A HISTORY
of
Graduate Work at Lehigh
1866 - 1941
by
ROBERT P. MORE
the number of "Candidates for other degrees" to be as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1907-1908</td>
<td>19</td>
</tr>
<tr>
<td>1910-1911</td>
<td>19</td>
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<tr>
<td>1913-1914</td>
<td>13</td>
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<tr>
<td>1916-1917</td>
<td>12</td>
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<tr>
<td>1919-1920</td>
<td>18</td>
</tr>
<tr>
<td>1922-1923</td>
<td>4</td>
</tr>
<tr>
<td>1925-1926</td>
<td>5</td>
</tr>
</tbody>
</table>

Finally, following the action of the faculty in June, 1923, all students working for undergraduate degrees were classed as matriculated undergraduates. This procedure is still followed.
1931
(Cont)

M.S.

A. E. Rheineck, B.S. in Ch.E. (U. of Wis.)
O. B. Schier, M.E. 29
L. C. Shugart, A.B. (U. of Ind. 27)
F. J. Trembley, B.S. (Hobart 23).

M.A.

T. G. Ehrsam, B.A. 31
Philip Gesoff, Ph.B. (Muhlenberg 31)
C. A. Harding, B.A. 31
R. S. McKeever, B.A. (Western Reserve 28)
C. D. Rankin, B.S. in Bus. Ad. 31
W. J. Steidle, B.A. 28
H. G. Swain, A.B. (Swarthmore 30)
Muriel L. Wilson, A.B. (Moravian Coll. for Women 26).

1932

M.S.

A. C. Baur, B.S. in Ch.E. 31
L. M. Bennettsch, B.S. in Ch.E. 30
W. J. Brand, A.B. (Western State Coll. 29)
B. F. Buie, B.S. (U. of S.C. 30)
K. G. Chesley, A.B. (U. of Kansas 30)
E. T. Clocker, B.S. in Ch.E. 31
W. A. Coyle, B.S. in E.E. (Clarkson Coll. 29)
K. A. Earhart, B.S. in Ch.E. 30
A. J. Frantz, B.S. in Chem. 30
John Gibbons, B.S. in C.E. (Tufts 31)
K. W. Glace, B.S. in Ch.E. 31
A. W. Goetz, Ch.E. (U. of Cincinnati 28)
J. B. Hartman, B.S. in M.E. 31
J. M. Holme, B.S. in C.E. (U. of Pa. 30)
C. L. Kreidler, B.S. in C.E. 30
R. G. Leren, E.E. 29
C. F. Maylott, B.S. in E.E. (Worcester P.I. 26)
W. S. Miller, B.S. in Chem. 30
F. J. Moylan, B.S. in Met. (Holy Cross 31)
J. L. Myer, B.S. in Eng. Phys. 30
H. R. Nettles, C.E. (U. of S.C. 27)
J. A. Osteen, B.S. (Furman U. 24)
A. N. Rogers, B.S. in Ch.E. 30
A. C. Smith, B.S. in Ch.E. (Bucknell 31)
A. L. Smith, B.S. in Ch.E. 30
D. B. Stabler, B.S. in C.E. 30
R. A. Stabler, B.S. in C.E. 31
G. B. Thom, M.E. 28

1933

M.A.

S. S. Beers, B.S. (Temple 24)
J. W. Burger, A.B. (Haverford 31)
W. B. Coleman, A.B. (Swarthmore 29)
R. H. Deily, A.B. (Muhlenberg 31), B.S. (Columbia 32)
R. F. Hartman, B.S. 28, Ph.B. (Muhlenberg)
D. B. Keat, B.S. (Lafayette 22)
D. A. Kern, A.B. (Ursinus 26)
1933 M.A.

Cont) H. D. Kriebel, Ph.B. (Muhlenberg 31)
J. E. Laury, B.A. (Muhlenberg 21)
Esta E. Metzger, Ph.B. (Muhlenberg 27)
E. L. Ort, B.A. (Muhlenberg 27)
M. J. Ryan, B.A. 25
R. L. Thierolf, B.S. (Lafayette 23)
Anna M. Todd, B.A. (Moravian Coll. for Women 29).

M.S.

A. R. Beall, B.A. (U. of Cincinnati 31)
C. L. Bittrich, Met.E. 27
A. J. Cisatkewicz, B.S. in E.M. 31
G. E. Cooper, B.S. in Ch.E. 31
A. P. Crary, B.S. (St. Lawrence 31)
E. B. Cyphers, B.S. in Ch.E. 31
A. O. J. Danello, B.S. in E.E. (Ohio U. 32)
L. E. Day, B.S. in Chem. (Johns Hopkins 27)
S. C. Diehl, B.S. in E.E. 30
E. B. Douglas, B.S. in Eng. Phys. 32
E. C. Easton, B.S. in E.E. 31
S. W. Farrell, B.S. in Ch.E. (Case 31)
J. E. Freshafer, B.S. in Eng.Phys. 31
H. J. Godfrey, B.S. in C.E. (Tufts 31)
J. M. Graham, B.S. in Ch.E. (Pa. State Coll. 31)
W. A. Green, B.S. (Moravian 31)
J. F. Houser, B.S. in M.E. (Pittsburgh 31)
J. E. Illick, C.E. 29
C. A. Janson, B.S. in Ch.E. 31
G. B. Kadel, B.S. in M.E. 31
H. C. Kelly, B.S. in Eng.Phys. 31
E. J. Klinger, B.S. (U. of Neb. 31)
Roy Kogge, A.A., B.S. in E.E. (Lewis Inst. 30, 32)
H. L. Langhaar, B.S. in M.E. 31
C. E. Lieberman, B.S. (Georgetown 31)
E. F. Lilliecrap, B.S. (Lafayette 32)
F. B. Lucas, B.S. in E.E. (Purdue 31)
J. A. Lutz, Ch.E. 29
J. Naprvnak, B.S. in Ch.E. 32
D. F. Nichols, B.S. in I.E. 32
F. P. Shannon, B.S. (Canisius), B.S. in M.E. 31
W. C. W. Smith, B.S. (Princeton 31)
E. H. Weiss, B.S. in E.E. 30

1934 M.A.

Judith Anderson, Ph.B. (Muhlenberg 32)
J. R. Connelly, B.S. in M.E., M.S. (U. of I11. 27, 29)
L. J. Fink, A.B. (Muhlenberg 31)
W. S. Genszler, Ph.B. (Muhlenberg 26)
E. G. N. Holmes, Ph.B. (Wesleyan 05) S.T.B. (Boston U. 03)
Stella E. Newhard, Ph.B. (Muhlenberg 32)
Bessie Parmet, A.E. (Cedar Crest 32)
A. J. Stofan, B.A. 26
C. F. Strauch, A.B. (Muhlenberg 30)
D. E. Wilkinson, B.S. in Bus. Ad. 31
B. C. Williams, Ph.B. (Lafayette 17)
1934 (Cont)
M.S.
J. D. Brandner, B.S. in Ch.E. 32
H. D. Comins, B.S. in C.E. 33
J. A. Engel, B.A. 31
H. F. Ether, B.S. (Hobart 33)
W. H. Formhals, B.S. in E.E. (U. of Ill. 30)
W. C. Fritz, B.S. in Chem. 32
J. H. Frye, A.B. (Howard Coll. 30)
M. O. Fuller, C.E. (Syracuse 10)
C. E. Green, B.S. in Ch.E. 32
B. G. Johnston, B.S. in C.E. (U. of Ill. 30)
Max Kantor, B.Ch.Eng. (U. of Minn. 29)
E. W. Kaufman, B.S. in Ch.E. 32
P. B. Myers, B.A. 32
H. B. Osborn, B.S. in Ch.E. 32
B. Rabinowitz, B.S. in Ch.E. 32
P. G. Reynolds, B.S. in M.E. 32
H. J. Robar, B.S. in Met.E. 33

1935
M.A.
Althea G. Bleam, A.B. (Cedar Crest 30)
F. J. Check, B.A. (St. Charles Sem. 33)
Bertha S. Fox, B.A. (Moravian Coll. for Women 29)
Cora H. Hoy, B.A. (Moravian Coll. for Women 34)
M. E. Illick, B.S. (Lafayette 25)
B. H. Jennings, B.Eng. (Johns Hopkins 25), M.S. 28
Effie M. Kistler, A.B. (Cedar Crest 30)
R. C. Kistler, A.B. (Muhlenberg 33)
Arlyle K. Kuehner, B.A. (Moravian Coll. for Women 30)
Lydia E. Marx, A.B. (Salem Coll. 31)
W. F. Nonnemacher, A.B. (Moravian), B.D. (Moravian)
E. K. Smiley, A.E. (Bowdoin 21)
G. E. Thom, M.E. 28, M.S. 32

M.S.
W. C. Bachman, B.S. in I.E. 33
H. F. Carl, B.S. in Eng. Phys. 33
H. H. Cox, B.S. (V.P.I. 34)
G. M. Dewees, B.S. in Ch.E. 33
A. O. Franz, B.S. in Ch.E. (Washington U. 34)
W. J. Godkin, B.S. in Chem. (Moravian 33)
L. C. Herman, B.S. in E.E. 30
C. C. Hertel, B.S. in M.E. 34
C. N. Hoyler, B.S. (Moravian 29)
C. M. Jackson, B.S. in Ch.E. 33
C. K. Okuno, B.S. in Chem. 34
J. L. Overholt, B.S. in Ch.E. (Iowa State Coll. 32)
F. L. Rights, B.S. in Ch.E. 33
N. G. Schreiner, C.E. 28
E. J. Serfass, B.S. in Ch.E. 35
R. P. Silver, B.S. in Chem. (Niagara 34)
W. E. Somers, B.S. in M.E. 33
Ruth M. Miller Spillman, B.A. (Bryn Mawr 27)
D. M. Stewart, A.B. (Brown 31) B.S. in C.E. (M.I.T. 33)
A. Tages-Nielsen, B.S. in Ch.E. 33
R. S. Taylor, B.S. in Ch.E. 33
1936

M.A.

W. H. Bohning, B.A. 34
S. B. Fairer, B.S. (Lafayette 29)
J. A. Maurer, A.B. (Moravian 32)
M. H. Purcell, A.B. (Muhlenberg 31)
Jane N. Reynolds, A.B. (Oberlin 35)
A. N. Sakellarides, B.A. (National School of Languages, Commerce and Finance, Turkey 19)
Marianne G. Witmeyer, B.A. (Moravian Coll. for Women 33).

M.S.

J. W. Baillie, B.S. in Ch.E. 34
D. C. Bomberger, B.S. in E.E. 34
A. M. Bounds, B.S. in Met.E. 33
F. L. Ehasz, B.S. in C.E. (N.Y.U. 33)
W. W. Felton, B.S. in E.E. 33
F. P. Fischer, B.S. in E.E. (Rutgers 32)
H. M. Fisher, B.S. in Ch.E. 34
Michael Koman, B.S. in Ch.E. 35
A. K. Long, B.S. in Ch.E. 34
I. E. Madsen, B.S. in C.E. (M.I.T. 33)
David Pisarev, B.S. in Ch.E. 34
J. N. Roper, B.S. in Ch.E. 34
E. L. Schaeffer, B.S. in Ch.E. 34
H. M. Strub, B.S. in Ch.E. 34
C. L. Weidner, B.A. 34, B.S. in Ch.E. 34
J. J. Williams, B.S. in Ch.E. 34
S. S. Young, B.S. in M.E. (Chiao Tung Univ. 31).

1937

M.A.

Louise Albright, B.A. (Cedar Crest)
S. M. Balkin, B.S. (Robert Coll.)
Joyce E. Beary, B.A. (Moravian Coll. for Women)
J. W. Beattie, B.A. (Lebanon Valley)
E. S. Kennedy, B.S. (Lafayette)
H. A. Kriebel, B.S. in Bus. Ad. 32
Blanche W. Lucas, B.S. (N.Y.U.)
Gladys K. Miller, A.B. (Cedar Crest)
Eleanor M. Ritter, Ph.B. (Muhlenberg)
E. F. White, A.B. (Albright)
Stella E. Ziegler, A.B. (Hood)

M.S.

K. O. Beatty, B.S. in Ch.E. 35
L. J. Conover, B.S. in E.E. (Lafayette), E.E. (Lafayette)
G. J. Gibson, B.S. in C.E. 35
W. H. Graeff, B.S. in Ch.E. 35
R. E. Harper, B.S. in E.E. (Swarthmore)
C. A. Heiberger, B.S. in Ch.E. 35
G. A. Hottle, B.S. in Ch.E. 32
T. E. Jackson, B.S. in M.E. (Carnegie L.T.)
G. L. Kehl, B.S. in Ch.E. (U. of Wis.)
G. W. Langmus, B.S. in C.E. (Columbia), C.E. (Columbia)
J. B. Lusk, B.S. in M.E. (Purdue)
1937 (Cont)

M.S.

S. E. Missle, B.S. in M.E. 35
D. T. Mivin, B.S. in Ch.E. 34
J. V. Opie, B.S. in Ch.E. 35
J. P. Sell, A.B. (Oberlin)
A. M. Webb, B.A. 35
W. S. Weil, B.S. in E.E. 35
G. R. Wernisch, B.S. in C.E. (U. of Wis.)
W. P. Willa, B.S. in E.E. 30

1938

M.A.

Frank Bene, B.A. 33
O. M. Blynn, B.S. in Ed. (Shippensburg State Teachers Coll.)
W. H. Brown, B.S. (Moravian)
Marjorie E. Carpenter, A.B. (Cedar Crest)
M. C. Cassebaum, Ph.D. (Muhlenberg)
P. F. Cauffman, B.S. in Ed. (Shippensburg State Teachers Coll.)
Harriet B. Davey, B.A. (Syracuse)
E. J. Hartman, B.A. (Bucknell)
C. F. Hensinger, B.A. 36
Helen M. Lilly, B.A. (Pa. State Coll.)
H. E. Newhard, B.S. (Moravian)
Morton Sher, A.B. (Muhlenberg).

M.S.

W. E. Black, B.S. (U. of Ill.)
A. E. Bolyn, B.A. 36
W. J. Enney, B.Eng. (Johns Hopkins 27)
J. W. Frame, B.S. in Met.E. (M.S. School of Mines and Met.)
T. H. Grainger, B.A. 36
W. R. F. Guyer, B.S. in Ch.E. 36
G. H. Kalb, B.S. in Ch.E. 36
E. A. Kelly, B.S. in A.E. (Pittsburgh)
G. C. Lee, B.S. in Ch.E. 37
Ruth L. Mayer, B.A. (Hunter)
J. K. McKendry, B.S. (U. of Wyoming)
R. G. Ramsay, B.S. in Ch.E. 36
R. J. Schatz, B.S. in Ch.E. 36
M. E. Shafer, B.S. in E.E. 36
K. B. Shiffer, B.S. (Muhlenberg)
P. J. Stichler, B.S. in Ch.E. 35
E. S. Tinley, B.S. in E.E. 35
J. H. Vail, B.S. in M.E. (Worcester P.I.)
D. L. Waidelich, B.S. in E.E. 36
A. C. Zettlemoyer, B.S. in Ch.E. 36.

Ph.D.

Vittorio DeNora, Dr. Ing. (R. Politecnicos, Milano)
H. B. Osborn, B.S. in Ch.E. 32, M.S. 34
E. J. Serfass, B.S. in Ch.E. 33, M.S. 35
C. L. Weidner, B.A. 34, B.S. in Ch.E. 34, M.S. 36
J. J. Williams, B.S. in Ch.E. 34, M.S. 36
S. S. Young, B.S. (Chiao Tung Univ. 31), M.S. 36.
1939

M.A.

Ruth E. Blessing, B.A. (Moravian Coll. for Women)
A. W. Boldt, B.S. (Gettysburg)
T. A. Brown, A.B. (Moravian)
Adam Brucher, B.A. 31
F. E. Carner, B.A. 38
C. W. Dankel, B.S. (Muhlenberg)
L. G. Frick, Ph.B. (Muhlenberg)
W. F. Hillegass, B.S. (Muhlenberg)
Benjamin Keen, A.B. (Muhlenberg)
N. G. Macadam, B.A. 32
Von Edgar Mauger, B.S. (E. Stroudsburg State Teachers Coll.)
Catharine S. McCandless, A.B. (Immaculata Coll.)
Elsie M. McDowell, B.A. (Moravian Coll. for Women)
E. L. Prestwood, A.B. (Columbia)
A. A. Ringleben, A.B. (Ursinus)
Ruth M. Roth, A.B. (Ursinus)
Verna V. Ruth, B.A. (Moravian Coll. for Women)
W. R. Transue, B.S. (Lafayette)

M.S.

C. M. Antoni, B.S. (M.I.T.)
J. F. Bailey, B.S. in M.E. (Purdue)
H. A. Ball, B.S. in Chem. 38
J. T. Bergen, B.S. in Ch.E. 38
F. E. Chapman, B.S. in Ch.E. 38
W. B. Clark, B.S. in Ch.E. 38
Leonard Coblentz, B.S. in Ch.E. (U. of Pa.)
K. C. Cox, B.S. in C.E. (State Univ. of Iowa)
G. B. Cushing, B.S. in E.E. 38
J. V. Fetterman, B.S. in Ch.E. 37
A. J. Getz, B.A. 38
H. T. Gillespie, B.S. (Moravian)
T. G. Harris, B.S. in Ch.E. 37
F. P. Hochgesang, B.S. in Ch.E. 37
H. C. Hoffman, B.S. (Susquehanna U.)
M. M. Kline, B.S. (Pa. State Coll.)
Bohumir Larys, B.E. (Higher Technical School, Brno, Moravia)
H. S. Levenson, B.S. in Ch.E. 37
E. M. Mahla, B.S. in Met.E. 38
D. Q. Marshall, B.S. in M.E. 38
J. M. Martin, B.S. (Muhlenberg)
J. H. H. Miller, B.S. (Albright)
E. H. Mount, B.S. in C.E. 37
A. Napravnik, B.S. in Ch.E. 37
C. M. Offenhauer, B.S. in Ch.E. (Purdue)
N. J. Pallicino, B.S. in M.E. 33
H. H. Pentz, B.S. in E.M. 35
William Priestley, B.S. in Ch.E. 37
F. G. Smith, B.S. in Ch.E. 38
M. C. Smith, M.S. in Met.E. (S. D. School of Mines)
Edward Steers, B.S. (Moravian)
N. W. Taylor, B.S. in Ch.E. 37
M. C. Udy, B.S. in Ch.E. 38
G. R. VanDuzee, B.S. (St. Lawrence)
M. E. Vordahl, B.S. (Washington State Coll.)
1939
(Cont)

Ph.D.
W. C. Forbes, B.S. (M.I.T.), M.S. (M.I.T.)
C. A. Heiberger, B.S. in Ch.E. 35, M.S. 37

1940
M.A.

Edward Blum, B.S. (Muhlenberg)
J. H. Croushore, B.A. 36
H. T. Hemmerly, B.S. (Moravian)
Mary E. Herbert, Ph.B. (Muhlenberg)
K. B. Horning, B.S. (U. of Ill.)
W. H. Innes, B.S. (U. of Akron)
W. E. Kuebler, B.S. (E. Stroudsburg State Teachers Coll.)
K. M. Lehr, Ph.B. (Muhlenberg)
M. A. Rader, B.S. (Moravian)

M.S.

W. H. Brodnitz, B.S. (Columbia)
R. A. Buerschaper, B.S. in Eng. Phys. 37
L. T. Cheney, B.C.E. (Syracuse)
A. J. Cross, B.A. 40
E. O. Dean, B.S. in M.E. (Tufts)
C. F. Derr, B.S. in I.E. 38
A. R. Deschere, B.S. in M.E. (Worcester P.I.)
T. S. DuBose, B.S. in M.E. (Clemson)
Jerome Ganz, B.S. in Chem. 38
C. F. Glick, B.S. in Ch.E. 38
A. A. Green, B.S. (Muhlenberg)
D. S. Grosch, B.S. (Moravian)
W. F. Gross, B.S. in Ch.E. (U. of Colorado)
C. W. Harrison, B.S. in E.E. (Purdue)
R. W. Helwig, B.S. in Ch.E. 39
T. T. Holme, B.S. in M.E. 35
T. F. Jacoby, B.S. in Ch.E. 38
G. W. Klingaman, B.S. in E.E. 33
C. A. Lee, B.S. in C.E. (U. of Wyoming)
R. E. Lorentz, B.S. (U. of Ill.)
Otakar Ondra, Dipl. Ing. in C.E. (Collège Francaise de Prague
W. F. O'Neil, B.A. 39
E. F. Ottens, B.S. in Ch.E. 38
W. V. Pink, M.E. (Stevens Inst.)
A. H. Raye, B.S. (U. of Maine)
W. L. Reinhart, B.S. (Muhlenberg)
R. N. Rhoda, B.S. in Chem. (Pittsburgh)
G. L. Schiel, B.S. in Met.E. 38
W. H. Schnabel, B.S. in Ch.E. 39
R. L. Scott, B.S. in M.E. (Purdue)
W. H. Sharp, B.S. in Chem. (U. of Vermont)
C. F. Smullin, B.S. in Ch.E. 38
R. E. Stephan, B.S. in E.E. (Purdue)
G. E. Tabet, B.A. (American Univ. of Cairo), B.S. in Ch.E. 40
J. M. Thomas, B.A. 37
C. H. Titus, B.S. in E.E. 38
1940

M.S.

A. C. Vine, B.A. (Hiram Coll.)
Eric Weiss, B.S. in E.T. 39
J. H. Weitz, B.A. (Wesleyan U.)
B. L. Wilker, B.S. (Muhlenberg).

Ph.D.

H. L. Langhaar, B.S. in M.E. 31, M.S. 33.

1941

M.A.

A. L. Garner, B.S. (Albright)
Sarah A. Geissinger, A.B. (Wilson Coll.)
E. L. Jones, A.B. (Antioch Coll.)
D. W. Meyers, B.S. (Lafayette)
Eugene Parke, A.B. (U. of Georgia)
T. J. Reese, B.A. (Moravian)
Mary J. Spence, B.A. (Muhlenberg)
Mildred G. B. Stoddard, B.S. (Kutztown State Teachers Coll.)
Helen S. Weinberger, A.B. (Cedar Crest), Ph.B. (Muhlenberg) B.S.L.S. (Drexel).

M.S.

T. O. Aho, A.B. (Temple)
P. H. Bartholomew, B.S. in Ch.E. 39
C. D. Bauman, B.S. (Albright)
B. K. Daubenspeck, B.S. in Ch.E. 37
L. M. Ferenczi, B.S. in M.E. 39
E. R. L. Gaughran, B.A. 39
L. F. Green, B.S. in C.E. (Case)
Earl Heins, B.S. in Ch.E. 39
J. A. Keller, B.S. in M.E. (Ga. School of Techn.)
R. H. Lambert, Dipl. Ing. (Ecole d'Ingenieurs)
J. N. Moses, B.S. (Moravian)
C. H. Reichardt, B.S. in Chem. (Rutgers)
M. O. Ricker, B.S. in Ch.E. (Northeastern U.)
J. B. Ricks, Ph.B. (Brown)
G. A. Rynearse, B.S. (Cal. I.T.)
J. H. Steele, B.A. (Bethany Coll.)
F. C. Strong, B.A. (Swarthmore)
P. T. W. Strub, B.S. in Ch.E. (Bucknell)
S. S. Tür, E.M. (Col. School of Mines), M.E.M. (Col. School of Mines)

Ph.D.

F. L. Ehasz, B.S. in C.E. (N.Y.U. 33), M.S. 36
T. G. Harris, B.S. in Ch.E. 37, M.S. 39
H. S. Levenson, B.S. in Ch.E. 37, M.S. 39.
SECTION II

GRADUATE WORK PRIOR TO 1900
From 1866 to 1877

The first Register of Lehigh University appeared in 1866. In it is the following item.

Resident Graduates

A limited number of graduates who desire to pursue their studies under the general direction of the Faculty, may be allowed the use of the library and may attend lectures in any of the departments during a term of three years, free of expense. Although not bound by university hours, they will be required to obey the directions of the President and of professors in reference to their departments; will board and lodge only in places sanctioned by the President; and will have their names placed upon the annual Register, with a statement of the general nature of the studies they pursue.

With the exception of the last phrase following the word "Register," which was deleted in the Register of 1871 and thereafter, this paragraph appears without essential change in the successive Registers for over a decade, appearing for the last time in the Register dated 1880-1881.

It is clear that the founders of the University from the very beginning envisioned graduate work as a part of the function of the institution they were creating. It is also true that this announcement represented for the time being an ideal and a hope, not an actuality. There is nothing in this first Register, nor in the succeeding ones for several years, which would tend to give definite form to this vision.

The first graduate students listed in the records are William R. Butler, M.E. '70, and George A. Jenkins, A.C. '70. Their names appear as "Resident Graduates" in the Register for 1870-1871. What they did is not indicated. The University had not yet formulated any regulations regarding advanced work, nor announced any advanced degrees. In fact, even the programs
of "postgraduate" work leading to a second undergraduate degree were not initiated until several years later. Neither of the men took any second degree at Lehigh. It seems a fair assumption that they were doing advanced work in the fields they had pursued as undergraduates, and that they were enrolled at the University in accordance with the paragraph "Resident Graduates," cited above. In 1873-1874 three more graduate students are listed; in 1875-1876, two; in 1876-1877, one. Of these six, four were working in the Schools in which they had taken their undergraduate degrees. Of the other two, one, a graduate in mechanical engineering, was working in the School of Civil Engineering; the other had taken a C.E. and was working in the School of Mining and Metallurgy. None of them took a second degree in course at Lehigh.

There is evidence that the need for some definite regulations governing graduate work and graduate degrees was gradually being felt. On May 19, 1873, President Coppée reported to the faculty that the executive committee of the Board of Trustees had, a week earlier, appointed a joint committee to consider the subject of graduate degrees. On the committee were Messrs. E. B. Coxe and H. E. Packer, President Coppée, and Professors Herr and McMillan. Neither the faculty minutes nor the minutes of the Board of Trustees or of its executive committee offer any clue as to what this committee reported, or whether it ever did report. The indications are that it did not.

In the Register for 1875-1876, at the end of the description of the School of General Literature, there appears
this statement. Students who complete the studies of this School will receive the degree of Bachelor of Arts (B.A.) and that of Master of Arts (M.A.) in course, after three years of professional study.

Nothing in the faculty minutes gives even an inkling of the reason for this entry, or of the background out of which it grew. Presumably it was the intention to confer the M.A., not for advanced work at Lehigh or under the direction of the faculty, but upon evidence of three years of continued academic work along professional lines, such as work for the ministry or law. The award of the master's degree on such a basis was not uncommon in the early history of advanced degrees. It reminds one of the present practice of conferring professional engineering degrees (C.E., M.E., etc.) after five years of professional work following the earning of the B.S.

On March 19, 1877, the faculty ordered the item, insofar as it concerned the M.A. degree, to be stricken out, and it appeared only in the one Register. The M.A. was never awarded under this regulation.

From 1877 to 1883.

On May 29, 1876, the faculty received a communication from H. S. Houskeeper, B.A. '72, inquiring about the conditions on which the degree of Master of Arts would be granted. Mr. Houskeeper never took his M.A., although he later enrolled as a candidate. But his inquiry started things. The faculty immediately appointed Professors Coppée (he had resigned the presidency in 1874) and Chandler as a committee to take the matter under consideration and to report to the faculty. Over a year later, on October 29, 1877, the committee reported what
it had found to be the practice of other colleges in conferring such degrees. The committee was continued and instructed to report appropriate postgraduate degrees. A week later, the establishment of the M.A. degree for the classical and scientific courses, and of the Ph.D. degree for the technical courses was recommended. The report was laid over for a week and on November 12, 1877, the following more specific and somewhat different recommendation was received and adopted by the faculty.

M. A.

The faculty will recommend for the degree of Master of Arts candidates, otherwise properly qualified, who, after taking the degree of Bachelor of Arts, shall pursue for at least two years at the University a course of liberal study approved by the faculty and shall pass a thorough examination in the same and present a satisfactory thesis.

Ph.D.

The faculty will recommend for the degree of Doctor of Philosophy candidates, otherwise properly qualified, who, after taking either of the degrees of Civil, Mechanical, or Mining Engineer, or Analytical Chemist, shall pursue for two years a course of advanced scientific study in the line of their professions, pass a thorough examination in the same, and present a satisfactory thesis.

D.Sc.

The faculty will recommend for the degree of Doctor of Science candidates, otherwise properly qualified, who, after taking the degree of Bachelor of Science, shall pursue for at least two years at the University a course of scientific study, embracing two subjects, approved by the faculty, pass a thorough examination showing in one of the subjects special attainments, and shall present a satisfactory thesis based upon an original scientific investigation.

The requirement of residence may be remitted in special cases by the faculty.
These regulations appeared for the first time in the Register for 1877-1878, and, in general, governed graduate work for six years. In the fall of 1880 the faculty added one phrase and one paragraph to the regulations as quoted. The phrase "at this University" was added to each paragraph, so that the statement for each degree read: "candidates ---- who after taking at this University the degree" etc. The following paragraph was also added.

Candidates for any of the above postgraduate degrees, or for the postgraduate degrees of C.E., M.E., or E.M., who are not graduates of this University, must give satisfactory evidence of having fulfilled the requirements of graduation in the corresponding undergraduate course. The acceptance of a diploma in lieu of examination, as evidence of proficiency, is at the discretion of each professor as regards the subjects in his department.

It will be noted that the phrase and the paragraph contradict each other. The phrase limits candidates for the advanced degrees to graduates of Lehigh. The paragraph clearly makes the assumption that graduates of other institutions may be candidates for advanced degrees.

It would seem that the three advanced degrees thus authorized were looked upon as being of equal rank. Certain phrases in the regulations governing the D.Sc. possibly lift it slightly above the others. Thus, the work for this degree must embrace "two subjects," the examination must show "in one of the subjects special attainments," and the thesis must be "based upon an original scientific investigation." But all three are based upon a minimum of two years of advanced work beyond the undergraduate curriculum.

The first candidate for an advanced degree to be
enrolled under these original regulations was H. S. Houskeeper, B.A. 72. He was admitted to a course for the D.Sc. on February 16, 1880. Astronomy and physics were the two subjects he selected for his course, but he never completed the work for the degree. On September 27, 1880, T. H. Hardcastle, B.A. '80, was given permission to enroll as a candidate for the M.A. in non-residence. Professors Coppée and W. A. Lamberton were appointed a committee to prepare a course for him in history and English literature. This course was duly reported to and approved by the faculty. In September, 1881, Professor Coppée reported that Mr. Hardcastle had been examined and had passed in all the work of his postgraduate course and had presented a satisfactory thesis. The following May he was recommended to the trustees for the M.A. and the degree was conferred in June, 1882. This was the first advanced degree given by Lehigh and the only one awarded under the original rules.

The total number of graduate students under these regulations was as follows:

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These numbers include only those who were working for the advanced degrees.

1883 to 1899

Late in 1881 the faculty appointed President Lamberton and Professors Coppée, Frazier, Chandler, and Doolittle as a committee to consider the whole subject of postgraduate degrees, and to recommend conditions under which they should be granted. The committee made its report in May, 1883, and the faculty approved the recommendations made. The result
was a considerable revision of the regulations governing graduate work and graduate degrees. In the Register for 1883-1884 these new regulations appear as follows.

Postgraduate Degrees

M.A.

The faculty will recommend for the degree of Master of Arts any candidate, otherwise properly qualified, who, after taking at this University the degree of Bachelor of Arts, shall pursue for at least one year at this University or two years elsewhere, a course of liberal study prescribed by the faculty in at least two departments, pass a satisfactory examination in the same, and present a satisfactory thesis.

M.S.

The faculty will recommend for the degree of Master of Science any candidate, otherwise properly qualified, who, after taking at this University the degree of Bachelor of Science or any degree in the School of Technology, shall pursue, for at least one year at this University or two years elsewhere, a course of study prescribed by the faculty in at least two departments, pass a thorough examination in the same, and present a satisfactory thesis.

Ph.D.

The faculty will recommend for the degree of Doctor of Philosophy any candidate, otherwise properly qualified, who, after taking at this University the degree of Master of Arts or Master of Science, shall pursue, for at least one year at this University or two years elsewhere, a course of advanced study prescribed by the faculty, pass a thorough examination in the presence of the faculty in the same, and present a satisfactory thesis giving evidence of original investigation.

The candidate shall have a good knowledge of Latin and either French or German.

The theses presented by candidates for postgraduate degrees shall be retained by the University.

These new rules were a very distinct step in the direction of the modern regulations that govern advanced degrees in American institutions. The doctor's degree had been put in a position very clearly at the top of the
advanced degrees given in course. Its award after two years of resident work would today be unusual, but not impossible. Details in the requirements for both the master's and doctor's degrees have of course been changed since 1883, and standards — we hope — have been raised. But, in general, under these rules the M.A., M.S., or Ph.D. stood for about the same sort of advanced study as they do today. Under the regulations of 1877 this was not true.

Starting with the fall of 1883, there was a very marked increase in the number of graduate students enrolled. There is no way of knowing whether there was any connection between this increase and the new regulations that had just been adopted. But the enrollment figures, as given in the annual Registers and counting only those working for advanced degrees, run as follows from 1883 to the end of the century.

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By the end of 1899 Lehigh had conferred twenty advanced degrees, viz., the M.A., 11; the M.S., 7; the Ph.D., 2. Chronologically they were distributed as follows.

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<th>Year</th>
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A HISTORY
OF
GRADUATE WORK AT LEHIGH
1866   1941

by

Robert P. More
M.A.  M.S.  Ph.D.

1889  2
1891  4  1
1893  2  1
1894  1
1895  1
1896  1
1897  1
1898  2
1899  2  1

Following the adoption of the new regulations in 1883, there were no very fundamental changes made for some time. In November, 1897, it was ruled that the work for the Ph.D. must be taken in at least two departments. In October 1892, in the case of all three degrees, the phrase "under at least two professors" was added to the requirement that the work must be in more than one department. At the same time the option of doing the work for the Ph.D. in "two years elsewhere" was withdrawn.

In May, 1894, on Professor Merriman's motion, a committee was appointed to consider the question of making changes in the regulations relating to postgraduate degrees, especially with respect to the advisability of requiring residence. The committee made a preliminary report that same month and then a fuller report in September. This report resulted in a number of important changes in the rules. As adopted by the faculty on October 1, 1894, and October 3, 1894, these revisions were four in number.

1. Candidates for the M.S. in the School of Technology were required to pass at least one year in residence at Lehigh before receiving the degree. As later interpreted by the faculty, this applied only to those candidates for the M.S. who had taken their undergraduate degrees in the School of Technology.
2. It was decided not to offer or publish in the Register a course of study leading to the Ph.D.

3. It was decided not to publish in the Register the names of candidates for the M.A. or the M.S. until they had entered on their period of residence, or passed one or more examinations.

4. A standing committee of three was established to take charge of the students doing graduate work, and the duties of the committee were defined.

These changes, as stated before, were important and the reason and purpose of them will be discussed under various headings later in this section. The next changes were made at the very end of 1899 and they will be discussed in the third section.

The Administration of Graduate Work.

From the account already given, it must be clear that the university faculty was in direct charge of graduate work both in regard to the enactment of the necessary legislation to govern the work, and the administering of the laws that had been enacted. Prior to 1894, the faculty frequently appointed special committees to study the regulations governing graduate work, or some particular aspect of the work, and to make recommendations to the faculty. We know of the appointment of such committees in 1876, 1878, 1880, 1881, 1887, 1892, 1894. But the faculty was by no means inclined to act merely as a rubber stamp for its committees. For instance, in the case of the four changes in the rules made as a result of the recommendations of the committee of 1894, two were not at all what the committee
had recommended. The committee had recommended that candidates for the M.S. in the School of Technology be required to work three months in residence. The faculty made it one year. The committee recommended that candidates for the Ph.D. be required to work for one year in residence. The faculty abolished the degree.

The procedure in handling the individual graduate student was fairly well standardized. The prospective student applied to the faculty to be admitted as a graduate student and to be given a course leading to the degree for which he was eligible. Sometimes the faculty immediately granted the request for admission. At other times the application was referred to a committee especially appointed and the student was admitted if this committee so recommended. At times, such applications were denied. The reasons for denial cannot always be known now. The reasons for denial that applied most frequently were (1) the applicant was not a graduate of Lehigh, or (2) the applicant wanted to work in non-residence for a degree which the rules said must be earned in residence. In one instance, in 1900, the reason was different. The applicant - he shall be anonymous - had applied and been rejected. But he was not content and pressed the matter. A committee of five, with the President as chairman, was appointed to study the case and to make a recommendation. Their report was adopted by the faculty and the following reply was sent to the applicant.

"Your exclusion from postgraduate courses was based on the opinion that you would not make good use of the privilege if it were granted you. Unless the Faculty has reason to believe that an applicant will pursue these courses seriously, the application will be rejected. An examination of your record at the University, a copy of which is appended, gives no ground for such belief in your case."
There is no record of any further correspondence in the case.

The committee appointed by the faculty to oversee the work of an applicant who had been admitted, or to make a recommendation concerning admission, was usually composed of two or three members, normally the professors in charge of the work which the student wished to pursue. If the petitioner was admitted, the committee planned a program of work which the student was required to complete and submitted the same to the faculty for approval. When the student had passed satisfactory examinations covering the work on his program and presented a satisfactory thesis, the professors in charge of the subjects on the program reported these facts to the faculty, which then recommended the student to the Board of Trustees for the degree earned. The degree was awarded and the diploma was given whenever the requirements had been met, which might be at any time of the year. The conferring of these degrees was not restricted to University Day, or to University Day and Founder's Day, as now.

Following 1894, the procedure was slightly different. In that year, it will be remembered, a standing committee of the faculty was established to take charge of graduate work. As originally proposed, the committee was to supervise graduate students and their work. Professor Frazier, however, wanted the committee to have wider powers than this and he moved an amendment to the effect that the committee should (1) obtain from the different professors outlines of the courses which could be given in the various departments, (2) publish these courses, and (3) limit the work for higher degrees to the lines thus marked out. To this suggestion Professor Klein proposed
an amendment forbidding the committee to interfere unduly with the administration of any department. — Faculties have not changed much! — As finally passed, the legislation establishing this committee and defining its duties follows.

A standing committee of three shall be appointed, to obtain from each department an outline of the course or courses of postgraduate study which that department can offer, and such outline shall be published in the Register when the Faculty has so ordered. This committee shall also keep the records of graduate students, and revise the list annually in accordance with the rules. All applications of candidates for postgraduate courses and all reports of professors shall be referred to the committee for record, and whenever a candidate shall have completed the work assigned, it shall report the fact to the faculty. The committee shall be appointed by the President annually in September.

This committee continued to exist and function for over thirty years. It is found referred to under various names, such as: the committee on higher degrees, the committee on advanced degrees, the committee on graduate instruction, the committee on graduate studies. As originally appointed in October, 1894, it consisted of Professors Frazier, Doolittle, and Robinson. In October, 1895, Professor Thayer replaced Professor Doolittle on the committee, and in 1899, Professor Merriman was appointed, possibly to replace Professor Robinson, who left the faculty that year. Whether there were any other changes during this period cannot be known now.

Following the appointment of this committee, it took the place of the special committees that had from time to time been appointed to study the status and government of graduate work in general. It likewise replaced the special committees that had been appointed to supervise the graduate work of each student. All applications for graduate enrollment
were referred to it for recommendation. It reported to the faculty for approval the graduate programs which the heads of departments had prepared for students in their fields. It could not, of course, actually prepare the programs as the older committees had done.

Who were eligible to become graduate students.

It is clear that in setting up rules for advanced degrees, the faculty from the beginning was thinking of graduates of Lehigh. This was not specifically stated in 1877, but the addition of the phrase "at this University," in 1880, brings it out definitely enough. The longer paragraph added at the same time, it is true, does provide for "candidates ---- who are not graduates of this University," but the actual practice of the faculty makes it rather evident that this provision was made to govern the cases of graduates of other institutions who wished to work for a second undergraduate degree, or possibly of graduates of institutions that offered no advanced degrees.

In the fall of 1878, Mr. Mace Moulton, C.E., a graduate of Dartmouth, requested permission to become a candidate for the Ph.D. in non-residence. The faculty appointed a committee (Frazier, Doolittle, Merriman) to see whether Dartmouth's School of Engineering was equivalent to Lehigh's, and to find out what postgraduate degrees were conferred by Dartmouth. Two weeks later, the committee made its report, stating that Dartmouth did not confer the Ph.D., but had a C.E. course which, on paper, was equivalent to Lehigh's, except in modern languages. The faculty agreed to admit Mr.
Moulton to candidacy for the Ph.D., but stipulated that he must pass examinations in French and German, and that he must work two years in residence.

A Rev. Mr. Carr applied for a non-resident postgraduate course in philosophy, in September, 1887. A committee (Coppée, Doolittle, Ringer) reported adversely on the ground that it was inexpedient at present to make such change in the rules as would enable the faculty to comply with the Rev. Mr. Carr's request. While the rule in question is not specified in the faculty minutes, it seems probable that the difficulty was that Mr. Carr was not a graduate of Lehigh.

In February, 1889, W. W. Mills applied for a graduate course leading to the M.A. The request was denied under the rule which limits the bestowal of advanced degrees to graduates of Lehigh. A year later, C. H. Meixell, B.A. (Ursinus '90) asked for a similar course. In spite of a favorable report by a committee specially appointed (Coppée, Hyde), the faculty denied the petition.

However, there were some exceptions to this long continued policy. Members of the teaching staff were admitted to candidacy for advanced degrees, irrespective of their undergraduate colleges. The following list gives the names of such faculty members, prior to 1900, with the year when they first appear on the rolls.

William K. Gillett, M.A. (N.Y.U.) 1887
Lionel R. Lenox, Ph.B. (Columbia) 1889
Ernest A. Gongdon, Ph.B. (Columbia) 1890
Fred C. Biggin, B.S. (Cornell) 1892
William H. Hoffman, B.C.E. 1895
Henry S. Webb, B.S. (M.I.T.) 1897
Natt M. Emery, B.A. (Dartmouth) 1898
John H. Klinck, M.E. (Cornell) 1898
Only three of these took degrees at the time: Webb, an
M.S. in 1893; Emery, an M.A. in 1899; and Klinck, an M.S.
in 1899. Biggin took an M.S. in 1913.

In March, 1896, the Rev. Mr. Creighton Spencer, a
graduate of Columbia, was admitted to candidacy for the M.A.
in absentia. His application had been made personally by
Professor Worcester.

In the fall of 1899, the whole policy was fundamentally
changed when the faculty, on the recommendation of the com-
mittee on higher degrees, voted that graduates of all insti-
tutions, having undergraduate courses substantially equivalent
to our own, should be admitted as resident candidates for the
degrees of M.A. and M.S.

Undergraduate Degrees and Graduate Degrees.

For over forty years, the advanced degree awarded in
recognition of graduate study was determined by the undergraduate
curriculum which the candidate had pursued, rather than by the
specific work which he carried on as a graduate student. It is
ture that it was the normal thing for a student to continue in
his advanced work in the field in which he had specialized as
an undergraduate. But it was not always so. A few examples
may serve to illustrate the point. At one and the same meeting
in October, 1889, the faculty approved a master's program for
Charles E. Dickerson, B.S. '89, in history and metaphysics, and
for Sylvanus E. Lambert, B.A. '89, in philosophy and history.
Dickerson's course was to lead to an M.S., Lambert's to an
M.A. A week later, the faculty approved an M.S. course in
history, literature, and philosophy for Albert G. Rau, B.S. '88.
P. A. Lambert, B.A. '83, took an M.A. degree (dated June, 1891) in mathematics and German. I. A. Heikes, B.M. '85, E.M. '86, applied in January, 1892, for an M.S. course in mathematics, philosophy and modern languages.

An occasional item in the faculty minutes indicates that the situation thus brought about was not always looked upon with equanimity. In September, 1891, D. K. Nicholison, M.E. '85, applied for an M.S. course in geology, English literature, and German. This was duly granted and a course was laid out. In 1894 he petitioned to drop the geology from the program. The petition, in due time, came into the hands of the newly appointed standing committee on higher degrees. In November, 1894, the petition was denied on the ground that an M.S. course should include at least one scientific subject.

In the fall of 1898, the same sort of problem came up in the case of George Davies, M.E. '98, who applied for an M.S. course in English, history, and economics. This time the committee on higher degrees asked for a specific ruling by the faculty on the question involved. The faculty ruled that a candidate for an M.S. degree must take his major subject in some department of science. It is interesting that the ruling was passed by a bare majority, 5 to 4.

It was not until the spring of 1919 that the problem was finally solved by a change in the fundamental attitude. From then on, the graduate degree conferred was made to depend, not on the undergraduate course which had been completed, but on the graduate course pursued.
Non-resident Work.

For many years, many of the graduate candidates for advanced degrees did their work in non-residence. This led to problems which crop up repeatedly in the faculty discussions. It was difficult to know whether a student was actually doing any work. Ultimately he had to come up for an examination if he wanted to take a degree. But in the meantime he was carried on the student roll, his name was published in the Register, and possibly he was doing nothing. This difficulty bothered the faculty from the time the first candidate for an advanced degree was enrolled.

Various rulings were made by the faculty in order to remedy the matter. In November, 1887, the following rule was passed and printed in the Register.

Applicants for any of these degrees will be required to complete the prescribed work within the allotted time. Special action of the faculty is required for any extension of time.

The allotted time was of course one year in residence or two years in non-residence. Under the rule, a student's name could be dropped after two years. But the result was not satisfactory.

In September, 1889, the faculty instructed its secretary to ask each candidate for a higher degree to submit to the faculty, before November 1, a statement of the work he had done during the past year. In October, 1890, on motion of Professor Merriman, it was voted that a notice should be sent to those men whose names had been on the roll of graduate students for a year or more, informing them that they would be expected to report for examination on or before the second
Preface

When we speak today of graduate degrees, we mean the advanced degrees, such as the masters' and doctors' degrees, which signify that the holder has successfully completed a requisite amount of advanced work in a field, over and beyond that normally done by an undergraduate specializing in the subject. A graduate student is one who has taken his first degree and is enrolled for such advanced work, whether or not he is a candidate for an advanced degree. It is the function of a graduate school to organize and provide such advanced work both in the form of courses and of research, and, through research, to extend the fields of knowledge.

All this may seem self-evident. But in glancing through the Lehigh records we find the term "graduate" applied also to a type of student and of work which does not come within the scope of the above definitions. Many of the graduate students listed in the annual Registers were not working for "advanced" degrees but for a second undergraduate degree. For example, a student who had taken his C.E. at the end of four years continued for a fifth year and took an E.M. degree. During this fifth year he was listed as a graduate student and the work he was doing was spoken of as postgraduate work. Today he would be regarded as an undergraduate student and his work would be under the administration of the undergraduate college. The first section of the history that follows will deal more or less briefly with this type of "graduate" work.
Monday in June; otherwise their names would be removed from the roll. Two years later, the committee on status of students was instructed to examine the list of postgraduate students and to recommend appropriate action in the case of those from whom no recent report had been received. Some names were eliminated from the roll on the recommendation of the committee and a suggestion was considered that no man's name be published in the Register until he had successfully passed part of the work assigned to him. This suggestion was incorporated in the revisions of the rules adopted in September, 1894. Under the new rule, a graduate student's name was not published until he had entered into residence or passed one or more examinations. But in January, 1893, Professor Merriman again called attention to the fact that some of the names of graduate students appearing in the proof of the Register had been on the list for several years.

The situation was not really remedied until the privilege of working for a degree in non-residence was finally withdrawn in 1924.

The question of non-resident study, apart from its bearing on the validity of the published lists of graduate students, was also considered from time to time from other angles. In October, 1892, the regulations governing the Ph.D. degree were so amended as no longer to allow non-resident work. In May, 1894, on motion of Professor Merriman, a committee was appointed to study the regulations governing postgraduate degrees. The advisability of requiring residence was especially recommended to the consideration of the committee. Three weeks later, the committee made its report through Professor Merriman.
It was pointed out that a number of graduates had taken the M.A. without residence. (The M.A. had been conferred nine times). The M.S. had been taken twice (by J. W. Richards, A.C. '86, M.S. '91, and H. E. Kiefer, A.C. '92, M.S. '94) and both recipients had pursued their graduate work in residence. In view of this fact and of the desirability of gathering at the University a larger number of graduate students, the committee recommended the abolition of the "non-residence" clause in the case of graduates of the technical courses. No action was taken at the time.

In September of the same year, however, the committee on higher degrees made a number of recommendations, among which was one to the effect that candidates for the M.S. in the School of Technology must pass at least three months in residence at Lehigh University before receiving the degree. On motion of Professor Frazier, the three months period was changed to one year and the rule was adopted. Candidates for the M.A. could still work in non-residence, and, as the faculty ruled in November, 1895, so could those candidates for the M.S. who had taken the B.S. and not one of the engineering degrees.

In December, 1899, the rules were so revised as to permit non-resident study only by candidates for the M.A. The committee on higher degrees, in October, 1900, recommended that no degree be granted for non-resident work, but no action was taken by the faculty. In fact, in October, 1908, the faculty moved in the other direction and voted that "in exceptional cases, candidates for the master's degree will be allowed to study in absentia," making no distinction between the M.A. and M.S. When the rules were again revised in April,
1919, they made provision for non-resident work for either the M.A. or M.S., but made a more detailed statement of the conditions under which the privilege would be granted. So the matter rested until March, 1924, after which non-resident work for an advanced degree was no longer permitted.

**Degrees with Distinctions.**

In May, 1897, Mr. Joseph Barrell, B.S. '92, E.M. '93, finished his work for the M.S. and Professor Williams urged that he be given his degree "magna cum laude." The faculty announced itself unwilling to make distinctions in the diplomas awarded for graduate degrees. The following resolution, however, was drawn up and adopted.

Geology is the major subject in which Mr. Joseph Barrell has pursued his studies leading to the degree of M.S.

The Professor of Geology has reported in terms of the highest praise on the large amount and excellent quality of the work performed by Mr. Barrell, especially in the preparation of his thesis. The Faculty has accordingly decided that a special minute shall be made of this report and communicated to Mr. Barrell.

The stand then taken by the faculty against awarding graduate degrees with special distinctions has never been changed and was positively reaffirmed in 1937 in connection with the reestablishment of courses leading to the Ph.D. degree.

**Masters' Programs before 1900.**

With weekly faculty meetings, with much detailed business coming before the faculty that would now go to committees, the secretary of the faculty for decades had an
cnerous task. Further, it was a task that he performed in his own handwriting. In reading the minutes one is frequently surprised at the details the early secretaries wrote into the minute book, and, from the point of view of the history of the University, one is grateful as well.

For years, the committees that planned the graduate programs of new graduate students reported these programs to the faculty for its approval. Many such programs were faithfully copied into the minutes by the various secretaries, and we are thus in a position to get a much clearer picture of what graduate work meant to a student in the final quarter of the last century.

Most of these programs follow the same general pattern. They list a series of books and pamphlets which the student is expected to master in preparation for a "thorough examination." Graduate courses as we now understand them did not exist. To judge from the programs, the difference between resident and non-resident work lay not in that the former meant attending classes and lectures while the latter did not, but in the fact that the resident student was present at the University so that he was able to consult regularly and frequently with the professors about his work.

In what follows are given a fair number of typical programs in different fields. They will suffice to give an adequate picture of the work that was being done.

1. Program of T. H. Hardcastle, B.A. '90, for the M.A. in the fields of history and English literature.

Program prepared by Professors Coppée and W. A. Lamberton, and approved Nov. 8, 1880.
Green, History of the English People.
Guizot, Civilization in Europe.
Bagenhot, The English Constitution.
Freeman, Comparative Politics.
McCarty, History of our own Times.
Marsh, The English Language and Literature.
A. Pope as the representative of England in his period; the thesis to be on the latter topic.

The above program led to the first master's degree granted by Lehigh.

2. Program for G. L. Hoppes, C.E. '83, for the M.S., approved October 3, 1883. Mr. Hoppes was to choose either the program outlined in hydraulics or the one in roofs and bridges.

In Hydraulics.
Humphrey and Abbots, Physics and Hydraulics of the Mississippi River.
Meissner, Die Hydraulik.
Corthell, Mississippi Jetties.
Fanning, Water Supply Engineering.
Various exercises and problems.

In Roofs and Bridges.
Greene, Bridges and Arches.
Ritter, Dach= und Brückenkonstruktionen.
DuBois, Strains in Framed Structures.
Roebling, Long Span Railroad Bridges
Various exercises and problems.

3. Program of F. J. Crilly, B.A. '83, for the M.A.
Prepared by Coppée and Johnson and approved on April 7, 1884.

In History.
Story on the Constitution.
The Federalist.
May, Constitutional History.
Woolsey, International Law.
DeToqueville, Democracy in America.

In Latin
Hadley, Introduction to Roman Law.
Institutes of Justinian.
Gaius, Elements of Roman Law.
Rules of Ulpian.
Phillimore, Private Law among the Romans.

Mr. Crilly was awarded his M.A. in 1889.
4. Program for J. H. Wells, C.E. '85, for an M.S. in civil engineering and in English literature and history. Prepared by Professors Merriman and Coppée, and approved on November 23, 1885.

In Hydraulics and Sanitary Engineering.

Nichols, Water Supply.
Krantz, Reservoir Walls.
Kutter, Hydraulic Tables and Formulas.
Fanning, Water Supply Engineering.
Adams, Sewers and Drains.
Latham, Sanitary Engineering.
Gerhardt, Sanitary House Inspection (with exercises and reports).

In English Literature and History.

McMaster, History of the People of the United States.
Stubbs, Constitutional History of England.
Green, History of the English People.
McCarthy, History of our own Times.
DeToqueville, Democracy in America.
Miller, History of Recent Times.
A thesis to be arranged with the professor.

5. Program for G. A. Ruddle, Ph.B. '86, for an M.A. in political science, philosophy, and language. Prepared by Coppée and Ringer and approved on December 6, 1886.

I. The Federalist.
Stubbs, Constitutional History of England.
DeToqueville, Democracy in America.
Comte, Modern Philosophy.
Kant, Kritik.

II. Politwin, French Grammar.
Brachet, Historical Grammar.
Nisard, Histoire de la Literature.
Corneille, two tragedies.
Molière, two comedies.
Gulzot, (according to correspondence with Prof. Ringer).
Lamartine, Musset.

In Latin.

Sellar, Roman Poets of the Republic
Lucretius
Hadley, Roman Law

In Greek.

Plato, Apology, Protagoras, Phaedo, Phaedrus.
Aristotle's Psychology.
Grote, Plato.
Burt, History of Greek Philosophy.
Ueberweg, History of Ancient Philosophy.

7. Program for S. E. Lambert, B.A. '89, for an M.A.
in philosophy and history and in German. Prepared by Professors
Coppée and Ringer and approved in the fall of 1889.

In Philosophy and History.

Sir William Hamilton, Logic
Sir William Hamilton, Metaphysics.
James McCosh, Psychology of the Motive Powers.
Lea, History of the Inquisition of the Middle Ages.
Stubbs, Constitutional History of England.
Bryce, The American Commonwealth.
A condensed paper on Stubbs and Bryce (at least 20 pages)
comparing the constitutions of Britain and America.
A thesis on a cognate subject approved by the professor
in charge.

In German.

Brandt, German Grammar (especially the second part).
Herder, Über den Ursprung der Sprache.
Grimm, Geschichte der deutschen Sprache.
J. Schmidt, Geschichte des deutschen Geistes von
Leibnitz bis Lessing.
J. Schmidt, Geschichte der deutschen Literatur von
Lessing bis auf unsere Zeit.
Scherer, Geschichte der deutschen Literatur
Essay (ca. 20 pages) in German on a subject selected
by Professor Ringer and Mr. Lambert.

8. Program for R. S. Perry, A.C. '38, for an M.S. in
chemistry and metallurgy. Reported by Professor Frazier and
approved on January 7, 1891.

In Chemistry.

Pattison-Muir and Wilson, Elements of Thermal Chemistry.
Naumann, Lehr- und Handbuch der Thermochemie.

In Metallurgy.

Ladeburg, Handbuch der Eisenhüttenkunde.
Bell, Chemical Phenomena of the Blast Furnace.
Gruner, Studies of Blast Furnace Phenomena.
Howe, Metallurgy of Steel.

9. Program for C. A. P. Turner, C.E. '90, for an M.S. in bridges and machine design. Prepared by Professors Merriman and Klein and approved on November 16, 1891. This is probably the most original program in the lot.

I. Preliminary undergraduate work in the M.E. department.


2. Write a report on the operations required to construct the following machine pieces given in Klein's Machine Technology.

Machine Shop - 1, 5, 9, 15, 23, 27, 35, 43.
Blacksmith Shop - 4, 8, 12, 16, 24, 32, 36, 46.
Pattern Shop - 2, 5, 9, 16, 25, 28, 35 and 36, 40.
Foundry Shop - 2, 5, 9, 16, 25, 28, 35 and 36, 40.

For minute directions as to what this report must contain, see Section VII, Art. 1 and 2, also Section VIII.

II. Work for the M.S.

Design a travelling crane of 30 ton capacity, 40 foot span, 30 foot lift, to be used for bridge building purposes. The bridge of the crane is to consist of wrought iron girders of such cross section and depth as to limit the stress in the upper (compression) members to 7500 lbs. and in the lower (tension) members to 8000 lbs. per square inch. Trucks at each end are to rest on staging built to suit. Engine, boiler, hoisting and operating gear and platform must be placed on top of the bridge, at one end; the bridge is to be supported on a four wheel truck at this operating end, and on a two wheeled truck at the other.

The construction should embody the following features:

The engine should have two steam cylinders and link reversing motion.
The boiler should work at 90 lbs. pressure and be of some suitable upright type, with all necessary accessories (including feed pump and water tank).
Hoisting gear should have single and double purchase lifting granny; the block and chains should be proportioned to suit the capacity of the traveler, and a powerful brake should be provided to check the load in lowering. There should be two hoisting and two lowering velocities of 15 and 30 ft. per minute respectively. The longitudinal and transverse motions should be operated by friction clutches which may be thrown into gear in either direction without stopping or reversing the engine, and so arranged that these motions may be at work at the same time as the hoisting gear. There should be two velocities, 30 and 60 ft. per minute for moving bridge along the track, and two velocities, 25 and 50 ft. per minute, for moving trolley along the bridge. Means of moving trolley along the bridge should be provided independent of the hoisting mechanism.


I. In Metallurgy.


II. In Mechanical Engineering.

1. Kennedy, Mechanics of Machinery.
2. Complete: Reuleaux, Kinematics, and read Willis, Treatise on Mechanisms.
4. Steam Engineering. Read up the transactions of American and English engineering societies for the past ten years on these two subjects: (a) The condensation in, and efficiency of the various types of land and marine engines. Tabulate the results. (b) The advantages of multiple-cylinder engines, their limitations, and the best ratio for their cylinder volumes.
5. Experimental work. Construction, calibration, and use of M.E. instruments. This is to include all apparatus employed for recording and testing. Consult Carpenter, Laboratory Manual.
6. Mechanical Technology. Report on the methods, tools, etc., for duplicating machine parts so accurately that they become interchangeable. Illustrate by some examples and give cost and output of plant.

7. Machine design. Design a shaft governor for a high speed engine, taking account of the inertia of the pieces, and all frictional resistances.

8. Thesis.

11. Program of Joseph Barrell, B.S. '92, E.M. '93, for an M.S. in geology and astronomy. Prepared by Professors Williams and Doolittle, and approved on May 7, 1894.

In Geology:

1. Judd, Volcanoes.
3. Hunt, Chemical and Geological Essays (3rd edition) including parts I to V inclusive, VII, XI, XIII, XIV.
4. Hunt, Mineral Physiology and Physiography (2nd edition) omitting parts 1, 2, 4, 8.

In Astronomy:

1. Doolittle, Practical Astronomy (complete).

12. Program of H. E. Kiefer, A.C. '92, for M.S. in chemistry and geology. Actually this is not a program of work to be done, but a report by Professors Chandler and Williams on what Mr. Kiefer actually did. The report was made in June, 1894. The M.S. was conferred the same month.

In Chemistry:

Study of the reaction of alcohols in diazo-compounds in general. A large field — 30 to 40 references in German and English. Original articles some 40-50 pages long in German. Worked 25 hours a week in the laboratory.


In Geology:

1. Croll, Climate and Time. — The discussion between Croll and Newcomb in the American Journal of Science.
Our primary purpose, however, will be to trace the development at Lehigh of graduate work in the currently accepted sense of the term. The chief difficulty has been to decide how best to present the material. Without making any argument for the arrangement finally adopted, we shall discuss in the second section the period prior to 1900, and in the third section, the period from 1900 to 1936. Let it be said that 1900 was chosen for the point of division not because 1900 is a nice number, but because, it just so happens, at that time two changes or innovations were made which seem to us to mark a real transition to a modern graduate school. For each period we shall attempt to give a general outline of what was done and to discuss in detail problems that arose and policies that were developed.

A fourth section will be devoted to an account of the Graduate School as it is now.

Finally, there will be added a fifth section listing chronologically the graduate students who have taken advanced degrees in course at Lehigh.

July, 1941.
2. Wright, The Ice Age in North America. Also the papers of Wright and others on the extra-
moraine fringe.
4. Lectures by Professor Williams.
5. Field work with Professor Williams.
6. In addition, Kiefer has read the current litera-
ture on the subject of glaciers, appearing since the beginning of the course.

13. Program for J. B. Krause, B.A. '98, for an M.A.
in Latin and Greek. Prepared by Professors Blake and Goodwin and approved on November 20, 1898.

It will be noted that this program begins to have a modern look. It is definitely divided into a major and a minor field. The number after each item evaluates that item in terms of what we would now call year-credits.

**Major in Latin.**

1. Horace, Satires, Epistles, Ars Poetica (2).
2. Cicero, De Natura Deorum (3)
3. Juvenal, Satires (1).
4. Pliny, Letters (as many as are contained in Wescott's edition) (1).
5. Crutwell, History of Roman Literature (1).

**Minor in Greek.**

1. Odyssey, Bks. VI-XII. Jebb's Homer (1).
2. Sophocles, Antigone (1).
3. Thucydides, Bks. VI and VII (2).
5. Jeven, Greek Literature (1).
6. Gow, Companion to School Classica, for reference (1).

Ph.D. work before 1900.

The degree of doctor of philosophy, as first announced by Lehigh in 1877, was only in name comparable with the degree now so called. It was to be given to candidates who had completed two years work after taking one of the engineering degrees. It differed from the M.A., not in the amount of work required, but
in the undergraduate training of the candidate. After 1883, however, it was distinctly the highest degree offered by the University in course and occupied the same place that the Ph.D. does today. This does not mean that it meant at that time as high a degree of training or specialization as it does today.

Between 1883, and the time when it was withdrawn in 1894, four individuals had enrolled as candidates for the Ph.D. M. M. Duncan, A.C., E.M. '80, had enrolled for work in metallurgy and chemistry. G. F. Duck, E.M. '83, an instructor in mining, was admitted to candidacy for work in geology and mineralogy. W. K. Gillett, a graduate of New York University and an instructor in modern languages, was enrolled for a course in international law and the philosophy of history. None of these three completed the work for the degree. J. W. Richards, A.C. '86, at the time an instructor in metallurgy, mineralogy and blowpiping, and later the well-known professor of metallurgy, took his M.S. in 1891 and his Ph.D. in 1893. His field was metallurgy and the title of his doctoral thesis was: A Calorimetric Study of Copper.

When the committee on higher degrees, in September, 1894, recommended certain amendments to the rules then governing graduate work, one of their suggestions was that a residence period of one year should be demanded of candidates for the Ph.D. When this came before the faculty for action, Professor Frazier moved an amendment to the effect that courses leading to the Ph.D. should no longer be offered or published in the Register, and the amendment was adopted. The trustees promptly approved the faculty's recommendation
that the Ph.D. be no longer offered, though they seem to have added the significant phrase "for the present." At least, the trustee action is so reported in the faculty minutes. It was not until over forty years later that the University again resumed doctoral work.

One would be much interested to know the reasons behind this unexpected and drastic step. But the faculty minutes offer little clue. The period was one of great financial difficulty for the University. One might be tempted to connect the action with this fact and yet there is no evidence of any such connection, and one might well expect that the report of the committee which had just studied the regulations governing graduate work would have mentioned this factor if it had entered seriously into the thinking of the faculty at the time.

At the time when the faculty took its action, H. E. Kiefer, B.S. '92, M.S. '94, had already applied for work for the Ph.D. The faculty decided that its action should not be retroactive and admitted him to candidacy in the fields of chemistry and mineralogy. He took the degree in 1896. The title of his thesis was: A Study of some Derivatives of Meta-Diazo-Benzene-Sulphonic Acid, and the Action of Certain Alcohols on Asym. Meta-Diazo-Xylene-Sulphonic Acid.

In the report of the committee on higher degrees relative to permitting Mr. Kiefer to pursue work for the Ph.D., there is perhaps the one clue to the reason that impelled the faculty to withdraw the degree. Professor Frazier reported that the committee had decided to report against permitting Mr. Kiefer work for the Ph.D., in view of the great difficulty
of arranging an adequate course. Subsequently, the committee had become convinced that an adequate course could be arranged in chemistry and mineralogy and so they reported favorably. It is not unlikely, therefore, that the faculty had decided not to offer work for the Ph.D. because of the difficulty, in general, of arranging courses that seemed adequate. This might have meant that the standard of doctoral work had risen in the mind of the faculty. It might also imply that forced retrenchment had made the faculty less able to meet its former standards. We know that retrenchment at the time was necessary.

It is unfortunate that we do not have much evidence concerning the program assigned to a doctoral candidate. The programs given to Messrs. Richards and Kiefer are not entered in the records. In 1890, Alfred E. Forstall, M.E. '83, applied for an M.S. course and Professors Chandler and Klein reported a course for him which, when completed, was to lead not only to the M.S., but to the Ph.D. as well. Mr. Forstall never finished the course but the program, which follows, will at least show us what a doctor's program was like in 1890.

In M.E.

For the M.S.

Verdet, Thomson, Rühlmann, History of Thermodynamics.
Tyndall, Heat as a Mode of Action
Clark-Maxwell, Theory of Heat.
Zeuner, Mechanische Wärmetheorie.
Zeuner, Technische Thermodynamik.
Hermann, Mechanische Wärmetheorie (treated graphically).

For the Ph.D.

Kirsch, Wärme-Bewegung in den Cylinder-Wandungen.
Rühlmann, Systematische Darstellung der Wärme-Theorie.
Rühlmann, Die Molecular-Theorie der Wärme.
Rühlmann, Thermo-Chemie.
Rühlmann, Anwendung der Wärmetheorie auf Electro-Chemie.
Rühlmann, Anwendung der Wärmetheorie auf Meteorologie.

In Chemistry:

Use Richter, Chemistry of Carbon Compounds (trans. by Smith) as reference in special subjects.

In Latin:

Caesar, Gallic War, Bks. 1-4.
Cicero, Four orations against Cataline.
Cicero, De Senectute and De Amicitia.
Latin Grammar.
Reading at sight of passages of equal difficulty from Cicero and Caesar.

Tuition and Fees.

The first Register, in its announcement that resident graduates would be welcome, stated that they could study for three years "free of expense." The same announcement was repeated in successive Registers until 1880-1881. In the meantime, starting with 1871-1872, the University had abolished tuition charges entirely for all students and did not restore such charges until January 1, 1892. Up to this time, therefore, graduate students were charged no tuition.

Under the tuition rates established by the trustees to go into effect with the beginning of 1892, undergraduates in the School of Technology paid $100.00 per year; those in the School of General Literature paid $60.00 per year. The Register announcing these rates does not state whether they were to apply to graduate students. We must assume, however, that they did, in view of an item that appears in the faculty
minutes under date of October 8, 1894. On that date Professor Merriman offered a resolution to the effect that the faculty request the Board of Trustees to exempt from tuition fees for the next five years those graduate students who give an equivalent in the work of instruction in the departments in which they are studying. The motion was not acted on, but its implication is clear.

In October, 1899, the faculty recommended to the trustees a revision of the tuition fees for graduate students. The new rates appeared in the Register for 1899-1900. Resident graduate students paid $50.00 per year, non-residents paid no tuition.

Apart from the tuition fee, the University also charged a graduation fee of $10.00. This definitely applied to graduate students who took an advanced degree and was so announced in the Register for 1877-1878 when advanced degrees were first offered. In November, 1879, the faculty petitioned the executive committee of the Board of Trustees to abolish this fee, which was done. In the summer of 1894, the trustees again established the fee which was to be collected from anyone taking an undergraduate or graduate degree.

When the revision in graduate tuition rates was made in 1899, it was provided that resident graduate students should pay a graduation fee of $10.00, non-resident students were required to pay $30.00 on graduation. The fee was to be only $10.00 for instructors who pursued graduate courses.

Faculty members seemingly had to pay tuition if they pursued graduate work. At any rate, in 1907 the faculty recommended to the trustees that tuition fees of members of the
teaching force be remitted. This seems clear enough, and yet the evidence is confused. It was noted above that the committee on higher degrees, when recommending the new tuition rates in 1899, proposed that instructors pay a graduation fee of $10.00, not of $30.00 as did non-resident students. There would seem to be no point to this under the rules if the instructors paid tuition.
The faculty had received from the committee on higher degrees in the fall of 1936 a proposed revision of the regulations governing graduate work and had adopted it. As published in the Register for 1935-1936, the new statement follows:

Graduate courses

The degree of Master of Arts is conferred on any candidate, otherwise properly qualified, who, after having the degree of Bachelor of Arts at any College of University, shall pursue for at least the year at Iowa University a course of liberal study, major or minor, and pass the examinations in the same, and present a satisfactory thesis.

The degree of Master of Science is conferred on any candidate, otherwise properly qualified, who, after having the degree of Bachelor of Science or a major or minor course of study in another university, shall pursue for at least one year at Iowa University a course of advanced study in two departments (other than professional), pass the examinations in the same, and present a satisfactory thesis.

The tuition fee is $100.00 per year and the diploma fee is $10.00. In exceptional cases, graduate students at Iowa University who are qualified for the degree of Master or Arts may be allowed to study in some department, in this event the tuition is charged but the diploma fee is $10.00 and, after the two years in residence, to secure the degree.

The courses of study may be selected, with the approval of the faculty, from the following list of subjects, at least fifteen courses, five each being chosen in two departments. About two thirds of the work in to be done in one department and about one third in another, these being called major and minor departments. The thesis is to be prepared in a subject connected with the subject of the major department. The candidate is required to satisfy each professor that he is fully competent to write the subject selected.

The following subjects are offered for the academic year 1935-1936, the numbers in parentheses denoting the number of hours required of the student. Other allied subjects are in some cases to be selected by candidates after consultation with the professor in charge.
The faculty had received from the committee on higher degrees in the fall of 1899 a proposed revision of the regulations governing graduate work and had adopted it. As published in the Register for 1899-1900, the new statement follows.

Graduate Courses

The degree of Master of Arts is conferred on any candidate, otherwise properly qualified, who, after taking the degree of Bachelor of Arts at any College or University, shall pursue for at least one year at this University a course of liberal study in two departments (under two professors), pass the examinations in the same, and present a satisfactory thesis.

The degree of Master of Science is conferred upon any candidate, otherwise properly qualified, who, after taking the degree of Bachelor of Science or a degree in technology at any college or university, shall pursue for at least one year at this University a course of advanced study in two departments (under two professors), pass the examinations of the same, and present a satisfactory thesis.

The tuition fee is $50.00 per year and the diploma fee is $10.00. In exceptional cases, graduates of this University who are candidates for the degree of Master of Arts may be allowed to study in non-residence; in this event no tuition is charged but the diploma fee is $30.00 and at least two years is required to complete the course.

The course of study may be selected, with the approval of the Faculty, from the following list of subjects, at least fifteen exercises per week being chosen in two departments. About two thirds of the work is to be done in one department and about one third in another, these being called major and minor departments. The thesis is to be prepared in a subject connected with the studies of the major department. The candidate is required to satisfy each professor that he is fully competent to pursue the subjects selected.

The following subjects are offered for the academic year 1900-1901, the numbers in parentheses denoting the exercises per week required of the student. Other allied subjects may in some cases be selected by candidates after conference with the professor in charge.
Candidates who expect to receive the
master's degree in June of 1901 are required to
confer with the professors on or before September
29, 1900, and to present their course of study to
the faculty for approval on October 1, 1900.

Following the above is a rather extensive list of graduate courses
offered in various fields, with a statement in each case of the
instructor offering the course and the number of exercises per
week.

Apart from the general revision, there are two in-
novations here that are of decided importance. One of these
is the fact that graduate work is thrown open to graduates of
any college or university. Anyone who has experienced gradu-
ate school training knows that the benefits connected with it
come from two sources. One, of course, is the training in the
courses and the contact with the experts who offer the courses.
The other - and it is hardly secondary in importance - is the
contact and competition with keen and ambitious fellow students
who have received their earlier training in a variety of
environments. Generally speaking the undergraduate who goes on
to graduate work has been an outstanding student in his own
college. Contact with outstanding students from other colleges
is decidedly worth while, if only to give the young scholar a
gauge with which to evaluate his own talents and shortcomings.
The action of the faculty, therefore, opened the way to the
development of a real graduate school atmosphere.

The second innovation was the announcement of graduate
courses. The nature of the graduate work before this step has
been indicated in the discussion of masters' programs before
1900. The assignment of Individual programs of readings and
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</tr>
</tbody>
</table>
study which were to be individually pursued was feasible and worth while as long as much of the work was done in non-residence and the resident students were few in number. But if residence was to be encouraged and as and if the number of resident students grew, a system of group work was necessary, at least for the more fundamental graduate work, and this meant graduate courses. So this second innovation, too, was a necessary one if a real graduate school was in time to be developed.

Following the adoption of the regulations cited above, there was no further basic revision until 1924, the occasional changes being matters of details. In 1908, the rules regarding non-resident work were so altered as to permit candidates for the M.S., too, to work in absentia, "in exceptional cases."

At the same time (October, 1908) the committee on higher degrees, in answer to a direct request for a ruling, reported its disapproval of the "practice of encouraging students who have not yet taken their first degree to do graduate work in advance, looking toward a higher degree." It had therefore formulated this rule for its own guidance:

No credit will be given toward a higher degree for work done while the candidate was an undergraduate, unless such extra work had been approved at the time by the committee on higher degrees in consultation with the professor concerned.

The principle then formulated is still enforced.

A year later, the faculty voted the following, which appeared for the first time in the Register for 1909-1910.

Candidates who spend only a part of their time in study are expected to take at least two years to finish the work.

The rule to this effect is now differently worded, but the idea involved still holds.
The Register for 1915-1916 shows the following revision of part of the statement that had long governed the composition of masters' programs.

About one third of the work is to be in another department called the minor department, and may be chosen from the following list of subjects or from other courses offered in the University which present an advanced stage of study and which are approved in the case of each individual applicant by the committee on higher degrees.

The important thing here is that advanced undergraduate courses were, under restrictions, accepted in the minor work taken for the master's degree.

The year 1918 brought two innovations. Provision was made for giving graduate credit for certain extension courses, and women were admitted to candidacy for the M.A. and M.S.

In the Register for 1918-1919, the regulations governing graduate work were considerably reworded, though the changes in meaning were really only three in number. For the first time the master's degree given was made to depend on the work pursued and not on the undergraduate degree held. As the published statement puts it,

the candidate will be recommended by the faculty to the Trustees for the master's degree appropriate to the course pursued.

The second change concerned the tuition rates. For resident students, the charge was $100.00. If the student took more than one year to finish his work, he was charged pro rata for any fraction of a succeeding year. Non-resident students paid $50.00 per year for the first and second year, nothing for the third year, and $50.00 per year after that if further enrollment was permitted by the faculty. All students paid a graduation
fee of $10.00.

The third change had to do with the thesis. In the past, a thesis was required for all degrees. Now it might or might not be required by the major department.

Beyond these three changes, the main change in the reworded rules was a more detailed statement on the subject of residence and non-residence. This part of the statement should perhaps be cited.

Residence is construed as continuous attendance at the University and living under its jurisdiction. Permission to enroll for study in non-residence will be granted only in exceptional cases to students who possess ample facilities for study and work, and usually only to students who can report periodically in person for conferences with the professors under whom they are studying.

A statement added in the Register of 1922-1923 marked the first step in the direction of a changed conception of the minor in a master's program. Under the new ruling, a student was permitted to take both his major and his minor in the same department, "provided the subjects are taken under two professors and are of distinctly different nature." In October, 1923, certain M.S. candidates were permitted to divide their minors between two departments. The further development of the master's program will be discussed later.

On March 3, 1924, the faculty adopted a completely new code of regulations governing the requirements for the masters' degrees. They are quoted here in full.

Graduate Courses.

Courses leading to the degree of M.A. or M.S. may, by permission of the faculty, be pursued by any properly qualified person who has taken the bachelor's degree or a degree in technology at any recognized college, university or technical institution, subject to the following regulations.
1. All work which is to be credited toward a master's degree must be done in actual and regular attendance at the University.

2. A minimum of 30 term hours is required

3. At least eighteen of the required thirty hours must be taken in one department. The remaining twelve hours will ordinarily be taken in one or two other departments, but the entire thirty hours may, with the approval of the committee on graduate studies, be taken in a single department. In all cases, however, the work must be taken under at least two different instructors.

4. A thesis may be required by the major department. If required, the thesis shall not count for more than 10 credit hours. Two bound, typewritten copies of the thesis (one of which shall be an original copy) shall be submitted to the faculty on or before May 15 of the year in which the degree is to be conferred.

5. The master's degree will not be granted unless the candidate has earned the grade of A or B in at least 3/5 of his work. No course in which the grade earned is less than C will count toward the degree.

6. Candidates employed as full time teachers in the University, or elsewhere, may not take more than six hours of graduate work in any one semester.

7. Tuition for graduate work will be charged on the basis of $5.00 per term hour.

When all requirements have been met, the candidate will be recommended by the faculty to the Trustees for the master's degree appropriate to the work pursued.

Two additions and two changes that were adopted in January, 1926, may as well be added here. As regards the changes, (1) it was ruled that the thesis, if required, could not count for more than six credit hours; (2) a distinction was made between admission to graduate standing and admission to candidacy for a degree. The following paragraphs were added to those published a year earlier.

Each graduate student must submit for the approval of the committee on graduate instruction the program of courses he proposes to take.
At least twelve of the eighteen term hours required in the major department, and at least fifteen of the thirty hours required for the degree must be taken in courses open primarily to graduates.

To one acquainted with the rules now in force, these regulations of 1924 and 1925 will sound very familiar. But they represent in some respects a marked departure from earlier practice. What was the explanation for the changes?

The rules, in the first place, entirely abolished the practice of crediting towards a degree work done in absentia or at other institutions. There were several reasons for this step. It had come to be a recognized principle that a college or university should not, in general, grant a degree in course to any one who had not put in at least a year of resident study at the institution and the master's degree was normally a degree awarded for one year of satisfactory work. Further, it was exceedingly difficult to control and maintain the standards of graduate work done privately. There had arisen, too, the practice of transferring from other institutions credit for graduate work. Thus, a student took a certain amount of such work at another institution. Then, for reasons of his own, he transferred these credits to Lehigh and took a Lehigh degree after taking such credits, over and beyond those transferred, as were necessary. Actually he might have taken only a minor fraction of the work at Lehigh. To meet all these difficulties, it was finally decided to require all work for the masters' degrees to be taken in course at the University. A similar rule, it might be said, was in force at other institutions.

The new rules defined the requirements for the degrees and the tuition to be charged in terms of credit hours. In part
this reflected the constant development of the graduate courses as the units of instruction following their first publication in 1900. In part, also, it was due to other developments in graduate work that had gradually taken place. An increasingly large proportion of the graduate students were men and women in the Lehigh Valley who were engaged in teaching and took one or two graduate courses a semester.

The added paragraph which demands that a certain amount of the credit for the degree must be earned in courses open primarily to graduates is connected with a change in the manner of publishing the courses offered by the University. From 1900 on, the annual Registers had listed graduate and undergraduate courses offered. Up to 1916, all graduate work had to be chosen from the graduate courses. During the following years, advanced undergraduate courses were permitted in the minor field, but they had to be approved by the committee on graduate instruction for each student. In the Register for 1925-1926, all courses offered by the University were for the first time grouped under three headings, viz. courses primarily for graduates, courses for advanced undergraduates and graduates, and courses for undergraduates. Starting with the Register for 1928-1929, these three groups are further distinguished by their numbers. Courses for graduates are numbered from 200 to 299; courses for advanced undergraduates and graduates, from 100 to 199; courses for undergraduates, from 1 to 99.

The next great change in the graduate picture is the establishment of the Graduate Board. Before discussing this, it is desirable to fill in certain elements in the picture of the first quarter of the century.
In the matter of the method of administering the graduate work, no change of consequence had taken place. The standing committee of the faculty, which had been established in 1894, continued to function. Somewhere in the course of time it had become a committee of five, but its duties had remained about the same. Just one change might be mentioned. The committee had originally been charged with the duty of keeping all records of graduate students and of reporting to the faculty any that had completed their work. In 1922, the faculty voted that term reports of graduate students should be reported to the secretary of the faculty for record. The change was a natural result of the gradual standardization of the graduate work in regularly held courses, similar to the undergraduate work.

The following table shows the enrollment for graduate work from 1900 to 1927. As in earlier tables, "graduate" students working for undergraduate degrees are not counted in these figures. It should be noted that the numbers do not mean full-time graduate students or students in residence, but all students officially enrolled for graduate work.

<table>
<thead>
<tr>
<th>Year</th>
<th>Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1900-1901</td>
<td>10</td>
</tr>
<tr>
<td>1901-1902</td>
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<td>1902-1903</td>
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<td>1907-1908</td>
<td>19</td>
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<tr>
<td>1908-1909</td>
<td>18</td>
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<td>1909-1910</td>
<td>18</td>
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<tr>
<td>1910-1911</td>
<td>15</td>
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<td>1911-1912</td>
<td>26</td>
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<td>1912-1913</td>
<td>34</td>
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<td>1913-1914</td>
<td>24</td>
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<tr>
<td>1914-1915</td>
<td>25</td>
</tr>
<tr>
<td>1915-1916</td>
<td>34</td>
</tr>
<tr>
<td>Year</td>
<td>M.A.</td>
</tr>
<tr>
<td>-------</td>
<td>------</td>
</tr>
<tr>
<td>1900</td>
<td>1</td>
</tr>
<tr>
<td>1901</td>
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<tr>
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<td>1912</td>
<td>1</td>
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<tr>
<td>1913</td>
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<td>1914</td>
<td>2</td>
</tr>
<tr>
<td>1915</td>
<td>2</td>
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<tr>
<td>1916</td>
<td>2</td>
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<tr>
<td>1917</td>
<td>3</td>
</tr>
<tr>
<td>1918</td>
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<td>1919</td>
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<td>2</td>
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<td>11</td>
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<tr>
<td>1922</td>
<td>8</td>
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<td>1923</td>
<td>3</td>
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<tr>
<td>1924</td>
<td>3</td>
</tr>
<tr>
<td>1925</td>
<td>11</td>
</tr>
<tr>
<td>1926</td>
<td>1</td>
</tr>
<tr>
<td>1927</td>
<td>2</td>
</tr>
</tbody>
</table>

The following table shows the number of degrees granted during the same period.

Late in 1925, President Richards met with the members of the committee on graduate instruction to suggest for their consideration various aspects of the whole problem of graduate work at Lehigh. The problems suggested dealt with the administration, the improvement and the future of the graduate
program at the University. As a result of much study the following conclusions were reached.

1. That Lehigh was committed to graduate instruction.
2. That Lehigh was not prepared for expansion of its graduate work to include work for the doctorate.
3. That the main problem was to devise means for insuring that the graduate work given by the various departments attain a standard equal to that of any other first class institution. A suggested means to this end was supervision to make sure that the men who gave the graduate work did not carry excessive teaching loads.
4. That the administration of graduate work should be placed in the hands of a Graduate Board. This Board was to consist of the President and Dean of the University and representatives, appointed by the President, of the fields of learning directly concerned in graduate work, - the number of representatives being left indefinite. All the details of administration, including the determination of requirements for degrees, the approval of graduate courses, and the approval of instructors to give the courses were to be under the Board's jurisdiction. The broad general policies regarding graduate work, its place in the organization of the University, its possible expansion from time to time were to be subject to the approval of the faculty after study by the committee on educational policy.

In January 1927, the faculty, on the recommendation of the committee on educational policy, passed the necessary legislation for the establishment of the Graduate Board. In May, President Richards announced the personnel of the
Board, viz., President Richards, Dean McConn, Professors S. J. Thomas, D. S. Chamberlin, R. M. Smith, F. V. Larkin, B. L. Miller, R. P. More, L. H. Gipson, A. A. Bennett, P. Hughes. The Board entered upon its duties in September, 1927, and continued to function until June, 1936. Professor More was appointed executive secretary of the Board at its institution and continued in that position during its life.

During the nine years of the Board's existence, no basic changes were made in the requirements for the masters' degrees. Close control was established, however, over the graduate work offered. No courses could be offered for graduate credit without the approval of the Board, which, in giving its approval, considered such matters as the need for the course, the standard of the course as indicated by its prerequisites, the possible expense occasioned by the course, the teaching load of the department. Similarly, no one could give a course for graduate credit until he had been approved to do so by the Board on the basis of his training and experience.

Through its executive secretary, the Board kept a check on the work of the graduate students, particularly of those who were candidates for degrees. It was his duty to see that the rules of the Board with respect to the masters' programs, the size of rosters, etc., were being fulfilled.

The tuition rates and the fees payable by graduate students were revised by the Board in the fall of 1928. The tuition was set at $10.00 per credit hour and the $10.00 graduation fee was continued. Under the revised rules, graduate students were required to pay a matriculation fee of $5.00 at the time of their first enrollment as students, and a library
SECTION I

"GRADUATE" WORK FOR AN UNDERGRADUATE DEGREE
fee of $5.00 per year. The latter fee was payable only by students who registered for more than six hours per semester.

The increase in enrollment during the years from 1927 to 1936 was remarkable. It is probable that this growth was due mostly to the economic conditions of the times. In view of the difficulty of obtaining positions, more students decided to secure further training. The enrollment figures for the period follow:

<table>
<thead>
<tr>
<th>Year</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>1927-1928</td>
<td>61</td>
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<tr>
<td>1928-1929</td>
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<td>1929-1930</td>
<td>62</td>
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<td>1930-1931</td>
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<td>1931-1932</td>
<td>144</td>
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<td>1932-1933</td>
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<tr>
<td>1933-1934</td>
<td>125</td>
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<tr>
<td>1934-1935</td>
<td>125</td>
</tr>
<tr>
<td>1935-1936</td>
<td>132</td>
</tr>
</tbody>
</table>

To the above figures should be added those who took graduate work in the summer session but were not enrolled during the regular academic year following. These figures run as follows: 1930, 10; 1931, 29; 1932, 28; 1933, 18; 1934, 24; 1935, 27; 1936, 30.

As the enrollment went up, so did the number of degrees conferred. The statistics follow.

<table>
<thead>
<tr>
<th>Year</th>
<th>M.A.</th>
<th>M.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1928</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>1929</td>
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<td>1930</td>
<td>5</td>
<td>10</td>
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<td>1931</td>
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<td>1932</td>
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<td>1933</td>
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<td>18</td>
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<tr>
<td>1935</td>
<td>13</td>
<td>21</td>
</tr>
<tr>
<td>1936</td>
<td>7</td>
<td>17</td>
</tr>
</tbody>
</table>

In the spring of 1933, the University published for the first time a separate catalogue or announcement covering the graduate work offered and done at Lehigh. Its purpose was frankly
to attract graduate students. It has appeared every spring since that time.

Shortly after President Williams took over the administration of Lehigh, he expressed before the faculty his hope that Lehigh might, in some departments, at least, proceed to offer work for the doctorate. The first thing necessary in considering such a step was a survey of the facilities of the University and particularly of the various departments. The task of making such a survey and studying the whole matter was referred to the Graduate Board. As far as the work for the doctorate is concerned, that will be discussed later. Suffice it here to say that the University, in 1936, did resume doctoral work. Another result of the movement thus inaugurated, however, was a total reorganization of the administration of the graduate work of the University.

On the recommendation of President Williams, the Board of Trustees, in 1936, authorized the organization of the Graduate School with a graduate faculty composed of all professors and associate professors who offer graduate courses and of such other teachers as may be designated by the graduate faculty. Since then, all graduate work at the University is under the jurisdiction of this faculty.

Graduate Courses.

The first announcement of definite graduate courses at Lehigh came in the Register for 1899-1900. As early as 1883, however, the committee, on whose recommendation the revised regulations of that year were adopted, had been considering "the propriety of recommending that the courses leading to these
postgraduate degrees be prescribed and printed in our Register, as well for the information of our own graduates as for others who may wish to come here and pursue their studies." Nothing came of it at that time, however. Again, when the standing committee on higher degrees was established in 1894, one of the duties with which it was charged was "to obtain from each department an outline of the course or courses of postgraduate study which that department can offer," and to publish them in the Register when the faculty so ordered. Again nothing happened for some years.

In January, 1898, the faculty discussed the subject and the committee was requested to make a report at an early date. A week later, it made its report which is here quoted in full.

The committee is of the opinion that no good purpose can be secured by the publication in the Register of graduate courses of study which consist merely of lists of books and publications for private reading. It is highly desirable, however, that ample opportunity be given for graduate study in all departments, as far as the equipment of the University makes such work possible, and the committee would welcome the publication of graduate courses of study in the form of lectures, class work, laboratory research, and the like. It recommends that the head of each department be requested to report to the committee such courses as can be given in his department, these reports to be embodied in a comprehensive report by the committee to the faculty when all departments have been heard from. In view of the lateness of the date, the committee recommends that no attempt be made to include the publication of such courses in the Register for 1897-1898.

The Register for that year, therefore, showed no lists of graduate courses. But the departments of civil and electrical engineering, for the first time, called attention to the specific fields in which they were prepared to offer graduate instruction. Thus, the former offered instruction in the theory of elasticity,
strength of materials, bridge engineering, railroad engineering, hydraulic and sanitary engineering, geodesy and the figure of the earth; the latter in the mathematical theory of electricity and magnetism, the advanced theory of alternating currents, and mathematical physics in general.

By December, 1899, the committee had collected the desired material and in the Register for the year it was published. It is neither feasible nor necessary to reproduce the list of courses here. Suffice it to say that work was offered in sanitary science, chemistry, mineralogy, civil engineering, modern languages, geology, mathematics and astronomy, English, physics and electrical engineering, philosophy, history and economics, Latin, and Greek. The list of fields has naturally changed and grown in the course of time. In 1903-1904, metallurgy, mining, and biology were added, and a year later, psychology. Education was added in 1907-1908. Today, most departments of the University offer opportunity for graduate work. Major work for the master's degree, for example, may be taken in bacteriology, biology, chemical engineering, chemistry, civil engineering, education, electrical engineering, English, French, geology, Greek, history and government, industrial engineering, Latin, mathematics, mechanical engineering, metallurgical engineering, mining engineering, philosophy, physics, psychology and Spanish. In accounting, economics, finance, German and sociology, major work cannot be taken, but students majoring in other fields can take collateral work for graduate credit in the advanced undergraduate courses. The number of courses in these fields has also grown immensely. The Graduate Catalogue published in 1941 lists 255 courses especially for
graduates, with 280 additional courses open to advanced undergraduates and graduates. By no means all of these courses are offered each year, many of them being offered in alternate years, others in cycles over several years.

**Masters Programs after 1900.**

The general pattern for masters' programs became fairly well stabilized after 1900. The variation was mostly in the field of the minor. At the beginning of the century, the program called for work in two fields, two thirds of the work being in the major, one third in the minor. A complete program meant fifteen exercises per week throughout the year, or in the present-day nomenclature, thirty semester hours. Following the revision of the rules of 1924, the major was stabilized at a minimum of eighteen semester hours, at least twelve of which were required to be taken in strictly graduate courses. The requirement of a thesis had been, since 1919, optional with the department in which the major was taken.

Up to the academic year 1915-1916, the courses in the minor field also had to be selected from the strictly graduate group. Under the changes made that year, minor courses could be taken from the advanced undergraduate courses, subject to the approval of the committee on higher degrees. This had been definitely opposed by the faculty in earlier years. In 1896, a Mr. Cunningham (probably E. S. Cunningham, M.E. '96) had presented a roster of work in the E.E. department as part of a course for the M.S. To quote from the faculty minutes, "as there seemed to be a misunderstanding on his part as to the acceptance of undergraduate work as part of such a course, the
matter was referred to the secretary." In 1898, the faculty unanimously ruled that no work was to be counted for the M.S. degree which was not distinctly of graduate caliber. By 1924, a limited amount of such advanced undergraduate work was permitted even in the major program.

The whole question of a minor in the master's program has been subject to uncertainty and change in the last two decades. In 1922-1923, the Register stated:

In special cases, on recommendation of the committee on graduate studies, a student may be permitted to take both major and minor courses in the same department, provided the subjects are taken under two professors and are of a distinctly different nature.

On the other hand, in October, 1923, the faculty permitted certain candidates for the M.S. to divide their minors between two fields. It is evident that the faculty did not have a clear and fixed idea of what constitutes a master's program. In part, this was undoubtedly due to the fact that the members of the faculty had done their own graduate work at different institutions and had naturally enough had different personal experiences. Some institutions required a major and a minor, others did not. Some demanded a thesis, others did not. Harvard, for instance, did not require a minor or a thesis, at least in some fields.

In the fall of 1930, the Graduate Board gave some consideration to the nature of a minor on a master's program. The question, primarily, was whether a minor should constitute a second, lesser, field of concentration, allied to or collateral with the major field, or whether the student should be left free to choose his minor in any field in which he was qualified and which appealed to him for reasons of his own. The Board at
that time decided to place no restrictions on the choice of the minor. For example, a student majoring in electrical engineering might choose mathematics as his second field because it would aid him in his work in his major; or he might choose history as his minor because he was interested in that field. The present practice is in line with that decision except that minors, under that name, have been eliminated from the master's program altogether. Under the liberal policy outlined above, a student might elect to take only a single course in a certain field. To speak of him as having taken a minor in that field was misleading. In November, 1937, an attempt was made to meet this difficulty by ruling that a minor must consist of at least six semester hours. But a year later, the following rule, still in effect, was passed.

At least eighteen of the required thirty semester-hours must be taken in one department, which shall be the student's major department or field. The remaining twelve hours, or any part of them, may also, with the approval of the graduate faculty, be taken in the major department; or they may be taken in any other field in which courses for graduate credit are given, as the needs and interests of the student may indicate. The distribution of the work shall be made upon the advice and with the approval of the head of the major department. In all cases, the work for the master's degree must be taken under at least two instructors.

Doctoral Work after 1900.

Following the withdrawal of doctoral work at Lehigh in 1894, it was not again offered until 1936. But this does not imply that there were no earlier attempts to restore it. On the contrary, these attempts were rather frequent, and at times persistent and ingenious.
In January, 1901, the question of reestablishing the Ph.D. degree was referred to the committee on advanced degrees. In March the committee made its report to the effect that it had carefully considered the question and that "it cannot recommend such action at present. One year ago courses leading to the degree of M.S. were published for the first time, and the committee is of the opinion that these should be developed and enlarged before advancing to higher work."

In September, 1910, J. B. Reynolds, B.A. '07, M.A. '10, petitioned to be allowed to take work for the Ph.D. In October, the committee on higher degrees reported that his petition "must be refused on the ground that the University does not offer the degree Ph.D. either as an honor or in course." A petition from R. L. Charles, B.A. '07, M.A. '10, to the same effect was denied in December on the same grounds.

In the fall of 1913, the committee on higher degrees, composed at the time of Professors Richards, Schober, Franklin and Ullmann, recommended to the faculty the following resolution:

Resolved, that the Faculty will consider the application of a candidate for the degree of doctor of philosophy when the acceptance of any such application is recommended by the committee on higher degrees.

But, when the resolution came up at the next meeting in November it was discussed and finally tabled.

By June, 1914, the subject was up again. G. A. Roush, a member of the department of metallurgy, petitioned to be allowed to enroll for work leading to the Ph.D. The committee on higher degrees recommended that the petition be granted, but the faculty, after discussion, voted in the negative.

In April, 1920, the question of reestablishing Ph.D. courses in the University was once again referred to the committee
on higher degrees, this time on motion of Professor McNutt. The committee made its report in May, but the report was not acted on until October 11, when a special meeting of the faculty was called to consider the matter. The report itself is not recorded but it was evidently in favor of renewing doctoral work. Professors Richards and Charles moved: "It is the sense of the faculty that the acceptance of candidates for the Ph.D. be reestablished under regulations hereafter to be adopted." Again the motion was lost. But Professor Richards, who was chairman of the committee on higher degrees, was not easily discouraged. Three months later, the committee recommended that E. E. Jones, an instructor in chemistry, be accepted as a candidate for the Ph.D. The vote, as usual, was negative, whereupon the committee promptly recommended that he be accepted as a candidate for the M.S., which was done.

When the whole question of the University's graduate program and its administration was taken under consideration in 1926 at the request of President Richards, the question of the renewal of doctoral work, perhaps in a limited number of departments, was again considered. The decision at the time was again in the negative. While the desirability of such a step was acknowledged, the decisive factor that led to the adverse decision was the matter of expense. It was not deemed feasible at the time to find the funds which were felt to be necessary if adequate library and laboratory facilities and instructional staff were to be supplied to such departments as might be allowed to offer such work.

In 1932, Professor Fort, of the department of mathematics, made an extensive study of the whole question in all its aspects
and submitted it to President Richards in the hope of bringing about a reestablishment of doctoral work in a limited number of fields at least. But the President was convinced that the financial difficulties could not be overcome at that time.

When Dr. Williams took over the presidency of the University in the fall of 1935, he brought up the question at the October meeting of the faculty and expressed his hope that the University, in some departments, might proceed to offer work for the doctorate. With this possibility in view he suggested that a survey of the facilities of the various departments be made and the faculty instructed the Graduate Board to make such a survey.

The Graduate Board labored arduously on the task thus assigned to it. Committees were appointed to study various aspects of the matter and to gather the necessary information. A committee composed first of Professors Fort, Sutherland and Carothers, and later of Fort, Gipson and Ullmann had the particularly difficult task of establishing criteria upon which to base an objective judgment and of gathering data relating to the various departments.

In the patient and extended discussions of the Board, the desirability and value of doctoral work at Lehigh was not questioned. The moot point was really always the cost of the step and the fear that the undergraduate college might be hurt by the necessity of diverting the funds of the University to provide for the expanded equipment and upkeep of the graduate work, which is admittedly an expensive type of instruction. The decisive turn to the discussion was given by President Williams, who felt that a graduate school would tend to attract
There always have been at Lehigh - and there still are - students who, after taking one undergraduate degree, such as the B.A. or B.S., or - in past years - the C.E., M.E., E.E., E.M., or the like, continued on at the University, studying for a second degree in another undergraduate field. The first formal provision for "postgraduate" work made at Lehigh was for students of this type. In the Register for 1873-1874 there was outlined and offered for the first time a "postgraduate" course in the School of Mining and Metallurgy, covering one year and designed for graduates in civil engineering. The course had been approved by the faculty at its meeting on March 3, 1873, and by the executive committee of the Board of Trustees shortly afterwards. The statement in the Register reads as follows.

A postgraduate course has been arranged in this school (i.e. School of Mining and Metallurgy) comprising courses in mining, metallurgy, chemical analysis and blowpipe analysis, with supplemental courses in geology and mineralogy. Graduates of the School of Civil Engineering, by remaining one year and taking this course, may obtain the degree of E.M.

In 1876-1877, the Register advertised similar one-year "postgraduate" courses in the School of Mechanical Engineering and the School of Civil Engineering. The former led to the M.E. degree and was intended for graduates in civil engineering; the latter, for graduates in mechanical engineering, led to the degree of C.E. These three courses appear for the last time in the Register for 1880-1881. Following their deletion from the Register, however, the following paragraph appeared without essential change in the Registers from 1881-1882 to 1898-1899.

Graduates of the University wishing to remain a year or more and pursue a course of studies as candidates for another degree may do so with the
its own backing and to gather strength as it went along, and that the prospect for new funds would be strengthened if the work was actually under way.

In February, 1936, the Board voted unanimously to recommend the renewal of work for the doctorate in such departments as were prepared at the time. The further work of the Board dealt then with preparing regulations to govern the work for the Ph.D. (it was decided that this should be the degree offered), and with selecting the departments that should be permitted to proceed. In May the Board, on the recommendation of its committees, voted to approve the following departments to offer work for the Ph.D.

Chemistry and Chemical Engineering
Civil Engineering
History
Mathematics
Mechanical Engineering
Metallurgical Engineering
Physics.

Two departments have since been added to the above list. Geology was added late in 1936, and electrical engineering in May, 1938.

The task of formulating rules to govern the award of the Ph.D. engaged the Graduate Board and its successor, the Executive Committee, for a long time. Every effort was made to make the requirements for the degree conform to the highest standards as they have been established in American institutions. Also, in view of the fact that in the Lehigh of the present the proposed work had nothing in either usage or tradition to guide it, a careful system of checks and centralization of authority was provided so as to ensure, as far as possible, a uniformity of standards throughout the various departments. The regulations
adopted are readily available in the University Register or the Graduate Catalogue, so that it does not seem necessary to repeat them here.

Following the renewal of doctoral work in 1936, the Ph.D. has been conferred on thirteen candidates up to and including June, 1941. There follow the names of these candidates with the fields in which they worked.

In 1938.

Vittoria DeNora in metallurgical engineering.
Earl J. Serfass in chemistry and chemical engineering.
Charles L. Weidner in chemistry and chemical engineering.
Shang Shoa Young in metallurgical engineering and chemistry.
Harry B. Osborn in chemical engineering and chemistry.
John J. Williams in chemical engineering and chemistry.

In 1939.

William C. Forbes in chemistry.
Charles A. Heiberger in chemistry and chemical engineering.
Edward S. Kennedy in mathematics.

In 1940.

Henry L. Langhaar in mathematics.

In 1941.

Francis L. Ehasz in civil engineering.
Thomas G. Harris in chemistry
Harold S. Levenson in chemistry

Faculty Members as Graduate Students.

In an earlier discussion it was pointed out that young members of the faculty, not Lehigh graduates, were admitted to graduate study at a time when such admission was otherwise limited to Lehigh graduates. One problem in connection with these teacher-students bothered the faculty for a long time. Under the regulations, the requirements for the master's degree contemplated one year of resident work or at least two years of non-resident work. How were young members of the faculty
to be classified? Were they to be allowed to do their graduate work in connection with their teaching jobs and take the degree in one year?

The question came up very sharply in June, 1894, in connection with the master's work of H. E. Kiefer, B.S. '92. Kiefer had applied for an M.S. course in geology and chemistry in September, 1893. Through an oversight, his committee (Williams and Chandler) had neglected to have the program, which they assigned to him, approved by the faculty. On May 21, 1894, the committee reported that he had completed all his work and the faculty voted to recommend him for the degree. Two weeks later, Professor Merriman brought up the matter on two counts, viz., (1) Kiefer had completed the work in one year, but, as an instructor, he had to be regarded as a non-resident and had to devote two years to the course; (2) no course had ever been approved for him. As far as the second point was concerned, the committee accepted the blame and insisted that the penalty should not fall on Mr. Kiefer who had done his work in good faith. With regard to the first point, Professor Williams stated that he had not known that an instructor had to work for two years. Professor Chandler insisted that Mr. Kiefer had worked on Saturdays and during vacations, and that he was a resident student. It was further stated that he had done the amount of work usually required. The outcome of this particular case was that Mr. Kiefer received his degree that June.

In the fall of the same year, when the regulations governing graduate work were being changed, Professor Doolittle
tried to insert a requirement of two years of work for instructors who were candidates for degrees. This was lost by a tie vote, and teaching candidates continued to take degrees in one year.

In October, 1903, the committee on higher degrees recommended that professors in charge of the courses, and the candidates, be reminded that each course is intended to occupy the time of an ordinary student for one year, and that therefore a candidate whose time is partly employed in teaching cannot be expected to obtain the degree in a single year. As noted in the faculty minutes, the recommendation was adopted, except the part referring to the time.

But when, in the following May, W. H. Welker, A.C. '04, applied for an M.S. course to be taken in 1904-1905, when he was to be a teacher in the department of chemistry, he was informed by the faculty that he would not be allowed to do this in one year and that more time was necessary. The view of the committee on higher degrees had prevailed after all.

In October 1909, the faculty voted the following for insertion in the Register.

Candidates who spend only part of their time in study are expected to take at least two years to finish the work.

This remained the rule in the matter until 1924, when the pertinent rule appeared in the following form:

Candidates employed as full time teachers in the University, or elsewhere, may not take more than six hours of graduate work in any one semester.

As thirty semester-hours were required for the degree, this meant that a full time employee of the University could no longer meet the requirements for the degree in two regular
years.

With the increase in graduate assistantships, fellowships, etc., there came to be a good many half-time employees of the University. In October, 1927, the Graduate Board extended the rule to cover such students by limiting them to ten semester hours in any one semester. These limits still apply.

It should be noted that these limits were imposed in part to protect the standards of graduate work, but also in part, and perhaps more particularly, to protect the University in its contractual relationship with its full- and half-time employees. This becomes evident from the fact that in time the rule was interpreted to apply only to employees of the University. The standards of the graduate work could be protected by the departments giving it. But when the University was the employer and also gave the graduate work, an excessive load of graduate work was bound to result either in poor graduate work, or in cheating the University of the time for which it was paying the student. The rule has been strictly enforced.

One other rule effecting graduate study by faculty members was passed early in 1937. It prohibits professors, associate professors and assistant professors from becoming candidates for the Ph.D. at Lehigh. These ranks form the voting members of the Lehigh faculty and the faculty recommends candidates for degrees. It seemed unwise, and possibly embarrassing, to have faculty members passing judgment on themselves or their voting colleagues.
Women Graduate Students.

In September, 1913, there came before the faculty an inquiry from Maud E. Welsh, B.A. (Syracuse), relative to the taking of work for the M.A. Lehigh had admitted women to certain types of courses, such as teachers' courses and extension courses, but had never enrolled them as matriculated students or candidates for either graduate or undergraduate degrees. In the present instance the faculty, at the suggestion of President Drinker, referred the inquiry to the trustees, and nothing seems to have happened.

In February, 1917, on motion of Professor R. W. Hall, the faculty voted to recommend to the Board of Trustees that the degrees of M.A. and M.S. be granted to women on the same conditions as in the case of men, provided that permission be not thereby extended to women to attend undergraduate courses in the University, other than extension courses. In September, the faculty was informed that the trustees had laid the matter aside for future consideration. In December, the trustees referred the matter back to the faculty, which, in February, 1918, repassed its resolution, adding the further proviso that "as at present, classes in which women are students shall largely be limited to the late afternoon and to Saturdays, so that the general character of campus life shall not be affected by this innovation." The trustees gave their approval and starting in the fall of 1918, women were duly matriculated as graduate students. In general, the women students have been local teachers who took part time work. The following table, giving the number of women enrolled for the regular semesters in alternate years, will show the trend.
1918-1919  3
1920-1921  8
1922-1923  8
1924-1925  8
1926-1927  6
1928-1929  9
1930-1931  21
1932-1933  26
1934-1935  19
1936-1937  38
1938-1939  25
1940-1941  21

Edna G. Tatnall, A.B. (Pennsylvania College for Women),
Bessie E. Kast, B.A. (Wellesley '05), and Mary A. Schwaninger,
A.B. (W. Md. Coll. '13), each took the M.A. in September, 1921.
They were the first women to take degrees from Lehigh. All
told, 54 women hold Lehigh degrees, earned in course.

In the original regulations governing women students,
it was provided that classes in which women were enrolled
should be held after four o'clock in the afternoon, or on
Saturday morning. In 1929, the rule was changed to read:

Women may be admitted as graduate students on
the same terms as men, except that registration in
courses open to undergraduates shall be subject to
special approval of the head of the department con-
cerned.

There is no evidence that "the general character of
campus life" has been harmedly "affected by the innovation."

Fellowships, Scholarships, etc.

Graduate instruction is costly. The work is largely
carried on in classes whose membership is small. Much of it
may be individual work. The men in charge of it are commonly
the more highly paid men of the faculty. In addition there
must be liberal provision for library and laboratory facilities
and the like. From a purely financial point of view, any
university would be better off without it. But, of course, the
financial angle is never the decisive factor that leads to the expansion of graduate work. To meet the need for highly trained men in the social and natural sciences and in education, to stimulate research in the university and thus to further its function of extending the fields of knowledge, and finally to increase its prestige in the world of education, - these generally are the things that a university has in mind in supporting and expanding its graduate work.

If these purposes are to be achieved, a university must not only have graduate students, it must have high grade graduate students, and the more the better. This has led to the perhaps curious situation that the students who receive this costly training are also the most highly subsidized students in American education. Fellowships, scholarships, assistantships, - these are the weapons with which the very real competition for students of high promise is carried on. Without such weapons an institution is at a distinct handicap in the development of its graduate work.

That this situation is not a new one is perhaps indicated by a motion made in the faculty by Professor Merriman in 1894. It was to the effect that the faculty should request the trustees to exempt from tuition fees for the next five years those graduate students who give an equivalent in the work of instruction in the departments in which they are studying. There is no record that the motion was ever acted on.

In 1918, Professor Ullmann urged the faculty to recommend to the trustees the immediate establishment of teaching fellowships for the M.S. at $300.00 per annum. The fellows
were to pay no tuition fees and were to be obligated to do twenty-one clock-hours of teaching per week. Professor Ullmann's motion was defeated.

Starting with this same year, however, the need began to be met from other sources. Gifts for temporary fellowships, gifts and bequests for endowments for permanent fellowships, and scholarships, fellowships, and assistantships provided by the University, have grown in number so that now the Graduate School is in a position to attract a respectable number of graduate students of the highest caliber. The various student aids will be listed below in three classifications, viz., those supported directly by the University, those of a permanent character established through gifts or bequests, those of a temporary character supported from time to time by gifts from industrial concerns and other special organizations or individuals.

1. Student aids supported by the University.

In addition to teaching assistantships, research assistantships, etc., which the University has established from time to time in various fields to help in carrying on the necessary work of the departments, and whose beneficiaries are able to devote half their time to graduate study, the University has established the following student aids.

University Scholarships. First announced in the Register for 1936-1937 and offered annually since. Twelve free tuition and twelve deferred tuition scholarships are offered for work in any field. The recipient can devote all his time to graduate study.
Lehigh Institute of Research Fellowships for work in various fields of science and technology. Stipend, $600.00 per annum. Four fellowships were announced in 1930-1931. Seven were offered in each of the next four years. They have not been offered since 1934-1935. The recipient devoted half his time to graduate study.

2. Permanent Scholarships and Fellowships.

Unless otherwise stated, the following are half-time fellowships. The recipient devotes half his time to graduate work, and half to research assigned to him by the department in which he is working.

New Jersey Zinc Company Research Fellowship.

Endowed through a gift of the New Jersey Zinc Company and first announced in 1924-1925. No special field of work is stipulated. Stipend, $600.00 per annum.

Henry Marison Bylesby Memorial Research Fellowships for work in electrical, mechanical or hydraulic engineering. Endowed by the widow of H. M. Bylesby, M.E. '73. Stipend, $750.00 per annum. The fellowships were first announced in 1926-27 and were two in number. For some years, more than two were awarded. Four were announced in 1940-1941.

Student Chemistry Foundation Fellowships for work in chemistry. The fellowships were established by members of the class of 1930 and were first announced in 1927-1928. Succeeding classes have also supported them. Two fellowships are offered every year. The stipend was originally $750.00 per annum. Since 1926-1937, the stipend has been $600.00 per annum. Only Lehigh graduates are eligible.
the sanction of the faculty. Graduates wishing to take special courses of study will be offered every facility in so doing.

The work in the School of Mining and Metallurgy brought considerable numbers of "graduate" students of this type. On December 19, 1881, the faculty voted to expand the full course in mining and metallurgy from four and one-half years to five years, and approved the course as prepared by Professors Frazier and Williams. At the end of four years, the student received the bachelor's degree, and after completing the fifth year, the E.M. On October 8, 1894, this fifth year course was abolished by vote of the faculty. It appeared for the last time in the Register for 1899-1900.

The formal fifth year courses thus disappeared in time from the Registers, but the practice of working for two undergraduate degrees did not cease. The following quotation from the Register for 1940-1941 will indicate that the University, now as in the past, encourages students to follow such a program with a view to getting a broader training.

If a student in the College of Arts and Science contemplates becoming a candidate for a degree in engineering after the completion of his B.A. curriculum, he should major in mathematics, business, physics, or chemistry, and choose as electives such technical studies as are contained in the earlier years of the engineering curriculum which he wishes to complete. By carefully selecting electives, with the advice and guidance of the dean of the College and the professor in charge of the engineering curriculum concerned, the graduate of the B.A. curriculum may enter the engineering curriculum chosen in full standing, and obtain his engineering degree in one or two years of further study. A detailed plan is made for each student.

Each year a number of students take undergraduate degrees who
James Ward Packard Research Fellowship for work in electrical or mechanical engineering. Established through a bequest from J. W. Packard, M.E. '84. First announced in 1929-1930 with a stipend of $750.00. Starting with 1930-1931, the stipend has been $600.00 per annum.

C. Kemble Baldwin Research Fellowship for work bearing on aeronautics. First announced in 1929-1930, with a stipend of $750.00 per annum. The endowment given by the widow of C. K. Baldwin, M.E. '95, makes possible an occasional, not annual, appointment.

Lawrence Calvin Brink Research Fellowship in civil engineering. First announced in 1931-1932, with a stipend of $600.00 per annum. The endowment given by the widow of L. C. Brink, C.E. '94, makes possible an occasional, not annual, appointment.

Garrett Linderman Hoppes Research Fellowship in civil engineering. Established through a bequest from Mrs. Maria B. Hoppes. First announced in 1932-1933. Stipend, $600.00 per annum.

William C. Gotshall Scholarships for work in engineering. Endowed by the bequest of W. C. Gotshall. First announced in 1936-1937. Stipend, $500.00 per annum. Seven scholarships were offered annually for the first two years; starting with 1938-1939, nine have been offered each year. The holder devotes all his time to graduate work.


3. Temporary Fellowships.

The fellowships of this type are not supported by an endowment. They are established from time to time and run for periods of varying length through gifts from industrial concerns, organizations of various kinds and individuals. The recipient generally devotes half his time to graduate study and the other half to research in fields designated by the donors. The donors are generally sufficiently identified by the name of the fellowship. "Announced in 1919" means in the spring term of that year.

Dupont Fellowship for work in chemistry. First announced in 1919 and again in 1920 and 1921. In 1919, the stipend was $350.00, the following years, $750.00. The fellowship was open to seniors or graduates.

George D. Callender Fellowship for work in chemistry. Stipend $1500.00 per annum. First announced in 1920 and each year thereafter until, for the last time, in 1927. During the last five years, it bore the name Callender-Carnell Fellowship.

Columbian Carbon Research Fellowship for work in chemistry. A gift of the L. Martin Company of New York. Announced in 1927, 1928 and 1929 with a stipend of $1000.00 per annum, and in 1930 with a stipend of $1600.00 per annum.

Pfister and Vogel Leather Company Research Fellowship for work in chemistry. Offered in 1927 and 1928. Stipend, $500.00 per annum.
Archer-Daniels-Midland Company and William C. Goodrich Company Research Fellowships for research in linseed and other drying oils. Stipend, $900.00 per annum. Three fellowships were offered in 1928, 1929, 1930, 1931; five in 1932; four in 1933, 1934, 1935; one in 1936. In 1935 and 1936, the fellowships bore the name of the Archer-Daniels-Midland Company only.

R. K. Laros Silk Company Research Fellowship for research in silk and the fabrication of silk textiles. Offered in 1929, and 1930 with a stipend of $750.00 per annum. Again offered with a stipend of $720.00 per annum in 1935, 1936, 1937, 1938, 1939 (two), 1940 (two), 1941 (two).

Barrett Leather Company Research Fellowship for work in leather technology. Offered in 1930 with a stipend of $750.00, and in 1931 with a stipend of $900.00 per annum.

Hunt Rankin Leather Company Research Fellowship for work in leather technology. Offered in 1930 with a stipend of $1800.00. In 1931, 1932, 1933, 1934, two fellowships were offered each year with a stipend of $900.00 per annum. In 1935, 1936, 1937, 1938, two fellowships were offered annually with a stipend of $600.00 per annum.

Engineering Foundation Research Fellowships for work in metallurgy. Two fellowships annually were offered in 1931 and 1932. Stipend, $750.00 per annum.

Bavenson and Levering Company Research Fellowship for the study of wool. Offered in 1932, 1933, 1934, 1935. Stipend, $750.00 per annum.
Textile Foundation Fellowship for scientific and economic research for the benefit of the textile industry and its branches. Offered in 1934, 1935, and 1936.

Chester Enameling Company Research Fellowship for research in patent leather. Offered in 1935. Stipend, $720.00 per annum.

American Institute of Steel Construction Research Fellowship for research in steel construction. Stipend, $600.00 per annum. Offered in 1935, 1936, 1937, 1938, 1939, 1940 (two), 1941 (two).

American Bureau of Welding Research Fellowship for research in electric welding. Stipend, $600.00 per annum. Offered in 1935, 1936, 1937, 1938, 1939, and 1940.

Concrete Reinforcing Steel Institute Fellowship for research in reinforcing steel. Stipend, $600.00 per annum. Offered in 1936, 1937, 1938, 1939, and 1940.

Seton Leather Company Fellowship for work in leather technology. Stipend, $720.00 per annum. Offered in 1936, 1937, 1938, 1939, 1940, 1941.

Raybestos-Manhattan Company Fellowship for work in asbestos products and brake lining. Stipend, $720.00 per annum. Offered in 1936, 1937, 1938, 1939, 1940 (two), 1941 (two).

United Fur Breeders Company Fellowships for work on tanning and dying rabbit furs. Stipend, $720.00 per annum. Two fellowships offered in 1936.

Stroock and Wittenberg Corporation Fellowship for work in resins. Stipend, $720.00 per annum. Offered in 1936 and 1937.
Portland Cement Association Fellowship for work in reinforced concrete slabs. Stipend, $600.00 per annum. Offered in 1936 and 1937.

National Oil Products Company Fellowship for work on textile oils. Offered in 1936, 1937, and 1938 with a stipend of $1800.00 per annum; with a stipend of $600.00 per annum in 1939, 1940 (two), 1941 (two).

Devoe and Reynolds Company Research Fellowship for work in colloid chemistry. Offered in 1937, 1938, 1939, 1940 and 1941. The stipend for 1941 is $600.00 per annum.

Harvey Hubbell Company Research Fellowship for work on electrical contacts. Stipend, $600.00 per annum. Offered in 1937, 1938 and 1939.


Mutual Chemical Company of America Fellowship for work on chromium compounds. Stipend, $800.00 per annum. Offered in 1938, 1939, 1940, 1941.

Silver Research Committee Fellowship for work on silver salts. Stipend, $600.00 per annum. Offered in 1938, 1940, 1941.

Corn Products Refining Company Research Fellowship in Leather Technology. Stipend, $1500.00 per annum. Offered in 1940, 1941.

John H. Frye, Sr., Research Fellowship in Metallurgy. Stipend, $600.00 per annum. Offered in 1940, 1941.

Heat Exchange Institute Fellowship for work on the transfer of heat. Stipend, $600.00 per annum. Offered in 1941.
In connection with the start of Lehigh's first graduate program in 1890, President Williams recommended that the Board of Trustees authorize the organization of a Graduate School which was to coordinate and control all aspects of graduate work at the University. As a governing organization, it consisted of a graduate faculty, an executive committee of the graduate faculty, an executive secretary, and a dean of the Graduate School. The peak of the pyramid, of course, is the president of the University.

The graduate faculty consists of all professors and associate professors and other graduate teachers, and other members as may be designated by the graduate faculty, and the president of the University. As noted in 1912, the faculty including the president, consisted of seventy-five members. Fundamentally, all graduate work at the University is under the jurisdiction of this faculty. Some of its power is delegated to an executive committee in order to make possible greater action on many administrative details, and also to facilitate the work in the details that are better handled in a small body. The faculty has power over the faculty in certain matters, such as the election of members of the executive committee, the approval of any changes in the regulations or rules of the Graduate Catalogue, and the approval of any graduate courses or of essential changes by the course already approved.

The executive committee is composed of the president of the University, the Dean of the Graduate School, the Executive Secretary of the Graduate Faculty, and ten other members designated by the faculty.
In connection with the revival of doctoral work at Lehigh in 1936, President Williams recommended and the trustees authorized the organization of the Graduate School which was to administer and control all aspects of graduate work at the University. As a governing organization, it consists of a graduate faculty, an executive committee of the graduate faculty, an executive secretary, and a dean of the Graduate School. The peak of the pyramid, of course, is the president of the University.

The graduate faculty consists of all professors and associate professors who offer graduate courses, such other teachers as may be designated by the graduate faculty, and the president of the University. In 1940-1941, the faculty, including the president, consisted of seventy-five members. Fundamentally, all graduate work at the University is under the jurisdiction of this faculty. Some of its power it has delegated to an executive committee in order to make possible prompter action on many administrative details, and also to facilitate decisions in some matters that are better handled in a small body. The faculty has however reserved for itself certain matters, such as the election of members of the executive committee, the approval of any changes in the regulations as printed in the Graduate Catalogue, and the approval of new graduate courses or of essential changes in the courses previously approved.

The executive committee is composed of the president of the University, the dean of the Graduate School, the executive secretary of the Graduate School and five elected members, who hold office for five years, one to be elected annually. This
committee has power to approve the teachers who give graduate courses and to say what departments may give work leading to advanced degrees. Other administrative details, such as the approval of individuals to be candidates for advanced degrees, the approval of programs for advanced degrees, the designation of committees to take charge of the doctoral work of individuals admitted to candidacy, and the like, are also entrusted to the committee. The original executive committee was composed of President Williams, Professor More (ex officio) and Professors Ullmann, H. P. Thomas, Sutherland, Gipson, Fort, and Diamond. Through the yearly changes, the committee now consists of President Williams, Dean Fort, Professor More (all ex officio) and Professors Diamond, Bidwell, Neville, Doan, and Willard.

The executive secretary keeps the minutes of the graduate faculty and the executive committee, acts for the committee in approving masters' programs, and, in general, keeps a check on the routine of graduate work to see that the regulations of the School are carried out. Professor More, who had the post of executive secretary under the Graduate Board, has continued in the same position in the Graduate School.

The position of dean of the Graduate School was created in the summer of 1938. Professor Tomlinson Fort of the Department of Mathematics has held the office since its creation. He is academic head of the School, presides over the meetings of the executive committee and represents the School at public functions. In general, he is charged with the duty of voicing the needs and interests of the School to the President.

To be admitted to the Graduate School, an applicant must be approved by the University's director of admissions,
through whom application for admission is made, and by the head of the department in which the applicant proposes to do the major portion of his work, and by the dean of the Graduate School. When so admitted, he is eligible to take any work for which he has adequate preparation. The only restriction as to this is that, during the regular college year, women students are not admitted to purely undergraduate courses, and that they are admitted to advanced undergraduate courses only upon the express permission of the head of the department concerned. Admission to candidacy for an advanced degree is a matter distinct from admission to the Graduate School, and must be separately approved by the executive committee.

The basic tuition rate in the Graduate School is $10.00 per semester-hour taken. Graduate students in residence who have completed their course and residence requirements for the Ph.D., and who are continuing at the University for work on their dissertations, pay a dissertation fee of $50.00 per semester. Other fees which a graduate student is required to pay are:

(a) A matriculation fee of $5.00, paid, once only, by any student who is matriculating at the University for the first time.

(b) A graduation fee of $10.00 for every degree taken.

(c) A library fee of $2.50 per semester and a health service fee of $6.00 per semester for every semester during which the student is registered for seven or more hours of work.

(d) A reading fee of $25.00 for a master's thesis prepared in absentia and for which the student has not registered.

(e) A reading fee of $50.00 for a doctoral dissertation prepared in absentia.
The total enrollment during the five years of the existence of the Graduate School is shown below. The figures in each instance indicate the total registration during the regular academic year.

<table>
<thead>
<tr>
<th>Years</th>
<th>Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1936-1937</td>
<td>176</td>
</tr>
<tr>
<td>1937-1938</td>
<td>184</td>
</tr>
<tr>
<td>1938-1939</td>
<td>177</td>
</tr>
<tr>
<td>1939-1940</td>
<td>193</td>
</tr>
<tr>
<td>1940-1941</td>
<td>174</td>
</tr>
</tbody>
</table>

To make the picture complete, it might be well to add here the figures for the total graduate enrollment in the summer sessions during these same years.

<table>
<thead>
<tr>
<th>Years</th>
<th>Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1937</td>
<td>69</td>
</tr>
<tr>
<td>1938</td>
<td>91</td>
</tr>
<tr>
<td>1939</td>
<td>74</td>
</tr>
<tr>
<td>1940</td>
<td>92</td>
</tr>
<tr>
<td>1941</td>
<td>63</td>
</tr>
</tbody>
</table>

Finally, there are given below the statistics on the advanced degrees of various kinds conferred during this same five year period.

<table>
<thead>
<tr>
<th>Years</th>
<th>M.A.</th>
<th>M.S.</th>
<th>Ph.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1937</td>
<td>12</td>
<td>19</td>
<td>0</td>
</tr>
<tr>
<td>1938</td>
<td>12</td>
<td>20</td>
<td>6</td>
</tr>
<tr>
<td>1939</td>
<td>19</td>
<td>35</td>
<td>3</td>
</tr>
<tr>
<td>1940</td>
<td>10</td>
<td>41</td>
<td>1</td>
</tr>
<tr>
<td>1941 (not including Founder's Day)</td>
<td>9</td>
<td>22</td>
<td>3</td>
</tr>
</tbody>
</table>
have taken an earlier degree, either at Lehigh or elsewhere.

Today we would regard such students as undergraduates, though, technically, they are students who continue formal study after taking a degree. But up to 1903, they were regularly listed in the University Register as graduate students. The following statistics, taken from the annual registers for sample years, will give an indication of the numbers of such students. We start with the Register for 1883-1884 because the earlier Registers did not indicate the type or grade of work being done by the graduate students listed.

<table>
<thead>
<tr>
<th>Year</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1883-1884</td>
<td>5</td>
</tr>
<tr>
<td>1886-1887</td>
<td>8</td>
</tr>
<tr>
<td>1889-1890</td>
<td>11</td>
</tr>
<tr>
<td>1892-1893</td>
<td>9</td>
</tr>
<tr>
<td>1895-1896</td>
<td>7</td>
</tr>
<tr>
<td>1898-1899</td>
<td>8</td>
</tr>
<tr>
<td>1901-1902</td>
<td>1</td>
</tr>
</tbody>
</table>

In October, 1903, the secretary of the faculty was instructed to place the names of graduate students studying for undergraduate degrees on the college rolls where they fall in relation to their conditions. In the Registers 1903-1904 to 1906-1907 these students do not appear as graduate students. Then, on March 30, 1908, on the recommendation of a committee composed of Professor Thornburg (secretary of the faculty) and the heads of departments in which degrees were conferred, the faculty adopted the following motion.

The names of students, who are graduates of colleges, universities, and institutions of similar grade, shall be grouped together and so printed in the Register and on the class rolls, and shall be subdivided into three classes:

(a) Candidates for M.A. and M.S.
(b) Candidates for other degrees.
(c) Special students.

Under this regulation the statistics for sample years indicate
Lehigh has confers and lifetime degrees to over 450 individuals, 900 men and 50 women. Seventeen of the one have earned the degree each. Since taking an M.A. or M.S. degree in the Ph.D. All have, therefore, 610 advanced degrees have been conferred, viz., 516 M.A.'s, 325 M.S.'s, in 30 years.

In this section the aim has been to give a complete list of the names of all who have earned an M.A., an M.S., or a Ph.D. at Lehigh up to July 1, 1941. The names have been arranged first of all by years, from 5 degrees into the years and alphabetically under the name of the recipient. After each name is given the degree or degrees and the institutions from which it was received. Where the name of the school is not mentioned, the earlier degrees were taken at Lehigh.

No attempt is made to state the time of the year when the degree was conferred. For the last twenty years degrees were regularly conferred on University Day and on Founder's Day. In early years, it can be shown to confer the degree and the degree whenever the candidate had qualified.

The list was compiled from two sources, viz., from the faculty minute, and from the commencement program or from the directly or as reprinted in the annual Registers.

R.A.
T. R. Eberhardt, M.A., 90
M.A.
W. M. Kelly, B.S., 30
P. D. Whelan, M.A., 30

SECTION V

RECIPIENTS OF GRADUATE DEGREES
Lehigh has conferred advanced degrees in course on 644 individuals, 590 men and 54 women. Seventeen of the men have earned two degrees each, four taking an M.A. and M.S., thirteen an M.S. and Ph.D. All told, therefore, 661 advanced degrees have been conferred, viz., 218 M.A.'s, 428 M.S.'s, 15 Ph.D.'s.

In this section the aim has been to give a complete list of the names of all who have earned an M.A., an M.S. or a Ph.D. at Lehigh up to July 1, 1941. The names have been arranged first of all by years, then by degrees within the years, and alphabetically under the degrees. After each name is given the previous degrees held and the institutions from which it was received. Where the source of the degree is not mentioned, the earlier degrees were taken at Lehigh.

No attempt is made to state the time of the year when the degree was conferred. For the last twenty years degrees are regularly conferred on University Day and on Founder's Day. In early years, it was the custom to confer the diploma and the degree whenever the candidate had qualified.

The list was compiled from two sources, viz., from the faculty minutes, and from the commencement programs either directly or as reprinted in the annual Registers.

M.A.
T. H. Hardcastle, B.A. 80

M.A.
F. J. Crilly, B.A. 83.
J. D. Hoffman, B.A. 83.
1891  M.A.
P. A. Lambert, B.A. 83
S. E. Lambert, B.A. 90
W. F. More, B.A. 83
L. B. Semple, B.A. 84.

M.S.
J. W. Richards, A.C. 86.

1893  M.A.
S. E. Berger, B.A. 89
E. A. Schnabel, B.A. 91.

Ph.D.
J. W. Richards, A.C. 86, M.S. 91.

1894  M.S.
H. E. Kiefer, A.C. 92.

1895  M.S.
M. D. Sohon, A.C. 90

1896  Ph.D.
H. E. Kiefer, A.C. 92, M.S. 94.

1897  M.S.
Joseph Barrell, B.S. 92, E.M. 93.

1898  M.S.
Barry MacNutt, E.E. 97

1899  M.A.
N. M. Emery, B.A. (Dartmouth 95)
R. E. Laramy, B.A. 96.

M.S.
J. H. Klinck, M.E. (Cornell 94).

1900  M.A.
E. A. Jacoby, B.A. 95

M.S.

1901  M.A.
H. M. Cressman, B.A. 95.
1901 (Cont)  M.S.
    P. L. Reed, C.E. 98
    W. L. Wilson, C.E. 93.

1902  M.S.
    Ernesto Franco, C.E. 01
    A. G. Rau, B.S. 88.

1903  M.A.
    M. J. Luch, B.A. 02.
    M.S.
    Henry Kemmerling, C.E. 91.

1904  M.A.
    H. E. Jordan, B.A. 03.

1905  M.S.
    C.E. Dickerson, B.S. 89
    L.N. Sullivan, B.S. (Rose P.I. 86).

1906  M.A.
    R. S. Goerlich, B.A. 05
    M.S.
    W. S. Landis, Met.E. 02

1907  M.A.
    G. R. Stull, B.A. 03.
    M.S.
    H. D. McCaskey, B.S. 93
    W. C. Willard, C.E. (Cumberland U. 06).

1908  M.S.
    L. E. Conrad, C.E. (Cornell Col. 04)
    Joseph Daniels, S.B. (M.I.T. 05)
    A. A. Diefenderfer, A.C. 02
    Arthur Edgar, A.C. 05
    L. A. Olney, A.C. 96
    J. E. Stocker, B.S. 95
1909 M.A.
E. E. Reinke, B.A. 08.

M.S.
S. A. Becker, C.E. 03
W. F. Carson, C.E. 03
R. A. Harrower, C.E. 05
F. T. Leilich, E.E. 08
S. S. Seyfert, E.E. 04.

1910 M.A.
R. L. Charles, B.A. 07
R. J. Gilmore, B.A. 07
J. B. Reynolds, B.A. 07.

1911 M.S.
A. C. Callen, E.M. 09
C. A. Pierle, A.B. (DePauw 09)

1912 M.A.

M.S.
G. F. Alrich, B.S. (Lafayette 10)
W. C. Carson, C.E. 11
S. K. Huang, E.M. 11

1913 M.A.
C. H. Rominger, A.M. (Moravian)
R. W. Walters, B.A. 07.

M.S.
F. C. Biggin, B.S. (Cornell 92)
Paul Cloke, E.E. 05
Charles Enzian, C.E. 01
L. H. Koch, B.S. (U. of Pa. 99)
W. F. Odom, B. S. (Clemson)
F. G. Perley, E.M. 08
To-Tan Sun, S.B. (M.I.T.), A.M. (Columbia)
S. J. Thomas, B.S. (Lafayette 12)
Cho Yang, B.S. (Imperial Pei Yang Univ.).

1914 M.A.
D.
T. H. Mueller, A.B., B.E. (Moravian 10, 12)
A. H. Myers, Ph.B. (Lafayette).

M.S.
Chieh Ho, E.M. (Col. School of Mines 13)
1915
M.A.
J. A. C. Mueller, A.B. (Moravian 14)

M.S.
Siegfried Fisher, B.S. (Columbia 07)
H. M. Fry, E. E. 10
J. S. Long, Ch.E. 14
S. H. Salisbury, B.S. 06
M. M. Shaw, M.E. 13

1916
M.A.
W. A. Lambert, B.A. 95
Jacob Tarshish, A.B. (Cincinnati).

M.S.
Ezra Bowen, B.S. 13
G. J. Buchner, B.S. (C.C.N.Y. 14)
E. A. Grissinger, E.E. 94

1917
M.A.
H. E. A. Durell, B.A. (St. Stephens 02)
A. S. Gilmore, B.A. 03
G. R. Schmich, B.S. (Moravian 13).

M.S.
R. L. Bartlett, S.B. (M.I.T. 10)
H. S. Price, C.E. (Princeton 16)
Morton Sultzter, E.E. 12

1918
M.A.
R. A. Mantone, B.A. (Wesleyan), B.D. (Dean Theol. Sem.).

M.S.
Y. K. Chiang, E.M. (Col. School of Mines)
Edwin Higgins, E.M. 02.

1919
M.A.
R. C. King, B.A. (U. of Mo. 05)
A. M. Lindsay, B.A. (Lebanon Valley)
G. E. Oswald, B.A. (Ursinus)
H. C. Snyder, Ph.B. (Muhlenberg)

M.S.
W. L. DeBaufre, E.E. 07, M.E. 09
P. B. Fraim, E.M. 09
R. T. Hutchinson, B.S. (Muhlenberg 13)
1920

M.A.

A. L. DeLozier, B.A. (Ashland Coll.)
W. M. Tinker, B.A. (Thiel 37), B.D. (Yale 94).

M.S.

J. E. Baum, A.B. (Muhlenberg 11), C.E. 15
D. S. Chamberlin, B.Ch.E. (U. of Mich. 12)
O. W. Eshbach, E.E. 15
J. G. Schmacker, A.B. (Muhlenberg)
H. H. Wentz, B.S. (Muhlenberg 15).

1921

M.A.

C. C. Bachman, A.B., A.M. (Muhlenberg 02, 04)
J. E. Baum, A.B. (Muhlenberg 11) C.E. 15, M.S. 20
M. O. Billow, A.B. (Lebanon Valley 08)
C. J. Brockman, B.A. 19, Ch.E. 21
W. A. Brunner, A.B. (Lebanon Valley 11)
P. L. Grubb, B.A. 01
Bessie E. Kast, B.A. (Wellesley 25)
R. H. Kressler, A.B. (Muhlenberg 01)
Mary A. Schweninger, A.B. (W. Md. Coll. 13)
Edna G. Tatnall, A.B. (Pa. Coll. for Women)

M.S.

J. L. Beaver, E.E. 04
J. M. Burke, B.S. 16
C. K. Ho, B.E.M. (U. of Ill.)
H. Kamura, Met.E. (Meiji Coll. of Technology, Japan)
C. E. Lawall, E.M. 14
R. E. Martin, A.B. (U. of Ind. 17)
S. R. Shealer, E.E. 09
J. G. Smull, B.S. 06
Philip Subkow, Ch.E. 20.

1922

M.A.

H. F. Arnold, A.B. (F. and M.)
J. A. Glasier, B.D. (General Theol. Sem.)
Mary L. Hess, A.B. (Allentown Coll. for Women)
H. M. Jacobs, Ph.B. (Lafayette)
C. H. Karsch, A.B. (U. of Pa.)
H. R. McCullough, A.B. (Muhlenberg)
J. C. Roberts, A.B. (Colgate).

M.S.

August Concilio, E.E. 20
S. J. Fegley, A.B. (Lafayette)
M. D. Fetherolf, A.B. (Muhlenberg)
I. M. Frankenberg, B.S. (Muhlenberg 18)
M. L. Frankenberg, B.S. (Muhlenberg 15)
G. J. Roche, E.E. 21
M. J. A. Smith, B.S. (F. and M.)
E. W. Zimmerman, B.S. (Muhlenberg)
1923  M.A.
H. M. Barzun, B.s.s.L. (U. of Paris)
Leonore D. S. Browne, A.B. (Smith 22)
H. J. Yeager, A.B. (F. and M. 21)

M.S.
M. K. Buckley, B.S. 21
W. H. Carter, B.S. 17
W. A. Everhart, A.B. (Miami 14)
K. V. Glentzer, A.B. (U. of Ind. 21)
H. D. Gruber, E.E. 09
C. H. McKenzie, B.S. 22
G. F. Nordenholt, M.E. 14
H. B. Rau, B.S. (Moravian)
Dzu-Kun Shen (?)
J. L. Stewart, B.S. (Pa. State Coll. 22)
S. B. Talmage, B.S. (U. of Utah 09)
R. V. Wetherhold, B.S. (Muhlenberg)

1924  M.A.
H. A. Farber, B.A. 20
W. L. Fink, A.B. (Ursinus)
H. A. Zinszer, B.A. 22.

M.S.
Rachel E. Anderson, B.A. (Wellesley 08)
E. W. Burgess, B.S. 21
P. N. Kistler, B.S. (Pa. State Coll. 20)
W. A. Kreidler, B.S. 20
L. L. Leach, B.S. (U. of Mo. 15)
G. A. Lyle, B.S. (Hampden Sydney 21)

1925  M.A.
Clara Carroll, B.A. (Moravian Coll. for Women 21)
Mary M. Crow, B.A. (Moravian Coll. for Women 20)
B. R. Ewing, B.A. 20
J. W. Fritsch, B.A. (Muhlenberg)
Emma C. Greider, B.A. (Hunter 22)
R. D. Hassler, B.S. (Moravian 17)
N. E. Kern, Ph.B. (Muhlenberg)
M. C. Old, B.A. 23
Hilda N. H. Shelling, B.A. (Moravian Coll. for Women)
G. E. Thomas, Ph.B. (Muhlenberg)
R. N. Thompson, A.B. (Cornell)

M.S.
H. V. Anderson, B.Ch.E. (U. of Mich. 12)
R. D. Billinger, Ch.E. 21
Harry Diamond, B.S. (M.I.T.)
C. A. Knauss, B.S. (Muhlenberg)
A. R. Miller, B.E. in E.E. (U. of Ill. 18)
Masatoki Miyake, B. Eng. (Waseda U.)
M. R. Solt, B.S. 18
Elvira M. Strunk, B.S. (Albright 20)
1926  M.A.
Genevieve Wilson, B.A. (U. of Pa.).

M.S.
W. J. Arner, Met.E. 21
P. E. Bowman, Ch.E. 22
Graham Wentz, Ch.E. 24.

1927  M.A.
E. H. Brown, B.S. (Pa. State Coll. 18)
Gertrude C. Lear, A.B. (Cornell 23).

M.S.
N. A. Chapin (U.S. Naval Acad. 20)
E. H. Hanlon (U.S. Naval Acad.)
N. S. Hibbsman, B.S. (Pa. State Coll. 24)
J. D. Ransom, Ch.E. 26
P. C. Wetterau, Ch.E. 25

1928  M.A.
Mary M. Dwyer, B.S. (Moravian Coll. for Women)
H. F. Fehr, B.A. 23
Elizabeth M. Lorsbach, Ph.B. (Muhlenberg)
R. L. Mohr, B.S. (Juniata)
W. W. Perkins, A.B. (Harvard 22)

M.S.
W. S. Bailey, S.B. (M.I.T.)
R. J. DeGray, Ch.E. 17
W. S. Egge, B.S. (N.D. State Agricultural Coll.)
B. H. Jennings, B.Eng. (Johns Hopkins 25)
H. C. Jones, Ch.E. 27
W. L. Kichline, B.A. 24
J. A. King, B.S. in M.E. (U. of Texas)
P. F. Schlingman, B.S. (U. of Ill.)
C. W. Simmons, B.Sc. (Queens U. 20)
M. A. Thorpe, B.Chem. (William and Mary)
E. K. Zimmerman, Ch.E. 27

1929  M.A.
M. W. Brown, B.A. 25
E. H. Johnson, B.A. (De Pauw 26)

M.S.
F. C. Anderson, B.S. in E.E. (U. of Minn. 24)
L. S. Barnes, B.A. (Occidental 26)
C. E. Brown, Ch.E. 27
W. R. Couch, C.E., M.S. (U. of Akron 23, 26)
H. H. Friend, B.S. (Northwestern 26)
1929
M. S. Gjesdahl, B.S. in Eng. (U. of Minn. 21)
C. D. Jensen, B.S. in C.E. (U. of Minn. 21)
R. B. K'burg, Ch.E. 28
W. W. Kittelberger, Ch.E. 27
E. W. McGovern, Ch.E. 22
F. H. Minner, B.S. (Muhlenberg 18)
S. C. Nevins, Ch.E. 23
F. A. Scott, B.S. (N. Y. State Coll. 24)
L. K. Scott, A.B. (U. of Kansas 27)
W. J. Sette, B.S. (Yale 27)
W. T. Sproull, B.S. (U. of Akron 27)
J. M. Thompson, A.B. (De Pauw 25)
H. P. Whitenight, B.S. (Muhlenberg 24).

1930
M.A.
J. L. Eisenhard, B.A. (Muhlenberg 14)
D. W. Gateson, B.A. (Trinity, Conn. 06)
H. M. Prentiss, Ph.B. (Muhlenberg 29)
C. F. Schoffstall, Ph.B. (Muhlenberg 26)
E. VanKeuren, B.A. 23.

M.S.
G. F. Ball, B.S. in Chem. (Pa. State Coll. 29)
M. A. Farrell, B.S. (Pa. State Coll. 28)
E. S. Greiner, B.S. in Met.E. (Carnegie I.T. 28)
P. V. Hartman, B.A. (Moravian 28)
W. E. Harvey, Met.E. 27
A. M. Hollembach, B.S. (Muhlenberg 27)
J. DeH. Long, B.S. (F. and M. 28)
T. H. Marshall, B.S. (Iowa State Coll. 27)
J. Z. Miller, Ch.E. 29
C. T. Oswald, Ch.E. 29.

1931
M.A.
N. J. Cook, B.A. 25
A. S. Erb, B.S. (Muhlenberg)
Ruth M. Kistler, A.B. (Ursinus)
B. W. Laubach, B.S. (Muhlenberg 25)
Elizabeth P. MacDougall, B.A. (U. of Wis.)
G. S. Schroepe, B.S. (Muhlenberg 23)
Agnes G. Shields, B.A. (Moravian Coll. for Women 30)
R. N. Taylor, Ph.B. (Muhlenberg 17)
W. J. Transue, B.S. (Moravian 23).

M.S.
G. F. Beal, B.S. in Ch.E. (Iowa State Coll.)
F. T. Benton, Ch.E. 29
E. R. Binkley, B.S. (F. and M. 28)
J. N. Dow, B.S. 31
W. H. Eoback, B.A. (Roanoke)
Philip Kratz, Ch.E. 29
W. S. W. McCarter, B.S. in Ch.E. (Pa. State Coll.)
E. W. Midlam, Ch.E. 29
R. K. Mowrer, B.S. (F. and M. 29)
G. W. Parkinson, B.S. in C.E. (U. of Saskatchewan)