resolving power and limiting magnification of the magnetic electron microscope as a function of beam energy and magnetic field strength. *Acta Phys. Austriaca* **3**, 38–51 (1949).
607. Hall, C. E. Method of measuring spherical aberration of an electron microscope objective. *J. Applied Phys.* **20**, 631–632 (1949).
608. Harrison, S. Aberration phenomenon in electrostatic lenses. *J. Applied Phys.* **20**, 412 (1949).
609. Heise, F. Determination of distortion and of aperture defect of electrostatic lenses from principal planes and from focal point auxiliary planes. *Optik* **5**, 479–490 (1949).
610. Heise, F., and Rang, O. Experimental investigations on electrostatic lenses. *Optik* **5**, 201–216 (1949).
611. Hillier, J., and Ellis, S. G. Illuminating system of the electron microscope. *J. Applied Phys.* **20**, 700–706 (1949).
612. Hubert, P. An electron lens corrected for spherical aberration. *Compt. rend.* **228**, 233–235 (1949).
613. Liebmamn, G. An improved method of numerical ray tracing through electron lenses. *Proc. Phys. Soc. B* **62**, 753–771 (1949).
614. Liebmamn, G. Measured properties of strong unipotential electron lenses. *Proc. Phys. Soc. B* **62**, 213–228 (1949).
615. Marton, L., and Lachenbruch, S. H. Electron optical observation of magnetic fields. *J. Research NBS* **43**, 409–428 (1949).
616. Marton, L., and Lachenbruch, S. H. Electron optical mapping of electromagnetic fields. *J. Applied Phys.* **20**, 1171–1182 (1949).
617. Möllenstedt, G. The electrostatic lens as a high resolving power velocity analyser. *Optik* **5**, 499–518 (1949).
618. Möllenstedt, G., and Heise, F. The electrostatic lens as a high resolving power velocity analyser. *Phys. Blätter* **5**, 80–83 (1949).
619. Mulvey, T., and Jacob, L. Distortion-free electrostatic lenses. *Nature* **163**, 525–526 (1949).
620. Ramberg, E. G. Phase contrast in electron microscope images. *J. Applied Phys.* **20**, 441–444 (1949).
621. Ramberg, E. G. Aberration correction with electron mirrors. *J. Applied Phys.* **20**, 183–187 (1949).
622. Rang, O. The electrostatic stigmator, a corrective element for astigmatic electron lenses. *Optik* **5**, 518–531 (1949).
623. Rang, O. An astigmatic electron lens easily adjustable in refractive power and azimuth. *Phys. Blätter* **5**, 78–80 (1949).
624. Ruhle, R. On the alignment of electron microscope optical systems. *Optik* **5**, 463–469 (1949).
625. Scherzer, O. Theoretical resolution limit of the electron microscope. *J. Applied Phys.* **20**, 20–29 (1949).
626. Scherzer, O. Spherical correction by means of an astigmatic intermediate image. *Optik* **5**, 497–499 (1949).

627. Scherzer, O. The effective density as performance index of fluorescent screens of the electron microscope. *Phys., Blätter* **5**, 74–75 (1949).  
 628. Scherzer, O. An electron optical apochromat. *Z. Naturforsch.* **3a**, 544–545 (1949).  
 629. Seeliger, R. Experiments for spherical correction of electron lenses by means of axially asymmetrical imaging elements. *Optik* **5**, 490–497 (1949).

## 5. RELATED INSTRUMENTS

1932

630. Brüche, E. and Johannson, H. Cinematography of oxide cathodes using the electron microscope. *Ann. Physik* **15**, 145–166 (1932).  
 631. Brüche, E. and Johannson, H. New investigations of cathodes with the electron microscope. *Physik, Z.* **33**, 898–899 (1932).  
 632. Knoll, M., Houtermanns, F. G., and Schulze, E. Emission distribution at glow cathodes with the magnetic microscope. *Z. Physik* **78**, 340–362 (1932).  
 633. Brüche, E. Electron microscopical reproduction by means of photoelectric electrons. *Z. Physik* **86**, 448–450 (1933).  
 634. Brüche, E. and Johannson, H. Electron microscope observations on the barium vapor deposited cathode. *Z. Physik* **84**, 56–59 (1933).  
 635. Brüche, E. and Johannson, H. Crystallographic investigations with the electron microscope. *Z. tech. Physik* **14**, 487–488 (1933).  
 636. Harris, L. and Johnson, E. A. Thin films for holding specimens for study in the electron microscope or electron diffraction camera. *Rev. Sci. Instruments* **4**, 454 (1933).  
 637. Johannson, H. Electron optical immersion objective. *Ann. Physik* **18**, 385–413 (1933).  
 638. Johannson, H. and Scherzer, O. Electric electron condensing lens. *Z. Physik* **80**, 183–192 (1933).  
 639. Knoll, M. and Lubszinsky, G. Electron microscope pictures with secondary electrons. *Physik, Z.* **34**, 671–674 (1933).  
 640. Malov, N. N. An electron microscope. *Uspekhi Fiz. Nauk*, **13**, 367–384 (1933).  
 641. Richter, E. F. Electron microscope observations of the migration of emitting material on oxide cathodes. *Z. Physik* **86**, 697–709 (1933).  
 642. Ruska, E. Formation of pictures of surfaces irradiated by electrons in the electron microscope. *Z. Physik* **83**, 492–497 (1933).

1934

643. Benham, W. E. Demonstration of low voltage electron microscope using electrostatic focusing. *J. Inst. Elec. Engrs* **75**, 388–390 (1934).  
 644. Brüche, E. The electron microscope and its application in particular to the study of thin layers on metals. *Kolloid Z.* **69**, 389–394 (1934).  
 645. Brüche, E. and Knecht, W. Note on attaining high resolution with the electron optical immersion objective. *Z. Physik* **92**, 462–466 (1934).  
 646. Brüche, E. and Knecht, W. Electron optical observation of the transformation of iron at temperatures between 500° and 1000° C. *Z. tech. Physik* **15**, 461–463 (1934).  
 647. Calbick, C. J. and Davisson, C. J. Electron microscope. *Phys. Rev.* **45**, 764 (1934).  
 648. Johannson, H. Immersion objective for electron microscopes. *Ann. Physik* **21**, 274–284 (1934).  
 649. Knecht, W. Combined light and electron microscope. *Ann. Physik* **20**, 161–182 (1934).  
 650. Pohl, J. Formation of electron optical images with photoelectrons. *Z. tech. Physik* **15**, 579–581 (1934).

1935

651. Brüche, E. The electron optical image of structures and its interpretation in the emission ratio of barium nickel cathodes. *Z. Physik* **98**, 77–107 (1935).  
 652. Brüche, E. and Knecht, W. Electron optical observations of the  $\alpha$ - $\gamma$  transformation in iron. *Z. tech. Physik* **16**, 95–98 (1935).

653. Brüche, E. and Mahl, H. On emission image of thoriated tungsten and thoriated molybdenum. I. Z. tech. Physik **16**, 623–627 (1935).  
 654. Dosse, J. and Knoll, M. Electron distribution at focus of X-ray tubes with the electron microscope. Arch. Elektrotech. **29**, 729–739 (1935).  
 655. Johnson, R. P. and Shockley, W. Investigation of thermionic filaments with a simple electron microscope. Phys. Rev. **48**, 973 (1935).  
 656. Kemnitz, G., Knoll, M., and Walcher, W. Electron concentration by concave hot cathode surfaces with the electron microscope. Z. Physik **96**, 612–619 (1935).  
 657. Mahl, H. Mineral micrographs with the electron microscope. Mineralog. u. Petrog. Mitt. **46**, 289–292 (1935).  
 658. Mahl, H. Electron optical image formation with emitting wires. Z. Physik **98**, 321–322 (1935).  
 659. Mahl, H. and Pohl, J. Production of electron optical images with photoelectrons. Z. tech. Physik **16**, 219–221 (1935).  
 660. Piontelli, J. R. Metallographic applications of electron beams and their physical basis. Met. Ital. **27**, 817–825 (1935).  
 661. Schenk, D. Distribution of emission over a crystalline heated cathode. Ann. Physik **23**, 240–254 (1935).  
 662. Wehnelt, A. and Schilling, W. Electron microscope examination of the electron emission of cold metals. Z. Physik **98**, 286–287 (1935)

### 1936

663. Ahearn, A. J., and Becker, J. A. Thoriated tungsten activation as revealed by the electron microscope. Phys. Rev. **49**, 879 (1936).  
 664. Behne, R. Photography of foils with the electron optical immersion objective. Ann. Physik. **26**, 385–397 (1936).  
 665. Behne, R. Contribution to the knowledge of the electron optical immersion lens. II. Z. Physik **101**, 521–526 (1936).  
 666. Behne, R. Characteristics of the immersion objective for image formation with fast electrons. Ann. Physik **26**, 372–384 (1936).  
 667. Brüche, E. and Mahl, H. On emission image of thoriated tungsten and thoriated molybdenum. II. Z. tech. Physik **17**, 81–84 (1936).  
 668. Brüche, E. and Mahl, H. On emission image of thoriated tungsten and thoriated molybdenum. III. Z. tech. Physik **17**, 262–266 (1936).  
 669. Heinze, W. and Wagener, S. The processes in the activation of oxide cathodes. Z. tech. Physik **17**, 645–653 (1936).  
 670. Johnson, R. P. and Shockley, W. An electron microscope for filaments: emission and adsorption by tungsten single crystals. Phys. Rev. **49**, 436–440 (1936).  
 671. Mahl, H. Influence of oxygen on glow emission investigated by the electron microscope. Z. tech. Physik **17**, 653–656 (1936).  
 672. Müller, E. W. Experiments on the theory of electron emission under the influence of strong fields. Phys. Z. **37**, 838–841 (1936).  
 673. Schenk, D. Electron optical observations of the thermionic emission of Ni in Cs vapor. Z. Physik **98**, 753–758 (1936).

### 1937

674. Burgers, W. G. Direct observation of structural changes at high temperatures with the electron microscope. Z. Metallkunde **29**, 250–251 (1937).  
 675. Burgers, W. G. and van Amstel, J. J. A. P. Electron optical observation of metal surfaces. I–II. Physica **4**, 5–22 (1937).  
 676. Gross, H., and Seitz, G. Production of electron optical pictures with photoelectrons. Z. Physik **105**, 734–737 (1937).  
 677. Moriya, Y. Electron microscope investigation of the photoemitting surface (Ag) CS, O–CS. Electrotech. J. (Japan) **1**, 65 (1937).  
 678. Müller, E. W. Electron microscopical observations of field emitters. Z. Physik **106**, 541–550 (1937).  
 679. Müller, E. W. Field emission and cathode sputtering of evaporated tungsten. Z. Physik **106**, 132–140 (1937).

### 1938

680. Ahearn, A. J. and Becker, J. A. Electron microscope studies of thoriated tungsten. Phys. Rev. **54**, 448–458 (1938).  
 681. Ardenne, M. v. Use of electron probe for micromanipulation. Naturwissenschaften **26**, 562 (1938).

682. Ardenne, M. v. Electron scanning microscope; theoretical fundamentals. *Z. Physik* **109**, 553–573 (1938).
683. Ardenne, M. v. The electron scanning microscope. *Z. tech. Physik* **19**, 407–416 (1938).
684. Burgers, W. G. and van Amstel, J. J. A. P. Electron optical observation of the transition of  $\alpha$  into  $\beta$  zirconium. *Nature* **141**, 330 (1938).
685. Burgers, W. G. and van Amstel, J. J. A. P. Electron optical observation of metal surfaces, III, IV. *Physica* **5**, 305–319 (1938).
686. Johnson, R. P. Simple electron microscopes. *J. Applied Phys.* **9**, 508–516 (1938).
687. Komovskii, G. F. and Rasumnyaya, E. G. Cathode tube microscope and quantitative luminescence. *Soviet Geol.* **8**, 111–117 (1938).
688. Mahl, H. Electron optical cathode imagery in a gas discharge. *Ann. Physik* **31**, 425–442 (1938).
689. Mahl, H. Electron optical examination of electronic and ionic emission of wires. *Z. Physik* **108**, 771–776 (1938).
690. Meschter, E. An electron microscope for studying thermal and secondary electron emission. *Rev. Sci. Instruments* **9**, 12–15 (1938).
691. Müller, E. W. Further observations with the field electron microscope. *Z. Physik* **108**, 668–680 (1938).

### 1939

692. Ardenne, M. v. The wedge sectioning method for producing microtome cuts of less than  $10^{-3}$  mm thickness for purposes of electron microscopy. *Z. wiss. Mikroskop.* **56**, 8–23 (1939).
693. Ardenne, M. v. On an ion probe of great sharpness. *Z. Physik* **20**, 344–346 (1939).
694. Ardenne, M. v. Capacity of the electron shadow microscope, an X-ray shadow microscope. *Naturwissenschaften* **27**, 485–486 (1939).
695. Boersch, H. The shadow microscope. A new electron supermicroscope. *Naturwissenschaften* **27**, 418 (1939).
696. Boersch, H. The electron shadow microscope. I. *Z. tech. Physik* **20**, 346–350 (1939).
697. Burgers, W. G. Metallographic investigations with the electron microscope. *Polytech. Weekblad* **33**, 17–19; 38–40 (1939).
698. Knoll, M. and Theile, R. Electron scanning for forming the image of the structure of surfaces and thin layers. *Z. Physik* **113**, 260–280 (1939).
699. Morton, G. A. and Ramberg, E. G. Point projector electron microscope. *Phys. Rev.* **56**, 705 (1939).
700. Staeger, A. Electronic and scanning microscopes. *Elec. Rev. (London)* **121**, 157–158 (1939).

### 1940

701. Ardenne, M. v. Stage vibrator for electron microscopes. *Kolloid Z.* **93**, 158–163 (1940).
702. Ardenne, M. v. and Reibedanz, H. Apparatus for boring extremely fine holes in metal foil. *Z. Instrumentenk.* **60**, 22–26 (1940).
703. Benjamin, M. The field emission microscope. *J. Soc. Glass. Technol.* **24**, 93–96 (1940).
704. Boersch, H. The electron shadow microscope. *Jahrb. AEG Forsch. Sonderh. Übermikroskop* **7**, 34–42 (1940).
705. Boersch, H. Diffraction experiments with very narrow electron beams. *Z. Physik* **116**, 469–479 (1940).
706. Dosse, J. Theoretical and experimental investigation of electron emitters. *Z. Physik* **115**, 530–556 (1940).
707. Ruska, E. Electron diffraction patterns recorded in the supermicroscope. *Wiss. Veröffentl. Siemens-Werken, Werkstoff-Sonderheft* 372–379 (1940).

### 1941

708. Ardenne, M. v. Use of the object chamber vibrator for producing emulsions. *Z. angew. Chem.* **54**, 144–146 (1941).
709. Fox, G. W. and Bailey, F. M. Measurement of cathode emission by use of the electron microscope. *Phys. Rev.* **59**, 174–178 (1941).
710. Hall, C. E. Silver in developed image. *Am. Phot.* **35**, 141 (1941).
711. Hass, G. and Kehler, H. On a temperature resistant and durable carrier for electron interference and electron microscope investigations. *Kolloid Z.* **95**, 26–29 (1941).

712. Recknagel, A. Theory of electrical electron microscope which is self-illuminating. *Z. Physik* **117**, 689-708 (1941).  
 713. Rule, J. T. Shape of stereoscopic images. *J. Optical Soc. Am.* **31**, 124-129 (1941).  
 714. Sasaki, N. and Mitani, K. Ion microscope. *Proc. Imp. Acad. (Tokyo)* **17**, 36-37 (1941).  
 715. Wilson, R. R. Vacuum-tight sliding seal. *Rev. Sci. Instruments* **12**, 91-92 (1941).

#### 1942

716. Ardenne, M. v., Schiebold, E. and Gunther, F. Fine beam electron diffraction in the universal electron microscope. *Z. Physik* **119**, 352-365 (1942).  
 717. Boersch, H. Increase of resolution of the emission electron microscope. *Naturwissenschaften* **30**, 120 (1942).  
 718. Boersch, H. A highly resolved image by means of ion rays (ion super-microscopy). *Naturwissenschaften* **30**, 711-712 (1942).  
 719. Boersch, H. Improvement of the resolving power of the emission electron microscope. *Z. tech. Physik* **23**, 129-130 (1942).  
 720. Daniel, J. H. Field emission from tungsten and thoriated tungsten single crystals. *Phys. Rev.* **61**, 657-667 (1942).  
 721. Dosse, J. and Müller, H. O. The resolving power of the emission electron microscope. *Z. Physik* **119**, 415-422 (1942).  
 722. Haefer, R. Field electron microscopic observations on tungsten points. *Z. Krist.* **104**, 1-10 (1942).  
 723. Hillier, J., Baker, R. F., and Zworykin, V. K. A diffraction adapter for the electron microscope. *J. Applied Phys.* **13**, 571-577 (1942).  
 724. Jenkins, R. O. Field emission of electrons. *Reports on Progress in Physics* **9**, 177-197 (1942-43).  
 725. Kinder, E. Emission electron microscopy with magnetic lenses. *Naturwissenschaften* **30**, 591-592 (1942).  
 726. Mahl, H. An experiment in emission microscopy with electrostatic lenses. *Z. tech. Physik* **23**, 117-119 (1942).  
 727. Mecklenburg, W. Electrostatic emission electron microscope. *Z. Physik* **120**, 21-30 (1942).  
 728. Ruthemann, G. Electron retardation at X-ray levels. *Naturwissenschaften* **30**, 145 (1942).  
 729. Zworykin, V. K., Hillier, J. and Snyder, R. L. A scanning electron microscope. *ASTM Bull.* **117**, 15-23 (1942).  
 730. Zworykin, V. K., Hillier, J. and Snyder, R. L. A scanning electron microscope. *Proc. Inst. Radio Engrs.* **30**, 255 (1942).

#### 1943

731. Antoine, L. D. and Hargett, M. V. Machine for shell-freezing small volumes of biological preparations. *J. Bact.* **46**, 525-529 (1943).  
 732. Asao, S., Watanabe, T., and Tomita, S. Electric field type electron microscope. *J. Phys. Math. Soc. Japan* **17**, 607-611 (1943).  
 733. Boersch, H. Comment on J. Picht's "Improvement of the resolving power of the emission electron microscope". *Z. tech. Physik* **24**, 216-217 (1943).  
 734. Hillier, J. On microanalysis by electrons. *Phys. Rev.* **64**, 318-319 (1943).  
 735. Mollwo, E. Interference phenomena from scattering particles in an interference field. *Z. Physik* **120**, 618-626 (1943).  
 736. Müller, E. W. Resolving power of the field electron microscope. *Z. Physik* **120**, 270-282 (1943).  
 737. O'Brien, H. C., and McKinley, G. M. New microtome and sectioning method for electron microscopy. *Science* **98**, 455-456 (1943).  
 738. Recknagel, A. Resolving power of the emission electron microscope. *Z. Physik* **120**, 331-362 (1943).  
 739. Riedel, G. An electrostatic precipitator for obtaining electron microscopic preparations. *Kolloid Z.* **103**, 228-232 (1943).

#### 1944

740. Abrams, I. M. and McBain, J. W. A closed cell for electron microscopy. *Science* **100**, 273-274 (1944).  
 741. Abrams, I. M. and McBain, J. W. A closed cell for electron microscopy. *J. Applied Phys.* **15**, 607-609 (1944).  
 742. Anon. Capacitor for electron microscope. *Ind. Eng. Chem., Anal. ed.* **16**, 278 (1944).

743. Berger, K. New film sluice for cathode ray oscilloscopes, electron microscopes and electron diffraction apparatus. *Bull. Assoc. Suisse Electr.* **35**, 236-239 (1944).
744. Hillier, J., and Baker, R. F. Microanalysis by means of electrons. *J. Applied Phys.* **15**, 663-675 (1944).
745. Marton, L. Electron microspectroscopy. *Phys. Rev.* **66**, 159 (1944).
746. Picard, R. G. Studies with the electron microscope diffraction adapter. *J. Applied Phys.* **15**, 678-684 (1944).
747. Zworykin, V. K. Using electrons for microanalysis. *Science* **99**, 334-335 (1944).

### 1945

748. Crane, H. R., Levinstein, H. and Williams, R. C. Shadow casting units for the RCA electron microscope. *Rev. Sci. Instruments* **16**, 296 (1945).
749. Ladd, W. A., and Braendle, H. A. High speed microtome for electron microscopy. *Rubber Age* **57**, 681-684 (1945).
750. Magnan, C., Chanson, P., and Ertaud, A. On the design of a proton microscope. *Compt. rend.* **220**, 770-772 (1945).
751. Marton, L. Adaptation of special specimen holders to commercial electron microscopes. *J. Applied Phys.* **16**, 387 (1945).
752. Simard, G. L., and Stryker, C. R. Diffraction specimen holder for electron microscopes. *Rev. Sci. Instruments* **16**, 146-148 (1945).
753. Sorg, H. E., and Becker, G. A. Grid emission in vacuum tubes; emission photographs taken with electron microscope. *Electronics* **18**, 104-109 (1945).

### 1946

754. Anderson, T. F. Shadow casting adaptor for the electron microscope. *Rev. Sci. Instruments* **17**, 71-72 (1946).
755. Barso, W. M. Two accessories for the electron microscope laboratory; (A) specimen stage (B) plate reader. *Can. J. Research* **24**, 402-405 (1946).
756. Fullam E. F., and Gessler, A. E. High speed microtome for the electron microscope. *Rev. Sci. Instruments* **17**, 23-35 (1946).
757. Gessler, A. E. and Fullam, E. F. Sectioning for the electron microscope accomplished by the high speed microtome. *Am. J. Anat.* **78**, 245 (1946).
758. Heard, O. O. Microtomy with a reciprocating circular knife and a mechanism for sharpening the knife. *Rev. Sci. Instruments* **17**, 227-232 (1946).
759. O'Brien, H. C. A vibrating muller for the preparation of dispersions of fine pigments for electron microscopy. *Science* **103**, 429 (1946).
760. Picard, R. G., and Reisner, J. H. Universal electron microscope as a high resolution diffraction camera. *Rev. Sci. Instruments* **17**, 484-489 (1946).
761. Schuster, M. C. High speed microtomizing. *Interchem. Rev.* **5**, 31-41 (1946).

### 1947

762. Froula, H. C. Attachments for aligning a console electron microscope. *J. Applied Phys.* **18**, 850 (1947).
763. Gaber, D. A space charge lens for the focusing of ion beams. *Nature* **160**, 89-90 (1947).
764. Hanson, E. E., and Daniel, J. H. An instrument for measuring particle diameters and constructing histograms from electron micrographs. *J. Applied Phys.* **18**, 439-443 (1947).
765. Merton, Sir Thomas. On interference microscopy. *Proc. Roy. Soc. (London)* (A) **191**, 1, (1947).

### 1948

766. Boersch, H. Ion supermicroscopy. *Experientia* **4**, 1-15 (1948).
767. Dinichert, P., and Kellenberger, E. New apparatus for making replicas. *Experientia* **4**, 407 (1948).
768. Drummond, D. G. A carrying case for electron microscope specimens. *J. Sci. Instruments* **25**, 418-419 (1948).
769. Dunaway, R. E., and Barton, H. M. Notes on electron diffraction with the universal electron microscope. *J. Applied Phys.* **19**, 799-800 (1948).
770. Grey, C. E. Electron microscope specimen punch. *Rev. Sci. Instruments* **19**, 369-370 (1948).
771. Grey, C. E. Microtome for electron microscopy. *Interchem. Rev.* **7**, 26-29 (1948).

772. Grey, C. E. and Kelsch, J. J. Use of the electron microscope and high speed microtome in medicine. *Exp. Med. and Surg.* **6**, 368-389 (1948).  
 773. Kirkpatrick, A. F. and Davis, E. G. Electron microscope goniometry. *Analytical Chem.* **20**, 965-968 (1948).  
 774. Pease, D. C. and Baker, R. F. Sectioning techniques for electron microscopy using a conventional microtome. *Proc. Soc. Exp. Biol. Med.* **67**, 470-474 (1948).  
 775. Sasaki, N. An ion microscope with a transverse magnetic field. *J. Applied Phys.* **19**, 1050-1053 (1948).

### 1949

776. Bishop, F. W. A device for producing an easily identified area on the electron microscope specimen screen. *Rev. Sci. Instruments* **20**, 324-325 (1949).  
 777. Bishop, F. W. A device to deposit automatically the proper thickness of metals used in shadow-casting in electron microscopy. *Rev. Sci. Instruments* **20**, 527-528 (1949).  
 778. Boersch, H. An electron filter for electron microscopy and electron diffraction. *Optik* **5**, 436-450 (1949).  
 779. Jacob, L. A new emission microscope for oxide cathodes. *J. Sci. Instruments* **26**, 262-266 (1949).  
 780. Magnan, C. The proton microscope. *Nucleonics* **4**, 52-66 (1949).  
 781. Newman, S. B., Borysko, E., and Swerdlow, M. New Method for micro-sectioning. *Anat. Rec.* **105**, 267-272 (1949).  
 782. Newman, S. B., Borysko, E., and Swerdlow, M. [New sectioning techniques for light and electron microscopy. *Science* **110**, 66-68 (1949).  
 783. Newman, S. B., Borysko, E., and Swerdlow, M. Ultra-microtomy by a new method. *J. Research NBS* **43**, 183-199 (1949).

## 6. APPLICATIONS

### 1933

784. Borries, B. v., and Ruska, E. Images of films in transmission by means of the electron microscope. *Z. Physik* **83**, 187-193 (1933).

### 1934

785. Marton, L. Electron microscopy of biological objects. I. *Bull. Acad. Roy. Belg. Cl. Sci.* **20**, 439-446 (1934).  
 786. Marton, L. Electron microscopy of biological objects. *Nature* **133**, 911 (1934).  
 787. Marton, L. Electron microscopy of biological objects. *Phys. Rev.* **46**, 527-528 (1934).  
 788. Marton, L. The electron microscope; first attempts at its application to biology. *Ann. Bull. Soc. Roy. Sci. Med. Nat. Bruxelles* **92**, 106 (1934).

### 1935

789. Driest, E., and Müller, H. O. Electron micrographs of chitin substances. *Z. wiss. Mikroskop.* **52**, 53-55 (1935).  
 790. Marton, L. The electron microscope and its applications especially in biology. 2nd Congr. Nat. Sci. Bruxelles **2**, 928-933 (1935).  
 791. Marton, L. Electron microscopy of biological objects. II. *Bull. Acad. Roy. Belg. Cl. Sci.* **21**, 553-564 (1935).  
 792. Marton, L. Electron microscopy of biological objects. III. *Bull. Acad. Roy. Belg. Cl. Sci.* **21**, 606-617 (1935).  
 793. Marton, L. The electron microscope and its applications. *Rev. Optique* **14**, 129-145 (1935).  
 794. Sause, E. Use of the electron microscope and diffraction in biology and pathology. *Frankfurt. Z. Path.* **47**, 485-516 (1935).

### 1936

795. Krause, F. Electron optical pictures of diatoms with the magnetic electron microscope. *Z. Physik* **102**, 417-422 (1936).  
 796. Marton, L. Electron microscopy of biological objects IV. *Bull. Acad. Roy. Belg. Cl. Sci.* **22**, 1336-1344 (1936).

797. Beischer, D. and Krause, F. Electron microscope in colloid investigations. *Naturwissenschaften* **25**, 825–829 (1937).  
 798. Krause, F. The electron microscope and its use in biology. *Naturwissenschaften* **25**, 817–825 (1937).  
 799. Marton, L. Electron microscopy of biological objects. V. Bull. Acad. Roy. Belg. Cl. Sci. **23**, 672–678 (1937).  
 800. Rudiger, O. Structural investigation of evaporated metal films. *Ann. Physik* **30**, 505–526 (1937).

## 1938

801. Beischer, D. Determination of size of crystals in metal and metal oxide smokes by means of X-ray and electron diffraction diagrams and electron micrographs. *Z. Elektrochem.* **44**, 375–385 (1938).  
 802. Beischer, D., and Krause, F. The electron microscope in colloid chemistry. *Angew. Chem.* **51**, 331–334 (1938).  
 803. Borries, B. v., and Ruska, E. Micrographs with the Siemens electron microscope. *Umschau* **42**, 818–822 (1938).  
 804. Borries, B. v., Ruska, E., and Ruska, H. Bacteria and virus as seen in the ultramicroscope with introduction to technology of ultramicroscopy. *Klin. Wochschr.* **17**, 921–925 (1938).  
 805. Borries, B. v., Ruska, E., and Ruska, H. Micrographs of bacteria with the supermicroscope. *Wiss. Veröff. Siemens-Werken* **17**, 107–111 (1938).  
 806. Dantz, D. The supermicroscope in paint research. *Farbe u. Lack* 402–403 (1938).  
 807. Eitel, W. H., Müller, H. O. and Radczewski, O. E. Examination of clay minerals with the ultramicroscope. *Ber. deut. Keram. Ges.* **20**, 165–180 (1938).  
 808. Gratia, A. The problem of ultraviruses. 1st Congr. Mierobiol. Paris (1938).  
 809. Krause, F. Examination of viruses with the electron microscope. *Naturwissenschaften* **26**, 122 (1938).  
 810. Krause, F. Power and new uses of the electron microscope. *Elektrotech. Z.* **59**, 851–853 (1938).  
 811. Ruska, E. Note on work of Krause in *Naturwissenschaften* **25**, 817 (1937). *Naturwissenschaften* **26**, 759 (1938).  
 812. Schumacher, E. E. and Soudan, A. G. Progress in nonferrous metals and alloys during the past few years. *Mining and Met.* **19**, 46–55 (1938).  
 813. Scott, G. H. and Packer, D. M. The localization of minerals in animal tissues by the electron microscope. *Science* **89**, 227–228 (1938).  
 814. Thiesen, P. A. New results and problems in colloidal research. *Angew. Chem.* **51**, 318–324 (1938).

## 1939

815. Ardenne, M. v. Possibility of examining living substances with electron microscopes. *Z. tech. Physik* **20**, 239–242 (1939).  
 816. Brüche, E. and Haagen, E. A new simple supermicroscope and its application to bacteriology. *Naturwissenschaften* **27**, 809–811 (1939).  
 817. Eitel, W. The importance of the electron microscope for mineralogy research. *Fortschr. Mineral. Krist. Petrogr.* **23**, 116–120 (1939).  
 818. Frank, F., and Ruska, H. Examination of the bluestructure of bird feathers with the electron microscope. *Naturwissenschaften* **27**, 229–230 (1939).  
 819. Friess, H., and Müller, H. O. Smokes and dusts in the electron microscope. *Gasmaske* **11**, 1–9 (1939).  
 820. Kausche, G. A., Pfankuch, E. and Ruska, H. Examination of plant viruses with the high power electron microscope. *Naturwissenschaften* **27**, 292–299 (1939).  
 821. Kausche, G. A., and Ruska, H. The structure of the "crystalline aggregates" of tobacco mosaic virus proteins. *Biochem. Z.* **303**, 221–230 (1939).  
 822. Kausche, G. A., and Ruska, H. Supermicroscopic investigations of the adsorption of metal colloids on proteins. *Kolloid Z.* **89**, 21–26 (1939).  
 823. Krause, F. Use of the electron microscope in biology and medicine. *Arch. exp. Zellforsch.* **22**, 668–672 (1939).  
 824. Krause, F. Determination of crystalline size in metal and metal oxide smokes by means of X-ray electron diffraction diagrams and electron photomicrographs. *Z. elektrochem.* **45**, 117, (1939).

825. Mahl, H. Photographs of diatoms with the supermicroscope. *Naturwissenschaften* **27**, 417 (1939).
826. Marton, L. The electron microscope in biology. *Acta Union Internat. Contre Cancer* **4**, 221-238 (1939).
827. Müller, H. O. The supermicroscope in medicine. *Med. Klinik (Munich)* **35**, 1041-1043 (1939).
828. Piekarski, G. Light optical and supermicroscopical investigation of problems of the bacterial nucleus. *Zentr. Bakt. Parasitenk.* **144**, 140-147 (1939).
829. Piekarski, G., and Ruska, H. Supermicroscopic pictures of bacterial flagellae. *Klin. Wochschr.* **16**, 383-386 (1939).
830. Piekarski, G., and Ruska, H. Supermicroscopical investigations of bacteria with particular reference to the so-called nucleoids. *Arch. Mikrobiol.* **10**, 302-321 (1939).
831. Radczewski, O. E., Müller, H. O., and Eitel, W. The hydration of tricalcium aluminate. *Naturwissenschaften* **27**, 837-838 (1939).
832. Radczewski, O. E., Müller, H. O., and Eitel, W. Study of hydration of cement by means of the electron microscope. *Zement* **49**, 1-4 (1939).
833. Radczewski, O. E., Müller, H. O., and Eitel, W. Supermicroscopical investigation of the hydration of lime. *Zement* **28**, 693-697 (1939).
834. Ruska, H. Electron microscopical representation of bacterial flagellae. *Klin. Wochschr.* **18**, 383 (1939).
835. Ruska, H. Electron microscopical research technique. *Naturwissenschaften* **27**, 287-292 (1939).
836. Ruska, H. Supermicroscopic demonstration of organic structure. *Arch. exp. Zellforsch* **22**, 673-680 (1939).
837. Ruska, H. New results of electron microscopy. *Forschungen u. Fortschr.* **15**, 371-372 (1939).
838. Ruska, H. Electron microscope pictures on problems of structure. *Ver. deut. Zool. Ges.* **12**, 295-302 (1939).
839. Ruska, H., Borries, B. v. and Ruska, E. The importance of the supermicroscope in virus research. *Arch. Ges. Virusforsch.* **1**, 155-169 (1939).
840. Scott, G. H. and Packer, D. M. The electron microscope as an analytical tool for the localization of minerals in biological tissues. *Anat. Record* **74**, 17-30 (1939).
841. Scott, G. H. and Packer, D. M. An electron microscope study of magnesium and calcium in striated muscle. *Anat. Record* **74**, 31-46 (1939).
842. Scott, G. H. and Packer, D. M. The localization of minerals in animal tissues by the electron microscope. *Science* **89**, 227-228 (1939).
843. Scott, G. H. and Packer, D. M. Magnesium and calcium in striated muscle as revealed by the electron microscope. *Proc. Soc. Exp. Biol. Med.* **40**, 301-302 (1939).
844. Sterekx, R. Some new methods of investigation applied in biological science. *Ann. Zymol.* **6**, 337-354 (1939).
845. Wolpers, C. and Ruska, H. Structural investigations of the clotting of blood. *Klin. Wochschr.* **18**, 1077-1081; 1111-1117 (1939).

## 1940

846. Ackerman, A. The microscopic forms of iron rust. *Kolloid Z.* **90**, 26-28 (1940).
847. Ardenne, M. v. Analysis of the structure of highly and very highly illuminated silver bromide grains with the universal electron microscope. *Z. angew. Phot.* **2**, 14-20 (1940).
848. Ardenne, M. v. Occurrence of black lines in electron microscope images of crystal lamellae. *Z. Physik* **116**, 736-738 (1940).
849. Ardenne, M. V. Experiments in photographing the virus of the hoof and mouth disease by means of the universal electron microscope. *Naturwissenschaften* **28**, 531-532 (1940).
850. Ardenne, M. v. Results of a new electron ultramicroscope. *Naturwissenschaften* **28**, 113-127 (1940).
851. Ardenne, M. v., and Beischer, D. Investigation of metal oxide smokes with the universal electron microscope. *Z. Elektrochem.* **46**, 270-277 (1940).
852. Ardenne, M. v. Images of minute particles, especially of molecules by means of the universal electron microscope. *Z. physik. Chem. (A)* **187**, 1-12 (1940).

853. Ardenne, M. v., and Beischer, D. Examination of the fine structure of high-molecular compounds with the universal electron microscope. I. The structure of  $\beta$  polyoxymethylene crystals. *Z. physik. Chem. (B)* **45**, 465-473 (1940).
854. Ardenne, M. v. and Beischer, D. Examination of the fine structure of high-molecular compounds with the universal electron microscope. II. The morphology of rubber and Buna. *Kautschuk* **16**, 55-60 (1940).
855. Ardenne, M. v., and Beischer, D. Investigation of catalysts with the universal electron microscope. *Angew. Chem.* **53**, 103-107 (1940).
856. Ardenne, M. v., and Beischer, D. Catalysts and the electron microscope. *Record Chem. Progress (Kresge-Hooker Sci. Lib.)* **1**, 13-14 (1940).
857. Ardenne, M. v., Endell, K., and Hoffman, E. Examination of finest fractions of bentonite and cement with the universal microscope. *Ber. deut. Keram. Ges.* **21**, 209-227 (1940).
858. Borries, B. v., and Kausche, G. A. Determination of the size and shape distribution of colloidal gold by means of the supermicroscope. *Kolloid Z.* **90**, 132-141 (1940).
859. Borries, B. v., and Ruttmann, W. Metallographic investigations of steel, cast iron, and brass by means of the supermicroscope. *Wiss. Veröff. Siemens-Werken, Werkstoff-Sonderh.* 342-362 (1940).
860. Burton, E. F., Hillier, J., and Prebus, A. Contribution of the electron microscope to medicine. *Can. Med. Assoc. J.* **42**, 116-119 (1940).
861. Columbian Carbon Company Research Laboratories. The particle size and shape of colloidal carbon as revealed by the electron microscope. *Columbian Colloidal Carbons* **2**, 5-53 (1940).
862. Eitel, W. and Gotthardt, E. Stereophotographic measurement of the thickness of very small crystals by electron microscope observation. *Naturwissenschaften* **28**, 367 (1940).
863. Eitel, W. and Radczewski, O. E. The characteristics of the clay mineral montmorillonite as shown by the supermicroscope. *Naturwissenschaften* **28**, 397-399 (1940).
864. Eitel, W. and Schusterius, G. The determination of the efficient surfaces of clay particles with the supermicroscope. *Chem. Erde* **13**, 322-335 (1940).
865. Eitel, W. and Schusterius, G. The interpretation of electron micrographs for the determination of clay grain distribution. *Naturwissenschaften* **28**, 300-303 (1940).
866. Frühbrodt, E., and Ruska, H. Research on the structure of bacteria, especially of bacterium membranes and capsules. *Arch. Mikrobiol.* **11**, 137-154 (1940).
867. Green, H., and Fullam, E. F. Some applications of the high resolving power of the electron microscope. *J. Applied Phys.* **14**, 332-340 (1940).
868. Haagen, E. The importance of the electron microscope in experimental virus research. *Jahrb. AEG Forsch. Sonderh. Übermikroskop* **7**, 88-90 (1940).
869. Hardy, J. I., and Plitt, J. M. An improved method for revealing the surface structure of fur fibers. *U. S. Dept. Int., Wildlife Circ.* **7**, (1940).
870. Husemann, E., and Ruska, H. Making glycogen molecules visible. *J. prakt. Chem.* **156**, 1-10 (1940).
871. Husemann, E., and Ruska, H. Making visible the molecules of p-iodobenzoyl-glycogen. *Naturwissenschaften* **28**, 534 (1940).
872. Jakob, A., and Loofman, H. Electron microscopic investigations of soil minerals of uniform composition  $<2\mu$ . *Bodenkunde u. Pflanzenernähr.* **21**, 666-672 (1940).
873. Jakob, A., and Mahl, H. Application of the supermicroscope in bacteriology, especially for experiments with capsules. *Jahrb. AEG Forsch., Sonderheft. Übermikroskop* **7**, 77-87 (1940).
874. Jakob, A., and Mahl, H. Structure of bacteria, in particular capsulation of anaerobiae by means of the electrostatic supermicroscope. *Arch. exp. Zellforsch.* **24**, 87-104 (1940).
875. Kalden, H. Investigations with the supermicroscope. *Chem. Z.* **64**, 129-133 (1940).
876. Kausche, G. A. Results and problems of experimental plant virus research. *Ber. deut. Botan. Ges.* **58**, 200-222 (1940).
877. Kausche, G. A. Investigations on the problem of biological characterization of phytopathogenic virus proteins. *Arch. ges. Virusforsch.* **1**, 363-372 (1940).
878. Kausche, G. A. The mechanism of the gold-sol reaction of the protein of tobacco mosaic and potato-X-virus. *Biol. Zentr.* **60**, 179-199 (1940).

879. Kausche, G. A. and Borries, B. v. The determination of the shape and size distribution in gold colloids. *Kolloid Z.* **90**, 132 (1940).
880. Kausche, G. A., and Ruska, H. The problem of the structure of the chloroplast. *Naturwissenschaften* **28**, 303–304 (1940).
881. Kausche, G. A., and Ruska, H. The identification of tobacco mosaic virus molecules in the chloroplast of virus infected plants. *Naturwissenschaften* **28**, 303 (1940).
882. Koch, L. and Lehmann, A. Supermicroscopical investigation of rolled aluminum surfaces. *Wiss. Veröff. Siemens-Werken, Werkst.-Sonderh.* 363–371 (1940).
884. Lemcke, A., Ruska, H., and Christophersen, J. Comparative microscopical and supermicroscopical observations on the infective agent of tuberculosis. *Klin. Wochenschr.* **19**, 217–220 (1940).
885. Loofbourou, J. R. Borderland problems in biology and physics: electron microscopy. *Revs. Modern Phys.* **12**, 331–333 (1940).
887. Mahl, H. Application of the supermieroscope in colloid chemistry and metallurgy. *Jahrb. AEG Forsch. Sonderh. Übermikroskop* **7**, 67–76 (1940).
888. Mahl, H. The electrostatic electron microscope and some applications in colloid chemistry. *Kolloid Z.* **91**, 105–117 (1940).
889. Mahl, H. Determination of the orientation of single crystals of aluminum by means of the supermieroscope. *Metallwirtschaft* **19**, 1082–1085 (1940).
890. Mahl, H. A plaster-cast method for supermicroscopical investigation of metal surfaces. *Metallwirtschaft* **19**, 488–491 (1940).
891. Mahl, H. Electron microscope images of objects by transmitted radiation and of metal surfaces. *Z. angew. Phot.* **2**, 58–63 (1940).
892. Mahl, H. Metallurgical researches with the electrostatic ultramicroscope. *Z. tech. Physik* **21**, 17–18 (1940).
893. Melchers, G., Trurnit, H. and Friedrich-Freksa, H. The electron-microscopical investigation of tomato mosaic virus Dahlem. *Biol. Zentr.* **60**, 546–556 (1940).
894. Meldau, R. Fine dusts in the submicroscopic field. *Z. Ver. deut. Ing.* **84**, 103–106; 677–678 (1940).
895. Meldau, R. On the air plankton. *Staub. Veröff. Staubbekämpfungsstelle* **14**, 317 (1940).
896. Middel, V., Reichmann, R. and Kausche, G. A. Supermicroscopic investigation of the structure of bentonites. *Wiss. Veröff. Siemens-Werken, Werkstoff-Sonderh.* 334–341 (1940).
897. Müller, R. Colloidal sulphur in dermatology. *Jb. Heyden.* **143** (1940).
898. O'Daniel, H., and Radczewski, O. E. Electron microscopy and electron diffraction study on the same specimen of highly dispersed minerals. *Naturwissenschaften* **28**, 628–630 (1940).
899. Pfankuch, E., and Kausche, G. A. Ultramicroscopic examination of bacteriophages. *Naturwissenschaften* **28**, 46 (1940).
900. Piekarski, G. The problem of the bacterial cell nucleus. *Rept. Proc. Intern. Congr. Microbiol. 1939*, 225 (1940).
901. Radczewski, O. E., Müller, H. O., and Eitel, W. Electron microscopic investigations of the hydration of lime. *Veröffentl. Kaiser Wilhelm Inst. Silikatforsch.* **10**, 139–142 (1940).
902. Radczewski, O. E., Müller, H. O., and Eitel, W. Supermicroscopic investigation of the beginning of precipitation of calcium carbonate from aqueous solutions. *Zentr. Mineral Geol.* **1**, 8–19 (1940).
903. Rake, G. The initial body and the plaque form in chlamydozoaceae. *J. Bact.* **54**, 637–640 (1940).
904. Ruska, E. Results of rendering visible and imaging smallest particles. *Natur u. Volk* **70**, 209–217 (1940).
905. Ruska, E., and Müller, H. O. Progress in reproduction of electron irradiated surfaces. *Z. Physik* **116**, 366–369 (1940).
906. Ruska, H. Regarding methods of making the lysis of bacteriophages visible in the electron microscope. *Naturwissenschaften* **28**, 3 (1940).
907. Ruska, H. Visibility of bacteriophage cultures in the ultramicroscope. *Naturwissenschaften* **28**, 45–46 (1940).
908. Ruska, H. The structure of cellulose fibers. *Kolloid Z.* **92**, 276–285 (1940).

909. Ruska, H., and Kretschmer, M. Supermicroscopic investigation of the degradation of cellulose fibers. *Kolloid Z.* **92**, 163–166 (1940).  
 910. Ruska, H., and Wolpers, C. The structure of "liquor fibrin." *Klin. Wochschr.* **19**, 695 (1940).  
 911. Scott, G. H. An electron microscope study of calcium and magnesium in smooth muscle. *Proc. Soc. Exp. Biol. Med.* **45**, 30–31 (1940).  
 912. Wood, L. A. Synthetic rubbers; a review of their compositions, properties and uses. *Rubber Chem. and Technol.* **13**, 861–885 (1940).  
 913. Zahn, H. Experiments on the supermicroscopy of wool. *Melland Textilber.* **21**, 505–508 (1940).

### 1941

914. Anon. A technique for the electron microscopic examination of encapsulated bacteria. *Paper Trade J.* **113**, 229 (1941).  
 915. Anderson, T. F. and Stanley, W. M. A study of the reaction between the tobacco mosaic virus and its antiserum by means of the electron microscope. *J. Biol. Chem.* **139**, 339–344 (1941).  
 916. Ardenne, M. v. Electron microscopy at elevated temperatures with the universal electron microscope. *Kolloid Z.* **97**, 257–272 (1941).  
 917. Ardenne, M. v. Experiments on making visible molecular roughness of crystal edges inclined to the lattice planes in the universal electron microscope. *Naturwissenschaften* **29**, 780–781 (1941).  
 918. Ardenne, M. v. Electron microscopy of living tissue. *Naturwissenschaften* **29**, 521–523 (1941).  
 919. Ardenne, M. v. On an electron microscopic investigation of the structure of reflection reducing layers and on the measurement of such layers. *Z. angew. Phot.* **3**, 13–16 (1941).  
 920. Ardenne, M. v. Electron ultramicroscopy with accessory probe for production of electron diffraction diagrams with very limited field of view. *Z. Physik* **117**, 515–523 (1941).  
 921. Ardenne, M. v. and Hofmann, U. Electron microscope and X-ray investigations of the structure of carbon black. *Z. physik. Chem., B.* **50**, 1–12 (1941).  
 922. Ardenne, M. v., and Friedrich-Freksa, H. Germination of the spores of the *bacillus vulgaris* from photographs in the 200 kv universal electron microscope. *Naturwissenschaften* **29**, 523–528 (1941).  
 923. Ardenne, M. v., Friedrich-Freksa, H., and Schramm, G. Electron microscopic investigation of the precipitin reaction of tobacco mosaic virus with rabbit antiserum. *Arch. ges. Virusforsch.* **2**, 80–86 (1941).  
 924. Ardenne, M. v., and Weber, H. H. Electron microscopic investigations of the muscle protein myosin. *Kolloid Z.* **97**, 322–325 (1941).  
 925. Barnes, R. B., and Burton, C. J. Metallic smokes as test objects in electron microscopy. *Chem. Eng. News* **19**, 965–967 (1941).  
 926. Beischer, D. Newer methods for investigating the structure of colloidal systems. *Kolloid Z.* **96**, 127–135 (1941).  
 927. Borries, B. v. and Janzen, S. Image of finely machined technical surfaces in the supermicroscope. *Z. Ver. deut. Ing.* **85**, 207–211 (1941).  
 928. Columbian Carbon Co. Research Laboratories. The particle size and shape of colloidal carbon as revealed by the electron microscope. *Rubber Chem. and Technol.* **14**, 52–84 (1941).  
 929. De Long, P. and Howland, A. W. New aspects of ocular micro organisms revealed by electron microscope. *Trans. Am. Ophthalmol. Soc.* **39**, 335–343 (1941).  
 930. Eitel, W. The electron microscope as an instrument for quantitative measurements in silicate research. *Das Übermikroskop als Forschungsmittel*, W. de Gruyter, Berlin 48–66 (1941).  
 931. Eitel, W. Recent results in portland cement research. *Angew. Chem.* **54**, 185–192 (1941).  
 932. Elod, E. The structure of wool fibers. *Kolloid Z.* **96**, 284–301 (1941).  
 933. Elvers, I. An electron microscopic study of chromosomes and cytoplasm in lilium. *Ark. Botanik*, **30B**, 1–8 (1941).  
 934. Endell, K. Significance of the electron microscope for identifying the microstructure of clays. *Tonind. Z.* **65**, 69–72 (1941).  
 935. Franz, E., Wallner, L., and Schiebold, E. Contribution to the interpretation of electron micrographs of fibrous specimens. *Kolloid Z.* **97**, 36–37 (1941).  
 936. Fricke, R., Schoon, T., and Schroeder, W. X-ray and electron microscopic investigations of the thermal modifications series:  $\gamma$ -FeOOH,  $\gamma$ -Fe<sub>2</sub>O<sub>3</sub>– $\gamma$ -Fe<sub>2</sub>O<sub>3</sub>. *Z. physik. Chem.* **850**, 13–22 (1941).

937. Gloor, W. E. Some relations of flow and physical properties with formulation in cellulose acetate plastics. *J. Applied Phys.* **12**, 420 (1941).
938. Hall, C. E., and Schoen, A. L. Application of the electron microscope to the study of photographic phenomena. *J. Optical Soc. Am.* **31**, 281–285 (1941).
939. Hass, G., and Kehler, H. Investigations on the electrolytically produced and annealed layers of aluminum oxide by means of electron interferences and measurements in the supermicroscope. *Kolloid Z.* **97**, 27–35 (1941).
940. Hearing, H., Gizveki, I. v., and Kirseck, A. Investigation of carbon black with the electron microscope. *Kautschuk* **17**, 55–62 (1941).
941. Henneberg, W. Electron microscope, supermicroscope and metallography. *Stahl u. Eisen* **41**, 769–777 (1941).
942. Hess, K., Kiessig, H., and Gundermann, J. X-ray and electron microscopic investigation of the process of grinding of cellulose. *Z. physik. Chem.*, B. **49**, 64–82 (1941).
943. Hillier, J. The electron microscope in the determination of particle size characteristics. *A. S. T. M. Symposium on new methods for particle size determination in subsieve range.* 90–94 (1941).
944. Hock, C. W., Ramsay, R. C., and Harris, M. Microscopic structure of the wool fiber. *J. Research Nat. Bur. Standards* **27**, 181 (1941).
945. Hoffman, A. J., Jakob, A. and Loofmann, H. Investigation of the clay fraction of soils with the electron microscope. *Bodenkunde u. Pflanzenernähr.* **25**, 257–271 (1941).
946. Hofmann, U., Ragoss, A., and Simkel, F. The structure of fine crystalline carbon colloids. *Kolloid Z.* **96**, 231–237 (1941).
947. Humbert, R. P. and Shaw, B. Studies of clay particles with the electron microscope. *Soil Sci.* **52**, 481–487 (1941).
948. Inuzuka, H. The use of the electron microscope in the study of clay. *J. Geol. Soc. Japan* **48**, 391–393 (1941).
949. Inuzuka, H. Observation of clay minerals using the electron microscope. *Am. Mineral.* **26**, 448–449 (1941).
950. Jentgen, H. Can we see the cellulose molecule? *Kunstseide u. Zellwolle* **23**, 76–79 (1941).
951. Kausche, G. A. Existence and work of the electron microscope for structure and virus research. *Nachrbl. deut. Pflanzenschutzdienst* **21**, 41–44 (1941).
952. Kausche, G. A., Pfankuch, E., and Ruska, H. Observations on the effect of sound and supersonics on the protein of tobacco mosaic virus. *Naturwissenschaften* **29**, 573–574 (1941).
953. Kinder, E. Some observations on crystals of MgO in the electron microscope. *Z. tech. Physik* **22**, 21–22 (1941).
954. Knoll, M. Evidence for built-up layers of iron oxide with the electron microscope. *Physik. Z.* **42**, 120–122 (1941).
955. Koch, H. W. Particle size and shape in gold sols. *Z. Elektrochem.* **47**, 717–721 (1941).
956. Koch, L., and Lehmann, A. Electron microscope investigation of smooth aluminum surfaces. *Aluminum* **23**, 304–309 (1941).
957. Kregel, E. A., Appling, J. W., Shema, B. F., and Sears, G. R. A technique for electron microscopic examination of encapsulated bacteria. *Science* **94**, 592 (1941).
958. Kuhn, J. Electron microscopic investigations of asbestos dust and asbestos lungs. *Arch. Gewerbeopath. Gewerbehyg.* **10**, 473–485 (1941).
959. Kuhn, W. Electron microscopic investigations of natural and synthetic cellulose fibers. *Melliand Textilber.* **22**, 249–250 (1941).
960. Lembke, A. Electron microscope observations on bacteria. *Das Übermikroskop als Forschungsmittel*, W. de Gruyter, Berlin 33–47 (1941).
961. Linke, F. Condensation nuclei made visible in the electron microscope. *Naturwissenschaften* **31**, 230–231 (1941).
962. Mahl, H. Metallurgical, chemical, and bacteriological investigations with the electrostatic electron microscope. *Chem. Fabrik* **15**, 279–280 (1941).
963. Mahl, H. Electron microscope observations of etch structures of aluminum. *Zentr. Mineral. Geol. A.* 182–191 (1941).
964. Mahl, H. Electron microscopic detection of metallic precipitation by the replica method. *Metallwirtschaft* **20**, 983–986 (1941).
965. Mahl, H. The damaging of cellulose fibers by radiation in the electron microscope. *Kolloid Z.* **96**, 7–10 (1941).
966. Mahl, H. Electron microscopic investigations of oxide surface films. *Korros. u. Metallschutz* **17**, 1–5 (1941).
967. Mahl, H. The electrostatic electron microscope and some results from the metallurgical field. *Z. Metallk.* **33**, 68–73 (1941).

968. Mahl, H. On the plastic printing process for the electron microscopic examination of surfaces. *Z. tech. Physik* **22**, 33–38 (1941).
969. Marton, L., McBain, J. W., and Vold, R. D. Electron microscope study of curd fibers of sodium laurate. *J. Am. Chem. Soc.* **63**, 1990–1993 (1941).
970. Mehl, R. F. The structure and rate of formation of pearlite. *Trans. Am. Soc. Metals* **29**, 813–862 (1941).
971. Meldau, R. Task of the electron microscope in dust research. *Das Übermikroskop als Forschungsmittel*, W. de Gruyter, Berlin, 78–87 (1941).
972. Meldau, R., and Teichmüller, M. Electron microscopic observations on air elutriated carbon dusts of different degrees of carbonization. *Ol und Kohle* **37**, 751–755 (1941).
973. Meldau, R., and Teichmüller, M. On the morphology of extremely fine lead oxide sublimates. I. *Z. Electrochem.* **47**, 95–97 (1941).
974. Meldau, R., and Teichmüller, M. On the morphology of extremely fine lead oxide sublimates. II. *Z. Electrochem.* **47**, 191–196 (1941).
975. Meldau, R., and Teichmüller, M. On the morphology of extremely fine lead oxide sublimates. III. *Z. Electrochem.* **47**, 630–634 (1941).
976. Meldau, R., and Teichmüller, M. The morphology of finest lead oxide sublimates. IV. *Z. Elektrochem.* **47**, 634–636 (1941).
977. Menke, W. Investigations of the fine structure of protoplasm with the universal electron microscope. *Protoplasma* **35**, 115 (1941).
978. Morton, H. E., and Anderson, T. F. Electron microscopic studies of biological reactions. I. Reduction of potassium tellurite by *Coryne bacterium diphtheriae*. *Proc. Soc. Exp. Biol. Med.* **46**, 272–276 (1941).
979. Mudd, S., and Anderson, T. F. Demonstration by the electron microscope of the combination of antibodies with flagellar and somatic antigens. *J. Immunol.* **42**, 251–266 (1941).
980. Mudd, S., Anderson, T. F., Polevitsky, K., and Morton, H. E. Structure of bacteria as shown by the electron microscope. *Am. J. Path.* **17**, 576 (1941).
981. Mudd, S., and Lackman, D. B. Bacterial morphology as shown by the electron microscope. *J. Bact.* **41**, 415–420 (1941).
982. Mudd, S., Polevitsky, K., Anderson, T. F., and Chambers, L. A. Bacterial morphology as shown by the electron microscope. *J. Bact.* **42**, 251–264 (1941).
983. Müller, F. H. Fiber production, fiber characteristics, and molecular structure. *Physik Z.* **42**, 123–129 (1941).
984. Preston, G. D. Study of dusts. *Nature* **147**, 298 (1941).
985. Radczewski, O. E., and Richter, H. Electron microscopic investigation of silicic acid sols. *Kolloid Z.* **96**, 1–6 (1941).
986. Riedel, G., and Ruska, H. Electron microscopic determination of the number of particles of a sol over its aerodisperse state. *Kolloid Z.* **96**, 86–96 (1941).
987. Riehm, E. Results and future of electron microscopy in phytopathology and botany. *Das Übermikroskop als Forschungsmittel*. W. de Gruyter, Berlin 20–32 (1941).
988. Ruska, H. On a new kind of structure arising in cytolysis by bacteriophage. *Naturwissenschaften* **29**, 367–368 (1941).
989. Ruska, H. Technique and research results of electron microscopy. *Vierteljahrsschr. naturforsch. Ges. Zürich* **86**, 20–21 (1941).
990. Ruska, H. Limiting problems out of the domain of structure research and microbiology. *Deut. med. Wochschr.* **67**, 281–286 (1941).
991. Ruska, H. Object selection, preparation and interpretation of micrographs. *Das Übermikroskop als Forschungsmittel*, W. de Gruyter, Berlin 88–104 (1941).
992. Ruska, H. Problems of virus research. *Forschungen u. Fortschr.* **17**, 363–365 (1941).
993. Ruska, H. The influence of germ injuring and germ killing methods on the structure of bacteria. *Z. Hyg. Infektionskrankh.* **123**, 294–301 (1941).
994. Ruska, H. Observations on the metabolic products formed by *chromobacterium prodigiosum*. *Z. Hyg. Infektionskrankh.* **123**, 289–293 (1941).
995. Schaefer, V. J. Studies of surface properties by the light scattering of deposited liquid films. *J. Phys. Chem.* **45**, 681–701 (1941).
996. Schmieder, F. Electron microscopic investigation of the relation between covering quality and grain size of pigments. *Kolloid Z.* **95**, 29–33 (1941).

997. Schmieder, F. Examples of the use of electron microscopes in chemical and technical problems. *Das Übermikroskop als Forschungsmittel*, W. de Gruyter, Berlin 67-77 (1941).
998. Schoon, T., and Beger, E. Influence of carrier structure and method of preparation on Pt catalysts. *Z. physik. Chem. A.* **189**, 171-182 (1941).
999. Schoon, T. and Klette, H. The structure of typical adsorbents. *Naturwissenschaften* **29**, 652-653 (1941).
1000. Schoon, T., and Koch, H. W. Studies of rubber fillers. I. Particle size and shape of carbon black and their influence on the properties of rubber mixtures as observed on electron micrographs. *Kautschuk* **17**, 1-7 (1941).
1001. Schramm, G. and Friedrich-Freksa, H. The precipitin reaction of tobacco mosaic virus with rabbit and hog antiserum. *Z. Physiol. Chem.* **270**, 233-246 (1941).
1002. Shaw, B. T. and Humbert, R. P. Electron micrographs of clay minerals. *Soil Sci. Soc. Am. Proc.* **6**, 146-149 (1941).
1003. Siebeck, R. Medical research and electron microscopy. *Das Übermikroskop als Forschungsmittel*, W. de Gruyter, Berlin 13-19 (1941).
1004. Stanley, W. M. The structure of viruses. *Pub. Am. Assoc. Adv. Sci.* **14**, 120-135 (1941).
1005. Stanley, W. M. and Anderson, T. F. A study of purified viruses with the electron microscope. *J. Biol. Chem.* **139**, 325-339 (1941).
1006. Wallner, F. E. and Schiebold, E. Contribution to the interpretation of supermicroscopical pictures of fibrous specimens. *Kolloid Z.* **97**, 36-37 (1941).
1007. Wesch, L. Electron optical properties of Lenard phosphors. *Ann. Physik* **40**, 249-294 (1941).
1008. Wiegand, W. B. Further electron microscopic studies on colloidal carbon, and the role of surface in rubber reinforcement. *India Rubber World* **105**, 270-272; *Can. Chem. Process. Inds.* **25**, 579-581 (1941).
1009. Wolpers, C. The blood corpuscles of thrombocytopenia. *Deut. med. Wochschr.* **67**, 515 (1941).
1010. Wolpers, C. The fine structure of erythrocyte membrane. *Naturwissenschaften* **29**, 416-420 (1941).
1011. Zahn, H. Electron micrographs of isolated spindle cells of sheep wool. *Mellandi Textilber.* **22**, 305-308 (1941).
1012. Zworykin, V. K. and Ramberg, E. G. Surface studies with the electron microscope. *J. Applied Phys.* **12**, 692-695 (1941).

## 1942

1013. Anderson, T. F. and Richards, A. G. Electron microscope studies of some structural colors of insects. *J. Applied Phys.* **13**, 748-758 (1942).
1014. Appleman, M. D. Barnes, M. R. and Sears, O. H. Some morphological characteristics of nodule bacteria as shown by the electron microscope. *Soil Sci. Soc. Am. Proc.* **7**, 269-271 (1942).
1015. Ardenne, M. v. and Endell, K. Melting of clinker minerals  $C_3A$  and  $C_4AF$  and of the fraction  $>3\mu$  of some Portland cement clinkers in the heating electron microscope. *Zement*, 313-316 (1942).
1016. Ardenne, M. v. The faithful representation of the structures close to the limit of resolution with the light microscope and the electron microscope. *Kolloid Z.* **100**, 206-211 (1942).
1017. Ardenne, M. v. Reaction chamber supermicroscopy by means of the universal electron microscope. *Z. physik. Chem. B* **52**, 61-71 (1942).
1018. Ardenne, M. v. On an electron microscopic investigation of the structure of reflection reducing layers and on the determination of the dimensions of such layers. *Z. angew. Phot.* **4**, 15-16 (1942).
1019. Ardenne, M. v. and Kirschner, H. Proof of the agreement of the light microscopic surface picture of a Hydronalium specimen with the electron microscope picture of a contrast foil of the same specimen. *Z. Metallkunde* **34**, 236-237 (1942).
1020. Arnold, A. and Golz, E. Zinc oxide studies, I. *Kautschuk* **18**, 39-50 (1942).
1021. Bennek, H., Rudiger, O., Stablein, F. and Volk, K. E. Structural examination of steel with the electron microscope. *Arch. Eisenhüttenw.* **15**, 431-436 (1942).
1022. Boersch, H. The influence of crystal lattice interferences on the imaging in the electron microscope. *Z. Physik* **118**, 706-713 (1942).
1023. Brown, O. J., Jr. and Smith, W. R. Relation of paint properties to surface areas of carbon black. *Ind. Eng. Chem.* **34**, 352-355 (1942).

1024. Burton, C. J., Barnes, R. B. and Roehow, T. G. The electron microscope: calibration and use at low magnification. *Ind. Eng. Chem.* **34**, 1429-1436 (1942).
1025. Clark, G. L., Barnes, M. R., and Baylor, M. R. B. A study of lampbrush chromosomes by the electron microscope. *Science* **95**, 250 (1942).
1026. Clark, G. L., Bernays, P. M. and Tordella, J. P. Progress in lime investigation with X-rays and electron microscope. *Nat. Lime Assoc. Proc. 24th Ann. Convention* (1942).
1027. Columbian Carbon Co. Research Laboratories. The surface area of colloidal carbons. *Columbian Colloidal Carbons*, **2**, 13-52 (1942).
1028. Duffek, V. and Mahl, H. The electron microscope representation of metallic surfaces by the replica process without injury to the surface of the sample. *Arch. Eisenhüttenw.* **16**, 73-76 (1942).
1029. Eisenhut, O. and Kuhn, E. Light microscopic and electron microscopic investigations of native and artificial cellulose fibers. *Angew. Chem.* **55**, 198-206 (1942).
1030. Eitel, W. Electron microscope cement research. *Zement* **31**, 489-495 (1942).
1031. Elod, E., Novotny, H. and Zahn, H. On the structure and chemistry of wool fibers. *Kolloid Z.* **100**, 283 (1942).
1032. Feitknecht, W., Signer, R. and Berger, A. On sols with flaked-shaped particles. On colloidal nickel hydroxide. *Kolloid Z.* **101**, 12-20 (1942).
1033. Fischer, H. and Kurtz, F. Electron microscope images of anodic oxide films on aluminum and their growth. *Korrosion u. Metallschutz* **18**, 42-50 (1942).
1034. Frampton, L. V. The size and shape of the tobacco mosaic virus protein particle. *Science* **95**, 232-233 (1942).
1035. Frey, F. Orientation marks on sample holders for the electron microscope. *Z. tech. Physik* **23**, 82 (1942).
1036. Frey-Wyssling, A. Remark on the discussion on electron microscopy of cellulose fibers. *Kolloid Z.* **100**, 304-305 (1942).
1037. Gotthardt, E. Stereoscopic measurements of objects with the electron microscope. *Z. Physik* **118**, 714-717 (1942).
1038. Green, R. H., Anderson, T. F., and Smadel, J. E. Morphological structure of the virus of vaccinia. *J. Exp. Med.* **75**, 651-656 (1942).
1039. Grim, R. E. Modern concepts of clay materials. *J. Geol.* **50**, 225-275 (1942).
1040. Gundermann, J. and Kulz, H. Observations on zinc black by means of the electron microscope. *Kolloid Z.* **98**, 287-289 (1942).
1041. Haan, E. v. and Schuh, M. Cytologic studies with the electron microscope. *J. Tech. Methods* **22**, 75-80 (1942).
1042. Hagerman, G. The order of magnitude of the fine particles of ground portland cement clinker. *Zement* **31**, 441-444 (1942).
1043. Hall, C. E., Jakus, M. A. and Schmitt, F. O. Electron microscope observations of collagen. *J. Am. Chem. Soc.* **64**, 1234 (1942).
1044. Hamann, A. The behavior of cellulose fibers in the electron microscope. *Kolloid Z.* **100**, 248-254 (1942).
1045. Hamly, D. H. and Watson, J. H. L. Electron and optical microscope interpretation of the wall of pleurosigma angulatum. *J. Optical Soc. Am.* **32**, 433-442 (1942).
1046. Hass, G. Electron microscopic and electron diffraction studies of the structure of evaporated metal films. *Kolloid Z.* **100**, 230-242 (1942).
1047. Heidenreich, R. D. Electron reflections in MgO crystals with the electron microscope. *Phys. Rev.* **62**, 292 (1942).
1048. Heidenreich, R. D. and Peek, V. G. Electron microscope study of surface structure. *Phys. Rev.* **62**, 291-293 (1942).
1049. Hess, K., Steurer, E. and Fromm, H. Influence of the grinding process on the properties of high polymers (cellulose and polystyrene) and on the nature of its action. I and II. *Kolloid Z.* **98**, 148-159; 290-304 (1942).
1050. Hillier, J. and Baker, R. F. The observations of crystalline reflections in electron microscope images. *Phys. Rev.* **61**, 722-723 (1942).
1051. Huber, H. and Wagener, S. X-ray and electron optical study of crystal structure of alkali earth oxide mixtures. *Z. tech. Physik* **23**, 1-12 (1942).
1052. Humbert, R. P. Particle shape and behavior of clays as revealed by the electron microscope. Symposium on testing and classification of ball clays. *Bull. Am. Ceram. Soc.* **21**, 260-263 (1942).
1053. Jakus, M. A., Hall, C. E. and Schmitt, F. O. Electron microscope studies of the structure of paramecium trichosis. *Anat. Rec.* **84**, 474-475 (1942).

1054. Jelley, E. E. Structure of the developed silver image as revealed by the electron microscope. *J. Phot. Soc. Am.* **8**, 283-289 (1942).
1055. Jung, F. Degeneration phenomena in erythrocytes. *Naturwissenschaften* **30**, 472-473 (1942).
1056. Jung, F. On the pathology of red blood corpuscles. I. Changes through simple physical influence. *Klin. Wochschr.* **21**, 917-922 (1942).
1057. Kelley, O. J. and Shaw, B. T. Studies of clay particles with the electron microscope. III. Hydrodynamic considerations in relation to shape of particles. *Proc. Soil Sci. Soc. Am.* **7**, 58-68 (1942).
1058. Kelley, W. P. and Page, J. B. Criteria for the identification of the constituents of soil colloids. *Proc. Soil Sci. Soc. Am.* **7**, 175-181 (1942).
1059. Knaysi, G. Width and origin of bacterial flagella: electron microscopic studies. *Science* **95**, 406-407 (1942).
1060. Kottmann, U. Morphological observations on "taches vierges" on coli cultures. *Arch. ges. Virusforsch.* **2**, 388-396 (1942).
1061. Levaditi, C. and Bonet-Maury. Electron supermicroscope for studying ultra virus. *Presse med.* **50**, 203-207 (1942).
1062. Luria, S. E. and Anderson, T. F. The identification and characterization of bacteriophages with the electron microscope. *Proc. Natl. Acad. Sci. U. S.* **28**, 127-130 (1942).
1063. Mahl, H. On thermally produced oxide films on aluminum. *Kolloid. Z.* **100**, 219-228 (1942).
1064. Mahl, H. The electron microscopic representation of surfaces with the replica method. *Naturwissenschaften* **30**, 207-217 (1942).
1065. Mahl, H. and Duffek, V. The electron microscope imaging with replica technique without damage to the surface of the object. *Arch. Eisenhüttenw.* **16**, 75-76 (1942).
1066. Mahl, H. and Pawlek, F. Electron microscopic structural investigations of non-alloyed steels. *Arch. Eisenhüttenw.* **16**, 219-222 (1942).
1067. Mahl, H. and Pawlek, F. Electron microscopic investigations of Al alloys. *Z. Metallkunde* **34**, 232-236 (1942).
1068. Mahl, H. and Stranski, I. N. Etch figures on aluminum crystal surfaces. I-II. *Z. physik. Chem.* **51**, 257-262; 319-346 (1942).
1069. Marquette, W. Review on the structure of cellulose fibers. *Rayon Textile Monthly* **23**, 518-519 (1942).
1070. Marshall, C. E., Humbert, R. P., Shaw, B. T., and Caldwell, O. G. Studies of clay particles with the electron microscope. II. The fractionation of beidellite, nontronite, magnesium bentonite, and attapulgite. *Soil Science* **54**, 149-157 (1942).
1071. Morton, H. E. and Anderson, T. F. Some morphologic features of the Nichols strain of treponema pallidum as revealed by the electron microscope. *Am. J. Syphilis, Gonorrhea, Venereal Diseases* **26**, 565-573 (1942).
1072. Mudd, S. The morphology of pathogenic bacteria and viruses as shown by the electron microscope with some practical implications. Robert James Terry Lecture, St. Louis Med. Soc. (1942).
1073. Mudd, S. and Anderson, T. F. Selective staining for electron microscopy: the effects of heavy metal salts on individual bacterial cell. *J. Exp. Med.* **76**, 103-108 (1942).
1074. Mudd, S., Polevitzky, K., and Anderson, T. F. Bacterial morphology as shown by the electron microscope. IV. Structural differentiation within the bacterial protoplasm. *Arch. Path.* **34**, 199-207 (1942).
1075. Mudd, S., Polevitzky, K., Anderson, T. F., and Kast, C. Bacterial morphology as shown by the electron microscope. III. Cell wall and protoplasm in a strain of fusobacterium. *J. Baet.* **44**, 361-366 (1942).
1076. Mueller, H. and Sakmann, B. W. Electro-optical properties of colloids. *J. Optical Soc. Am.* **32**, 309-317 (1942).
1077. Müller, H. O. Imaging of melting metal surfaces in the electron microscope. *Z. wiss. Mikroskop* **58**, 122-125 (1942).
1078. Müller, H. O. Measurement of the depth of electron microscopic objects. *Kolloid Z.* **99**, 6-28 (1942).
1079. Müller, H. O. and Pasewaldt, C. W. Observations on the fine structure of the test diatom Pleurosigma angulatum W. Sm. and stereoscopic pictures with the electron microscope. *Naturwissenschaften* **30**, 55-60 (1942).
1080. Polevitzky, K. and Anderson, T. F. The morphology of various bacterial forms, some of pathogenic significance in oral infections, as shown by the electron microscope. *J. Baet.* **43**, 66 (1942).

1081. Rawlins, T. E. Recent evidence regarding the nature of viruses. *Science* **96**, 425-426 (1942).
1082. Reumuth, H. The microscopic fine structure of wool. Contributions to morphology, histology and anatomy. *Kleipzg's Textil Z.* **45**, 149 (1942).
1083. Richards, A. G., Jr. and Anderson, T. F. Electron microscope studies of insect cuticle with a discussion of the application of electron optics to this problem. *J. Morph.* **71**, 135-183 (1942).
1084. Richards, A. G., Jr. and Anderson, T. F. Electron micrographs of insect tracheae. *J. N. Y. Entomol. Soc.* **50**, 147-167 (1942).
1085. Richards, A. G., Jr. and Anderson, T. F. Further electron microscope studies on arthropod tracheae. *J. N. Y. Entomol. Soc.* **50**, 245-247 (1942).
1086. Richards, A. G., Jr., Anderson, T. F. and Hance, R. T. A microtome sectioning technique for electron microscopy illustrated with sections of striated muscle. *Proc. Soc. Exp. Biol. Med.* **51**, 148-152 (1942).
1087. Rippel, A. Microbiology. *Forschungdienst, Sonderh.* **16**, 138-143 (1942).
1088. Roberts, E. A. The structure of chloroplasts, chromoplasts, leucoplasts and carotin crystals and their relationship to cellulose particles and colloidal carbon. *Am. J. Botany* **29**, Suppl. 16, (1942).
1089. Rosenblatt, M. B., Fullam, E. F. and Gessler, A. E. Studies of mycobacteria with the electron microscope. *Am. Rev. Tuberc.* **46**, 587-598 (1942).
1090. Rosenow, E. C. Microdiplococci in filtrates of natural and experimental poliomyelitic virus compared under the electron and light microscopes. *Proc. Staff Meetings Mayo Clinic* **17**, 99-106 (1942).
1091. Ross, S. Orientation of micelles in soap fibers. *J. Phys. Chem.* **46**, 414-417 (1942).
1092. Rüdiger, O. Use of beryllium for electron microscopic replica foil. *Naturwissenschaften* **30**, 279 (1942).
1093. Rüdiger, O. et al. Structural examination of steel with the electron microscope. *Arch. Eisenhüttenw.* **15**, 431-436 (1942).
1094. Ruska, E. Taking photographs with the electron microscope at high pressure. *Kolloid Z.* **100**, 212-219 (1942).
1095. Ruska, H. Electron microscopy of penetrated objects. *Jahrb. Auslands-amtes deut. Dozentenschaft* 201-211 (1942).
1096. Ruska, H. Electron microscopic investigations of asbestos dust and asbestos lungs. (Appendix to the paper of Kuhn, J.) *Arch. Gewerbepath. Gewerbehyg.* **11**, 575-578 (1942).
1097. Ruska, H. Morphological findings in cytolysis by bacteriophage. *Arch. ges. Virusforsch.* **2**, 345-387 (1942).
1098. Schaefer, V. J. New methods for preparing surface replicas for microscopic observation. *Phys. Rev.* **62**, 494-496 (1942).
1099. Schaefer, V. J. and Harker, D. Surface replicas for use in the electron microscope. *J. Applied Phys.* **13**, 427-433 (1942).
1100. Schmitt, F. O., Hall, C. E., and Jakus, M. A. Electron microscope investigations of the structure of collagen. *J. Cellular Comp. Physiol.* **20**, 11-53 (1942).
1101. Scott, G. H. and Anderson, T. F. A study of connective tissue with the electron microscope. *Anat. Record* **82**, 445 (1942).
1102. Sears, G. R. and Kregel, E. A. Application of the electron microscope to the problems of the pulp paper and paper board industry. *Paper Trade J.* **114**, 43-49 (1942).
1103. Semmler-Alter, E. Electron microscope observations on deep-etched aluminum and hydronalium. *Aluminum* **24**, 302-307 (1942).
1104. Semmler-Alter, E. The proper structure of aluminum oxide films for electron microscopic surface examinations. *Z. Metallkunde* **34**, 229-231 (1942).
1105. Semmler-Alter, E. Electron microscope investigation of martensite in different tempering stages in steel with 0.24% carbon. *Arch. Eisenhüttenw.* **16**, 223-225 (1942).
1106. Sharp, D. G., Taylor, A. R., Beard, D. and Beard, J. W. Study of the papilloma virus protein with the electron microscope. *Proc. Soc. Exp. Biol. Med.* **50**, 205-207 (1942).
1107. Sharp, D. G., Taylor, A. R., Beard, D., and Beard, J. W. Electron micrography of the western strain equine encephalomyelitis virus. *Proc. Soc. Exp. Biol. Med.* **51**, 206-207 (1942).
1108. Shaw, B. T. The nature of colloidal clay as revealed by the electron microscope. *J. Phys. Chem.* **46**, 1032-1043 (1942).

1109. Siegbahn, M. Stereoscopic micrographs taken with the electron microscope. *Nord. Tid. Fot.* **11**, (1942).
1110. Smadel, J. E., Anderson, T. F. and Green, R. H. Morphological structure of virus of vaccinia. *Proc. Soc. Exp. Biol. Med.* **49**, 686-688 (1942).
1111. Smakula, A. A remark on the paper of M. v. Ardenne "On an electron microscopic investigation of the structure of reflection reducing layers and the determination of such layers." *Z. angew. Phot.* **4**, 15-16 (1942).
1112. Stanley, W. M. and Anderson, T. F. Electron micrographs of protein molecules. *J. Biol. Chem.* **146**, 25-30 (1942).
1113. Strung, H. Contribution to the problem of "Pyroleisit." *Naturwissenschaften* **31**, 8) (1943).
1114. Taylor, A. R., Sharp, D. G., Beard, D. and Beard, J. W. Electron microscopy of the eastern strain equine encephalomyelitis virus. *Proc. Soc. Exp. Biol. Med.* **51**, 332-334 (1942).
1115. Thiessen, P. A. Reciprocal adsorption of colloids. *Z. Elektrochem.* **48**, 675-681 (1942).
1116. Thiessen, P. A. Relation between shape and properties of colloidal conglomerates. *Kolloid Z.* **101**, 241-248 (1942).
1117. Tiselius A. and Gard, S. Electron microscopic observations of poliomyelitis virus preparations. *Naturwissenschaften* **30**, 728-731 (1942).
1118. Umbreit, W. W. and Anderson, T. F. A study of thiobacillus thiooxidans with the electron microscope. *J. Bact.* **44**, 317-320 (1942).
1119. Wallner, L. The possibilities of electron microscopic structure determination of fibers. I, II, and III. *Melliand Textilber.* **23**, 158-162; 211-214; 261-263 (1942).
1120. Wergin, W. Discussion on electron microscopy of cellulose fibers. *Kolloid Z.* **100**, 436-437 (1942).
1121. Wergin, W. What does the electron microscope reveal regarding the structure of cellulose fibers? *Kolloid Z.* **98**, 131-141 (1942).
1122. Wessel, E. Electron microscope observations on tuberculosis bacillae from human typhus. *Z. Tuberk.* **88**, 22-36 (1942).
1123. Wiegand, W. B. and Ladd, W. A. Colloidal carbon as revealed by the electron microscope. *Rubber Age* **50**, 431-436 (1942).
1124. Wile, U. J., Picard, R. G. and Kearny, E. B. The morphology of spirochaete pallida in the electron microscope. *J. Am. Med. Assoc.* **119**, 880-881 (1942).
1125. Wolpers, C. Electron optical imaging of tertian malaria. *Klin. Wochschr.* **21**, 1049-1054 (1942).
1126. Wolpers, C. and Zwickau, K. On the problem of the "Erythrocyte" membrane. *Folia Haematol.* **66**, 211-221 (1942).
1127. Zahn, H. Electron micrographs of isolated spindle cells of sheep wool. II. *Melliand Textilber.* **23**, 157 (1942).

### 1943

1128. Anon. Polystyrene aids electron microscope. *Modern Plastics* **21**, 124-125 (1943).
1129. Alexander, L. T., Faust, G. T., Hendricks, S. B., Isley, H. and McMurdie, H. F. Relationships of the clay minerals halloysite and endellite. *Am. Mineral.* **28**, 1-18 (1943).
1130. Ardenne, M. v. Suitability of gelatin-free photographic film for electron microscopy. *Z. Physik* **121**, 1-6 (1943).
1131. Ardenne, M. v. Electron microcinematography with the universal electron microscope. *Z. Physik* **120**, 397-412 (1943).
1132. Ardenne, M. v. The production of the electron microscope films. *Fortschungen u. Fortschr.* **19**, 77-78 (1943).
1133. Ardenne, M. v. and Beischer, D. The electron microscope photographs of fine reaction layers on crystals of metal oxide smokes. *Kolloid Z.* **102**, 127-131 (1943).
1134. Ardenne, M. v. and Endell, K. The sintering of clay minerals and of sludge in naturally occurring moulding sands in the heating electron microscope. *Giesserei* **30**, 6-13 (1943).
1135. Ardenne, M. v., Endell, K. and Lehmann, H. The sintering of ceramic raw materials in the heating electron microscope. *Ber. deut. keram. Ges.* **24**, 73-88 (1943).
1136. Barnes, R. B. and Burton, C. J. The electron microscope and cellulose. *Ind. Eng. Chem.* **35**, 120-125 (1943).
1137. Barrett, C. S. Seeing metals at high magnification. *Machine Design* **15**, 138-140 (1943).

1138. Barrett, C. S. Metallography with the electron microscope. *Metals Technol.* **10**, 1-19 (1943).
1139. Baylor, M. R. B., Nalbandov, A. and Clark, G. L. Electron microscope study of sperm. *Proc. Soc. Exp. Biol. Med.* **54**, 229-232 (1943).
1140. Beischer, D. Electron microscopic investigations for the structure determination of colloidal particles. X. Electron microscopic investigation for the structure determination of colloidal systems. *Z. Elektrochem.* **49**, 463-466 (1943).
1141. Benard, J. An improvement in the technique of the investigation of metals by means of the electron microscope, serving to shorten the process. *Metaux et Corrosion* **18**, 48-49 (1943).
1142. Bole, G. A. and Loomis, G. A. Some physical procedures used in ceramic research. *J. Applied Phys.* **14**, 443-450 (1943).
1143. Burton, E. F. Electron microscope studies of the capture of airborne particles by single fibers. *Nature* **152**, 540 (1943).
1144. Chambers, L. A. and Henle, W. Studies on the nature of the virus of influenza. I. The dispersion of the virus of influenza A in tissue emulsions and in extraembryonic fluids of the chick. *J. Exp. Med.* **77**, 251-264 (1943).
1145. Chambers, L. A., Henle, W., Lauffer, M. A., and Anderson, T. F. Studies on the nature of the virus of influenza: II. The size of the infectious unit in influenza. *A. J. Exp. Med.* **77**, 265-276 (1943).
1146. Clark, G. L., Quaife, M. L., and Baylor, M. R. B. Electron microscope studies of proteins including some hemocyanins and nucleoproteins. *Biodynamica* **4**, 153-162 (1943).
1147. Eitel, W. Electron microscopy and electron diffraction of silicate meta-phases. I. On methalloysite (Eitel, W. and Radzewski, O. E.) II. The metaphase of brucite. (Eitel, W. and Kedesdy, H.) III. The metaphase of the dehydration of talc. (Eitel, W. and Kedesdy, H.) IV. Metakaolin. (Eitel, W. and Kedesdy, H.) Abhandl. preuss. Akad. Wiss. Math. naturw. Klasse **5**, 5-11; 13-20; 21-36; 37-45 (1943).
1148. Eitel, W. The electron microscope and its application to ceramic problems. *Ber. deut. keram. Ges.* **24**, 37-53 (1943).
1149. Eisenhut, O. and Kuhn, E. Light microscopic and electron microscopic investigations of natural and synthetic cellulose fibers. *Melliand Textilber.* **24**, 210 (1943).
1150. Elvers, I. On an application of the electron microscope to plant cytology. *Acta Horti Bergiani* **13**, 150-245 (1943).
1151. Endell, K. and Ardenne, M. v. Representation of sintering and melting of glass mixtures, soda and soda slags in the heating electron microscope. *Glasstech. Ber.* **21**, 121 (1943).
1152. Endell, K. and Ardenne, M. v. Representation of sintering and melting of ceramic raw materials of glass mixtures, of slags, and of coal ashes in the heating electron microscope. *Kolloid Z.* **104**, 223-231 (1943).
1153. Endell, K., Zinsen, A. and Ardenne, M. v. On the sintering and melting of coal ashes in the heating electron microscope and the importance of slag viscosity for the fueling of melting furnaces. *Feuerungstech* **31**, 73-84 (1943).
1154. Franz, E., Schiebold, E. and Wallner, L. Contributions of the electron microscope to the morphology of cellulose. *Forschungsber. Zellwolle, Kunstseide-Rings* **3**, 114 (1943).
1155. Franz, E., Schiebold, E. and Weygand, C. On the morphological structure of bacterial cellulose. *Naturwissenschaften* **31**, 350 (1943).
1156. Franz, E. and Schiebold, E. On the structure of bacterial cellulose. *J. makromol. Chem.* **3**, 4-16 (1943).
1157. Fullam, E. F. Magnification calibration of the electron microscope. *J. Applied Phys.* **14**, 677-683 (1943).
1158. Fullam, E. F. and Schuster, M. C. The diminutive diatom. *Interchem. Rev.* **2**, 34-36 (1943).
1159. Gard, S. Purification of poliomyelitis viruses. Experiments on murine and human strains. *Acta Med. Scand. Suppl.* **143** (1943).
1160. Gard, S. Comparative physico-chemical and electron microscopic studies of purified poliomyelitis virus preparations. *Arkiv. Kemi. Mineral. Geol.* **17B**, 1 (1943).
1161. Gard, S. Electron microscope observations on purified poliomyelitis virus preparations. II. A contribution to the question of the epidemiology of infantile paralysis. *Klin. Woehschr.* **22**, 315-318 (1943).

1162. Gard, S. Electron microscope observations on purified poliomyelitis virus preparations. III. A comparison with the results of physico-chemical experiments. *Arch. ges. Virusforsch.* **3**, 1-17 (1943).
1163. Gartner, K. The action of sulfonamide as revealed by fluorescent and electron microscopy. *Zentr. Bakt. Parasitenk.* **150**, 97-115 (1943).
1164. Glaser, R. W. and Stanley, W. M. Biochemical studies on the virus and the inclusion bodies of silkworm jaundice. *J. Exp. Med.* **77**, 451-466 (1943).
1165. Golz, E. Electron microscopic fine structure of fractured glass surfaces. *Z. Physik* **120**, 773-777 (1943).
1166. Golz, E. Surface electron microscopy of glass and ceramics by the replica method. *Z. tech. Physik* **24**, 8-11 (1943).
1167. Golz, E. Electron microscopy of glass surfaces. *Glastechn. Ber.* **21**, 121-148 (1943).
1168. Green, H. and Fullam, E. F. Some applications of the high resolving power of the electron microscope. *J. Applied Phys.* **14**, 332-340 (1943).
1169. Gunther, F. A contribution to the study of the influence of method of preparation on the electron microscope image of some highly polymeric organic substances. *Forschungsber. Zellwolle Kunstseide-Rings* **3**, 9 (1943).
1170. Hanke, W. Determination of the size and shape of ultramicroscopic particles. *Z. Physik* **121**, 438-458 (1943).
1171. Harker, D. and Schaefer, V. J. Metallography by electron microscope. *Metal Progress* **43**, 68-69 (1943).
1172. Harvey, E. B. and Anderson, T. F. The spermatozoon and fertilization membrane of arbaea punctulata as shown by the electron microscope. *Biol. Bull.* **85**, 151-156 (1943).
1173. Heidenreich, R. D. Interpretation of electron micrographs of silicon surface replicas. *J. Applied Phys.* **14**, 312-320 (1943).
1174. Heidenreich, R. D. and Peck, V. G. Fine structure of metallic surfaces with the electron microscope. *J. Applied Phys.* **14**, 23-29 (1943).
1175. Henle, W. and Henle, G. Interference of inactive virus with the propagation of virus of influenza. *Science* **98**, 87-89 (1943).
1176. Hess, K. Changes in air elutriated organic high polymers. *V. D. I. Beih. Verfahrenstech.* **3**, 61 (1943).
1177. Heubner, W. Toxicology of sulfonamide. *Deut. med. Wochschr.* **69**, 385-390 (1943).
1178. Hoek, C. W. and McMurdie, H. F. Structure of the wool fiber as revealed by the electron microscope. *J. Research Nat. Bur. Standards* **31**, 229-236 (1943).
1179. Hoek, C. W. and McMurdie, H. F. Structure of the wool fiber as revealed by the electron microscope. *Am. Dyestuff Repr.* **32**, 433-436; 451-454 (1943).
1180. Hofmann, U. The structure and technical properties of carbons. *Wien. Chem.-Ztg.* **46**, 97-106 (1943).
1181. Husemann, E. Electron microscopic investigations of ground cellulose fibers. *J. makromol. Chem.* **1**, 158-167 (1943).
1182. Husemann, E. and Carnap, A. Electron microscopic investigations of hydrolytically split fibers. *J. makromol. Chem.* **3**, 16-27 (1943).
1183. Hutchinson, W. G. and McCracken, M. R. Study of flagella of a fresh water bacterium by motion micro-photography and electron micrography. *J. Bact.* **45**, 305 (1943).
1184. Ingleman, B. and Siegbahn, K. An electron microscopic study of dextran molecules. *Arkiv. Kemi. Mineral. Geol.* **18**, 1-6 (1943).
1185. Johnson, F. H., Zworykin, N. and Warren, G. A study of luminous bacterial cells and cytolysates with the electron microscope. *J. Bact.* **46**, 167-185 (1943).
1186. Jungeblut, C. W. and Bourdillon, J. Electron micrography of murine poliomyelitis virus preparations. *J. Am. Med. Assoc.* **123**, 399-402 (1943).
1187. Kedesdy, H. Electron microscopic investigations of the roasting of tale and of steatite. *Ber. deut. keram. Ges.* **24**, 201-232 (1943).
1188. Kinder, E. Magnesium oxide crystals in the electron microscope. *Naturwissenschaften* **31**, 149 (1943).
1189. Kinder, E. and Suffert, F. On the fine structure of iridescent butterfly scales of the Morpho type. *Biol. Zentr.* **63**, 268-288 (1943).
1190. Knaysi, G. and Mudd, S. The internal structure of certain bacteria as revealed by the electron microscope. A contribution to the study of the bacterial nucleus. *J. Bact.* **45**, 349-359 (1943).

1191. Koch, P. A., Freytag, H. and Ardenne, M. v. Fiber examination with an electron microscope. *Glastech. Ber.* **21**, 249-255 (1943).
1192. Kolbe, R. W. and Golz, E. Electron microscopic diatom studies. *Ber. deut. botan. Ges.* **61**, 91-98 (1943).
1193. Krause, F. and Mahl, H. Electron microscopic surface representation of medico-biological objects with replica technique. *Kolloid Z.* **105**, 53-55 (1943).
1194. Lepsius, R. Methods of structural analysis of macromolecules. *Kunststoffe* **33**, 133-138 (1943).
1195. Levaditi, C. Appearance and dimensions of the elementary vaccine body and of normal bodies in the electron microscope. *Presse Méd.* **51**, 67 (1943).
1196. Linke, F. Condensation nuclei made visible in the electron microscope. *Naturwissenschaften* **31**, 230-231 (1943).
1197. Luria S. E., Delbrück, M. and Anderson, T. F. Electron microscope studies of bacterial viruses. *J. Bact.* **46**, 57-77 (1943).
1198. Magerstedt, C. The morphology of spirochaeta pallida. *Arch. Dermatol. u. Syphilis* **185**, 272-280 (1943).
1199. Mahl, H. The electron microscopic testing of light metal steel as material and workpiece. *Aluminum* **25**, 112-115 (1943).
1200. Mahl, H. Progress in surface electron microscopy with the replica method. *Metallwirtschaft* **22**, 9-12 (1943).
1201. Mahl, H. and Krause, P. Electron microscope imaging of surfaces of medico-biological objects with the replica technique. *Kolloid Z.* **105**, 33-35 (1943).
1202. Mahl, H. and Stranski, J. N. The behavior of aluminum in metallographic etching. *Naturwissenschaften* **31**, 12-17 (1943).
1203. Mahl, H. and Stranski, I. N. The block structure of cadmium single crystals. *Metallkunde* **35**, 147-151 (1943).
1204. Malmberg, E. W. and Chia-Si, Lu. Fine oxide smoke as a reference standard in electron wave-length calibration. *Rev. sci. Instruments* **14**, 271-273 (1943).
1205. Marx, T., Klemm, W. and Smekal, A. Electron microscope studies of scratches. *Naturwissenschaften* **31**, 143-144 (1943).
1206. Marx, T. and Wehner, G. Electron microscopic representation of the lamellar structure of magnesium hydroxide. *Kolloid Z.* **105**, 226-227 (1943).
1207. Miller, L. B. Dispersion of pigments and fillers for microscopical examination. *Paper Trade J.* **116**, 39-42 (1943).
1208. Morton, H. E. and Anderson, T. F. The morphology of *Leptospira icterohemorragiae* and *L. canicola* as revealed by the electron microscope. *J. Bact.* **45**, 143-146 (1943).
1209. Mudd, S. Changes in the bacterial cell brought about by the action of germicides and antibacterial substances as demonstrated by the electron microscope. *Am. J. Public Health* **33**, 167-168 (1943).
1210. Mudd, S., Heinmets, F., and Anderson, T. F. The pneumococcal capsular swelling reaction studied with the aid of the electron microscope. *J. Exp. Med.* **78**, 327-332 (1943).
1211. Mudd, S., Heinmets, F. and Anderson, T. F. Bacterial morphology as shown by the electron microscope. VI. Capsule, cell-wall, and inner protoplasm of pneumococcus, type III. *J. Bact.* **46**, 205-211 (1943).
1212. Mudd, S., Polevitsky, K. and Anderson, T. F. Bacterial morphology as shown by the electron microscope. V. *Treponema pallidum*, *T. macrodantum*, and *T. microdentum*. *J. Bact.* **46**, 15-24 (1943).
1213. Müller, H. O. Three dimensional compression of super-microscopic particles. *Z. Ver. deut. Ing.* **87**, 229-230 (1943).
1214. Müller, H. O. Calculation of depth of electron microscopic objects. *Kolloid Z.* **99**, 7-27 (1943).
1215. Pfankuch, E. and Piekenbrock, F. On the splitting of the virus proteins of the tobacco mosaic group. *Naturwissenschaften* **31**, 94 (1943).
1216. Picard, R. G. and Duffendack, O. S. Studies on the structure of thin metallic films by means of the electron microscope. *J. Applied Phys.* **14**, 291-305 (1943).
1217. Plotz, H., Smadel, M. J. E., Anderson, T. F. and Chambers, L. A. Morphological structure of *Rickettsiae*. *J. Exp. Med.* **77**, 355-358 (1943).
1218. Preckshot, G. W., De Lisle, N. G., Cottrell, C. E. and Katz, D. L. Asphaltic substances in crude oils. *Trans. Am. Inst. Mining Met. Eng. Petroleum Division* **151**, 188-205 (1943).

1219. Ragoss, A., Hofmann, U. and Holst, R. The graphitizing of Thermax-carbon. *Kolloid Z.* **105**, 118 (1943).  
 1220. Richards, A. G. Jr., Steinbach, H. B. and Anderson, T. F. Electron microscope studies of squid giant nerve axoplasm. *J. Cellular Comp. Physiol.* **21**, 129–137 (1943).  
 1221. Ruska, H. Attempt at a classification of the virus species. *Arch. ges. Virusforsch.* **2**, 480–498 (1943).  
 1222. Ruska, H. On the virus of chickenpox and herpes. *Klin. Woehschr.* **22**, 703 (1943).  
 1223. Ruska, H. The agent of spinal infantile-paralysis. *Umschau* **47**, 216–217 (1943).  
 1224. Ruska, H. Results of bacteriophage research and their interpretation by morphological findings. *Ergeb. Hyg. Bakt. Immunitätsforsch. Exp. Therap.* **25**, 437–498 (1943).  
 1225. Ruska, H. Extension of microscopical vision and its effect on morphology, colloid-research and microbiology. *Jahrb. Auslandsamtes deut. Dozentenstiftshaft* 65–71 (1943).  
 1226. Ruska, H. and Kausche, G. A. On the form, size distribution and structure of some elementary virus bodies. *Zentr. Bakt. Parasitenk.* **150**, 311–318 (1943).  
 1227. Ruttmann, W., Ziesecke, J. and Wolff, U. Metallographic investigations with the electron microscope of steel by the reflection method. *Arch. Eisenhüttenw.* **16**, 469–474 (1943).  
 1228. Schaefer, V. J. Surface replicas containing dye for use in light microscope. *Metal Progress* **44**, 72–74 (1943).  
 1229. Schaefer, V. J. Dry stripped replicas for the electron microscope. *Science* **97**, 188 (1943).  
 1230. Schmidt, R. W. Oxidation of metal powders in electron microscopic investigations. *Kolloid Z.* **102**, 15–17 (1943).  
 1231. Schmitt, F. O., Hall, C. E. and Jakus, M. A. The ultrastructure of protoplasmic fibrils. *Biol. Symposia* **10**, 261–276 (1943).  
 1232. Sehramm, G. On the splitting of tobacco mosaic virus into low molecular proteins and the reformation of high molecular proteins from the products of the splitting. *Naturwissenschaften* **31**, 94–96 (1943).  
 1233. Semmler-Alter, E. Electron microscopic surface representation of some metallographic materials with replica technique. *Metallwirtschaft* **22**, 303–307 (1943).  
 1234. Semmler-Alter, E. Electron microscope studies with aluminum surfaces. *Aluminum* **24**, 302–307 (1942); *Light Metals* **6**, 20–24 (1943).  
 1235. Semmler-Alter, E. Methods and results of application of electron microscope to metallography. *Rev. mét.* **40**, 3, (1943).  
 1236. Seymour, F. J. Electron microscope, fertility, and gynecology. *Med. Woman's J.* **50**, 151 (1943).  
 1237. Sharp, D. G., Taylor, A. R., Beard, D., and Beard, J. W. Morphology of the Eastern and Western strains of the virus of equine encephalomyelitis. *Arch. Path.* **36**, 167–176 (1943).  
 1238. Sjostrand, F. Electron microscopic examination of tissues. *Nature* **151**, 725–726 (1943).  
 1239. Sjostrand, F. A new method for the production of very thin sections for electron microscope observation of tissues, and some preliminary electron microscopic observations on the submicroscopic structure of "Skelett" muscle fibers. *Arkiv. Zool.* **35A**, 1–18 (1943).  
 1240. Sjostrand, F. Fixation and preparation of tissues for electron microscopic examination. *Nord. Med.* **19**, 1207–1212 (1943).  
 1241. Sliepevich, C. M., Gildart, L., and Katz, D. M. Crystals from Portland cement hydration; an electron microscope study. *Ind. Eng. Chem.* **35**, 1178–1187 (1943).  
 1242. Stanley, W. M. Viruses and the electron microscope. *Chronica Botan.* **7**, 291–294 (1943).  
 1243. Staudinger, M. Macromolecular compounds. Microscopic and electron microscopic investigations of macromolecular materials. *Chem. Ztg.* **67**, 316–320 (1943).  
 1244. Strunz, H. Contributions to the pyrolusite problem. *Naturwissenschaften* **31**, 89–91 (1943).  
 1245. Taylor, A. R., Sharp, D. G., Beard, D., Beard, J. W., Dingle, J. H., and Feller, A. E. Isolation and characterization of influenza virus A (PR 8 Strain). *J. Immunol.* **47**, 261–282 (1943).

1246. Taylor, A. R., Sharp, D. G., McLean, I. W. Jr., Beard, D., Beard, J. W., Dingle, J. H. and Feller, A. E. Purification and character of the swine influenza virus. *Science* **98**, 587-589 (1943).
1247. Thiesessen, P. A. The cause of dichroism of colloidal metals. *Z. anorg. u. allgem. Chem.* **250**, 352-356 (1943).
1248. Troch, P. Electron microscope observation of tuberculosis bacillae after "Peteosthor" treatment. *Z. Hyg. Infektionskrankh.* **124**, 513-518 (1943).
1249. VonKennel, J., Kimmig, J., and Lembke, A. Gas analytic and electron optical examination of the effect of sulfanilamide. *Deut. med. Wochschr.* **69**, 129-130 (1943).
1250. Weiss, L. J. Electron micrographs of Rickettsiae of typhus fever. *J. Immunol.* **47**, 353-357 (1943).
1251. Weiss, L. J. Electron micrographs of bacteria medicated with penicillin. *Proc. Indiana Acad. Sci.* **52**, 27-29 (1943).
1252. Wile, W. J. and Kearney, E. B. The morphology of *Treponema pallidum* in the electron microscope; demonstration of flagella. *J. Am. Med. Assoc.* **122**, 167-168 (1943).
1253. Wolpers, C. Transverse striation in collagens and basic material. *Klin. Wochschr.* **22**, 624 (1943).
1254. Zahn, H. Electron micrographs of isolated epithelial cells of sheep wool. *Melliand Textilber.* **24**, 157-160 (1943).
1255. Zworykin, V. K. Applications of the electron microscope in metallurgy. *Trans. Am. Inst. Mining Met. Engrs. Inst. Metals Div.* **152**, 13-37 (1943).

#### 1944

1256. Baker, R. F. and Nicoll, F. H. On the silica replica method of surface examination with the electron microscope. *J. Applied Phys.* **15**, 803-805 (1944).
1257. Barrett, C. S. Electron microscope in metallurgical research. *J. Applied Phys.* **15**, 691-696 (1944).
1258. Barrett, C. S. Metallography with the electron microscope. *Trans. Am. Inst. Mining Metal. Engrs.* **156**, 62-80 (1944).
1259. Baylor, M. R. B., Severens, J. M. and Clark, G. J. Electron microscope studies of the bacteriophage of *Salmonella pullorum*. *J. Bact.* **47**, 277-282 (1944).
1260. Beard, J. W., Sharp, D. G., Taylor, A. R., McLean, I. W. Jr., Beard, D., Feller, A. E. and Dingle, J. H. Ultracentrifugal, chemical and electron microscopic identification of the influenza virus. *Southern Med. J.* **37**, 313-320 (1944).
1261. Borries, B. v. and Glaser, W. On the rise in temperature of objects in the electron microscope. *Kolloid Z.* **106**, 123-128 (1944).
1262. Crane, H. R. Direct centrifugation onto electron microscope specimen film. *Rev. Sci. Instruments* **15**, 253 (1944).
1263. Dubin, J. N. and Sharp, D. G. Comparison of the morphology of *bacillus megatherium* with light and electron microscopy. *J. Bact.* **48**, 313-329 (1944).
1264. Dusek, V. and Mahl, H. Electron microscopic examination of metal surfaces by the replica method, without injuring the surface. *Arch. Eisenhüttenw.* **16**, 73-76 (1944).
1265. Edwards, J. D. and Keller, F. The structure of anodic oxide coatings. *Trans. Am. Inst. Mining Met. Engrs. Inst. Metals Div.* **156**, 288-300 (1944).
1266. Eyer, H. and Ruska, H. On the fine structure of spotted fever. *Z. Hyg. Infektionskrankh.* **125**, 483-492 (1944).
1267. Frey-Wyssling, A. and Mühlthaler, K. Electron microscope pictures of the submicroscopic structure of a gel. *Vierteljahrsschr. naturforsch. Ges. Zürich.* **89**, 214-215 (1944).
1268. Fuller, M. L. Twinning in fine oxide. *J. Applied Phys.* **15**, 164-170 (1944).
1269. Fuller, M. L., Brubaker, D. G., and Berger, R. W. Mounting of pigments for electron microscopy. *J. Applied Phys.* **15**, 201 (1944).
1270. Gard, S., Snellman, O. and Tyren, H. Studies on macromolecular components in faeces and intestinal contents. The Swedberg, 1884-1944. Almerist and Wiksell, Uppsala, 1945, 530-539 (1944).
1271. Gerould, C. H. Ultramicrostructures of the human tooth as revealed by the electron microscope. *J. Dental Research* **23**, 239-245 (1944).

1272. Götz, E. and Kolbe, R. W. Electron microscope study of diatoms. *Ber. deut. bot. Ges.* **61**, 91 (1944).
1273. Haardick, H., Kausche, G. A. and Ruska, H. Electron microscopic determination of the concentration of tobacco mosaic virus solutions. *Naturwissenschaften* **32**, 226–228 (1944).
1274. Heidenreich, R. D. and Mathieson, L. A. Electron microscopic determination of surface elevations and orientations. *J. Applied Phys.* **15**, 423–435 (1944).
1275. Hall, C. E., Hauser, E. A., Le Beau, D. S., Schmitt, F. O. and Talalay, P. Natural and synthetic rubber fibers; electron microscope studies. *Ind. Eng. Chem.* **36**, 634–640 (1944).
1276. Hendriks, S. B., Wildman, S. G. and McMurdie, H. F. Morphology of latex particles as shown by electron micrographs. *India Rubber World* **110**, 297 (1944).
1277. Hoagland, C. L. The chemistry of viruses. *Ann. Rev. Biochem.* **12**, 615–638 (1944).
1278. Hock, C. W. and McMurdie, H. F. Structure of the wool fiber as revealed by the electron microscope. *Am. Dyestuff Repr.* **32**, 433–436; 451–454 (1944).
1279. Hofer, A. W. Electron microscope studies on azobacter flagellation and rhizobium bacteriophage. *J. Bact.* **47**, 415–416 (1944).
1280. Hofer, A. W. Flagellation of azotobacter. *J. Bact.* **48**, 697–701 (1944).
1281. Huggin, M. L. Photography of crystal structures. *J. Chem. Phys.* **12**, 520 (1944).
1282. Ingelman, B. and Siegbahn, K. Dextrans and levan molecules studied with the electron microscope. *Nature* **154**, 237–238 (1944).
1283. Ingelman, B. and Siegbahn, K. Electron microscopic study of dextran molecules. *Arkiv. Kemi Mineral Geol.* **18B**, 1 (1944).
1284. Jakus, M. A., Hall, C. E. and Schmitt, F. O. Electron microscope observations of clam muscle fibrils. *J. Am. Chem. Soc.* **66**, 313–314 (1944).
1285. Johnson, F. H. Observations on the electron microscopy of *B. cereus*, and Tyrothricin action. *J. Bact.* **47**, 551–557 (1944).
1286. Jung, F. and Asen, A. Reticulocytes. *Klin. Wochschr.* **23**, 115–117 (1944).
1287. Kausche, G. A. Electron microscopic determination of the concentration of tobacco virus solutions. *Naturwissenschaften* **39**, 226–228 (1944).
1288. Keller, F. and Geisler, A. H. Application of electron microscope to study of aluminum alloys. *Metals Technol.* **11**, Tech. Pub. 1700, 1–17 (1944).
1289. Keller, F. and Geisler, A. H. Extending microscopic examination of metals. *J. Applied Phys.* **15**, 696–704 (1944).
1290. Knight, C. A. A sediment component of allantoic fluid and its relationship to influenza viruses. *J. Exp. Med.* **80**, 83–100 (1944).
1291. Kratky, O., Sekora, A. and Weber, H. H. New small angle interferences in myosin. *Naturwissenschaften* **31**, 91 (1944).
1292. Krause, F. Imaging of tissue with the electron microscope. *Deut. med. Wochschr.* **70**, 532–534 (1944).
1293. Ladd, W. A. Electron microscope studies of colloidal carbon in vulcanized rubber. *Ind. Eng. Chem., Anal. ed.* **16**, 642–644 (1944).
1294. Lauffer, M. A. The size and shape of tobacco mosaic virus particles. *J. Am. Chem. Soc.* **66**, 1188–1201 (1944).
1295. Lauffer, M. A., and Miller, G. L. The sedimentation rate of the biological activities of influenza A virus. *J. Exp. Med.* **80**, 525–533 (1944).
1296. Lauffer, M. A., Stanley, W. M. Biophysical properties of preparations of PR8 influenza virus. *J. Exp. Med.* **80**, 535–552 (1944).
1297. Lehmann, H., Endell, K. and Ardenne, M. v. The process of sintering and melting of some ceramic materials in the heating electron microscope. *Sprechsaal* **77**, 21–28 (1944).
1298. Levy, G. B. Dark field illumination in electron microscopy. *J. Applied Phys.* **15**, 623–625 (1944).
1299. Liebermeister, K. Electron microscope investigations on the effect of Cibazol on haemolytic Staphylococci. *Deut. med. Wochschr.* **70**, 125–130 (1944).
1300. Magerstedt, C. A contribution to the morphology of the syphilis spirochetes. *Arch. Dermatol. u. Syphilis* **185**, 272–280 (1944).
1301. Mahl, H. On the production and stripping of thin surface films with regard to replica technique. *Korrosion u. Metallschutz* **20**, 225–228 (1944).
1302. Mahl, H. and Raether, H. Surfaces of polished rock salt crystals. *Physik. Z.* **122**, 660 (1944).

1303. Martin, D., Baylor, M. R. B., and Clark, G. L. A preliminary electron microscope study of the active deposit from radiothorium. *Science* **99**, 185 (1944).
1304. Marton, L. Stereoscopy with the electron microscope. *J. Applied Phys.* **15**, 726-727 (1944).
1305. Marton, L. Electron microscope study of ferromagnetic domains. *Phys. Rev.* **65**, 353-354 (1944).
1306. McMurdie, H. F. Microscopic and diffraction studies on dry cells and their raw materials. *Trans. Electrochem. Soc.* **86**, 313-326 (1944).
1307. Melnick, J. L. Detection with the electron microscope of rod-shaped particles in stools of normal and poliomyelitic individuals. *J. Immunol.* **48**, 25-28 (1944).
1308. Miller, G. L. Influence of pH and of certain other conditions on the stability of the infectivity and red cell agglutinating activity of influenza virus. *J. Exp. Med.* **80**, 511-524 (1944).
1309. Miller, G. L., Laufer, M. A. and Stanley, W. M. Electrophoretic studies on PR8 influenza virus. *J. Exp. Med.* **80**, 553-563 (1944).
1310. Mrgudich, J. N. and Clock, R. C. X-ray and electron microscope evaluation of carbon blacks. *Trans. Electrochem. Soc.* **86**, 351-364 (1944).
1311. Mudd, S. Relationship of virus to immunity as shown by electron microscope. *J. Am. Med. Assoc.* **126**, 636-639 (1944).
1312. Mudd, S. and Anderson, T. F. Pathogenic bacteria, Rickettsias and viruses as shown by the electron microscope. *J. Am. Med. Assoc.* **126**, 561-571; 632-639 (1944).
1313. Müller, H. O. An arrangement for the accurate exposure of electron micrographs. *Kolloid Z.* **109**, 152-156 (1944).
1314. Nissen, H. F. Electron sensitivity of various photographic layers. *Z. Physik* **122**, 573-588 (1944).
1315. Pohlmann, R. and Wolpers, C. On the behavior of histological suspensions in ultrasonic field. *Kolloid Z.* **109**, 106-112 (1944).
1316. Pool, M. L. Portable demonstration electron microscope. *Phys. Rev.* **65**, 353 (1944).
1317. Rawlings, T. E. Stream double refraction studies on the orientation of tobacco mosaic virus particles. *Science* **99**, 447-449 (1944).
1318. Richards, A. G. Electron micrographs of mosquito microtrichiae. *Entomol. News.* **55**, 260-262 (1944).
1319. Richards, A. G. and Thomassen, L. Microstructures of tooth surfaces as revealed by the electron microscope. *J. Am. Dental Assoc.* **31**, 772-776 (1944).
1320. Ruess, G. L. Heating of the object in the Siemens electron microscope. *Kolloid Z.* **109**, 149-152 (1944).
1321. Ruska, H. On the elementary bodies of the bronchopneumonia virus of mice. *Klin. Wochschr.* **23**, 121-122 (1944).
1322. Schmitt, F. O. Structural proteins of cells and tissues. *Advances in Protein Chemistry* **1**, 25-68 (1944).
1323. Schmitt, F. O. X-ray and electron microscopic studies of the structure of collagen fibers. *J. Am. Leather Chemists Assoc.* **39**, 430-431 (1944).
1324. Semmler-Alter, E. and Ziesecke, I. Comparison between the reflection and replica methods for electron microscopic representation of surfaces. *Z. Metallkunde* **36**, 115-120 (1944).
1325. Sharp, D. G., Taylor, A. R., McLean, I. W., Jr., Beard, D. and Beard, J. W. Sedimentation velocity and electron micrographic studies of viruses A (PR8 strain) and B (Lee strain) and swine influenza virus. *J. Biol. Chem.* **156**, 585-600 (1944).
1326. Sharp, D. G., Taylor, A. R., McLean, I. W., Jr., Beard, D. and Beard, J. W. Density and size of influenza virus A (PR8 strain) in solution. *Science* **100**, 151-153 (1944).
1327. Sharp, D. G., Taylor, A. R., McLean, I. W., Jr., Beard, D., Beard, J. W., Feller, A. E. and Dingle, J. H. Isolation and characterization of influenza virus B (Lee strain). *J. Immunol.* **48**, 129-153 (1944).
1328. Sollner, K. and Anderman, J. Structure of the collodion membrane and its electrical behavior. *J. Gen. Physiol.* **27**, 433-460 (1944).
1329. Stanley, W. M. The size of influenza virus. *J. Exp. Med.* **79**, 267-283 (1944).
1330. Taylor, A. R., Sharp, D. G., McLean, I. W., Jr., Beard, D., Beard, J. W., Dingle, J. H. and Feller, A. E. Purification and character of the swine influenza virus. *J. Immunol.* **48**, 361-379 (1944).
1331. Waugh, D. F. The linkage of corpuscular protein molecules. I. A fibrous modification of insulin. *J. Am. Chem. Soc.* **66**, 663 (1944).

1332. Weiss, L. J. Application of the electron microscope to biological research. Proc. Indiana Acad. Sci. **53**, 53-54 (1944).
1333. Weiss, L. J. Electron micrographs of pleuropneumonia-like organisms. J. Bact. **47**, 523-527 (1944).
1334. Williams, R. C. and Wyckoff, R. W. G. Thickness of electron microscopic objects. J. Applied Phys. **15**, 712-715 (1944).
1335. Wolpers, C. Comments on the paper of F. Krause; "The imaging of tissues with the electron microscope." Deut. med. Wochschr. **70**, 435 (1944).
1336. Wolpers, C. Electron microscope imaging of elastic tissue elements. Klin. Wochschr. **23**, 169-172 (1944).
1337. Wolpers, C. The cross striation of collagen fibers. Virchow's Arch. Path. Anat. **312**, 292-302 (1944).

### 1945

1338. Anderson, T. F. On a bacteriolytic substance associated with a purified bacterial virus. J. Cellular Comp. Physiol. **25**, 1-16 (1945).
1339. Anderson, T. F. The activity of a bacteriostatic substance in the reaction between bacterial virus and host. Science **101**, 565-566 (1945).
1340. Babudieri, B. and Bietti, G. B. Electron microscopic observation on bacteriolytic produced by the lysozyme of tears. Archives of Ophthalmology **33**, 449-454 (1945).
1341. Barnes, R. B., Burton, C. J., and Scott, R. G. Electron microscopical replica techniques for the study of organic surfaces. J. Applied Phys. **16**, 730-739 (1945).
1342. Bawden, F. C. and Pirie, N. W. The separation and properties of tobacco mosaic virus in different states of aggregation. Brit. J. Exp. Path. **26**, 294 (1945).
1343. Baylor, M. B., Appleman, M. D., Sears, O. H., and Clark, G. L. Some morphological characteristics of nodule bacteria as shown by the electron microscope. J. Bact. **50**, 249-256 (1945).
1344. Beard, J. W. Ultracentrifugal chemical and electron micrographic characters of purified animal viruses. Proc. Inst. Med. Chicago **15**, 294-313 (1945).
1345. Brubaker, D. G. Light and electron microscopy of pigments. Ind. Eng. Chem. Anal. Ed. **17**, 184-187 (1945).
1346. Boyer, R. F., and Heidenreich, R. D. Molecular weight studies on high polymers with the electron microscope. J. Applied Phys. **16**, 621-639 (1945).
1347. Brown, H. P. On the structure and mechanics of the protozoan flagellum. Ohio J. Sci. **45**, 247-278 (1945).
1349. Bruck, H. and Grivet, P. The electron microscope. Application of the electrostatic microscope of the Compagnie Générale de Télégraphie. Comm. tech. états propriétés surface metaux, Journées états surface (Paris) 162-176 (1945).
1350. Caldwell, W. C. The evaporation of molten metals from hot filaments. J. Applied Phys. **12**, 779 (1945).
1351. Chaudron, G. Surface-study meeting. Rev. mét. **42**, 305-307 (1945).
1352. Claude, A. and Fullam, E. F. An electron microscope study of isolated mitochondria. J. Exp. Med. **81**, 51-62 (1945).
1353. Clark, G. L., Baylor, M. R. B., Martin, D. E. and Rafferty, G. T. Electron microscope in dermatology. Arch. Dermatol. and Syphilol. **51**, 81-89 (1945).
1354. Donges, D. and Fricke, R. Composition structure of antimony cinnabar and the surface energy of  $Sb_2S_3$ . Z. anorg. Chem. **253**, 2 (1945).
1355. Donovick, R. and Wyckoff, R. W. G. The comparative potencies of several typhus vaccines. U. S. Public Health Service, Pub. Health Repts. **60**, 605 (1945).
1356. Donovick, R. and Wyckoff, R. W. G. Tests of epidemic typhus vaccines. U. S. Public Health Service, Pub. Health Repts. **60**, 560 (1945).
1357. Drummond, D. G. The preparation of specimens for the electron microscope. Electronic Eng. **17**, 807-809 (1945).
1358. Gard, S. Preparation of bacterial flagellae. Arkiv Kemi Mineral. Geol. **19A**, 21 (1945).
1359. Gerould, C. H. Electron microscope study of the mechanism of fluorine deposition in teeth. J. Dental Research **24**, 223 (1945).

1360. Gratia, A. The electron microscope in the study of bacteriophage. *Bull. Acad. roy. med. Belg.* **10**, 139-150 (1945).
1361. Gulbransen, E. A., Phelps, R. T. and Langer, A. A use of the electron microscope in chemical microscopy. *Ind. Eng. Chem., Anal. Ed.* **17**, 646-652 (1945).
1362. Hall, C. E., Jakus, M. A., and Schmitt, F. O. Structure of certain muscle fibrils as revealed by the use of electron stains. *J. Applied Phys.* **16**, 459-463 (1945).
1363. Han-braeus, G. and Ranby, B. Electron microscopic investigation of precipitates of cellulose nitrates. *Nature* **155**, 200-201 (1945).
1364. Harker, D. and Murphy, M. J. The study of age-hardening using the electron microscope and formvar replicas. *Trans. Am. Inst. Mining Met. Eng.* **161**, 75-89 (1945).
1365. Heidenreich, R. D. Electron microscope investigation of surface structure. *S. A. E. Journal* **53**, 588-594 (1945).
1366. Heidenreich, R. D. Techniques in applied electron microscopy. *J. Optical Soc. Am.* **35**, 139-148 (1945).
1367. Heidenreich, R. D. and Sturkey, L. Crystal interference phenomena in electron microscope images. *J. Applied Phys.* **16**, 97-105 (1945).
1368. Herschan, H. K. Replica method for evaluating finish of a metal surface. *Mech. Eng.* **67**, 119-122 (1945).
1369. Jakus, M. A. The structure and properties of the trichocysts of paramecium. *J. Exp. Zool.* **100**, 457-485 (1945).
1370. Katz, D. L. and Beu, K. E. Nature of asphaltic substances. *Ind. Eng. Chem.* **37**, 195-200 (1945).
1371. Knight, C. A. The preparation of highly purified PR8 influenza virus from infected mouse lungs. *Science* **101**, 231-232 (1945).
1372. Ladd, W. A., Wiegand, W. B. Electron microscope studies of colloidal carbon reticulate chain structure. *Rubber Age* **57**, 299-307 (1945).
1373. Lepine, P. French electron microscope, first applications to biological research. *Bull. Acad. Méd. (Paris)* **129**, 653-655 (1945).
1374. McCartney, J. T. Determination of the size distribution of fine coal particles by the electron microscope. *U. S. Bur. Mines, Rep. Invest.* **3827**, 1-11 (1945).
1375. McCarty, M. Reversible inactivation of the substance inducing transformation of pneumococcal types. *J. Exp. Med.* **81**, 501-514 (1945).
1376. McLean, I. W., Jr., Beard, D., Taylor, A. R., Sharp, D. G., and Beard, J. W. The antibody response of swine to vaccination with inactivated swine influenza virus. *Nature* **101**, 544-546 (1945).
1377. Mahl, H. Electron microscopic studies of surfaces. *Ergeb. Exakt. Naturw.* **21**, 262-312 (1945).
1378. Mahl, H. and Raether, H. Electron microscopic studies of treated surfaces. *Reichsber. Physik.* **1**, 166-168 (1945).
1379. Möllenstedt, G. Silicate glass as a permanent temperature-stable, and acid-resistant foil for electron interference and electron microscopy *Reichsber. Physik.* **1**, 108-110 (1945).
1380. O'Brien, H. C. Pigment dispersion methods for electron microscopy. *J. Applied Phys.* **16**, 370-372 (1945).
1381. Olsen, L. O., Smith, C. S., and Crittenden, E. C., Jr. Techniques for evaporation of metals. *J. Applied Phys.* **16**, 425-434 (1945).
1382. Ostroumov, B. A. Electron microscopic metallography. *Zavodskaya Lab.* **11**, 554-561 (1945).
1383. Porter, K. R., Claude, A., and Fullam, E. F. A study of tissue culture cells by electron microscopy. *J. Exp. Med.* **81**, 233-246 (1945).
1384. Powers, D. H. Effect of synthetic resins on cellulose and protein fibers. *Ind. Eng. Chem.* **37**, 188-193 (1945).
1385. Price, W. C., Williams, R. C., Wyckoff, R. W. G. The electron micrography of crystalline plant viruses. *Science* **102**, 277-278 (1945).
1386. Schmitt, F. O. Ultra structure and the problem of cellular organization. *Harvey Lectures* **40**, 249-268 (1945).
1387. Sharp, D. G. and Taylor, A. R. Electron microscope. Its operation and application to study of viruses and other disease agents. *Merck Rept.* **54**, 4-8 (1945).
1388. Shekhter, A., Roginskii, S. Z. and Isayev, B. M. Electron microscopical investigation of catalyst. I. Asbestos as carrier. *Acta Physicochim. URSS* **20**, 217-226 (1945).
1389. Stanley, W. M. The preparation and properties of influenza virus vaccines concentrated and purified by differential centrifugation. *J. Exp. Med.* **81**, 193-218 (1945).

1391. Thielsch, H. Ion-migration phenomena observed with the electron microscope. *J. Chem. Phys.* **13**, 249-250 (1945).  
 1392. Thomassen, L., Williams, R. C. and Wyckoff, R. W. G. Surface replicas for electron microscopy. *Rev. Sci. Instruments* **16**, 155-156 (1945).  
 1393. Turkevich, J. Electron microscopy of catalysts. *J. Chem. Phys.* **13**, 235-239 (1945).  
 1394. Weitbrecht, G. and Fricke, R. Particle size, lattice distortion, and secondary structure of  $\text{Al}_2\text{O}_3$  and its parent substances. *Z. anorg. Chem.* **253**, 9-29 (1945).  
 1395. Williams, R. C. and Wyckoff, R. W. G. Electron shadow micrography of the tobacco mosaic virus protein. *Science* **101**, 594-596 (1945).  
 1396. Williams, R. C. and Wyckoff, R. W. G. Electron shadow-micrographs of virus particles. *Proc. Soc. Exp. Biol. Med.* **59**, 265-270 (1945).  
 1397. Williams, R. C. and Wyckoff, R. W. G. Electron shadow-micrographs of haemocyanin molecules. *Nature* **156**, 68-70 (1945).  
 1398. Wyckoff, R. W. G. and Rhian, M. An electrophoretic study of an anti-influenza horse serum. *J. Immunol.* **51**, 359-363 (1945).  
 1399. Wyckoff, R. W. G. Some biophysical problems of viruses. *Science* **101**, 129-136 (1945).

#### 1946

1400. Anderson, T. F. The electron microscope in medical research. *Radiography and Clinical Photography* **22**, 15-19 (1946).  
 1401. Anon. Shadowed electron micrographs of viruses. *J. Am. Med. Assoc.* **131**, 1062 (1946).  
 1402. Anon. Electron microscope probes atomic nature of rust. *Steel* **118**, 78-79 (1946).  
 1403. Bachman, G. S., Fischer, R. B. and Badger, A. E. Observation of gold particles in glass with the electron microscope. *Glass Ind.* **27**, 399-422 (1946).  
 1404. Bang, F. B. Studies on Newcastle disease virus. III. Characters of the virus itself with particular reference to electron microscopy. *J. Exp. Med.* **88**, 251-266 (1946).  
 1405. Bang, F. B. Filamentous forms of Newcastle virus. *Proc. Soc. Exp. Biol. Med.* **63**, 5-7 (1946).  
 1406. Benson, G. Acetylene black on rubber. *Rubber Age* **58**, 461-465 (1946).  
 1407. Black, L. M., Price, W. C. and Wyckoff, R. W. G. The electron micrography of plant virus antibody mixtures. *Proc. Soc. Exp. Biol. Med.* **61**, 9-12 (1946).  
 1408. Boeke, J. Electrical measuring instruments in chemistry during the war. *Chem. Weekblad* **42**, 230-237 (1946).  
 1409. Bruck, H. and Grivet, P. Application of the electrostatic microscope. *Onde Elect.* **26**, 217-227 (1946).  
 1410. Clark, T. P. and Vierthalter, W. A. An electron microscope study of used nitrided steel piston rings. National Advisory Committee for Aeronautics, Technical Note No. **1132**, 1-22 (1946).  
 1411. Claude, A. Electron microscopy of animal cells. *Proc. New York Assoc. Publ. Health Lab.* **26**, 16-18 (1946).  
 1412. Claude, A. and Fullam, E. F. The preparation on sections of guinea pig liver for electron microscopy. *J. Exp. Med.* **83**, 499-503 (1946).  
 1413. Cogan, H. A. and Setterstrom, C. A. Properties of ethyl silicate. *Chem. Eng. News* **24**, 2399-2501 (1946).  
 1414. Cravath, A. M. Preparing pigments for the electron microscope. *J. Applied Phys.* **17**, 1125-1126 (1946).  
 1415. Cravath, A. M., Smith, A. E., Vinograd, J. R. and Wilson, J. N. Preparation of electron microscope specimens for determination of particle size distribution in aqueous suspensions. *J. Applied Phys.* **17**, 309-310 (1946).  
 1416. Crook, E. M. and Shefford, F. M. L. Electron microscopy of viruses. I. State of aggregation of tobacco mosaic virus. *Brit. J. Exp. Path.* **27**, 328-338 (1946).  
 1417. Dobbins, R. E. and Rossman, R. P. Mechanical processing of carbon blacks, resultant effects in GR-S compounds. *Ind. Eng. Chem.* **38**, 1145-1148 (1946).  
 1418. Dupouy, G. The electron microscope; its use in metallography and in studying the condition of surfaces. *Metal Treatment* **13**, 153-168 (1946).  
 1419. Eigelsbach, H. T., Chambers, L. A. and Coriell, L. L. Electron microscopy of bacterium tularensis. *J. Bact.* **52**, 179-185 (1946).  
 1420. Endell, K. Demonstration of fiber structure of Fuller's earth in the electron microscope. *Z. Naturforsch.* **1**, 646-649 (1946).

1421. Foster, R. and Antes, L. A comparison of electron micrographs with photomicrographs of young bacterial cultures stained to demonstrate desoxyribosenucleic acid. *J. Bact.* **51**, 584 (1946).
1422. Giuntini, J., Lepine, P., Nicolle, P., and Croissante, O. Electron pictures of some bacteriophages and determination of their sizes. *Société française de Microbiologie* **5**, 12 (1946).
1423. Grivet, P., Bruck, H., and Bertein, F. Electron microscope and its applications in metallography. *Métaux et Corrosion* **21**, 1–10 (1946).
1424. Groupe, V., Oskay, J. and Rake, G. Electron micrographs of the elementary bodies of fowl pox and canary pox. *Proc. Soc. Exp. Biol. Med.* **63**, 477–478 (1946).
1425. Gulbransen, E. A. New developments in the study of surface chemistry. *Metal Progress* **49**, 553–559 (1946).
1426. Gulbransen, E. A., Phelps, R. T. and Hickman, J. W. Oxide films formed on alloys at moderate temperatures; electron diffraction and electron microscope study. *Analytical Chem.* **18**, 640–652 (1946).
1427. Gunn, A. F. and Scott, R. A. Measurement of thickness of thin films. *Nature* **158**, 621 (1946).
1428. Hall, C. E., Jakus, M. A., and Schmitt, F. O. An investigation of cross striations and myosin filaments in muscle. *Biol. Bull.* **90**, 32–50 (1946).
1429. Hass, G. On the growth and structure of thin oxide layers on aluminum. *Optik* **1**, 134–143 (1946).
1430. Heidenreich, R. D. Investigation of secondary phases in alloys by electron diffraction and the electron microscope. *J. Applied Phys.* **17**, 125 (1946).
1431. Heidenreich, R. D., Gerould, C. H. and McNulty, R. E. Electron metallographic methods and some results for magnesium alloys. *Trans. Am. Inst. Mining Met. Engrs.* **166**, 15–36 (1946).
1432. Heidenreich, R. D., Sturkey, L., and Woods, H. L. Investigation of secondary phases in alloys by electron diffraction and the electron microscope. *J. Applied Phys.* **17**, 127–136 (1946).
1433. Hermans, P. H. Electron microscopic structure of cellulose powder from wood pulp ground in very dry conditions. *J. Am. Chem. Soc.* **68**, 2730–2732 (1946).
1434. Hermans, P. H. Electron microscopy of cellulose fibers ground in  $H_2O$ . *Textile Res. J.* **16**, 11 (1946).
1435. Hillier, J. and Baker, R. F. The mounting of bacteria for electron microscope examination. *J. Bact.* **52**, 411 (1946).
1436. Hook, A. E., Beard, D., Taylor, A. R., Sharp, D. G., and Beard, J. W. Isolation and characterization of the T2 bacteriophage of escherichia coli. *J. Biol. Chem.* **165**, 241–258 (1946).
1437. Hunger, J., Pawlek, F. and Seeliger, R. Electron microscope investigations on precipitation in beryllium-bronze. *Metallforsch.* **1**, 168–174 (1946).
1438. Jacobsen, A. E. and Sullivan, W. F. Centrifugal sedimentation method for particles size distribution. *Ind. Eng. Chem.* **18**, 360–364 (1946).
1439. Jakus, M. A. and Hall, C. E. Electron microscope observations of the trichocysts and cilia of paramecium. *Biol. Bull.* **91**, 141–144 (1946).
1440. Karle, J. The scattering of electrons by hydrocarbon films. *J. chem. Phys.* **14**, 297–305 (1946).
1441. Kelsey, R. H. and Hanson, R. E. Method for preparing rubber latex specimens for the electron microscope. *J. Applied Phys.* **17**, 675–677 (1946).
1442. Kern, S. F. Technique of electron microscope investigation of fiber surfaces. *J. Polymer Sci.* **1**, 259–265 (1946).
1443. Knight, C. A. The preparation of highly purified PR8 influenza virus from infected mice. *J. Exp. Med.* **83**, 11–24 (1946).
1444. König, H. Lattice constant determination by electron microscope. *Naturwissenschaften* **33**, 343–344 (1946).
1445. König, H. Electron microscopic replica process for biological objects. *Nachr. Ges. wiss. Göttingen* **1**, 68–70 (1946).
1446. Kopp, C. and Möllenstedt, G. Single stage electron microscopy using fine grain photographic emulsions and light screens. *Nachr. Ges. wiss. Göttingen* **1**, 79–82 (1946).
1447. Kuhn, A. The structure of butterfly scales in electron micrographs. *Z. Naturforsch.* **1**, 348–351 (1946).
1448. Lepine, P. First biological images obtained with an electron microscope of french construction. *Ann. Inst. Pasteur* **72**, 656–657 (1946).

1449. Lepine, P., Giuntini, J., Croissant, O. and Nicolle, P. Application of metal shadowing to the study of bacteriophage with the electron microscope. Soc. franaise Microbiol. **5**, 12 (1946).
1450. Loring, H. S., Marton, L. and Schwerdt, C. E. Electron microscopy of purified Lansing virus. Proc. Soc. Exp. Biol. Med. **62**, 291-292 (1946).
1451. Marton, L., Das Gupta, N. N. and Marton, C. Modification of specimens in electron microscopy. Science **104**, 35-36 (1946).
1452. McDill, R. D., Williams, R. C. and Wyckoff, R. W. G. Flax film. J. Applied Phys. **17**, 25 (1946).
1453. Mercer, E. H. and Rees, A. L. G. The structure and elasticity of the cortex of keratin fibers. Australian J. Exp. Biol. Med. Sci. **24**, 175-183 (1946).
1454. Mercer, E. H. and Rees, A. L. G. An electron microscope investigation of the cuticle of wool. Australian J. Exp. Biol. Med. Sci. **24**, 147-158 (1946).
1455. Mosley, V. M. and Wyckoff, R. W. G. Electron micrography of the virus of influenza. Nature **157**, 263 (1946).
1456. Mrgudieh, J. N. Manifold evaluation of the properties of materials. Ind. Radiography **4**, 31-36 (1946).
1457. O'Brien, H. C. Jr. Thin section methods for the electron microscope examination of cured polymers. J. Applied Phys. **17**, 407 (1946).
1458. O'Brien, H. C. and McBain, J. W. Thin undistorted sections for electron microscopy. J. Am. Chem. Soc. **68**, 1139 (1946).
1459. Olofsson, B. Investigation of wool by electron microscope. Proc. Swed. Inst. Textile Research, Gothenburg, Swed. **2**, (1946).
1460. Oster, G. and Stanley, W. M. An electron microscope study of the contents of hair cells from leaves diseased with tobacco mosaic virus. Brit. J. Exp. Path. **27**, 261-265 (1946).
1461. Phelps, R. T., Gulbransen, E. A., and Hickman, J. W. Electron diffraction and electron microscope study of oxide films formed on metals and alloys at moderate temperatures; stripped oxide films of metals. Ind. Eng. Chem., Anal. Ed. **18**, 391-400 (1946).
1462. Picard, R. G. The electron microscope and its application to the study of metals. Metallurgia **34**, 181-185 (1946).
1463. Price, W. C., Williams, R. C., and Wyckoff, R. W. G. Electron micrographs of crystalline plant viruses. Arch. Biochem. **9**, 175-185 (1946).
1464. Price, W. C. and Wyckoff, R. W. G. Electron micrographs of molecules on the face of a crystal. Nature **157**, 764 (1946).
1465. Raether, H. Electron microscope investigation of electrolytically polished metal surfaces. Optik **1**, 69-75 (1946).
1466. Raether, H. On the structure of tempered rock salt crystal surfaces. Optik **1**, 296-319 (1946).
1467. Rake, G., Rake, H., Hamre, P. and Groupe, V. Electron micrographs of the agent of feline pneumonitis. Proc. Soc. Exp. Biol. Med. **63**, 489-491 (1946).
1468. Rawlins, T. E., Roberts, C. and Utech, N. M. An electron microscope study of tobacco mosaic virus at different stages of infection. Am. J. Botany **33**, 356-363 (1946).
1469. Roginskii, S. Z., Shekhter, A. B., and Sakharova, S. V. An electron microscope study of the aging of smoke deposits. Compt. rend, acad. sci. URSS **52**, 687-689 (1946).
1470. Sanderson, L. Microscope in metallurgy; studies at high and low temperatures. Chem. Age. London **54**, 612-614 (1946).
1471. Schuster, M. C. High speed micromotoming. Interchem. Rev. **5**, 31-41 (1946).
1472. Schuster, M. C., and Fullam, E. F. Preparation of powdered materials for electron microscopy. Ind. Eng. Chem., Anal. Ed **18**, 653-657 (1946).
1473. Scott, D. B. and Wyckoff, R. W. G. Typical structures on replicas of apparently intact tooth surfaces. U. S. Public Health Service, Public Health Reports **61**, 1397-1400 (1946).
1474. Scott, D. B. and Wyckoff, R. W. G. Shadowed replicas of tooth surfaces. U. S. Public Health Service, Public Health Reports **61**, 697-700 (1946).
1475. Seeliger, R. The replica method. Phys. Blätter **3**, 15 (1946).
1476. Sharp, D. G., Taylor, A. R., Hook, A. E., and Beard, J. W. Rabbit papilloma and vaccinia viruses and T-2 bacteriophage of *E. coli* in "shadow" electron micrographs. Proc. Soc. Exp. Biol. Med. **61**, 259-265 (1946).
1477. Shekhter, A., Roginskii, S. Z., and Sakharova, S. An electron microscopic investigation of smoke deposits. Acta Physicochim, URSS **21**, 463-468 (1946).

1478. Shekhter, A. B., Roginskii, S. Z. and Sakharova, S. An electron microscope investigation of freshly formed precipitates from solutions. *Acta Physicochim. URSS* **21**, 849-852 (1946).
1479. Shepard, C. C. and Wyckoff, R. W. G. The nature of the soluble antigen from typhus rickettsiae. U. S. Public Health Service, Public Health Reports **61**, 761-767 (1946).
1480. Skilling, W. T. Gold shadowing in electron microscopy. *Sci. Monthly* **62**, 559-561 (1946).
1481. Stringham, B. Tinticite, a new mineral from Utah. *Am. Mineral* **31**, 395-400 (1946).
1482. Thielsch, H. "Shadow-cast" replicas for use in the electron microscope. *Trans. Am. Inst. Mining. Met. Engrs., Inst. Metals Div. Tech. Publ.* **1977**, 1-10 (1946).
1483. Tillear, D. L. and Smith, N. D. P. Examination of pigments and extenders with the electron microscope. *J. Soc. Chem. Ind. (London)* **65**, 305-308 (1946).
1484. Tillear, D. L. and Smith, N. D. P. Comparison of optical and electron microscopy of pigments. *J. Soc. Chem. Ind. (London)* **65**, 261-264 (1946).
1485. Watson, J. H. L. Filmless sample mounting for the electron microscope. *J. Applied Phys.* **17**, 121-127 (1946).
1486. Watson, J. H. L. and Kaufman, K. Electron microscope examination of the microphysical properties of the Polymer Cuprene. *J. Applied Phys.* **17**, 996-1005 (1946).
1487. Waugh, D. F. A fibrous modification of insulin. I. The heat precipitate of insulin. *J. Am. Chem. Soc.* **68**, 247-250 (1946).
1488. Weiser, R. S. and Hargiss, C. O. Studies on the death of bacteria at low temperatures. *J. Bact.* **52**, 71-79 (1946).
1489. Williams, R. C., and Wyckoff, R. W. G. Applications of metallic shadow-casting to microscopy. *J. Applied Phys.* **17**, 23-33 (1946).
1490. Wyckoff, R. W. G. Frozen-dried preparations for the electron microscope. *Science* **104**, 36-37 (1946).

#### 1947

1491. Ackermann, J. Silica glass as object holder for electron optical systems. *Optik* **2**, 280-282 (1947).
1492. Algera, L., Beyer, J. J., van Iterson, W., Kerstens, W. K. H. and Thung, T. H. Some data on the structure of the chloroplast, obtained by electron microscopy. *Biochim. et Biophys. Acta* **1**, 517-525 (1947).
1493. Anon. Isolation of polio virus. *Arch. Phys. Med.* **28**, 115-116 (1947).
1494. Astbury, W. T. and Spark, L. C. An electron microscope and X-ray study of actin. *Biochim. Biophys. Acta* **1**, 388-391 (1947).
1495. Bang, F. B. Newcastle virus; conversion of spherical forms to filamentous forms. *Proc. Soc. Exp. Biol. Med.* **64**, 135-137 (1947).
1496. Bavor, M. R. B., and Clark, G. L. Electron microscopic studies of the interference phenomenon between bacterial viruses of the escherichia coli group. *J. Bact.* **53**, 49-55 (1947).
1497. Boersch, H. Atomic contrast in the electron microscope. *Z. Naturforsch* **2a**, 615-633 (1947).
1498. Boswell, F. W. Electron microscope studies of virus elementary bodies. *Brit. J. Exp. Path.* **28**, 253-260 (1947).
1499. Bretschneider, L. H. and van Iterson, W. An electron microscopical study of bull sperm. I. Koninkl. nederland. Akad. Wetenschap. **50**, 1-10 (1947).
1500. Brieger, E. M., Crowe, G. R. and Cosslett, V. E. Electron microscopy of bacteria. *Nature* **160**, 864 (1947).
1501. Brown, A. F. and Jones, W. M. A methyl methacrylate-silica replica technique of electron microscopy. *Nature* **159**, 635-636 (1947).
1502. Buchholz, J. T. Methods in the preparation of chromosomes and other parts of cells for examination with an electron microscope. *Am. J. Bot.* **34**, 445-454 (1947).
1503. Buchholz, J. T. Chromosome structure under the electron microscope. *Science* **105**, 607-610 (1947).
1504. Burton, E. F., Sennett, R. S. and Ellis, S. G. Specimen changes due to electron bombardment in the electron microscope. *Nature* **160**, 565-567 (1947).
1505. Claude, A., Porter, K. R. and Pickett, E. G. Electron microscope study of chicken tumor cells. *Cancer Research* **7**, 421-430 (1947).

1506. Coblenz, J. M. and Levine, M. The effect of metabolytes of *E. coli* on the growth of colo-aerogenes bacteria. *J. Bact.* **53**, 455 (1947).  
1507. Coffey, J. M. and Cohen, S. M. A study of hemophilus pertussis by means of the electron microscope. *J. Bact.* **54**, 275 (1947).  
1508. Conn, H. J. and Elrod, R. P. Concerning flagellation and mobility. *J. Bact.* **54**, 681-687 (1947).  
1509. Coslett, V. E. Particle "growth" in the electron microscope. *J. Applied Phys.* **18**, 844-845 (1947).  
1510. Cunha, R., Weil, M. L., Beard, D., Taylor, A. R., Sharp, D. G. and Beard, J. W. Purification and characters of Newcastle diseased virus (California Strain). *J. Immunol.* **55**, 69-89 (1947).  
1511. Davidson, N. and Hillier, J. Single crystal electron diffraction by micro-crystalline materials. *J. Applied Phys.* **18**, 499-511 (1947).  
1512. de Decker, H. C. J. The significance of the electron microscope for metal research. *Metalen* **1**, 113-117 (1947).  
1513. de Decker, H. C. J. The significance of the electron microscope for metal research. *Metalen* **1**, 139-151 (1947).  
1514. Delbrück, M. On bacteriophage. *Naturwissenschaften* **34**, 301-306 (1947).  
1515. der Matessian, E. New method of electrolytic polishing of electron microscope samples. *Iron Age* **159**, 51-53 (1947).  
1516. Duran-Reynals, F. A study of three new duck variants of the rous chicken sarcoma. *Cancer Research* **7**, 99 (1947).  
1517. Dyar, M. T. Isolation and cytological study of a free-living spirochete. *J. Bact.* **54**, 483-493 (1947).  
1518. Edwards, O. F. and Wyckoff, R. W. G. Electron micrographs of bacterial cultures infected with bacteriophage. *Proc. Soc. Exp. Biol. Med.* **64**, 16-19 (1947).  
1519. Eisenstark, A., and Clark, G. L. Electron micrographs of X-ray treated *E. Coli* cells. *Science* **105**, 553-555 (1947).  
1520. Ellis, S. G. Electron microscopic examination of greases. *Can. J. Research* **25A**, 119-123 (1947).  
1521. Ellis, S. G. Films, resistant to organic solvents, for use in the electron microscope. *J. Applied Phys.* **18**, 846-847 (1947).  
1522. Elod, E. and Zahn, H. Recent problems in the wool research. *Melliand Textilber.* **28**, 217-221; 253-256; 291-294 (1947).  
1523. Evans, C. A. and Underdahl, N. R. Spore wall demonstrated with the electron microscope. *J. Bact.* **53**, 647-648 (1947).  
1524. Farrant, J. L., Mercer, E. H. and Rees, A. L. G. Structure of fibrous keratin. *Nature* **159**, 535-536 (1947).  
1525. Farrington, B. B. and Birdsall, D. H. An electron microscope study of lubricating greases. *Inst. Spokesman* **11**, 4-10 (1947).  
1526. Farrington, B. B. and Birdsall, D. H. Study of lubricating greases by electron microscope. *Oil and Gas J.* **45**, 268-270; 275-279 (1947).  
1527. Fischer, R. B. Electron micrographs as an aid in teaching gravimetric analysis. *J. Chem. Ed.* **24**, 484-486 (1947).  
1528. Foster, E., Baylor, M. R. B., Meinkoth, N. A. and Clark, G. L. An electron microscopic study of protozoan flagella. *Biol. Bull.* **93**, 114-121 (1947).  
1529. Frey-Wyssling, A. and Mühlenthaler, K. Fiber preparations for electron microscope; production by means of supersonics. *Textile Research J.* **17**, 32-33 (1947).  
1530. Frimer, A. I. and Pupko, S. L. Investigational techniques in electron microscopy. *Zavodskaya Lab.* **13**, 1375-1387 (1947).  
1531. Froula, H. C. Determination of magnification in electron micrographs. *J. Applied Phys.* **18**, 19-20 (1947).  
1532. Fullam, E. F. Measuring by electron microscopy. *Gen. Elec. Rev.* **50**, 18-21 (1947).  
1533. Gard, S. and Magun, P. v. Studies on interference in experimental influenza II. Purification and centrifugation experiments. *Arkiv. Kemi. Mineral. Geol.* **24**, 1-4 (1947).  
1534. Gaw, H. Z. and Stanley, W. M. Comparative properties of purified preparations of two distinctive strains of tobacco mosaic virus obtained from diseased Turkish tobacco and phlox plants. *J. Biol. Chem.* **167**, 765-772 (1947).  
1535. Gallardo, E. Definition, general characteristics, and identification of viruses. *Rev. sanidad. Higien. Publ. Madrid* **21**, 557-593 (1947).  
1536. Geisler, A. H. and Keller, F. Study of age-hardening by the aid of the electron microscope. *Engineer* **183**, 194-195 (1947).

1537. Gerould, C. H. Preparation and uses of silica replicas in electron microscopy. *J. Applied Phys.* **18**, 333-343 (1947).
1538. Gessler, A. E. and Grey, C. E. Submicroscopic spherical bodies in carcinoma. *Exp. Med. Surg.* **5**, 307 (1947).
1539. Giuntini, J., Croissant, O., Anthanasiu, P., and Reinie, L. Comparative morphology in the electron microscope. *Comptes rend. Soc. Biol.* **141**, 749-750 (1947).
1540. Granick, S. and Porter, K. R. Structure of the spinach chloroplast as interpreted with the electron microscope. *Amer. J. Bot.* **34**, 545-550 (1947).
1541. Groupe, V. and Rake, G. Studies on the morphology of the elementary bodies of fowl pox. *J. Bact.* **53**, 449-454 (1947).
1542. Groupe, V. Surface striations of Euglena gracilis revealed by electron microscopy. *Proc. Soc. Exp. Biol. Med.* **64**, 401-403 (1947).
1543. Hamre, D., Rake, H. and Rake, G. Morphological and other characteristics of the agent of feline pneumonitis grown in the allantoic cavity of the chick embryo. *J. Exp. Med.* **86**, 1-6 (1947).
1544. Hast, N. Structure of clay. *Nature* **159**, 354-357 (1947).
1545. Hast, N. Preparation of thin specimen films. *Nature* **159**, 370 (1947).
1546. Hauser, E. A. and Le Beau, D. S. Elasticity explained. *Sci. American* **177**, 204-206 (1947).
1547. Hauser, E. A. and Le Beau, D. S. Morphology of Lyogels. *J. Phys. & Colloid Chem.* **51**, 278-285 (1947).
1548. Hawn, C. Z. v. and Porter, K. The fine structure of clots formed from purified bovine fibrinogen and thrombin; a study with the electron microscope. *J. Exp. Med.* **86**, 285-292 (1947).
1549. Heidenreich, R. D. and Shockley, W. Electron microscope and electron diffraction study of slip in metal crystals. *J. Applied Phys.* **18**, 1029-1031 (1947).
1550. Heiger, I. Carcinogenic activity of preparations rich in cholesterol. *Nature* **160**, 470 (1947).
1551. Holzer, W. The action of penicillin as revealed by light and electron microscope research. *Wiener Z. Innere med. Grenzgeb.* **28**, 333-352 (1947).
1552. Horio, M., Kobayashi, K., and Kondo, T. Investigation of fine structure of freely coagulated viscose fibers by means of optical and electron microscopes. *Textile Res. J.* **17**, 264-280 (1947).
1553. Hovanity, W. An electron microscope study of isolated chromosomes. *Genetics* **32**, 500-504 (1947).
1554. Hunger, J. and Seeliger, R. Electron microscopic relief patterns by means of imprint and double layer reproductions. *Metallforschung* **2**, 65-69 (1947).
1555. Husemann, E. and Carnap, A. Electron microscopic investigations of submicroscopic fibrils of synthetic fibers. *Makromolekulare Chem.* **1**, 158-163 (1947).
1556. Induni, G. On a new method of object preparation for electron microscope research. *Experientia, Basel* **3**, 247-248 (1947).
1557. Ingelse, L. Methods and results of electron microscope research on metals. *Metalen* **1**, 155-157; 181-188; 203-206 (1947).
1558. Jackson, M. L., Mackie, W. Z. and Pennington, R. P. Electron microscope applications in soils research. *Proc. Soil. Sci. Soc. Amer.* **11**, 57-63 (1947).
1559. Jakus, M. A. and Hall, C. E. Actin and myosin. *J. Biol. Chem.* **167**, 705-714 (1947).
1560. Johnson, F. H. and Baker, R. F. The electron and light microscopy of Beggiatoa. *J. Cell Comp. Physiol.* **30**, 131-145 (1947).
1561. Knaysi, G., Baker, R. F. and Hillier, J. A study with the high voltage microscope of the endospore and the life cycle of bacillus. *J. Bact.* **53**, 525-537 (1947).
1562. Knaysi, G. and Baker, R. F. Demonstration with the electron microscope of a nucleus in Bacillus mycoides grown in a nitrogen-free medium. *J. Bact.* **53**, 539-553 (1947).
1563. Knight, C. A. Nucleoproteins and virus activity. *Symposia on Quantitative Biology* **12**, 115-121 (1947).
1564. Knight, P. A., and Oster, G. The size of the particles of some strains of tobacco mosaic virus as shown by the electron microscope. *Arch. Biochem.* **15**, 289-294 (1947).
1565. Kriss, A. E., Rukina, K. A. and Isayev, B. M. Study of structure with the aid of the electron microscope. *Am. Rev. Soviet Med.* **4**, 212-222 (1947).

1566. Kurotehkin, T. J., Libbey, R. L., Gagnon, E. and Cox, H. R. Size and morphology of the elementary bodies of the psittacosis lymphogranuloma venerum group of viruses. *J. Immun.* **55**, 283-287 (1947).
1567. Lembke, A. Research on the causes of tuberculosis. *Zentr. Bakt. Parasitenk.* **152**, 239-247 (1947).
1568. Lepine, P., Giuntini, J., Croissant, O. and Reinie, L. Electron microscope observations of the "lymphogranulomatose inguinale" virus. *Ann. Inst. Pasteur* **73**, 822-824 (1947).
1569. Lipscomb, W. N., Rubin, T. R. and Sturdivant, J. H. Investigation of a method for the analysis of smokes according to particle size. *J. Applied Phys.* **18**, 72-79 (1947).
1570. Lofgren, R. Electron microscopy as applied to some biological problems. *J. Bact.* **54**, 271 (1947).
1571. Loring, H. S. Similarities in electron micrographs of purified Lansing virus and Sk virus. *Proc. Soc. Exp. Biol. Med.* **64**, 101-102 (1947).
1572. Lotmar, W. The crystallite size of thin antimony layers. *Helv. Phys. Acta* **20**, 441-445 (1947).
1573. Mackie, W. Z., Chatterjee, B. and Jackson, M. L. Mineral crystal forms in soils observed in the electron microscope; I. Single-component clays and synthetic mixtures. *Proc. Soil. Sci. Soc. Amer.* **12**, 176-179 (1947).
1574. Mahl, H. On interpretation of electron micrographs. *Optik* **2**, 106-113 (1947).
1575. Mandle, R. J. Artifacts in gold shadowed electron micrographs due to electrons of high intensity. *Proc. Soc. Exp. Biol. Med.* **64**, 362-366 (1947).
1576. Markham, R., Smith, K. M. and Wyckoff, R. W. G. Electron microscopy of tobacco necrosis virus crystals. *Nature* **159**, 574 (1947).
1577. Mason, H., Kohler, H., MacCardle, R. C., and Dalton, A. J. Chemistry of Melanin. IV. Electron micrography of natural Melanins. *Proc. Soc. Exp. Biol. Med.* **66**, 421-433 (1947).
1578. Mazia, D., Hayashi, T. and Yudowitch, K. Fibre structure in chromosomes. *Symposia on quantitative biology* **12**, 122-130 (1947).
1579. Meerman, P. G. Electron microscope as tool for the investigation of pigments. *Verfkronek*, **20**, 160-165 (1947).
1580. Mehl, R. F., Ramberg, E. G., and Baker, R. F. First successful photograph of steel surface made with an electron microscope. *Metal. Prog.* **52**, 988 (1947).
1581. Millson, H. E., Watkins, H. W., and Roger, G. L. Studies on wool dyeing; crocking. *Am. Dyestuff Repr.* **36**, 45-63, 69-70 (1947).
1582. Möllenstedt, G. Silica as a durable temperature-stable and acid resistant substrate for electron diffraction and electron microscopy. *Optik* **2**, 276-279 (1947).
1583. Mossman, H. W., and Noer, H. R. Study of the amnion with the electron microscope. *Anat. Rec.* **97**, 253-257 (1947).
1584. Nielsen, J. E. Electron microscope reveals a possible valve structure of amphipleura pellucida. *Trans. Am. Microscop. Soc.* **66**, 140-143 (1947).
1585. Norris, F. A. and Mattil, K. F. A new approach to the glycerid structure of natural fats. *J. Am. Oil Chem. Soc.* **24**, 274-275 (1947).
1586. Oster, G. Studies on the sonic treatment of tobacco mosaic virus. *J. Gen. Physiol.* **31**, 89-102 (1947).
1587. Oster, G., Doty, P. M. and Zimm, B. H. Light scattering studies of tobacco mosaic virus. *J. Am. Chem. Soc.* **69**, 1193-1197 (1947).
1588. Passey, R. D., Dmochowski, L., Astbury, W. T. and Reed, R. Electron microscope studies of normal and malignant tissues of high and low breast cancer strains of mice. *Nature* **160**, 656 (1947).
1589. Pease, D. The structure of trichocysts revealed by the electron microscope. *J. Cellular. Comp. Physiol.* **29**, 91-94 (1947).
1590. Pease, D. C. Disappearance of salt from glass ice during low temperature dehydration, and its implication in electron microscopy. *Science* **106**, 543 (1947).
1591. Pennington, R. P. and Jackson, M. L. Segregation of the clay minerals of polycomponent soil clays. *Proc. Soil Sci. Soc. Amer.* **12**, 452-457 (1947).
1592. Penso, G. and Scanga, F. Studies on the mechanism of action of streptomycin. I. Electron microscope observations on streptomycin treated Esch. Coli during the growth phase. II. Electron microscope observations on the action of streptomycin on resting cells of Esch. Coli. *Rend. Ist. super. sanità, Rome* **10**, 633-638 (1947).
1593. Perry, S. V. and Reed, R. Electron microscope and X-ray study of actin. I. Electron microscope. *Biochim. et Biophys. Acta* **1**, 379-387 (1947).

1594. Polson, A., Mosley, V. M. and Wyckoff, R. W. G. The quantitative chromatography of silk hydrolysate. *Science* **105**, 603-604 (1947).
1595. Polson, A. and Wyckoff, R. W. G. Shape of haemocyanin molecules. *Nature* **160**, 153-154 (1947).
1596. Porter, K. R., and Thomson, H. P. Some morphological features of cultured rat sarcoma cells as revealed by the electron microscope. *Cancer Research* **7**, 431-438 (1947).
1597. Rake, G. The initial body and the plaque form in the Chlamydozoaceae. *J. Bact.* **54**, 637-640 (1947).
1598. Ranzi, S. Electron microscope investigation of the action of salt solutions on myosin. *Nature* **160**, 712 (1947).
1599. Richards, A. G. and Korda, F. H. Electron micrographs of centipede setae and microtrichia. *Entomol. News* **58**, 141-145 (1947).
1600. Roberts, E. A. Further studies with the electron microscope showing relationship of the structure of the chloroplast chlorophyll to the location of chlorophyll in the chloroplast. *Am. J. Botany* **34**, 602 (1947).
1601. Rollins, M. L. Cotton fibres: swelling measurement by microscopical methods. *Textile Research J.* **17**, 19-26 (1947).
1602. Ruska, H. The absorption of mercuric chloride by bacteria and viruses. *Arch. Exp. Path. Pharmakol.* **204**, 576-585 (1947).
1603. Ruska, H., Poppe, K. and Kausche, G. A. Electron microscope observations on the morphology of "Seiffert's" microorganisms and the cause of tuberculosis in cattle. *Z. Hyg. Infektionskrankh.* **127**, 201-215 (1947).
1604. Saxe, L. H. Jr. Electron microscope observations of flagellated protozoa. *Anat. Record* **99**, 131 (1947).
1605. Schiefer, H. F. Solution of problem of producing uniform abrasion and its application to the testing of textiles. *J. Research Nat. Bur. Standards* **39**, 1 (1947).
1606. Schmitt, F. O., Bear, R. S., Hall, C. E., Jakus, M. A. Electron microscope and X-ray diffraction studies of muscle structure. *Ann. N. Y. Acad. Sci.* **47**, 799-812 (1947).
1607. Schoenholz, D. and Kimball, C. S. Electron microscope studies: bright-drying wax dispersions. *Soap and Sanit. Chem.* **23**, 131 (1947).
1608. Scott, D. B. and Wyckoff, R. W. G. Shadowed replicas of ground sections through teeth. U. S. Pub. Health Service, Public Health Repts. **62**, 422-425 (1947).
1609. Scott, D. B. and Wyckoff, R. W. G. Electron microscopy of tooth structure by the shadowed collodion replica method. U. S. Public Health Service, Public Health Repts. **62**, 1513-1516 (1947).
1610. Shanahan, A. J., Eisenstark, A. and Tanner, F. W. Morphology of Escherichia Coli exposed to penicillin as observed with the electron microscope. *J. Bact.* **54**, 183-189 (1947).
1611. Signer, R. and Studer, H. Investigations of biological structures with the electron microscope. *Chimia Switz.* **1**, 136 (1947).
1612. Sigurgeirson, T. and Stanley, W. M. Electron microscope studies on tobacco mosaic virus. *Phytopath. Z.* **37**, 26-38 (1947).
1613. Spearman, J. B. Structure of the Keratin molecule. *Nature* **159**, 338 (1947).
1614. Topping, N. H. and Atlas, L. T. The common cold: a note regarding isolation of an agent. *Science* **106**, 636-637 (1947).
1615. Van Iterson, W. Some electron microscopical observations on bacterial cytology. *Biochim. Biophys. Acta* **1**, 527-548 (1947).
1616. Van Thiel, P. H. and Van Iterson, W. An electron microscopical study of Leptospira biflexa. *Proc. Koninkl. Nederland. Akad. Wetenschap.* **50**, 976-979 (1947).
1617. Vertsner, V. N. Simple method of shadow replicas in electron microscopy. *C. R. Acad. Sci. URSS* **58**, 1031-1033 (1947).
1618. Walton, W. H. The application of electron microscopy to particle size measurement. Trans. Inst. Chem. Engrs. London, and Soc. Chem. Ind. London Roads and Bldg. Materials Group, Advance Copy, 51-57 (1947).
1619. Vertsner, V. N. The soviet electron microscope. *Zavodskaya. Lab.* **13**, 1369-1375 (1947).
1620. Watson, J. H. L. Observations on crystal structure and particle shape in electron micrographs of several carbon blacks. *Trans. Electrochem. Soc.* **92**, 49-61 (1947).
1621. Watson, J. H. L. Effect of electron bombardment upon carbon black. *J. Applied Phys.* **18**, 153-161 (1947).

1622. Watson, J. H. L. Electron microscope observation of the morphology of several gases polymerized by charged particle bombardment. *J. Phys. & Colloid Chem.* **51**, 654-661 (1947).
1623. Wirth, J., Anthanasiu, P., Barski, G. and Croissant, O. Study with the electron microscope of protoplasmic inclusions in pure cultures of renal cells infected with vaccinal virus. *Compt. rend.* **225**, 827-829 (1947).
1624. Woodruff, H. B., Nunheimer, T. O. and Lee, S. B. A bacterial virus for actinomycetes Grisens. *J. Bact.* **54**, 535-541 (1947).
1625. Wyckoff, R. W. G. Electron micrographs from concentrated solutions of the tobacco mosaic virus protein. *Biochim. Biophys. Acta* **1**, 139-146 (1947).
1626. Wyckoff, R. W. G. Symmetrical patterns of bacteriophage production. *Proc. Soc. Exp. Biol. Med.* **66**, 42-44 (1947).
1627. Wyckoff, R. W. G. Shadow casting for microscopy. *J. Photo. Soc. Am.* **33**, 1-5 (1947).

### 1948

1628. Anderson, R. B. and Emmett, P. H. Measurement of carbon black particles by the electron microscope and low temperature nitrogen adsorption isotherms. *J. Applied Phys.* **19**, 367-373 (1948).
1629. Anderson, T. F. The activation of the bacterial virus T-4 by 1-tryptophan. *J. Bact.* **55**, 637-649 (1948).
1630. Anon. Magnetic field patterns shown by electron microscope. *Electronics* **21**, 128 (1948).
1631. Anon. Electron-optical techniques for ferromagnetic studies. *Elec. Mfg.* **42**, 186-188 (1948).
1632. Anon. Electron microscopic studies; aid to I. C. I. paint research. *Chem. Age, London* **59**, 592 (1948).
1633. Anon. Electron microscope increased usefulness in textiles. *Textile World* **98**, 123 (1948).
1634. Arens, H. Electron microscope investigations of separate phases in the preparation of emulsions. *Z. wiss. Phot.* **43**, 120-138 (1948).
1635. Astbury, W. T. The structure of biological tissues as revealed by X-ray diffraction and in electron microscope. *Nature* **161**, 514 (1948).
1636. Astbury, W. T., Reed, R., and Spark, L. C. An X-ray and electron microscope study of tropomyosin. *Biochem. J.* **43**, 282-287 (1948).
1637. Babudieri, B. A new procedure for the preparation of bacterial preparations for observations with the electron microscope. *Rend. Inst. super. sanità Rome* **11**, 572-576 (1948).
1638. Bailey, C. A., Dierk, F. H. and Proffitt, J. E. On the purification of the Rickettsia of tonsugamushi disease. *Federation Proc.* **7**, 301 (1948).
1639. Bang, F. B. Studies of Newcastle disease virus. Character of the virus itself with particular reference to electron microscopy. *J. Exp. Med.* **88**, 233-240; 241-249; 251-266 (1948).
1640. Bang, F. B. and Gey, G. O. A fibrillar structure in rat fibroblasts as seen by electron microscopy. *Proc. Soc. Exp. Biol. Med.* **69**, 86-89 (1948).
1641. Barski, G. and Mourin, J. Culture on plastic membranes in liquid media of various tissues. *Ann. Inst. Pasteur* **74**, 312-322 (1948).
1642. Barton, H. M. and Jones, D. J. Electron microfossils. *Science* **108**, 745-746 (1948).
1643. Bates, T. F. and Black, M. V. Electron microscope investigation of opal glass. *Glass Ind.* **29**, 487-492; 516-518 (1948).
1644. Beard, J. W. Review of purified animal viruses. *J. Immun.* **58**, 49 (1948).
1645. Beard, J. W. The chemical, physical and morphological properties of animal viruses. *Physiol. Revs.* **28**, 349 (1948).
1646. Benson, S. W. and Ellis, D. A. Surface areas of proteins. I. Surface areas and heats of absorption. *J. Am. Chem. Soc.* **70**, 3563-3569 (1948).
1647. Bergold, G. Bundles of the polyhedral viruses. *Z. Naturforsch.* **3b**, 25 (1948).
1648. Bessis, M. and Brieka, M. Electron microscope study of the fine structure of the protoplasm of thrombocytes. *Biochim. Biophys. Acta* **2**, 339-350 (1948).
1649. Bessis, M. and Burstein, M. and Tabuis, J. The electron microscopy of thrombocytes. *Rev. hematologie* **3**, 48-68 (1948).
1650. Black, L. M., Mosley, V. M. and Wyckoff, R. W. G. Electron microscopy of potato yellow-dwarf virus. *Biochim. Biophys. Acta* **2**, 121-123 (1948).

1651. Boersch, H. The possibility of forming images of atoms in the electron microscope. III. Contrast of crystal lattices and the phase contrast method in electron microscopy. *Monatsh.* **78**, 163-171; *Osterr. Akad. Wiss. Wien. Math. Naturw. Kl. Sitz. Ber. Abt.* **157**, 163-171 (1948).
1652. Boynton, W. H., Takahashi, W. N., Woods, G. M., and Walker, W. W. Further studies on propagation of hog cholera virus in vitro, including electron micrographs. *Vet. Med.* **43**, 403-406 (1948).
1653. Bryner, J. S. Correlation of optical and electron microscopy. *Metals Tech.* **15**, Tech. Pub. 2364 (1948).
1654. Callaghan, E. Endellite deposits in Gardner Mine Ridge, Lawrence County, Indiana Dept. Conservation, Div. Geology, Ind. Bull. **1** (1948).
1655. Calvet, F., Siegel, B. M. and Stern, K. G. Electron optical observations on chromosome structure in resting cells. *Nature* **162**, 305-306 (1948).
1656. Comeforo, J. E., Fischer, R. B. and Bradley, W. F. Mullitization of kaolinite. *J. Am. Ceram. Soc.* **31**, 254-259 (1948).
1657. Cosslett, V. E. Beryllium film as object supports in the electron microscopy of biological specimens. *Biochim. et Biophys. Acta* **2**, 239-245 (1948).
1658. Cosslett, V. E. and Markham, R. Structure of turnip yellow mosaic virus crystals. *Nature* **161**, 250 (1948).
1659. Dawson, I. M. and McFarlane, A. S. Structure of an animal virus. *Nature* **161**, 464 (1948).
1660. Deacon, B. M., Ellis, S. G., Cross, W. G. and Sennett, R. S. Some observations on the formvar replica method, with a note on glass surfaces. *J. Applied Phys.* **19**, 704-712 (1948).
1661. de Berard, W. W. and Baylis, J. R. New vistas to water quality research. *Eng. News* **140**, 639-642 (1948).
1662. de Haas, E. and Lundquist, D. Studies of silicon carbides with the electron microscope. *Applied Scientific Research* **B1**, 181-186 (1948).
1663. de Robertis and Schmitt, F. O. An electron microscope analysis of certain nerve axon constituents. *J. Cellular Comp. Physiol.* **31**, 1-23 (1948).
1664. Doetsch, R. N. and Pelezar, M. J., Jr. The microbacteria. I. Morphological and physiological characteristics. *J. Baet.* **56**, 37-49 (1948).
1665. Donnet, J. B. Electron microscopic studies of vanadium pentoxide sols. *Compt. rend.* **227**, 508-510 (1948).
1666. Eekhardt, A. Variations in electron microscope preparations due to electron bombardment. *Optik* **3**, 53-58 (1948).
1667. Ellis, S. G. Oil industry uses for electron microscope. II. Petroleum Refiner **27**, 487-491 (1948).
1668. Ellis, S. G. Electron microscopy, application and use in petroleum industry. I. Petroleum Refiner **27**, 410-415 (1948).
1669. Epstein, H. T. Electron microscopy of monolayers. *Phys. Rev.* **74**, 1256 (1948).
1670. Farrant, J. L. and Hodge, A. J. An interferometric method for the calibration of electron microscope magnification. *J. Applied Phys.* **19**, 840-844 (1948).
1671. Feuer, G., Molnar, F., Petko, E., and Straub, F. B. Studies on the composition and polymerization of actin. *Hung. Acta Physiol.* **1**, 150 (1948).
1672. Fischer, R. B. and Simonsen, S. H. Metallo-organic precipitates in inorganic analysis investigation by electron microscopy. *Anal. Chem.* **20**, 1107-1109 (1948).
1673. Frey-Wyssling, A., Muhlethaler, R. and Wyckoff, R. W. G. Microfibril structure of the cell walls of plants. *Experientia* **4**, 475 (1948).
1674. Frimer, A. I. Electron microscopic investigation of antimony cesium layers. *Doklady Akad. Nauk. S. S. S. R.* **63**, 255-257 (1948).
1675. Fullam, E. F. and Savage, R. H. Carbon film formation and commutator brush wear as revealed by the electron microscope. *J. Applied Phys.* **19**, 654-661 (1948).
1676. Gessler, A. E., Grey, C. E., Schuster, M. C., Kelsch, J. J., and Richter, M. N. Notes on the electron microscopy of tissue sections. I. Normal tissue. II. Neoplastic. *Cancer Research* **8**, 534-574 (1948).
1677. Gessler, A. E., Grey, C. E. and McCarty, K. Notes on the electron microscopy of tissue sections; submicroscopic spherical bodies in human carcinoma II. *Exp. Med. Surg.* **6**, 329-345 (1948).
1678. Gitzen, W. H. Identification of free silica in dusts and fumes. *Anal. Chem.* **20**, 265-267 (1948).
1679. Giuntini, J. and Girard, G. Morphology and dimension of the etiologic agent of tularemia observed in the electron microscope. *Ann. Inst. Pasteur, Paris* **74-75**, 412-416 (1948).

1680. Gollan, F. and Marvin, J. F. Electron microscopy of the purified M M poliomyelitis virus. *Proc. Soc. Exp. Biol. Med.* **67**, 366-367 (1948).
1681. Gorter, C. J. and Houwink, A. L. An electron microscope study of the structure of the woolhair. *Koninkl. Nederland. Akad. van Wetenschap.* **51**, 262-268 (1948).
1682. Gross, J. Electron microscope studies of sodium hyaluronate. *J. Biol. Chem.* **172**, 511-514 (1948).
1683. Gross, J. and Schmitt, F. O. The structure of human skin collagen as studied with the electron microscope. *J. Exp. Med.* **68**, 555-567 (1948).
1684. Hall, C. E. Dark field electron microscopy. I. Studies of crystalline substances in dark field. *J. Applied Phys.* **19**, 198-212 (1948).
1685. Hall, C. E. Dark field electron microscopy. II. Studies of colloidal carbon. *J. Applied Phys.* **19**, 271-277 (1948).
1686. Hamm, F. A., and Corner, J. J. Replica studies of dyed nylon. *Anal. Chem.* **20**, 861-870 (1948).
1687. Hamm, F. A. and Van Norman, E. Transformations in organic pigments. *J. Applied Phys.* **19**, 1097-1109 (1948).
1688. Hampp, E. G., Scott, D. B. and Wyckoff, R. W. G. Morphological characteristics of certain cultured strains of oral spirochetes and treponema pallidum revealed by the electron microscope. *J. Bact.* **56**, 754-769 (1948).
1689. Harris, L., Jeffries, D. and Siegel, B. M. Electron microscope study of gold smoke deposits. *J. Applied Phys.* **19**, 791-794 (1948).
1690. Harris, L., McGinnies, R. T., and Siegel, B. M. Preparation and optical properties of gold blacks. *J. Optical Soc. Am.* **38**, 582-589 (1948).
1691. Hast, N. Production of extremely thin metal films by evaporation onto liquid surfaces. *Nature* **162**, 892 (1948).
1692. Heimets, F. Studies with the electron microscope on the interaction of red cells and influenza virus. *J. Bact.* **55**, 823 (1948).
1693. Heimets, F. and Golub, O. J. Observation on the growth of psittacosis virus in chorioallantoic membranes by electron microscope. U. S. Dept. Comm. Pub. Board PB **95885**; *J. Bact.* **56**, 509-525 (1948).
1694. Hillier, J. On the investigation of specimen contamination in the electron microscope. *J. Applied Phys.* **19**, 223-230 (1948).
1695. Hillier, J., Knaysi, G. and Baker, R. F. New preparation techniques for the electron microscopy of bacteria. *J. Bact.* **56**, 569-576 (1948).
1696. Hillier, J., Mudd, S., and Smith, A. G. Observations with improved electron microscope techniques on the internal structure of escherichia coli cells and the generation of coliphage. *Am. J. Path.* **24**, 715-716 (1948).
1697. Hock, C. W. Electron microscopical examination of rayon. *Textile Res. J.* **18**, 366-371 (1948).
1698. Jakob, A. and Mahl, H. On the adsorption of metal colloids on bacteria. *Z. Naturforsch.* **3B**, 26-29 (1948).
1699. Jones, W. M. and Barer, R. Electron microscopy of the sarcolemma. *Nature* **161**, 1012 (1948).
1700. Jordan, W. K. and Oster, G. On the nature of the interaction between actomyosin and ATP. *Science* **108**, 188-190 (1948).
1701. Kellenberger, E. and Werner, G. H. The antibiotic action of streptonysin studied with the electron microscope. *Experientia* **4**, 440 (1948).
1702. Kinsinger, W. G. and Hock, C. W. Electron microscopical studies of natural cellulose fibers. *Ind. Eng. Chem.* **40**, 1711-1716 (1948).
1703. Kirkpatrick, A. F. and Davis, E. G. Electron microscope goniometry. *Analyt. Chem.* **20**, 965-968 (1948).
1704. Kisch, B. A crossed fibre effect in electron microscopy. *Exp. Med. Surg.* **6**, 366 (1948).
1705. Kisch, B., Grey, C. E. and Kelsch, J. J. Electron histology of the heart. *Exp. Med. Surg.* **6**, 346 (1948).
1706. König, H. Experiments on lattice building elements of the solid body. *Optik* **3**, 291-220 (1948).
1707. König, H. The function of carbon in electron microscopy. *Naturwissenschaften* **35**, 261-265 (1948).
1708. König, H. and Winkler, A. Bacterial inclusions and their change under the electron microscope. *Naturwissenschaften* **35**, 136-144 (1948).
1709. Law, H. B. A technique for the making and mounting of fine mesh screens. *Rev. Sci. Instruments* **19**, 879-881 (1948).
1710. Lepine, P., Croissant, O. and Reinic, L. The structure of the virus of inguinal lymphogranulomatose in electron microscopy. *Ann. Inst. Pasteur, Paris* **74**, 421-423 (1948).

1711. Lindberg, J., Philip, B. and Gralen, N. Occurrence of thin membranes in the structure of wool. *Nature* **162**, 458 (1948).
1712. Mahla, E. M. and Nielsen, N. A. Oxide replica technique for the electron microscope examination of stainless steel and high nickel alloys. *J. Applied Phys.* **19**, 378-382 (1948).
1713. Mahla, E. M. and Nielsen, N. A. Applications of the electron microscope in corrosion studies. Pittsburgh International Conference on Surface Reactions. Pittsburgh, Corrosion Pub. Co. 60-66 (1948).
1714. Mahla, E. M. and Nielsen, N. A. A study of films isolated from passive stainless steels. *Trans. Electrochem. Soc.* **93**, 1-16 (1948).
1715. Mahl, H. A review of the electron microscope surface technique. *Optik* **3**, 59-67; *Ergeb. exakt. Naturwiss.* **21**, 262-310 (1948).
1716. Mahl, H. Length and thickness measurements in the electron microscope. *Arch. tech. Messen*, **156**, 81-83 (1948).
1717. Markham, R., Smith, K. M. and Wyckoff, R. W. G. Molecular arrangement in tobacco necrosis virus crystals. *Nature* **161**, 760 (1948).
1718. Martin, H. Electrokinetic change in human erythrocytes during adsorption and elution of PRS influenza virus. *Proc. Soc. Exp. Biol. Med.* **68**, 385-392 (1948).
1719. Matoltsy, A. G. Electron microscope observations of resins. *Nature* **161**, 353-354 (1948).
1720. McLauchlan, T. A., Clark, E. M. and Boswell, F. W. Morphology of *B. Megatherium* bacteriophage. *Nature* **160**, 755-756 (1948).
1721. McMurdie, H. F. and Golovato, E. Study of the modification of manganese dioxide. *J. Research Nat. Bur. Standards* **4**, 589-600 (1948).
1722. Miller, W. R., Pannell, L., Cravitz, L., Tanner, W. and Ingalls, M. S. Studies on certain biological characteristics of *maleomyces mallei* and *malleomyces pseudomallei*. I, II. *J. Bact.* **55**, 115-126; 127-135 (1948).
1723. Mitchell, P. D. and Crowe, G. R. A note on electron micrographs of normal and tyrocidin-lysed streptococci. *J. Gen. Microbiol.* **1**, 85 (1948).
1724. Muhrlethaler, K. Electron optical investigations on the structure of gels. *Makromolekulare Chem.* **2**, 143-171 (1948).
1725. Mudd, S. Submicroscopic structure of the bacterial cell as shown by the electron microscope. *Nature* **161**, 302 (1948).
1726. Nagler, F. P. O. and Rake, G. The use of the electron microscope in the diagnosis of variola, vaccinia, and varicella. *J. Bact.* **55**, 45-51 (1948).
1727. Nutting, G. C. and Borasky, R. Electron microscopy of collagen. *J. Am. Leather Chem. Assoc.* **43**, 96-110 (1948).
1728. Passey, R. D., Dimochowski, L., Astbury, W. T., Reed, R. and Johnson, P. Ultracentrifugation and electron microscope studies of tissues of inbred strains of mice. *Nature* **161**, 759 (1948).
1729. Perry, S. V., Reed, R., Astbury, W. T. and Spark, L. C. An electron microscope and X-ray study of the syneresis of actomyosin. *Biochem. Biophys. Acta* **2**, 674 (1948).
1730. Porter, K. R. and Thompson, H. P. A particulate body associated with epithelial cells cultured from mammary carcinomas of mice of a milk-factor strain. *J. Exp. Med.* **88**, 15-24 (1948).
1731. Preston, R. D., Nicolai, E., Reed, R. and Millard, A. An electron microscope study of cellulose in the wall of *valonia ventricosa*. *Nature* **162**, 665-666 (1948).
1732. Rake, G., Blank, H., Coriell, L. L., Nagler, F. P. O., and Scott, T. F. The relationship of varicella and herpes Zoster; electron microscope studies. *J. Bact.* **56**, 293-303 (1948).
1733. Rake, G. and Oskay, J. J. Cultural characteristics of *Donovania granulomatis*. *J. Bact.* **55**, 667-675 (1948).
1734. Reagan, R. L., Hauser, J. E., Lillie, M. G. and Craige, A. H. Jr. Electron micrograph of the virus of infectious bronchitis of chickens. *Cornell Vet* **38**, 190-191 (1948).
1735. Rebuck, J. W., Woods, H. L. and Monaghan, E. A. Electron microscopy of sickle cells. *Proc. Soc. Exp. Biol. Med.* **68**, 220-222 (1948).
1736. Rebuck, J. W. and Woods, H. L. Electron microscope studies of blood cells. *J. Hematol.* **3**, 175-191 (1948).
1737. Reed, C. I. and Reed, C. P. A comparative study of human and bovine sperm by electron microscopy. *Anat. Rec.* **100**, 1-7 (1948).
1738. Reed, R. and Rudall, K. M. Electron microscope studies of muscle structure. *Biochem. Biophys. Acta* **2**, 19-26 (1948).
1739. Reed, R. and Rudall, K. M. Electron microscope studies on the structure of earthworm cuticles. *Biochem. Biophys. Acta* **1**, 7-18 (1948).

1740. Richards, A. G. and Korda, F. H. Studies on arthropod cuticle. II. Electron microscope studies of extracted cuticle. *Biol. Bull.* **94**, 212-235 (1948).
1741. Roberts, E. A. and Suthwick, M. D. Contribution of studies with the electron microscope to studies of the relationship of chromoplasts to carotene bodies and carotene bodies to vitamin A. *J. Plant Physiology* **23**, 621-633 (1948).
1742. Rooyen, C. E. v. and Scott, D. G. Smallpox diagnosis with special reference to electron microscopy. *Can. J. Pub. Health* **39**, 467-477 (1948).
1743. Rozsa, G. and Staudinger, M. Electron microscope research on muscle proteins. *Makromolekulare Chem.* **2**, 66-67 (1948).
1744. Ruska, H. The question of activation of bacteriophage solutions through fractionation by foaming. *Kolloid Z.* **110**, 175-177 (1948).
1745. Ruska, H. and Menze, C. The size of typhus bacteriophage from filtration end-point determination and electron micrographs. *Kolloid Z.* **110**, 103-105 (1948).
1746. Rybak, B., Lepine, P. and Croissant, O. Biochemical conditions of the multiplication of a bacteriophage. Evidence gained with the electron microscope. *Compt. rend.* **227**, 238-240 (1948).
1747. Schiffman, I. and Siegel, S. Fundamental research in ferromagnetism. *Tech. Inf. Pilot.* 765-824 (1948).
1748. Schmitt, F. O. and Dennes, A. R. T. Physical properties of protoplasm. *Annual Rev. Physiology* **10**, 1-16 (1948).
1749. Schultz, E. W., Thomassen, P. R. and Marton, L. Electron microscope observations on pseudomonas aeruginosa bacteriophage. *Proc. Soc. Exp. Biol. Med.* **68**, 451-455 (1948).
1750. Scott, J. F. Electron micrograph studies on sodium-desoxyribose nucleate. *Biochem. Biophys. Acta* **2**, 1-6 (1948).
1751. Seeliger, R. Resolution of polygonal-sided objects in the electron microscope. *Optik* **3**, 315-319 (1948).
1752. Seeliger, R. On roughness measurements with the electron microscope. *Metallkunde* **39**, 170-172 (1948).
1753. Sharp, D. G. Enumeration of the virus particles by electron micrography. *Proc. Soc. Exp. Biol. Med.* **70**, 54 (1948).
1754. Smiles, J., Welch, F. V. and Elford, W. J. The influence of antibacterial substances on the interaction of bacteria and bacteriophage. *J. Gen. Microbiol.* **2**, 205-227 (1948).
1755. Smith, W. E., Hillier, J. and Mudd, S. Electron micrograph studies of two strains of pleuropneumonialike (L) organisms of human derivation. *J. Bact.* **56**, 589-601 (1948).
1756. Smith, W. E., Mudd, S. and Hillier, J. L-type variation and bacterial reproduction by large bodies as seen in electron micrographic studies of *bacteroides funduliformis*. *J. Bact.* **56**, 529-541 (1948).
1757. Snellman, O. and Erdos, T. An electron microscope study of myosin, actin and actomyosin. *Biochim. Biophys. Acta* **2**, 660-667 (1948).
1758. Snellman, O. and Erdos, T. Ultracentrifugal analysis of crystallized myosin. *Biochim. Biophys. Acta* **2**, 650-659 (1948).
1759. Spivak, G. V. and Stolyarova, E. L. Electron optical effects in plasma discharges. *J. Tech. Phys. USSR* **18**, 279-288 (1948).
1760. Steere, R. L. and Williams, R. C. A simplified method of purifying tomato bushy-stunt virus for electron microscopy. *Phytopathology* **38**, 948 (1948).
1761. Stranski, I. N. The growth of mosaic and block structures in crystals. *Optik* **3**, 17-23 (1948).
1762. Swerdlow, M. and Seeman, G. S. A method for the electron microscopy of wool. *J. Res. Natl. Bur. Standards* **41**, 231-245; *Text. Res. J.* **18**, 536-550 (1948).
1763. Takahashi, W. N. Crystallization of squash mosaic virus. *Amer. J. Botany* **35**, 243-245 (1948).
1764. Textile Microscopy in Germany. Off. Quartermaster Gen. Military Planning Div. Res. Dep. Branch, Textile Series **13**, Textile Research Inst. New York, N. Y. (1948).
1765. Toman, M. and Rozsival, M. The structure of the raphe of nitzeliae. *Stud. Bot. Czechoslo.* **9**, 26 (1948).
1766. Trillat, J. J. and Laloeuf, A. Study of the structure of ammonium chloride fumes by diffraction and the electron microscope. *Compt. rend.* **227**, 67-69 (1948).
1767. Watson, J. H. L. Pseudostructures in electron microscope specimens. *J. Applied Phys.* **19**, 713-720 (1948).

1768. Watson, J. H. L. Particle size determinations with electron microscopes. *Anal. Chem.* **20**, 576-584 (1948).
1769. Watson, J. H. L. Specimen contamination in electron microscopes. *J. Applied Phys.* **19**, 110-111 (1948).
1770. Watson, J. H. L. Electron microscopy of radiation polymerization products. *J. Phys. & Colloid Chem.* **52**, 470-474 (1948).
1771. Watson, J. H. L., Heller, W. and Wojtowicz, W. Direct electron microscopic thickness determination of ultramicroscopically thin crystals. *J. Chem. Physics* **16**, 999-1000 (1948).
1772. Waugh, D. F. Regeneration of insulin from insulin fibrils by the action of alkali. *J. Am. Chem. Soc.* **70**, 1850 (1948).
1773. Weil, M. L., Beard, D., Sharp, D. G. and Beard, J. W. Purification and sedimentation and electron micrographic characters of the mumps virus. *Proc. Soc. Exp. Biol. Med.* **68**, 309-313 (1948).
1774. Weil, M. L., Beard, D., Sharp, D. G. and Beard, J. W. Purification, pH stability and culture of the mumps virus. *J. Immunol.* **60**, 4 (1948).
1775. Werner, G. H. and Kellenberger, E. The role of the electron microscope on the study of the mode of action of antibiotics. *Bull. Acad. Suisse Sci. Med.* **4**, 263-274 (1948).
1776. Winkler, A. and König, H. The significance of electron microscopic observations on bacteria. *Zentr. Bakt. Parasitenk.* **152**, 9-15 (1948).
1777. Wolken, J. J. and Schwertz, F. A. Physical structures of shell membranes. *J. Gen. Physiol.* **32**, 153-161 (1948).
1778. Wolpers, C. H. The cross striation of collagen and shrinkage under the action of heat. *Biochim. Z.* **318**, 373-383 (1948).
1779. Wolpers, C. H. The disk and lamellar stages of collagen cross-striations. *Makromolekulare Chem.* **2**, 37-47 (1948).
1780. Wood, W. B. Jr. and Smith, M. R. The inhibition of surface phagocytosis by the capsular "slime layer" of *Pneumococcus* Type III. *J. Exp. Med.* **96**, 85-98 (1948).
1781. Wyckoff, R. W. G. Electron microscope study of viruses. *J. Am. Med. Assoc.* **136**, 1081-1083 (1948).
1782. Wyckoff, R. W. G. The electron microscopy of developing bacteriophage. II. Growth of  $T_4$  in liquid culture. *Biochim. Biophys. Acta* **2**, 246-253 (1948).
1783. Wyckoff, R. W. G. The electron microscopy of developing bacteriophage. I. Plaques on solid media. *Biochim. Biophys. Acta* **2**, 27-37 (1948).
1784. Wyckoff, R. W. G. The electron microscopy of macromolecular crystals. *Acta Crystallographica* **1**, 292-294 (1948).
1785. Wyckoff, R. W. G. Multiplication of bacteriophage. *Nature* **162**, 649 (1948).
1786. Wyckoff, R. W. G. The electron microscopy of molecules. *Chem. Listy* **42**, (1948).
1787. Wyckoff, R. W. G. The electron microscopy of microorganisms. *Proc. 4th Internat. Congr. Tropical Med. Malaria* **1**, 310-312 (1948).
1788. Yanchevski, K. Illumination of objects in electron microscopes. *Dokl. Akad. Nauk. USSR.* **63**, 127-130 (1948).
1789. Zahn, H. On the structure of wool fibers. *Textil Praxis* **1**, 3 (1948).

#### 1949

1790. Anon. The fine structure of the wool fibre as revealed by the electron microscope. *Wool Sci. Rev.* **22**, 3-14 (1949).
1791. Angulo, J. J. and Watson, J. H. L. Electron microscopy study of chick embryo erythrocytes. *Proc. Soc. Exp. Biol. Med.* **71**, 646 (1949).
1792. Backus, R. C. and Williams, R. C. Small spherical particles of exceptionally uniform size. *J. Applied Phys.* **20**, 224-225 (1949).
1793. Baker, R. F. and Pease, D. G. Improved sectioning technique for electron microscopy. *J. Applied Phys.* **20**, 480 (1949).
1794. Baker, R. F. and Pease, D. C. Sectioning of the bacterial cell for the electron microscope. *Nature* **163**, 282 (1949).
1795. Bang, F. B. and Gey, G. O. Electron microscopy of tissue cultures infected with the virus of eastern equine encephalomyelitis. *Proc. Soc. Exp. Biol. Med.* **71**, 78-80 (1949).
1796. Bartholomew, J. W. Flagellation of certain species of *Pseudomonas* as seen with the electron microscope. *J. Gen. Microb. London* **3**, 340 (1949).
1797. Bates, T. F. The electron microscope applied to geological research. *New York Acad. Sci. Trans. Ser. 2*, **11**, 100-107 (1949).
1798. Beams, H. W. Electron microscope studies on the structure of cardiac muscle. *Anatomical Rec.* **105**, 59-82 (1949).

1799. Bernstein, I. M. Comparative dispersion of pigments in various vehicles. American Ink Maker **27**, 29–33; 59 (1949).
1800. Beversdorfer, K. Electron microscope surface imaging of ruby glasses. *Optik* **5**, 557–564 (1949).
1801. Bishop, F. W. A magnetic beam splitting focusing device for the electron microscope. *Rev. Sci. Instruments* **20**, 532–533 (1949).
1803. Bishop, F. W. A technique for the production of silica-filmed electron microscope screens in quantity. *Rev. Sci. Instruments* **20**, 529–530 (1949).
1804. Bonifas, V., Gallard, G. Applications of electron microscopy in biological research. *Journal de radiologie et d'électrologie* **30**, 286 (1949).
1805. Bowen, N. L. and Tuttle, O. F. The system  $MgO-SiO_2-H_2O$ . *Bull. Geol. Soc. Am.* **60**, 439–460 (1949).
1806. Brieger, E. M. and Cosslett, V. E. Preparation of bacteria for electron microscopy. *Nature* **164**, 352 (1949).
1807. Brown, A. F. Fine structure of slip zones. *Nature* **163**, 961 (1949).
1808. Brown, A. F. Elementary slip processes in aluminium as shown by the electron microscope. *J. Inst. Metals* **75**, 103–114 (1949).
1809. Burton, C. J. Electron microscopy. *Anal. Chem.* **21**, 36–40 (1949).
1810. Callan, H. G., Randall, J. T., and Tomlin, S. G. An electron microscope study of the nuclear membrane. *Nature* **163**, 280 (1949).
1811. Claude, A. Electron microscope studies of cells by the method of replicas. *J. Exp. Med.* **89**, 425–430 (1949).
1812. Comer, J. J. and Hamm, F. A. Modified silica replica technique. *Anal. Chem.* **21**, 418–419 (1949).
1813. Cuckow, F. W. and Trotter, J. Some experiences in the application of the electron microscope to the study of steels. *Proc. Phys. Soc.* **62B**, 360–365 (1949).
1814. Dalton, A. J., Kahler, H., Kelley, M. G., Lloyd, B. J. and Striebich, M. J. Some observations on the mitochondria of normal and neoplastic cells with the electron microscope. *J. Nat. Cancer Inst.* **9**, 439–449 (1949).
1815. Dawson, I. M. and Elford, W. J. Electron microscope studies on the interaction of certain viruses with fowl red cell membranes. *Nature* **163**, 63 (1949).
1816. Delisle, L. Electron micrographs of tungsten. *Metal Progress* **56**, 670–671 (1949).
1817. Delisle, L. Method of examination of sections of fine metal powder and particles with the electron microscope. *J. Metals* **1**, 228–232 (1949).
1818. Deuterbande, L., Kahler, H. and Mitchell, B. L. Differentiation under the electron microscope of  $SiO_2$  and  $NaCl$  crystals. *Arch. Intern. Pharmacodynamie* **80**, 171–177 (1949).
1819. Draper, M. H. and Hodge, A. J. Submicroscopic localization of minerals in skeletal muscle by internal "microincineration" within the electron microscope. *Nature* **163**, 576–580 (1949).
1820. Draper, M. H. and Hodge, A. J. Studies on muscle with the electron microscope. I. The ultrastructure of toad striated muscle. *Austral. J. Exp. Biol. Med. Sci.* **27**, 465–504 (1949).
1821. Earle, M. D. and Minikin, J. A. New method of sectioning synthetic fibers with the ultra-microtome for examination with the electron microscope. *Text. Res. J.* **19**, 36–41 (1949).
1822. Echeistova, A. T. and Shekhter, A. B. Electron microscopic study of structural changes of highly dispersed solids on heating. *Izvest. Akad. Nauk SSSR, Otdel. Khim. Nauk*, 13–17 (1949).
1823. Evans, A. S. and Melnick, J. L. Electron microscope studies of the vesicle and spinal fluids from a case of Herpes Zoster. *Proc. Soc. Exp. Biol. Med.* **71**, 283–286 (1949).
1824. Faberge, A. C. Measuring the thickness of very thin microtome sections. *Science* **110**, 73 (1949).
1825. Farrant, J. L. and O'Connor, J. L. Elementary bodies of varicella and Herpes Zoster. *Nature* **163**, 260 (1949).
1826. Fernández-Morán, H. and Luft, R. Submicroscopic cytoplasmic granules in the anterior lobe cells of the rat hypophysis as revealed by electron microscopy. *Acta endoer. Kbh.* **2**, 199 (1949).
1827. Frimer, A. I. and Sinitskaya, I. G. A method of investigating the micro-structure of photo cathodes by means of the electron microscope. *Dokl. Akad. Nauk. SSSR*, **66**, 49–51 (1949).

1828. Geach, G. A. Metallurgical applications of the electron microscope; report on a recent symposium. *Metallurgia* **41**, 115–120 (1949).
1829. Geach, G. A. Metallurgical achievements of the electron microscope; a review of the literature to the end of 1948. *Metallurgia* **40**, 319–326 (1949).
1830. Grigg, G. W. and Hodge A. J. Electron microscope studies of spermatozoa. I. The morphology of the spermatazoon of the common domestic fowl (*Gallus domesticus*). *Austral. J. Sci. Res.* **B 2**, 271–286 (1949).
1831. Haardick, H. On interaction between evaporated layers and microscopic objects. *Optik* **5**, 549–555 (1949).
1832. Hall, C. E. Electron microscopy of fibrinogen and fibrin. *J. Biol. Chem.* **179**, 857–864 (1949).
1833. Hanre, D. The effect of ultrasonic waves upon *Klebsiella pneumoniae*, *Saccharomyces cerevisiae*, *Miyagawanella felis* and influenza virus A. *J. Bact.* **57**, 279 (1949).
1834. Hass, G. and Scott, N. W. Silicon monoxide protected front surface mirrors. *J. Opt. Soc. Am.* **39**, 179–184 (1949).
1835. Hass, G. and Kehler, H. Silicium monoxide replica and support membranes and a method to study discontinuous evaporated films. *Optik* **5**, 48–52 (1949).
1836. Hattiangdi, G. S. and Swerdlow, M. Characterization of alkali soaps by electron microscopy. *J. Research NBS* **42**, 343–360 (1949).
1837. Heden, C. G. and Wyckoff, R. W. G. The electron microscopy of heated bacteria. *J. Bact.* **58**, 153–160 (1949).
1838. Heidenreich, R. D. Electron microscope and diffraction study of metal crystal textures by means of thin sections. *J. Applied Phys.* **20**, 993–1010 (1949).
1839. Heinmets, F. Modification of silica replica technique for study of biological membranes and application of rotary condensation in electron microscopy. *J. Applied Phys.* **20**, 384–387 (1949).
1840. Helywig, G. and Menke, E. Electron microscopy of cellular processes in human dentin. *Naturwissenschaften* **36**, 281–283 (1949).
1841. Hillier, J., Mudd, S. and Smith, A. G. Internal structure and nuclei in cells of *Escherichia coli* as shown by improved electron microscopic techniques. *J. Bact.* **57**, 319–338 (1949).
1842. Hodge, A. J. The motility and flagellation of bacteria. *Australian J. Science* **11**, 115–119 (1949).
1843. Houwink, A. L. The electron microscope and some applications. *Nederlandsch Tijdschr. Geneesk.* **93**, 2563 (1949).
1844. Hovanitz, W. The finer structure of the resting chromosomes. *Anat. Rec.* **105**, 3 (1949).
1845. Jacquez, J. A. and Porter, K. R. Electron microscopy observations on Hodgkin's material. *Cancer, N. Y.* **2**, 853–856 (1949).
1846. Jakob, A. On the so-called nuclear stage of leptospira. *Optik* **5**, 564–572 (1949).
1847. Kahler, H. and Woods, M. W. Electron microscopic and electrophoretic study of tobacco mosaic virus. *Arch. Biochem.* **22**, 393–401 (1949).
1848. Kaufman, B. P. Chromosome structure as revealed by cryptic digestion. *Anat. Rec.* **105**, 15–16 (1949).
1849. Kaye, W. Aluminum-beryllium alloy for substrate and replica preparation in electron microscopy. *J. Applied Phys.* **20**, 1209–1215 (1949).
1850. Knaysi, G. and Hillier, J. Preliminary observation on the germination of the endospore in *Bacillus megatherium* and the structure of the spore coat. *J. Bact.* **57**, 23–29 (1949).
1851. Koch, W. and Wiester, H. J. New contributions to the knowledge of carbides in alloyed steels. *Stahl u. Eisen* **69**, 73–79 (1949).
1852. Koch, W. and Wiester, H. J. Investigation on the causes of the annealing stability of special carbide containing steels. *Stahl u. Eisen* **69**, 80–86 (1949).
1853. König, H. and Helwig, G. On electron microscope imaging of inhomogeneities of glass surfaces. (Preliminary communication). *Optik* **5**, 573–575 (1949).
1854. Küster, A. Electron microscopic investigation of developed photographic layers. *J. wiss. Photogr.* **43**, 191–200 (1949).
1855. Laurell, A. H. F. A method of sectioning bacteria *in situ* for electron microscopical and cytochemical investigations. *Nature* **163**, 282 (1949).
1856. Lalaw, L. W., Mosley, V. M. and Wyckoff, R. W. G. Lysis of formalinized bacteria by bacteriophage. *Science* **110**, 275–276 (1949).

1857. Levinstein, H. The growth and structure of thin metallic films. *J. Applied Phys.* **20**, 306-315 (1949).
1858. Lindberg, J. Allwörden reaction. *Textile Res. J.* **19**, 43-45 (1949).
1859. Lindberg, J., Mercer, E. H., Philip, B. and Gralen, N. The fine histology of the keratin fibers. *Textile Res. J.* **19**, 673-678 (1949).
1860. Marshall, C. E. The colloid chemistry of the silicate minerals. *Agronomy, I. Acad. Press, Inc. Publishers, N. Y.* (1949).
1861. Marton, L., Lachenbruch, S. H., Simpson, J. A., Van Bronkhorst, A. Fringe fields of ferromagnetic domains. *J. Applied Phys.* **20**, 1258 (1949).
1862. Mathieu-Sicaud, A. and Levavasseur, G. Dispersion of clay suspensions by ultrasonics. Interpretation of the results of the electron microscope. *Comptes rend.* **228**, 393-395 (1949).
1863. McCabe, L. C., Mader, P. P., McMahon, H. E., Hamming, W. J. and Chaney, A. L. Industrial dusts and fumes in the Los Angeles area. *Ind. Eng. Chem.* **41**, 2486-2493 (1949).
1864. McCutcheon, D. M. Cathodic vacuum etching of metals. *J. Applied Phys.* **20**, 414-415 (1949).
1865. Mercer, E. H., Lindberg, J. and Philip, B. The "subcutis" and other cuticular preparations from wool and hair. *Text. Res. J.* **19**, 678-685 (1949).
1866. Möllenstedt, G. Molecular lattice in the electron microscope. *Kolloid Z.* **114**, 167 (1949).
1868. Mottlau, A. Y. Technique for the preparation of grease or solid samples dispersed in grease-like media for examination with the electron microscope. *J. Applied Phys.* **20**, 1055-1059 (1949).
1869. Mühlthalter, K. The structure of bacterial cellulose. *Biochim. Biophys. Acta* **3**, 527-535 (1949).
1870. Mühlthalter, K. Electron micrographs of plant fibers. *Biochim. Biophys. Acta* **3**, 15-25 (1949).
1871. Nitschmann, H. Electron microscopic size determination of the calcium casein particles in cows' milk. *Helvetica Chim. Acta* **32**, 1258-1264 (1949).
1872. Norin, R. Mineralogical composition of some clays from the Rhaetic and Liassic beds of northwest Scania, Sweden. *Geol. Foren. L. Stockholm Forh.* **71**, 215-237 (1949).
1873. Nutting, J. and Cosslett, V. E. A replica technique for the examination of fracture surfaces with the electron microscope. The dry stripping of formvar replicas from etched metal surfaces. *J. Inst. Metals* **75**, 57-74 (1949).
1874. Palacios-De-Borao, G. S. J. Electron microscopy of symbiotic nitrogen bacteria. *Microbiología Española* **2** Madrid (1949).
1875. Palay, S. L. and Claude, A. An electron microscope study of salivary gland chromosomes by the replica method. *J. Exp. Med.* **89**, 431-438 (1949).
1876. Pease, D. and Baker, R. F. Preliminary investigations of chromosomes and genes with the electron microscope. *Science* **109**, 8-10 (1949).
1877. Polukarov, M. N. Ultra-microscopic investigation of the electrolysis of silver nitrate. *J. Gen. Chem. USSR* **19**, 1583-1595 (1949).
1878. Porter, K. R. and Hawn, C. V. Z. Sequences in the formation of clots from purified bovine fibrinogen and thrombin. A study with the electron microscope. *J. Exp. Med.* **90**, 225-232 (1949).
1879. Radavich, J. F. The study of grain boundaries with the electron microscope. *J. Metals, Trans.* **185**, 395-398 (1949).
1880. Rhian, M., Lensen, S. G., and Williams, R. C. An electron microscope study of material from tissue of the central nervous system of poliomyelitis and normal mice and cotton rats. *J. Immun.* **62**, 487 (1949).
1881. Rhoades, R. P. Low speed microtomy for the electron microscope. *Proc. Soc. Exp. Biol.* **71**, 660 (1949).
1882. Rigby, G. R. Application of crystal chemistry to ceramic materials. *Trans. Brit. Ceram. Soc.* **48**, 1-67 (1949).
1883. Robillard, J. Use of the electron microscope in the optical industry. *Rev. Opt.* **28**, 129-145 (1949).
1884. Rochow, T. G. and Rowe, F. G. Resinography of some consolidated separate resins. *Anal. Chem.* **21**, 461-466 (1949).
1885. Rozsa, G., Szent-Györgyi, A. and Wyckoff, R. W. G. The electron microscopy of F-actin. *Biochim. Biophys. Acta* **3**, 561-569 (1949).

1886. Schmitt, F. O. Some commentaries on electron microscopy as applied in biology. *Fed. Proc. Balt.* **8**, 530, (1949).
1887. Schultz, J., MacDuffe, R. C., and Anderson, T. F. Smear preparations for the electron microscopy of animal chromosomes. *Science* **110**, 5-7 (1949).
1888. Schulz, L. G. The structure and growth of evaporation LiF and NaCl films on amorphous substrates. *J. Chem. Phys.* **17**, 1153-1162 (1949).
1889. Schwartz, C. M., Austin, A. E. and Weber, P. M. A positive replica technique for electron microscopy. *J. Applied Phys.* **20**, 202-205 (1949).
1890. Scott, D. B., Kaplaw, H. and Wyckoff, R. W. G. Replica studies of changes in tooth surface with age. *J. Dental Res.* **28**, 31-47 (1949).
1891. Scott, D. B. and Wyckoff, R. W. G. Studies of tooth surface structure by optical and electron microscopy. *J. Am. Dent. Assn.* **39**, 275-282 (1949).
1892. Scott, D. B. and Wyckoff, R. W. G. Metal shadowing for the optical microscopy of certain tissues. *Am. J. Clin. Path.* **19**, 63-66 (1949).
1893. Scott, G. D. Spherical particles for electron microscopy. *J. Applied Phys.* **20**, 417 (1949).
1894. Seeliger, R. On electron microscope imaging of fine loose artifacts on surfaces. *Z. Metallkunde* **40**, 255-256 (1949).
1895. Seeliger, R. On preparation technique of the replica method for electron microscope surface imaging and roughness measurements. *Metallooberfläche* **3**, 181-186 (1949).
1896. Sharp, D. G. Enumeration of virus particles by electron microscopy. *Proc. Soc. Exp. Biol. and Med.* **70**, 54-59 (1949).
1897. Sharp, D. G. and Wolf, F. A. The virus of tobacco leaf-curl. *Phytopathology* **39**, 225 (1949).
1898. Shutts, J. H. An electron microscope study of the egg membranes of melanophis differentialis (Thomas). *Biol. Bull.* **97**, 100 (1949).
1899. Siegel, B. M. The structure of cellulose in the electron microscope. *TAPPI* **32**, 109-116 (1949).
1900. Signer, R., Pfister, H., Studer, H. Electron microscopy of rough surface particles. *Makromolekulare Chemie* **4**, 50-54 (1949).
1901. Silberman, L. B., Elliott, S. B., Greenfield, M. A. Radiation survey of X-ray output of an electron microscope from personnel hazard viewpoint. *Science* **110**, 376-377 (1949).
1902. Singer, S. J. and Petzold, R. F. An improvement in the shadow-east replica technique. *J. Applied Phys.* **20**, 816-817 (1949).
1903. Sjostrand, S. F. An electron microscope study of the retinal rods of the guinea pig eye. *J. Cellular and Comp. Phys.* **33**, 383-403 (1949).
1904. Sponsler, O. L. and Bath, J. D. Electron microscope studies of submicroscopic structures of Ankist rodesmus falcotus. *Am. J. Bot.* **36**, 756-758 (1949).
1905. Steinhaus, E. A. and Thompson, C. G. Granulosis disease in the buckeye caterpillar, Junonia Coenia Hubner. *Science* **110**, 276-278 (1949).
1906. Stern, G. Physical properties of reduced iron powder plus graphite and copper. *Iron Age* **163**, 81-85 (1949).
1907. Syrrist, A. Electron microscope studies of structural changes in enamel following topical application of NaFl. *Odontologisk Tidskrift* **57**, 106 (1949).
1908. Szawlewicz, S. A. Utilization of the electron microscope and infrared spectrophotometer for the examination and testing of materials. Rpt. 424526, Naval Air Material Center, Exp. Sta., Phila., Pa. (1949).
1909. Trotter, J. Interpretation of electron micrographs prepared by the plastic replica process. *Nature*, **164**, 227-228 (1949).
1910. Trotter, J. and McLean, D. Electron microscope study of quenched and tempered steel. *Iron and Steel Inst.* **163**, 9-13 (1949).
1911. Turkeyich, J. and Hillier, J. Electron microscopy of colloidal systems. *Anal. Chem.* **21**, 475-485 (1949).
1912. Vanamee, P. The preparation of tissues for electron microscopy. *Med. Div. Rept.* **209**, 39 (1949).
1913. Vanamee, P. and Porter, K. R. Formation of certain connective tissue fibre. *Anat. Rec.* **105**, 65-66 (1949).
1914. Watson, J. H. L. The morphology of carbon black particles in shadow east specimens. *J. Applied Phys.* **20**, 747-754 (1949).
1915. Watson, J. H. L., Heller, W. and Wojtowicz, W. Comparative electron and light microscopic investigations of tactoid structures in  $V_2O_5$  sols. *Science* **109**, 274-278 (1949).

1916. Wilkinson, P. G. and Birks, L. S. Properties of gold deposited at liquid air temperatures. *J. Applied Phys.* **20**, 1169-1171 (1949).
1917. Williams, A. E. The electron microscope. Recent improvements and developments. *Iron and Coal Trades Rev.* 1345-1347 (1949).
1918. Williams, R. C. and Backus, R. C. The electron micrographic structure of shadow-cast films and surfaces. *J. Applied Phys.* **20**, 98-106 (1949).
1919. Williams, R. C. and Steere, R. L. Electron micrographic observations of tobacco mosaie virus in crude, undiluted plant juice. *Science* **109**, 308-309 (1949).
1920. Winkler, A. and König, H. The significance of electron optical findings with bacteria. *Zentr. Bakt. Parasitenk.* **153**, 9-15 (1949).
1921. Wirth, J. and Anthanasiu, P. Electron microscopy of cells from tissue cultures infected with vaccine virus. *Proc. Soc. Exp. Biol. Med.* **70**, 59-64 (1949).
1922. Wittebort, J. I. The electron microscope and its application to materials problems. U. S. Air Force Air Matériel Comm. Tech. Rept. 5754 (1949).
1923. Wyckoff, R. W. G. Multiplication of the T-3 bacteriophage against *E. coli*. *Proc. Soc. Exp. Biol. Med.* **71**, 144-146 (1949).

## AUTHOR INDEX

### A

- Abrams, I. M. 740, 741.  
Ackerman, A. 846.  
Ackerman, J. 1491.  
A. E. G. 8.  
Ahearn, A. J. 84, 663, 680.  
Alexander, A. E. 267.  
Alexander, L. T. 1129.  
Algera, L. 1492.  
Alyea, H. N. 82.  
Anderman, J. 1328.  
Anderson, R. B. 1628.  
Anderson, T. F. 101, 102, 103, 212, 754, 915, 978, 979, 980, 1005, 1013, 1038, 1062, 1071, 1073, 1074, 1075, 1080, 1083, 1084, 1085, 1086, 1101, 1110, 1112, 1118, 1145, 1172, 1197, 1208, 1210, 1211, 1212, 1217, 1220, 1312, 1338, 1339, 1400, 1629, 1887.  
Angulo, J. J. 1791.  
Anon. 39, 41, 42, 43, 119, 147, 148, 149, 150, 181, 182, 183, 184, 241, 242, 243, 244, 265, 266, 742, 914, 1128, 1401, 1402, 1403, 1630, 1631, 1632, 1633, 1790.  
Antes, L. 1421.  
Anthanasiu, P. 1539, 1623, 1921.  
Antoine, L. D. 737.  
Appleman, M. D. 1014, 1343.  
Appling, J. W. 957.  
Ardenne, M. v. 9, 104, 289, 290, 299, 300, 315, 316, 317, 325, 326, 343, 373, 440, 441, 451, 452, 453, 454, 488, 681, 682, 683, 692, 693, 694, 701, 702, 708, 716, 815, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 916, 917, 918, 919, 920, 921, 922, 923, 924, 1015, 1016, 1017, 1018, 1019, 1130, 1131, 1132, 1133, 1134, 1135, 1151, 1152, 1153, 1191, 1297.  
Arens, A. 1634.  
Arnold, A. 1020.  
Asao, S. 732.  
Asen, A. 1286.  
Astbury, W. T. 1494, 1588, 1635, 1636, 1728, 1729.  
Atlas, L. T. 1614.  
Austin, A. E. 1889.

### B

- Babudieri, B. 1340, 1637.  
Bachman, C. H. 120, 327, 336, 337, 338.  
Bachman, G. S. 1403.  
Baekus, R. C. 1792, 1918.  
Badger, A. E. 1403.  
Bailey, C. A. 1638.  
Bailey, F. M. 709.  
Baker, R. F. 332, 339, 549, 723, 744, 774, 1050, 1256, 1435, 1560, 1561, 1562, 1580, 1695, 1793, 1794, 1876.  
Banca, M. C. 151, 312.

Bang, F. B	1404, 1405, 1495, 1639, 1640, 1795.
Barer, R	1699.
Barski, G	1623, 1641.
Barnes, M. R	1014, 1025.
Barnes, R. B	105, 106, 925, 1024, 1136, 1341.
Barnett, J. M	107.
Barrett, C. S	224, 1137, 1138, 1257, 1258.
Barso, W. M	755.
Bartholomew, J. W	1796.
Barton, H. M	769, 1642.
Bates, T. F	1643, 1797.
Bath, J. D	1904.
Bawden, F. C	1342.
Baylis, J. R	1661.
Baylor, M. R. B	129, 1025, 1139, 1146, 1259, 1303, 1343, 1353, 1496, 1528.
Beams, H. W	1798.
Bear, R. S	1606.
Beard, D	1106, 1107, 1114, 1237, 1245, 1246, 1260, 1325, 1326, 1327, 1330, 1376, 1436, 1510, 1773, 1774.
Beard, J. W	1106, 1107, 1114, 1237, 1245, 1246, 1260, 1325, 1326, 1327, 1330, 1344, 1376, 1436, 1476, 1510, 1644, 1645, 1773, 1774.
Becker, E	442.
Becker, G. A	663, 753.
Becker, H	455, 469, 470, 471.
Beckert, J. A	84, 680.
Beger, E	998.
Behne, R	664, 665, 666.
Beischer, D	121, 797, 801, 802, 851, 853, 854, 855, 856, 926, 1133, 1140.
Benard, J	1141.
Bender, J. F	312.
Benham, W. E	643.
Benjamin, M	703.
Bennek, H	1021.
Bensen, I. B	152.
Benson, G	1406.
Benson, S. W	1646.
Berger, A	1032.
Berger, K	743.
Berger, R. W	1269.
Bergmann, P	423.
Bergold, G	1647.
Berqvist, A	356.
Bernays, P. M	1026.
Bernstein, I. M	1799.
Berta, L	245.
Bertein, F	559, 560, 561, 562, 563, 564, 565, 581, 601, 602, 1423.
Bertram, S. J	509.
Bessis, M	1648, 1649.
Beu, K. E	1370.
Beyer, J. J	1492.
Beyersdorfer, K	1800.
Bhattacharya, D. L	374.
Bietti, G. B	1340.
Big, E. J	122.
BIOS Reports	248.
Birdsall, D. H	1525, 1526.
Birks, L. S	1916.
Bishop, F. W	776, 777, 1801, 1803.
Black, L. M	1407, 1650.
Black, M. V	1643.
Blank, H	1732.
Bocciarelli, D	357.
Boeke, J	1408.

Boersch, H.	85, 328, 424, 425, 472, 473, 524, 525, 526, 537, 550, 582, 695, 696, 704, 705, 717, 718, 719, 733, 766, 778, 1022, 1497, 1651.
Bol, K.	578.
Bole, G. A.	1142.
Bonet-Maury	1061.
Bonifas, B.	1804.
Borasky, R.	1727.
Borgnis, F.	583, 603.
Borries, B. v.	27, 44, 45, 54, 59, 60, 61, 62, 83, 123, 153, 185, 246, 280, 284, 287, 291, 301, 302, 303, 329, 330, 331, 344, 381, 426, 443, 444, 456, 457, 474, 475, 489, 584, 604, 784, 803, 804, 805, 839, 858, 859, 879, 927, 1261.
Boryska, E.	781, 782, 783.
Boswell, F. W.	1498, 1720.
Bourdillon, J.	1186.
Boutaric, A.	33.
Bowen, N. L.	1805.
Boyer, R. F.	1346.
Boynton, W. H.	1652.
Bradner, H.	320.
Bradley, W. F.	1656.
Braendle, H. A.	749.
Bragg, L.	124.
Bravo, R. A.	125, 126, 154.
Bretschneider, L. H.	1499.
Brieka, M.	1648.
Brieger, E. M.	1500, 1806.
Brown, A. F.	1501, 1807, 1808.
Brown, F. G.	547.
Brown, H. P.	1347.
Brown, O. J.	1023.
Brubaker, D. G.	1269, 1345.
Brüche, E.	1, 3, 4, 13, 15, 63, 86, 87, 127, 128, 278, 304, 305, 394, 402, 412, 415, 427, 428, 429, 476, 510, 516, 585, 630, 631, 633, 634, 635, 644, 645, 646, 651, 652, 653, 667, 668, 816.
Bruck, H.	207, 363, 538, 564, 566, 567, 568, 569, 1349, 1409, 1423.
Bryner, J. S.	247, 1653.
Buehholtz, J. T.	1502, 1503.
Burgers, W. G.	674, 675, 684, 685, 697.
Burstein, M.	1649.
Burton, C. J.	105, 106, 925, 1024, 1136, 1341, 1809.
Burton, E. F.	22, 64, 292, 860, 1143, 1504.
Busch, H.	4, 391, 392.

## C

Calbick, C. J.	155, 393, 395, 647.
Caldwell, O. G.	1070.
Caldwell, W. C.	1350.
Calfas, P.	108.
Callaghan, E.	1654.
Callan, H. G.	1810.
Calvet, F.	1655.
Carnap, A.	1182, 1555.
Castner	46.
Chambers, L. A.	1144, 1145, 1217, 1419.
Chaney, A. L.	1863.
Chanson, P.	570, 750.
Charlesby, A.	306.
Chatterjee, B.	1573.
Chaudbury, A. K.	374.
Chaudron, G.	1351.
Chia-Si Lu	1204.
Chilton, L. V.	351.
Clark, E. M.	1720.

Clark, G. L.	129, 1025, 1026, 1139, 1146, 1259, 1303, 1343, 1353, 1496, 1519, 1528.
Clark, T. P.	1410.
Claude, A.	1352, 1383, 1411, 1412, 1505, 1811, 1875.
Clock, R. C.	1310.
Coblenz, J. M.	1506.
Coffey, J. M.	1507.
Cogan, H. A.	1413.
Cohen, S. M.	1507.
Coheur, P.	249.
Columbian Carbon Co. Research Laboratories.	861, 928, 1027.
Comeforo, J. E.	1656.
Comer, J. J.	1812.
Conn, H. J.	1508.
Copeland, P. L.	511.
Coriell, L. L.	1419, 1732.
Corner, J. J.	1686.
Cosslett, V. E.	23, 225, 250, 548, 551, 571, 1500, 1509, 1657, 1658, 1806, 1873.
Cottrell, C. E.	1218.
Cox, H. R.	1566.
Craggs, J. D.	512.
Craigie, A. H., Jr.	1734.
Crane, H. R.	350, 748, 1262.
Cravath, A. M.	1414, 1415.
Cravitz, L.	1722.
Critten'en, E. C., Jr.	1381.
Croissant, O.	1422, 1449, 1539, 1568, 1623, 1710, 1746.
Crook, E. M.	351, 1416.
Cross, W. G.	1660.
Crowe, G. R.	1500, 1723.
Csokan, P.	130.
Cuckow, F. W.	186, 352, 1813.
Cunha, R.	1510.

## D

Dalton, A. J.	1577, 1814.
Daniel, J. H.	720, 764.
Dantz, D.	806.
Das Gupta, N. N.	374, 1451.
Davidson, N.	1511.
Davis, E. G.	773, 1703.
Davission, C. J.	393, 395, 647.
Dawson, I. M.	1659, 1815.
De, M. L.	374.
Deacon, B. M.	1660.
DeBerard, W. W.	1661.
De Broglie, L.	21, 552, 553, 572, 573.
De Decker, H. C. J.	1512, 1513.
De Haas, E.	1662.
De Heer, H. J.	226.
Delbrück, M.	1197, 1514.
Delisle, L.	1816, 1817.
DeLisle, N. G.	1218.
De Long, P.	929.
Dennes, A. R. T.	1748.
der Mattesian, E.	1515.
De Robertis.	1663.
Deuterbande, L.	1818.
Diels, K.	436, 458.
Dierk, F. H.	1638.
Dingle, J. H.	1245, 1246, 1260, 1327, 1330.
Dinichert, P.	251, 767.
Dinochowski, L.	1588, 1728.
Dobbin, R. E.	1417.
Doetsch, R. N.	1664.
Donges, D.	1354.

Donnet, J. B	1665.
Donovan, G. E	156, 157.
Donovick, R	1355, 1356.
Dorgelo, H. B	65, 252.
Dosse, J	16, 66, 430, 443, 490, 491, 492, 493, 494, 654, 706, 721.
Doty, P. M	1587.
Draper, M. H	1819, 1820.
Driest, E	789.
Drummond, D. G	187, 768, 1357.
Dubin, J. N	1263.
Duffek, V	1028, 1065, 1264.
Duffendack, O. S	1216.
Dunaway, R. E	769.
Dupouy, G	188, 358, 1418.
Duran-Reynals, F	1516.
Dyar, M. T	1517.

## E

Earle, M. D	1821.
Echeistova, A. T	1822.
Eckhardt, A	1666.
Edwards, J. D	1265.
Edwards, O. F	1518.
Ehrenberg, W	586, 605.
Eigelsbach, H. T	1419.
Eisenhut, O	1029, 1149.
Eisenstark, A	1519, 1610.
Etel, W. H	807, 817, 831, 832, 833, 862, 863, 864, 865, 901, 902, 930, 931, 1030, 1147, 1148.
Electron Microscope Conferences	254, 255, 256, 257, 268, 274.

### Electron Microscope Society of America

Elford, W. J	189, 203, 227, 253, 554.
Elliott, S. B	1754, 1815.
Ellis, D. A	1901.
Ellis, S. G	1646.
Elod, E	364, 575, 611, 1504, 1520, 1521, 1660, 1667, 1668.
Elrod, R. P	932, 1031, 1522.
Elvers, I	1508.
Emmett, P. H	933, 1150.
Endell, K	1628.
Epstein, H. T	857, 934, 1015, 1134, 1135, 1151, 1152, 1153, 1297, 1420.
Erdos, T	1669.
Erkama, J	1757, 1758.
Ertaud, A	88.
Evans, A. S	750.
Evans, C. A	1823.
Exterman, R. C	1523.
Eyer, H	258.
	1266.

## F

Faberge, A. C	1824.
Farrant, J. L	1524, 1670, 1825.
Farrington, B. B	1525, 1526.
Faust, G. T	1129.
Feitknecht, W	1032.
Feller, A. E	1245, 1246, 1260, 1327, 1330.
Fernandez-Moran, H	1826.
Feuer, G	1671.
FIAT Reports	204, 205, 259.
Finch, G. I	587.
Fischer, H	1033.
Fischer, R. B	1403, 1527, 1656, 1672.
Fischer, R. D	190.
Foster, E	1528.

Foster, R	1421.
Fox, C. W	709.
Frampton, L. V	1034.
Frank, F	818.
Franz, E	935, 1154, 1155, 1156.
Frey, F	333, 1035.
Freytag, H	1191.
Frey-Wyssling, A	25, 228, 1036, 1267, 1529, 1673.
Fricke, R	936, 1354, 1394.
Friedrich-Freksa, H	893, 922, 923, 1001.
Friess, H	819.
Frimer, A. I	1530, 1674, 1827.
Fritz, R	36, 445.
Fromm, H	1049.
Froula, H. C., Jr	206, 762, 1531.
Fruhbrodt, E	77, 866.
Fullam, E. F	109, 756, 757, 868, 1089, 1157, 1158, 1163, 1352, 1383, 1412, 1472, 1532, 1675.
Fuller, M. L	1268, 1269.

## G

Gabor, D	24, 26, 555, 588, 763.
Gaede	67.
Gagnon, E	1566.
Gallarati, G	40.
Gallard, G	1804.
Gallardo, E	1535.
Gard, S	17, 1117, 1159, 1160, 1161, 1162, 1270, 1358, 1533.
Gartner, K	1163.
Gaw, H. Z	1534.
Geach, G. A	1828, 1829.
Geisler, A. H	1288, 1289, 1536.
Gerould, C. H	1271, 1359, 1431, 1537.
Gessler, A. E	756, 757, 1089, 1538, 1676, 1677.
Gey, G. O	1640, 1795.
Gildart, L	1241.
Girard, G	1679.
Gitzen, W. H	1678.
Giuntini, J	1422, 1449, 1539, 1568, 1679.
Gizycki, I. v	940.
Glaser, R. W	1164.
Glaser, W	403, 404, 405, 406, 416, 446, 447, 477, 478, 479, 495, 496, 497, 498, 513, 528, 529, 589, 590, 606, 1261.
Gloor, W. E	937.
Gobrecht, R	499, 514.
Goddard, L. S	539.
Goldsztab, S	158.
Gollan, F	1680.
Golovato, E	1721.
Golub, O. J	1693.
Golz, E	305, 480, 591, 1020, 1165, 1166, 1167, 1192, 1272.
Goatee, T	260.
Gorter C. J	1681.
Gotthardt, E	862, 1037.
Gralen, N	1711, 1859.
Granick, S	1540.
Gratia A	808, 1360.
Gratsiatos, J	431.
Green, H	867, 1168.
Green, R. H	1038, 1110.
Green, T. A	592.
Greenfield, M. A	1901.
Grey, C. E	770, 771, 772, 1538, 1676, 1677, 1705.
Grigg, G. W	1830.
Grim, R. E	1039.

Grivet, P.	207, 229, 359, 363, 375, 515, 564, 569, 1349, 1409, 1423..
Gross, H.	676.
Gross, G.	1682, 1683.
Groupe, V.	1424, 1467, 1541, 1542.
Grube, W. L.	382.
Gulbransen, E. A.	1361, 1425, 1426, 1461.
Gundermann, J.	942, 1040.
Gunn, A. F.	1427.
Gunther, F.	716, 1169.

## H

Haagen, E.	816, 868.
Haam, E. v.	1041.
Haardick, H.	1273, 1831.
Haefer, R.	722.
Haegerman, G.	1042.
Hagemann	131.
Haine, M. E.	365, 383.
Hall, C. E.	208, 230, 366, 607, 710, 938, 1043, 1053, 1100, 1231, 1275, 1284, 1362, 1428, 1439, 1559, 1606, 1684, 1685, 1832.
Hamann, A.	1044.
Hambraeus, G.	1363.
Hamly, D. H.	89, 1045.
Hamn, F. A.	1686, 1687, 1812.
Hamming, W. J.	1863.
Hampp, E. G.	1688.
Hamre, D.	1467, 1543, 1833.
Hanke, W.	1170.
Hanson, E. E.	764.
Hanson, R. E.	1441.
Hardy, J. I.	869.
Hargett, M. V.	731.
Hargiss, C. O.	1488.
Harker, D.	1171, 1364.
Harrington, J.	68.
Harris, L.	636, 1689, 1690.
Harris, M.	944.
Harrison, S.	608.
Harvey, E. B.	1172.
Harvey, G. G.	318.
Hass, G.	711, 939, 1046, 1429, 1834, 1835.
Hast, N.	1544, 1545, 1691.
Hatschek, P.	18.
Hattiangdi, G. S.	1836.
Hauser, E. A.	1275, 1546, 1547.
Hauser, J. E.	1734.
Hawley, G. G.	19.
Hawn, C. Z. V.	1548, 1878.
Hayashi, T.	1578.
Heard, O. O.	758.
Heden, C. G.	1837.
Heering, H.	940.
Heidenreich, R. D.	1047, 1048, 1173, 1174, 1274, 1346, 1365, 1366, 1367, 1430, 1431, 1432, 1549, 1838.
Heiger, I.	1550.
Heinmets, F.	1210, 1211, 1692, 1693, 1839
Heinze, W.	669.
Heise, F.	609, 610, 618.
Heller, W.	1771, 1915.
Helwig, G.	1840, 1853.
Hendricks, S. B.	1129, 1276.
Henle, G.	1175.
Henle, W.	1144, 1145, 1175.
Henneberg, W.	3, 69, 90, 413, 417, 418, 516, 941.
Henriot, E.	419.

Hermans, P. H	1433, 1434.
Herschman, H. K	1368.
Hess, K	942, 1049, 1176.
Heubner, W	1177.
Hickman, J. W	1426, 1461.
Hillier, J	110, 159, 179, 180, 209, 223, 231, 261, 292, 297, 319, 323, 324, 332, 339, 341, 367, 459, 481, 500, 549, 556, 557, 595, 611, 723, 729, 730, 734, 744, 860, 943, 1050, 1435, 1511, 1561, 1694, 1695, 1696, 1795, 1756, 1841, 1850, 1911.
Himpan, J	506.
Hinderer, H	334.
Hoagland, C. L	1277.
Hock, C. W	944, 1178, 1179, 1278, 1697, 1702.
Hodge, A. J	1670, 1819, 1820, 1830, 1842.
Hofer, A. W	1279, 1280.
Hoffman, A. J	945.
Hoffman, E	857.
Hofmann, U	921, 946, 1180, 1219.
Holst, R	1219.
Holzer, W	1551.
Hook, A. E	1436, 1476.
Horio, M	1552.
Houston, W. B	320.
Houtermanns, F. G	632.
Houwink, A. L	1681, 1843.
Hovanitz, W	1553, 1844.
Howland, A. W	929.
Howlett, L. E	360.
Huber, H	1051.
Hubert, P	612.
Huggins, M. L	1281.
Hughes, A. L	501.
Humbert, R. P	947, 1002, 1052, 1070.
Hunger, J	1437, 1554.
Husemann, E	870, 871, 1181, 1182.
Hurst, W	307.
Hutchinson, W. G	1183.
Hutter, R. G. E	541, 542, 543.

## I

Induni, G	191, 368, 1556.
Ingalls, M. S	1722.
Ingelse, L	1557.
Ingleman, B	1184, 1282, 1283.
Inone, T	482, 502.
Inuzuka, H	948, 949.
Isayev, B. M	1388, 1565.
Isley, H	1129.

## J

Jackson, M. L	1558, 1573, 1591.
Jacob, L	460, 593, 619, 779.
Jacobsen, A. E	1438.
Jacquez, J. A	1845.
Jakob, A	872, 873, 874, 945, 1698, 1846.
Jakus, M. A	1043, 1053, 1100, 1231, 1284, 1362, 1369, 1428, 1439, 1559, 1606.
Janzen, S	927.
Jeffries, D	1689.
Jolley, E. E	1054.
Jenkins, R. O	724.
Jentgen, H	950.
Johannson, H	394, 630, 631, 634, 635, 637, 638, 648.
Johnson, E. A	636.

Johnson, F. H	1185, 1285, 1560.
Johnson, R. P	267, 655, 670, 686, 1728.
Jones, D. J	1642.
Jones, W. M	1501, 1699.
Joos, G	517.
Jordan, W. K	1700.
Jung, F	1055, 1056, 1286.
Jungeblut, C. W	1186.
Jupe, J. H	192.

## K

Kahler, H	1814, 1818, 1847.
Kalden, H	875.
Kaplan, H	1890.
Karle, J	1440.
Kato, N	482, 502.
Katz, D. L	1218, 1370.
Katz, D. M	1241.
Kaufman, B. P	1848.
Kaufman, K	1486.
Kausche, G. A	820, 821, 822, 858, 876, 877, 878, 879, 880 881, 896, 899, 951, 952, 1226, 1273, 1287 <sup>c</sup> 1603.
Kaye, W	1849.
Kearney, E. B	1124, 1252.
Kedesdy, H	1147, 1187.
Kehler, H	711, 939, 1835.
Kellenberger, E	251, 269, 767, 1701, 1775.
Keller, F	1265, 1288, 1289, 1536.
Kelley, M. G	1814.
Kelley, O. J	1057.
Kelley, W. P	1058.
Kelsch, J. J	772, 1676, 1705.
Kelsey, R. H	1441.
Kemnitz, G	656.
Kern, S. F	1442.
Kerstens, W. K. H	1492.
Kiessig, H	942.
Kimball, C. S	1607.
Kinning, Y	1249.
Kinsinger, W. G	1702.
Kinder, E	270, 308, 345, 361, 483, 503, 576, 725, 953, 1188, 1189.
Kirkpatrick, A. F	773, 1703.
Kirschner, H	1019.
Kirseck, A	940.
Kisch, B	1704, 1705.
Klemperer, O	5, 70, 461.
Klemm, W	1205.
Klette, H	999.
Knaysi, G	1059, 1190, 1561, 1562, 1695, 1850.
Knecht, W	645, 646, 649, 652.
Knight, C. A	1290, 1371, 1443, 1563.
Knight, P. A	1564.
Knoll, M	34, 277, 279, 280, 396, 397, 399, 400, 458, 632, 639, 654, 656, 698, 954.
Kobayashi, K	1552.
Koch, H. W	955, 1000, 1851, 1852.
Koch, J	420.
Koch, L	882, 956.
Koch, P. A	1191.
Kohl, W. H	22.
Kohler, A	517, 1577.
Kolbe, R. W	1192, 1272.
Komovskii, G. F	687.
Kompfner, R	504.
Kondo, T	1552.

Kondriskii, E. I.	232.
König, H.	271, 1444, 1445, 1706, 1707, 1708, 1776, 1853, 1920.
Kopp, C.	362, 369, 1446.
Korda, F. A.	1599, 1740.
Kossel, W.	530.
Kottmann, U.	1060.
Koza, R. W.	221.
Kratky, O.	1291.
Krause, F.	795, 797, 798, 802, 809, 810, 823, 824, 1193, 1201, 1292.
Kregel, E. A.	957, 1102.
Kretschmer, M.	909.
Kriss, A. E.	1565.
Kronig, R.	484.
Kuhn, A.	1447.
Kuhn, E.	1029, 1149.
Kuhn, J.	958.
Kuhn, W.	959.
Kulz, H.	1040.
Kupfmuller, K.	160.
Kurotehkin, T. J.	1566.
Kushnir, Y. M.	233.
Kuster, A.	1854.
Kurtz, F.	1033.

## L

Lachenbruch, S. H.	615, 616, 1861.
Ladd, W. A.	749, 1123, 1293, 1372.
Lalaw, L. W.	1856.
Laloef, A.	1766.
Lammel, E.	498, 592.
Langer, A.	1361.
LaPlume, J.	577.
Lauffer, M. A.	161, 1145, 1294, 1295, 1296, 1309.
Laurell, A. H. F.	1855.
Law, H. B.	1709.
Le Beau, D. S.	1275, 1546, 1547.
Ledon, A. G.	234.
Lee, S. B.	1624.
Lehmann, A.	882.
Lehmann, H.	956, 1135, 1297.
Lembke, A.	884, 960, 1249, 1567.
Lenson, S. G.	1880.
LePine, P.	1373, 1422, 1448, 1449, 1568, 1710, 1746.
Le Poole, J. B.	370, 372, 380, 579.
Lepsius, R.	1194.
Levaditi, C.	1061, 1195.
Levavasseur, G.	1862.
Levine, M.	1506.
Levinstein, H.	748, 1857.
Levy, G. B.	1298.
Libbey, R. L.	1566.
Liebermeister, K.	1299.
Liebmann, G.	376, 558, 594, 613, 614.
Lillie, M. G.	1734.
Lindberg, J.	1711, 1858, 1859, 1865.
Linke, F.	961, 1196.
Lipscomb, W. M.	1596.
Lloyd, B. J.	1814.
Lofgren, R.	1570.
Loofman, H.	872, 945.
Loofbourow, J. R.	885.
Loomis, G. A.	1142.
Loring, H. S.	1450, 1571.
Lotmar, W.	1572.

Lubszinsky, G	639.
Luft, F	437.
Luft, R	1826.
Lundgren, E. H	91.
Lundquist, D	1662.
Luria, S. E	1062, 1197.
Lutskaya, R. A	598.

## M

Mac Cardle, R. C	1577.
Mac Duffe, R. C	1887.
Mackie, W. Z	1558, 1573.
Mader, P. P	1863.
Madia, G	40.
Magerstedt, C	1198, 1300.
Magnan, C	750, 780.
Magun, P. v	1533.
Mahl, H	85, 262, 272, 293, 309, 310, 340, 371, 384, 540, 653, 657, 658, 659, 667, 668, 671, 688, 689, 726, 825, 873, 874, 887, 888, 889, 890, 891, 892, 962, 963, 964, 965, 966, 967, 968, 1028, 1063, 1064, 1065, 1066, 1067, 1068, 1193, 1199, 1200, 1201, 1202, 1203, 1264, 1301, 1302, 1377, 1378, 1574, 1698, 1715, 1716.
Mahla, E. M	1712, 1713, 1714.
Malatesta, S	448.
Malmberg, E. W	1204.
Malov, N. N	640.
Mandle, R. J	1575.
Markham, R	1576, 1658, 1717.
Marquette, W	1069.
Marschall, J. R	37.
Marshall, C. E	1070, 1860.
Martin, D. E	1303, 1353.
Martin, H	1718.
Martin, L. C	48, 71, 72, 286, 294, 295, 421.
Marton, C	1451.
Marton, L	2, 38, 92, 111, 112, 132, 133, 210, 296, 311, 312, 346, 353, 407, 432, 449, 505, 541, 542, 543, 578, 615, 616, 745, 751, 785, 786, 787, 788, 790, 791, 792, 793, 796, 799, 826, 969, 1304, 1305, 1450, 1451, 1749, 1861.
Marty, C	235.
Marvin, J. F	1680.
Marx, T	1205, 1206.
Mason, H	1577.
Mathieson, L. A	1274.
Mathieu-Sicaud, A	1862.
Matthias, A	113.
Mattil, K. F	1585.
Matoltsy, A. G	1719.
Mazia, D	1578.
McBain, J. W	112, 740, 741, 969, 1458.
McCabe, L. C	1863.
McCartney, J. T	1374.
McCarty, M	1375, 1677.
McCracken, M. R	1183.
McCutcheon, D. M	1864.
McDill, R. D	1452.
McFarlane, A. S	1659.
McGinnies, R. T	1690.
McKinley, G. M	737.
McLauchlan, T. A	1720.
McLean, D	1910.
McLean, I. W. Jr	1246, 1260, 1325, 1326, 1327, 1330, 1376.
McMahon, H. E	1863.
McMillen, J. H	285.

McMurdie, H. F.	1129, 1178, 1179, 1276, 1278, 1306, 1721.
McNulty, R. E.	1431.
Mecklenburg, W.	727.
Meerman, P. G.	1579.
Mehl, R. F.	970, 1580.
Meinkoth, N. A.	1528.
Melchers, G.	893.
Meldau, R.	894, 895, 971, 972, 973, 974, 975, 976.
Melnick, J. L.	1307, 1823.
Menke, E.	1840.
Menke, W.	977.
Ments, M. V.	579.
Menze, C.	1745.
Merceer, E. H.	1453, 1454, 1524, 1859, 1865.
Merling, K. B.	385.
Merryman, H. T.	386.
Merton, T.	765.
Meschter, E.	690.
Mezerik, A. G.	162.
Middel, V.	896.
Mierekel, G.	16.
Millard, A.	1731.
Miller, G. L.	1295, 1308, 1309.
Miller, L. B.	1207.
Miller, W. R.	1722.
Millson, H. E.	1581.
Minikin, J. A.	1821.
Mitani, K.	714.
Mitchell, B. L.	1818.
Mitchell, P. D.	1723.
Mollenstedt, G.	263, 273, 362, 369, 387, 617, 618, 1379, 1446, 1582, 1866, 1867.
Mollwo, E.	735.
Molnar, F.	1671.
Monaghan, E. A.	1735.
Moriya, Y.	677.
Morton, G. A.	11, 20, 93, 163, 464, 699.
Morton, H. E.	978, 1071, 1208.
Mosley, V. M.	1455, 1594, 1650, 1856.
Mossman, H. W.	1583.
Mottlau, A. Y.	1868.
Moulton, F. R.	55.
Mourin, J.	1641.
Mrgudieh, J. N.	1310, 1456.
Mudd, S.	94, 193, 211, 212, 979, 980, 981, 982, 1072, 1073, 1074, 1075, 1190, 1209, 1210, 1211, 1212, 1311, 1312, 1696, 1725, 1755, 1756, 1841.
Mueller, H.	1076.
Muhletahler, K.	1267, 1529, 1673, 1724, 1869, 1870.
Müller, E. W.	531, 672, 678, 679, 691, 736.
Müller, F. H.	983.
Müller, H. O.	47, 321, 721, 789, 807, 819, 827, 831, 832, 833, 901, 902, 905, 1077, 1078, 1079, 1213, 1214, 1313.
Muller, R.	897.
Mulvey, T.	619.
Munday, G. L.	164.
Murphy, M. J.	1364.
Myers, L. M.	6.

## N

Nagler, F. P. O.	1726, 1732.
Nalbandov, A.	1139.
Nesslinger, A.	462.
Nelson, W. L.	195.
Neurath, F.	194.

Newman, S. B	781, 782, 783.
Nicolai, E	1731.
Nicolle, P	1256, 1422, 1449.
Nielsen, J. E	1584.
Nielsen, N. A	1712, 1713, 1714.
Nissen, H. F	1314.
Nitschmann, H	1871.
Noer, H. R	1583.
Norin, R	1872.
Norris, F. A	1585.
Novotny, H	1031.
Nunheimer, T. O	1624.
Nuttall, A. K	288.
Nutting, G. C	1727, 1873.
Nuyens, M	407.

## O

O'Brien, H. C	737, 759, 1380, 1457, 1458.
Ockenden, F. E. J	196.
O'Connor, J. L	1825.
O'Daniel, H	898.
Olofsson, B	1459.
Olsen, L. O	1381.
Osterkamp, W. K	372.
Opatowski, I	544.
Oskay, I. J	1424, 1733.
Oster, G	1460, 1564, 1586, 1587, 1700.
Ostroumov, B. A	1382.

## P

Packer, D. M	813, 840, 841, 842, 843.
Page, J. B	1058.
Palacios-De-Borao G. S. J	1874.
Palay, S. L	1875.
Pannell, L	1722.
Parnum, D. H	286, 295.
Passey, R. D	1588, 1728.
Pawlek, F	1066, 1067, 1437.
Pease, D. C	774, 1589, 1590, 1793, 1794, 1876.
Peck, V. G	1048, 1174.
Pelezar, M. J., Jr	1664.
Pendzich, A	340, 483.
Pennington, R. P	1558, 1591.
Penso, G	1592.
Perry, S. V	1593, 1729.
Petko, E	1671.
Petzold, R. F	1902.
Pfankueh, E	820, 899, 952, 1215.
Pfister, H	1900.
Phelps, R. T	1361, 1426, 1461.
Philip, B	1711, 1859, 1865.
Picard, R. G	165, 175, 197, 355, 746, 760, 1124, 1216, 1462.
Picht, J	7, 398, 408, 506, 532.
Pickett, E. G	1505.
Pieckenbrock, F	1215.
Piontelli, J. R	660.
Piekarski, G	828, 829, 830, 900.
Pirie, N. W	213, 1342.
Plass, G. N	518, 519.
Plitt, J. M	869.
Plotz, H	1217.
Pohl, J	650, 659.
Pohlmann, R	1315.
Polevitsky, K	1074, 1075, 1080, 1212.
Policard, A	214.
Polson, A	1594, 1595.
Polukarov, M. L	1877.

Pool, M. L.	1316.
Poppe, K.	1603.
Porter, K. R.	1383, 1505, 1540, 1548, 1596, 1730, 1845, 1878, 1913.
Posener, L.	409.
Potter, E. J.	166.
Powers, D. H.	1384.
Prebus, A. F.	114, 167, 292, 297, 313, 860.
Preckshot, G. W.	1218.
Preston, G. D.	168, 984, 1731.
Price, W. C.	1385, 1407, 1463, 1464.
Proffitt, J. E.	1638.
Pupko, S. L.	73, 1530.

## Q

Quaife, M. L.	1146.
Quarrel, A. G.	134.
Quinn, J. T.	377.

## R

Radavich, J. F.	1879.
Radczewski, O. E.	807, 831, 832, 833, 898, 901, 902, 985, 1147.
Raether, H.	1302, 1378, 1465, 1466.
Rafferty, G. T.	1353.
Ragoss, A.	946, 1219.
Rake, G.	903, 1424, 1467, 1541, 1543, 1597, 1732, 1733.
Rake, H.	1467, 1543.
Rakhimov, S. M.	378.
Ramberg, E. G.	20, 332, 339, 463, 464, 520, 595, 620, 621, 699, 1012, 1580.
Ramo, S.	327, 336, 337, 338.
Ramsauer, C.	10, 14.
Ramsay, R. C.	944.
Ranby, B.	1363.
Randall, J. J.	1810.
Rang, O.	610, 622, 623.
Ranzi, S.	1598.
Rasumnyaya, E. G.	687.
Rawlins, T. E.	1081, 1317, 1468.
Rayleigh, Lord	49.
Rayner, E. H.	169.
Reagan, R. L.	1734.
Rebsch, R.	438, 450, 485.
Rebuck, J. W.	1735, 1736.
Recknagel, A.	13, 429, 486, 540, 576, 591, 712, 738.
Reed, C. I.	1737.
Reed, C. P.	1737.
Reed, R.	236, 1588, 1593, 1636, 1728, 1729, 1731, 1738, 1739.
Rees, A. L. G.	95, 135, 170, 171, 215, 1453, 1454, 1521.
Regenstreif, E.	565, 602.
Reichmann, R.	896.
Reinie, L.	1539, 1568, 1710.
Reisner, J. H.	760.
Renner, J.	56, 74.
Reumuth, H.	1082.
Rhea, H. E.	96.
Rhian, M.	1398, 1880.
Rhoades, R. P.	1881.
Richards, A. G., Jr.	103, 1013, 1083, 1084, 1085, 1086, 1220, 1318, 1319, 1599, 1740.
Richter, E. F.	641.
Richter, H.	985.
Richter, M. N.	1676.
Riedel, G.	739, 986.
Riehm, E.	987.

Rigby, G. R.	1882.
Rippel, A.	1087.
Risco, M.	237.
Roberts, C.	1468.
Roberts, E. A.	1088, 1600, 1741.
Robillard, J.	1883.
Rochow, T. G.	1024, 1884.
Roger, C. L.	1581.
Roginskii, S. Z.	1388, 1469, 1477, 1478.
Rogowski, W.	439.
Rollins, M. L. R.	1601.
Romani, L.	538.
Rooyen, C. E. v.	1742.
Rosenblatt, M. B.	1089.
Rosengarten, G.	97.
Rosenow, E. C.	1090.
Ross, S.	1091.
Rosselet, G. A.	221.
Roszman, R. P.	1417.
Rowe, F. G.	1884.
Rosza, G.	1743, 1885.
Rozival, M.	1765.
Rubin, T. R.	1569.
Ruchardt, H.	50.
Rudall, K. M.	1738, 1739.
Rüdenberg, R.	136, 401, 596.
Rüdiger, O.	800, 1021, 1092, 1093.
Ruess, G. L.	1320.
Ruhle, R.	388, 624.
Rukina, E. A.	1565.
Rule, J. T.	713.
Runge, F. E.	355.
Ruska, E.	44, 45, 52, 54, 60, 61, 62, 137, 153, 172, 185, 275, 277, 279, 281, 282, 283, 284, 287, 291, 302, 303, 314, 321, 335, 347, 396, 397, 399, 400, 426, 444, 456, 457, 474, 475, 489, 533, 642, 707, 784, 803, 804, 805, 811, 839, 904, 905, 1094.
Ruska, H.	45, 51, 75, 76, 77, 138, 804, 805, 818, 820, 821, 822, 829, 830, 834, 835, 836, 837, 838, 839, 845, 866, 870, 871, 880, 881, 884, 906, 907, 908, 909, 910, 952, 986, 988, 989, 990, 991, 992, 993, 994, 1095, 1096, 1097, 1221, 1222, 1223, 1224, 1225, 1226, 1266, 1273, 1321, 1602, 1603, 1744, 1745.
Ruthemann, G.	507, 728.
Ruttmann, W.	859, 1227.
Rybak, B.	1746.

## S

Sakharova, S. V.	1469, 1477, 1478.
Sakmann, B. W.	1076.
Samuel, A. L.	354.
Sanderson, L.	1470.
Sasaki, N.	714, 775.
Saupe, E.	794.
Savage, R. H.	1675.
Savchenko, F.	465.
Saxe, L. H., Jr.	1604.
Scanga, F.	1592.
Schaefer, V. J.	995, 1098, 1099, 1171, 1228, 1229.
Schafer, H. E.	216.
Schelling, H. v.	494.
Schenk, D.	661, 673.
Scherzer, O.	1, 276, 410, 433, 434, 466, 508, 580, 625, 626, 627, 628, 638.
Schiebold, E.	716, 935, 1006, 1154, 1155, 1156.
Schiefer, H. F.	1605.
Schiff, L. I.	505, 521, 522.

Schiffman, I.	1747.
Schilling, W.	662.
Schlesinger, K.	545.
Schmidt, R. W.	1230.
Schmieder, F.	996, 997.
Schmitt, F. O.	28, 115, 1043, 1053, 1100, 1231, 1275, 1284, 1322, 1323, 1362, 1386, 1428, 1606, 1663, 1683, 1748, 1886.
Schneider, W.	438.
Schoen, A. L.	938.
Schoenholz, D.	1607.
Schoon, T.	936, 998, 999, 1000.
Schramm, G.	1001, 1232.
Schroeder, W.	936.
Schuh, M.	1041.
Schultz, E. W.	1749.
Schultz, J.	1887.
Schulz, L. G.	348, 1888.
Schulze, E.	632.
Schumacher, E. E.	812.
Schuster, M. C.	761, 1158, 1471, 1472, 1676.
Schusterius, G.	864, 865.
Schwartz, C. M.	1889.
Schwartzman, G.	174.
Schwerdt, C. E.	1450.
Schwartz, F. A.	1777.
Scott, D. B.	1473, 1474, 1608, 1609, 1688, 1890, 1891, 1892.
Scott, G. D.	1742, 1893.
Scott, G. H.	285, 813, 840, 841, 842, 843, 911, 1101.
Scott, J. F.	1750.
Scott, N. W.	1834.
Scott, R. A.	239, 1427.
Scott, R. G.	1341.
Scott, T. F.	1732.
Sears, G. R.	957, 1102.
Sears, O. H.	1014, 1343.
Seeliger, R.	629, 1475, 1554, 1751, 1752, 1894, 1895.
Seeman, G. S.	1762.
Seeman, H.	414, 534.
Seidel, R. D.	173.
Seitz, G.	676.
Sekora, A.	1291.
Selme.	238.
Semmler-Alter, E.	139, 1103, 1104, 1105, 1233, 1234, 1235, 1324.
Sen, A. N.	217.
Sennett, R. S.	1504, 1660.
Setterstrom, C. A.	1413.
Seymour, F. J.	1236.
Shanahan, A. J.	1610.
Sharp, J. W.	389.
Sharp, D. G.	198, 1106, 1107, 1114, 1237, 1246, 1245, 1260, 1263, 1325, 1326, 1327, 1330, 1376, 1387, 1436, 1476, 1510, 1753, 1773, 1774, 1896, 1897.
Shaw, B. T.	947, 1002, 1057, 1070, 1108.
Sheffield, R. M. L.	351, 1416.
Shekhter, A. B.	1388, 1469, 1477, 1478, 1822.
Shema, B. F.	957.
Shepard, C. C.	1479.
Shockley, W.	655, 670, 1549.
Shutts, J. H.	1898.
Siday, R. E.	586, 605.
Siebeck, R.	1003.
Siegahn, K.	535, 546, 1184, 1282, 1283.
Siegahn, M.	1109.
Siegel, B. M.	1655, 1689, 1690, 1899.
Siegel, S.	1747.
Signer, R.	1032, 1611, 1900.

Sigurgeirson, T.	1612.
Silverman, L. B.	1901.
Simard, G. L.	752.
Simonsen, S. H.	1672.
Simpson, J. A.	1861.
Singer, S. J.	1902.
Sinitskaya, I. G.	1827.
Sinkel, F.	946.
Sjostrand, F.	1238, 1239, 1240, 1903.
Skilling, W. T.	1480.
Sliepcevich, C. M.	1241.
Smadel, J. E.	1038, 1110, 1217.
Smakula, A.	1111.
Smekal, A.	1205.
Smiles, J.	1754.
Smith, A. E.	1415.
Smith, A. G.	1696, 1841.
Smith, C. S.	1381.
Smith, K. M.	1576, 1717.
Smith, M. R.	1780.
Smith, N. D. P.	1483, 1484.
Smith, P. C.	165, 175, 180, 199, 355.
Smith, W. E.	1755, 1756.
Smith, W. R.	1023.
Smith, T. A.	98.
Snedden, R.	200.
Snellman, O.	1270, 1757, 1758.
Snyder, R. L.	729, 730.
Sollner, W. M.	1328.
Sommerfield, A.	32.
Sorg, E.	753.
Sorokina V. V.	597.
Spark, L. C.	1494, 1636, 1729.
Speak, G. S.	295.
Spearman, J. B.	1613.
Spivak, G. V.	598, 1759.
Sponsler, O. L.	1904.
Stabenov, G.	422.
Stablein, F.	1021.
Staeger, A.	700.
Staley, F. R.	201.
Stanley, W. M.	161, 915, 1004, 1005, 1112, 1164, 1242, 1296, 1309, 1329, 1390, 1460, 1534, 1612.
Starks, H. J. H.	35.
Staudinger, M.	1243, 1743.
Steere, R. L.	1760, 1919.
Steigerwald, K. H.	390.
Steinbach, H. B.	1220.
Steinhaus, E. A.	1905.
Sterckx, R.	57, 844.
Stern, K. G.	1655, 1906.
Steurer, E.	1049.
Stokley, J.	78.
Stolyarova, E. L.	1759.
Stranski, I. N.	1068, 1202, 1203, 1761.
Straub, F. B.	1671.
Streibich, M. J.	1814.
Stringham, B.	1481.
Strung, H.	1113, 1244.
Stryker, C. R.	752.
Stuart, A. H.	140, 141.
Studer, H.	1611, 1900.
Sturdevant, J. H.	1569.
Sturkey, L.	599, 1367, 1432.
Suffert, F.	1189.
Sugata, E.	467.
Sullivan, L. J.	318.
Sullivan, W. F.	1438.
Sushkin, N. G.	30, 378.

Suthwick, M. D.	1741.
Svartholm, N.	523.
Swerdlow, M.	781, 782, 783, 1762, 1836.
Swinton, K. R.	218.
Syrrist, A.	1907.
Szawlewicz, S. A.	1908.
Szent-Gyorgyi, A.	1885.

## T

Tabuis, J.	1649.
Takahashi, W. N.	1652, 1763.
Talalay, P.	1275.
Tanner, F. W.	1610, 1722.
Taylor, A. R.	1106, 1107, 1114, 1237, 1245, 1246, 1260, 1325, 1326, 1327, 1330, 1376, 1387, 1436, 1476, 1510.
Teichmuller, M.	972, 973, 974, 975, 976.
Textile Microscopy in Germany	1764.
Theile, R.	698.
Thielsch, H.	1391, 1482.
Thiessen, P. A.	814, 1115, 1116, 1247.
Thomassen, L.	1392.
Thomassen, P. R.	1319, 1749.
Thompson, C. G.	1905.
Thompson, H. P.	1730.
Thompson, G. P.	142, 176, 1596.
Thung, T. H.	1492.
Tilleard, D. L.	1483, 1484.
Timofeev, P. V.	597.
Tiselius, Å.	1117.!
Toman, M.	1765.
Tomita, S.	732.
Tomlin, S. G.	1810.
Topping, N. H.	1614.
Tordella, J. P.	1026.
Trabacchi, G. C.	264, 357.
Trian, L.	53.
Trillat, J. J.	1766.
Troch, P.	1248.
Trotter, J.	1813, 1909, 1910.
Turkevich, J.	1393, 1911.
Trurit, H.	893.
Tuttle, O. F.	1805.
Tyren, H.	1270.

## U

Uchastkina, Z. V.	219.
Umbreit, W. W.	1118.
Underdahl, N. R.	1523.
Utech, M. N.	1468.

## V

Valle, G.	31.
Vallejo, A.	99.
Vanamee, P.	1912, 1913.
VanAmstel, J. J. A. P.	675, 684, 685.
VanBronkhorst, A.	1861.
Vance, A. W.	319, 322, 323, 324.
VanDorsten, A. C.	372, 379, 380.
VanIterson, W.	1492, 1499, 1615, 1616.
VanNorman, E.	1687.
Van Thiel, P. H.	1616.
Veith, W.	600.
Verhoeff, A.	380.
Vertsner, V. N.	202, 349, 1617, 1619.
Vierthaler, W. A.	1410.
Vinograd, J. R.	1415.

Voit, H.	468.
Vold, R. D.	969.
Volk, K. E.	1021.
Von Kennel, J.	1249.
Vouk, V.	116.

## W

Wagener, S.	669, 1051.
Walcher, W.	420, 656.
Walker, W. W.	1652.
Wallauschek, R.	423.
Wallner, F. E.	1006.
Wallner, L.	935, 1119, 1154.
Wallraff, A.	442, 455, 469, 470, 471.
Walton, W. H.	1618.
Wambacher, H.	298.
Warren, G.	1185.
Watanabe, T.	732.
Watkins, H. W.	1581.
Watson, J. H. L.	89, 143, 1045, 1485, 1486, 1620, 1621, 1622, 1767, 1768, 1769, 1770, 1771, 1791, 1914, 1915.
Waught, D. F.	1331, 1487, 1772.
Weber, H. H.	924, 1291.
Weber, P. M.	1889.
Wehnelt, A.	662.
Wehner, G.	1206.
Weigle, J.	592.
Weil, B. H.	220, 221.
Weil, M. L.	1510, 1773, 1774.
Weiser, R. S.	1488.
Weiss, L. J.	1250, 1251, 1332, 1333.
Weitbrecht, G.	1394.
Welch, F. V.	1754.
Wendt, G.	487, 536.
Wergin, W.	1120, 1121.
Werner, G. H.	1701, 1775.
Wesch, L.	1007.
Wessel, E.	1122.
Weygand, C.	1155.
Whelpton, R. V.	286.
Wiegand, W. V.	1008, 1123, 1372.
Wiester, H. J.	1851, 1852.
Wildman, S. G.	1276.
Wile, W. J.	1124, 1252.
Wilkinson, P. G.	1916.
Williams, A. E.	1917.
Williams, R. C.	240, 748, 1334, 1385, 1392, 1395, 1396, 1397, 1452, 1463, 1489, 1760, 1792, 1880, 1918, 1919.
Wilman, H.	587.
Wilson, J. N.	1415.
Wilson, R. R.	715.
Wilson, W.	117, 144, 177, 178.
Winkler, A.	1708, 1776, 1920.
Winterfeld, E. v.	118.
Wirth, J.	1623, 1921.
Wittebort, J. E.	1922.
Wojtowicz, W.	1771, 1915.
Wolf, F. A.	1897.
Wolff, U.	1227.
Wolken, J. J.	1777.
Wolpers, C.	845, 910, 1009, 1010, 1125, 1126, 1253, 1335, 1336, 1337, 1778, 1779.
Wood, L. A.	912.
Wood, W. B., Jr.	1780.
Woodruff, H. B.	1624.
Woods, G. M.	1652.

Woods, H. L.	1432, 1735, 1736.
Woods, M. W.	1847.
Wright, W. D.	461.
Wyckoff, R. W. G.	29, 222, 1334, 1355, 1356, 1385, 1392, 1395, 1396, 1397, 1398, 1399, 1407, 1452, 1455, 1463, 1464, 1473, 1474, 1479, 1489, 1490, 1518, 1576, 1594, 1595, 1608, 1609, 1625, 1626, 1627, 1650, 1673, 1688, 1717, 1781, 1782, 1783, 1784, 1785, 1786, 1787, 1837, 1856, 1885, 1890, 1891, 1892, 1923.

## Y

Yanchevski, K.	1788.
Yudowitch, K.	1578.

## Z

Zahn, H.	913, 1011, 1031, 1127, 1254, 1522, 1789.
Ziesecke, J.	1227, 1324.
Zimm, B. H.	1587.
Zinsen, A.	1153.
Zwickau, K.	1126.
Zworykin, N.	1185.
Zworykin, V. K.	11, 20, 79, 80, 81, 100, 145, 146, 179, 180, 223, 323, 324, 341, 411, 435, 723, 729, 730, 747, 1012, 1255.





