A HISTORY
OF THE
Department of Chemistry and
Chemical Engineering
of
Lehigh University
Bethlehem, Pennsylvania
(1866 - 1941)
Location of Chemistry Department on Lehigh Campus

I - Christmas Hall 1866-1868
II - Packer Hall 1868-1883
III - Wm. H. Chandler Chem. Laboratory 1884 -
A History
of the
Department of Chemistry and Chemical Engineering of
Lehigh University
Bethlehem, Pennsylvania
(1866-1941)
To the Committee on Departmental Histories this report on Seventy-Five Years of Chemistry at Lehigh University is respectfully submitted.

It represents the result of interest and help from many sources. Biographical outlines of the present staff were compiled by the respective individuals. Photographs of the instructional staff were made by E. F. Williams, '41. The period from 1894 to 1938 was traced by Dr. H. M. Ullmann. The bibliography of staff writings was compiled by members of the Class of 1941, whose efforts are acknowledged in a preface to that section. Many thanks to many friends.

The editor has introduced biographies of Dr. Wetherill and Dr. Chandler and included numerous pictures taken over a period of years. Finally, a summary of the more important events of the seventy-five years has been made as the introductory essay. This paper was read before the Division of Chemical Education of the American Chemical Society at Atlantic City on September 10, 1941.

It was hoped to be able to include much of the human and humorous side of the "chemische gefühl" but time prevented. The task has been a pleasure even though done during an extremely busy summer. No apologies are made for split infinitives or cracked grammar. The work was done by a chemist under heat and pressure.

The Editor,
R. D. Billinger.

William H. Chandler Chemical Laboratory.
Oct. 1, 1941.
## CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seventy-five Years of Chemistry at Lehigh University</td>
<td>1</td>
</tr>
<tr>
<td>Departmental Heads</td>
<td>2</td>
</tr>
<tr>
<td>Buildings</td>
<td>11</td>
</tr>
<tr>
<td>Courses</td>
<td>12</td>
</tr>
<tr>
<td>Student Chemical Society</td>
<td>13</td>
</tr>
<tr>
<td>Fellowships</td>
<td>14</td>
</tr>
<tr>
<td>Publications</td>
<td>14</td>
</tr>
<tr>
<td>Graduate Work</td>
<td>15</td>
</tr>
<tr>
<td>Graduates</td>
<td>15</td>
</tr>
<tr>
<td>Charles Mayer Wetherill</td>
<td>18</td>
</tr>
<tr>
<td>William H. Chandler</td>
<td>26</td>
</tr>
<tr>
<td>The Period 1894-1938 (by H. M. Ullmann)</td>
<td>30</td>
</tr>
<tr>
<td>Vahan Simon Babasinian</td>
<td>43</td>
</tr>
<tr>
<td>Instructional Staff (1866-1941)</td>
<td>44</td>
</tr>
<tr>
<td>Publications (75-Year Bibliography)</td>
<td>52</td>
</tr>
<tr>
<td>Biographical Sketches of Faculty (1941)</td>
<td>78</td>
</tr>
<tr>
<td>Laboratory Views</td>
<td>94</td>
</tr>
<tr>
<td>Staff Picture (1941)</td>
<td>99</td>
</tr>
</tbody>
</table>
A diamond jubilee is quite appropriate for a University whose origin was due to the black diamonds of Pennsylvania. It is now seventy-five years since Asa Packer, who had been a successful entrepreneur in coal and transportation in Carbon County, founded the University which bears the name of the Valley in which he lived.

When Lehigh University started in the autumn of 1866 its Department of Chemistry consisted of but one Professor, Dr. Charles Mayer Wetherill. With only a few students majoring in chemistry the laboratory was confined to small quarters in the original campus building, Christmas Hall. In the first class graduated (1869) there was one chemistry student. In 1940 there were 68 majoring in chemistry and chemical engineering. To handle some 300 chemistry majors plus a like number of students in service courses to other departments, a teaching staff of 22 members is now employed.

In the history of the Department 975 students have been granted undergraduate degrees. Until 1906 the degree of A.C., Analytical Chemist, was granted. Since then B.S. in Chem., and Ch.E. degrees (more recently B.S. in Ch.E.) have been established. In addition graduate degrees of M.S. and Ph.D. are showing a steady increase. Annually there are now about thirty students taking graduate work, most of whom receive the Master's degree.
The Pilots - Departmental Heads

There have been five Departmental Heads over the span of years. Dr. C. M. Wetherill (1866-71), Dr. W. H. Chandler (1871-06), Dr. W. B. Schober (1906-14) and Dr. H. M. Ullmann (1914-38) were followed by the present incumbent Dr. H. A. Neville (1938 -). To these men must be given the major share of credit for growth of the Department. Brief outlines of their several careers and contributions follow.

Charles Mayer Wetherill, Ph.D., M.D., was one of the original faculty of five scholars selected to chart the courses of the young technical institution. Wetherill was rich in training and experience, and came from a family well known in the industrial and scientific world. A graduate of the University of Pennsylvania, he had furthered his training in the well known Philadelphia laboratory of Booth and Boye. His education was completed by a year with Pelouze in Paris, and two years with Liebig in Giessen. Here he received the Doctorate in 1848. In the interval before coming to Lehigh he had been successively public analyst, lecturer, traveller, first chemist of the Department of Agriculture, special investigator for President Lincoln on gunpowder production and chemist for the Smithsonian Institute. His published researches cover papers on medical, agricultural and mineralogical subjects. His interest in the first field had led the New York Medical College to grant him an honorary M.D. degree. His longest treatise was a book published in 1860 on "The Manufacture of Vinegar." One of his most important pieces of work in Washington was a study and plan for the ventilation of the Capitol Building.
CHARLES MAYER WETHERILL (1825-1871)

LEHIGH'S FIRST PROFESSOR OF CHEMISTRY
The first chemical laboratory consisted of two rooms in the west end of Christmas Hall - the first building on the Lehigh Campus. In 1868 the laboratory was moved to Packer Hall where Wetherill designed an excellent laboratory on the first floor. For his first classes he prepared and printed "A Syllabus of Lectures on Chemical Physics" and two years later "Lecture Notes in Chemistry."

Despite the duties of arranging courses, lectures and designing laboratories, Wetherill had time for research on the mineral Itacolumite (articulite) and his paper was commended by the well known geologist Dana. Before Wetherill died suddenly, in 1871, he had considered a change to the chair of chemistry at the University of Pennsylvania.

One of Penn's greatest alumni the late Edgar Fahs Smith, Professor of Chemistry and later Provost, wrote an illuminating biography of Dr. Wetherill. This seventy-page tribute establishes Wetherill as one of the outstanding American chemists of his day. This series of articles appeared in 1929 (posthumously arranged by Dr. C. A. Browne) in the Journal of Chemical Education.

Dr. William Henry Chandler was the second Department head to occupy the chair of chemistry from 1871 to 1906. The Chandler influence in American Chemistry was long felt, not only through the activities of the Lehigh Professor, but also through the work of his illustrious brother - Dr. C. F. Chandler of Columbia. William Chandler received his A.B. and A.M. degrees at Union College, where he studied under his brother. In 1873 he was awarded his Ph.D. from Hamilton College. For three years
he was an instructor at Columbia, again working with his brother Charles. At intervals prior to this he had done industrial work in the copper works of New Bedford, and in the turpentine and phosphate industries of the south. He was well equipped to carry on the guidance of young chemists in the new University in Bethlehem.

During this period the Chandlers edited "The American Chemist," seven volumes of which appeared from 1870-77. This was a monthly journal of theoretical, analytical and technical chemistry published in New York by W. Baldwin and Co. It was a very important beginning in the literature of American chemistry and no doubt inspired the subsequent publications of the American Chemical Society. The Chandlers also conducted an analytical laboratory in New York City.

During Dr. Chandler's thirty-five years with the University he served as Librarian for most of his incumbency. His interest in books led him to purchase many rare volumes which are now greatly treasured. His energy and intellectual ability were attested by the publication of a three volume "Encyclopedia and Epitome of Universal Knowledge." This was published in 1878 by P. F. Collier, New York.

The work of which Professor Chandler was most proud was the erection of the Chemical Laboratory - since named for him. He planned it and supervised its erection with the help of Addison Hutton, Philadelphia architect. The construction occurred between May, 1884 and September, 1885. The main building was 259 by 44 feet, and consisted of two principal stories, a basement and a smaller third story. A south wing 62 by 42 feet was connec-
SCHOFER, William Bush.


Schober, Dr. William Bush, Coconut Grove, Fla. Chemistry.

ted to the main building. Chandler had made a study of important laboratories in this country and abroad and after the experience gained in erecting his own building he published his findings in a book "The construction of chemical laboratories." This was printed in Washington by the Government Printing Office when Chandler was a U. S. Commissioner to the Paris Exposition in 1889.

Some of Dr. Chandler's researches are indicated in government publications on "Textile Fabrics, Wearing Apparel and Accessories" and "Products of Mining and Metallurgy." He was especially proud of his Chemical Museum in which he had collected many interesting specimens of natural and industrial production.

Succeeding Dr. Chandler, who died in 1906, came Dr. William B. Schober, a native of Maryland, graduate of St. John's College and Johns Hopkins University, an organic chemist. Schober had done work on diazo-compounds and sulphonic acids, translated Gatterman's Laboratory Manual of Organic Chemistry and faithfully taught at Lehigh from 1892 to 1914. He retired from the Department and spent his later years in Florida, succumbing to ill health in 1935.

From 1914 to 1938 the Department was under the direction of Dr. Harry Maas Ullmann - aptly described in Bowen's History of Lehigh as "able executive and efficient administrator." No detailed account of Dr. Ullmann's career will be repeated here. It was the subject of a biographical sketch in the July 20, 1936, News Edition of Industrial and Engineering Chemistry - written by one of his former students, Mr. A. E. Buchanan - Director of
ULLMANN, Harry Maas, Prof. Emeritus.
b. Springfield, Mo., April 14, 1868, h. 5'5", w. 153#.
Member A.C.S., A.I.Ch.E., Soc. Chem. Ind., Fellow Chem. Soc. (London),
A.A.A.S.
Pbbl. "Rapid Determination of Ash and Phosphorus in Coke", "Rapid
Determination of Ash in Coal," Determination of Titanium in
Argillaceous Limestones."
1904-10, Asso. Prof. 1910-14, Prof. and Head of Dept. of
Chem. & Chem. Eng., 1914-58, Prof. Emer. 1958-.
Frat. & Soc. Theta Delta Chi, Sigma Xi, Tau Beta Pi, Bethlehem Club,
Saucon Valley Country Club.
Church: Episcopal.
Hobby: Sailing.
NEVILLE, Harvey Alexander, Head of Dept. and Prof. of Chemistry.
b. Millwood, Virginia, Feb. 18, 1898, h. 5'11"", w. 150#.
m. Ilda Langdon, children - 3.
Edn. Boyce High School, Boyce, Va., Randolph-Macon College, A.B., 1918,
Frat. & Soc.: Phi Beta Kappa, Sigma Xi, Tau Beta Pi.
Member A.C.S., A.A.A.S. (fellow).
(articles): about 30 in chemical journals, principally in colloid chemistry and catalysis.
Scien. disc.: 4 patents.
Experience: Instr. and Associate, Univ. of Illinois, 1921-27.
Asst. Prof. Lehigh, 1927-50, Assoc. Prof. 1930-50, Prof. and Head, 1938 -.
Chief Duties: Lecturer in Gen.Chem. (freshmen), Adv. Chem. (juniors),
Surface Chemistry (graduate students), Administrator.
Hobby: Gardening.
Research for the Remington Arms Company.

Dr. Ullmann, native of Missouri, came to Lehigh in 1894 from the influence of Ira Remsen at Johns Hopkins and two years' study in Munich and Paris. His early work in Bethlehem was in the field of quantitative analysis. Among his published papers are methods of rapid analysis for ash and phosphorus in coal and coke, and a method for the determination of titanium in cement rocks. It was Ullmann (in 1903) who laid out the curriculum in chemical engineering during Dr. Chandler's administration and with the guidance of the University President Thomas M. Drown. Drown had been Professor of Chemistry at M. I. T. and his advice was invaluable.

Dr. Ullmann's greatest success was in building up his Department and surrounding himself with a congenial staff which combine intellectual activity with a remarkable esprit de corps. He labored at great length with students - "the quick and the dead."

Dr. Harvey A. Neville has been Head of the Department since 1938. A diplomatic Virginian, graduate of Randolph-Macon and Princeton, Dr. Neville had seven years' experience at the University of Illinois before joining the Lehigh Staff in 1927. His guiding hand has directed several courses of study, with chief interest and accent in the realm of colloids and catalysis. He is an acknowledged expert and consultant to the plastics industry.

Buildings

As the University grew the chemistry laboratories were moved from Christmas Hall in 1868 to larger quarters in the newly erected Packer Hall. Here Dr. Wetherill had ample space for his lectures, laboratory work and museum collection. In 1884 Dr.
Chandler moved to the present building which he designed and which bears his name. This fire-proof, sandstone building has been described briefly under Chandler's work.

Additional extensions have been made to the original building. A three story extension 60 by 37 feet was added in 1921 to the western end, and an east wing 116 by 52 feet was completed in 1938. The three story east wing, completely modernized to afford facilities for research, chemical engineering laboratories and an excellent laboratory for general chemistry was provided by funds donated by the alumni. The trustees have named the east wing the Harry M. Ullmann Chemistry Laboratory, in recognition of his 25 years of service as head of the Chemistry Department.

Pictures of the main building show the old-fashioned chimneys which were the source of fume hood ventilation used in Chandler's day. The new annexes now utilize power fans and blowers to remove fumes.

**Courses**

An interesting survey of the early courses offered in 1866 is obtained from the first Register of the University. The courses listed for the School of Analytical Chemistry were:

*Junior Schoolmen*

Qualitative Analysis - (Fresenius), English translation, Use of the blowpipe (Plattner). Use of the spectroscope. General Chemistry (Miller's Inorganic). Lectures by the Professor and constant practice in the Laboratory.

Physics - Lectures on Chemical Physics.

*Senior Schoolmen*

With the passing years many new courses of study were offered and older ones dropped, keeping in line with general practice. Today there is a list of some 53 chemistry and chemical engineering courses offered to undergraduates, and 30 more to graduate students. Much more emphasis has been placed in recent years upon advanced courses in physical and organic chemistry, kinetics, thermodynamics, colloids, catalysis, chemical engineering design and practice - with accompanying research problems. However, the effort has been made to keep the fundamental courses of general and analytical chemistry of such a nature as to be most helpful to the training of engineers, which has been Lehigh's chief aim throughout the years.

Student Chemical Society

"In the first year of Professor Chandler's administration, 1871, the Chemical Society of the Lehigh University was founded and has been active continuously in a highly successful career for seventy years." This statement by Dr. H. M. Ullmann is but a modest summary of one of the factors chiefly responsible for the esprit de corps in the Department. It is one of the pioneer student chemical societies in America. Besides fostering the scientific spirit by bringing distinguished scientists to speak
at meetings, and in the earlier years financing trips to distant points for the collection of museum specimens, the Society has been an important social function to students and staff. Its annual Christmas party assembles some three hundred members and guests to a grand banquet. Chief sponsor for this event is Professor A. A. Diefenderfer.

**Fellowships**

Various industrial fellowships have been established to foster research and provide funds for graduate students. These have included researches on silk, leather, drying oils, resins, carbon black, chromium compounds, paint, etc.

Unique among research fellowships is a plan inaugurated in 1927 by the Class of 1930 (freshmen) to donate refunds of laboratory deposits toward the establishment of research fellowships for Lehigh graduates. This fund has grown to well over $20,000 and is a lasting tribute to the spirit of Lehigh students. Recipients of these fellowships have done research in physical chemistry, organic chemistry and X-ray studies.

**Publications**

From the very first year of its establishment the Department has encouraged faculty publications of texts and contributions to the technical literature. Approximately three hundred and thirty publications have been produced covering a wide range of subjects. Nationally known texts have been published in the fields of chemical calculations, qualitative analysis and general chemistry experiments. For years also the English translation (by Professors Schober and Babasinian) of Gatterman's textbook for the organic chemistry laboratory was widely used. Well
known have become the researches of Dr. J. S. Long on the drying oils, the work of Dr. E. R. Theis in tanning technology, the vapor pressure studies of hydrates by Dr. W. W. Ewing and the colloid and plastic researches of Dr. H. A. Neville. Less known, though equally important studies of other staff members have resulted in important contributions to analytical, physical, and organic chemistry, X-ray analysis, chemical engineering, chemical education and history of chemistry.

Graduate Work

Lehigh University has encouraged a small group of graduate students for many years to pursue work for the Master's degree. In fact, the doctorate was established as far back as 1893 when Joseph W. Richards attained it. Dr. Richards distinguished career as a metallurgist and electrochemist proved that he merited this distinction of being Lehigh's first Ph.D. Another doctorate was granted in 1896 to Dr. H. E. Kiefer. Then for many years only the Master's degree was given until in 1937 the doctorate was re-established. The present number of graduate students total 29, 5 studying toward the Doctorate and 24 toward the Master's degree. Of this number 25 go forward in chemistry, while 4 are in chemical engineering. This is in contrast to the undergraduate students which number 315, of which 261 are in the curriculum of chemical engineering and 54 in the chemistry curriculum.

Graduates

An industrial organization is known by its products. Similarly a University is known by its graduates. As the college president is reported to have said, "We guarantee the product
AMERICA'S PIONEER PRESS AGENT FOR ALUMINUM—J. W. RICHARDS

A CHEMIST OF THE CLASS OF '86
LEHIGH'S FIRST PH.D.

Lehigh graduates - and those who didn't - are to be found in many prominent positions. A roster of these is impossible here, but such a list would include men prominent in the production of steel, coal, oil, paint, linoleum, drugs, arms and ammunition, fertilizers and many allied chemical fields as well as in academic positions.

Acknowledgment

This paper is but part of a longer report being prepared by the author in connection with the seventy-fifth anniversary of the University. The author is indebted to many alumni and members of the University staff for information. To Professor Emeritus, Dr. H. M. Ullmann, he is indebted for important details of the long period 1894 to 1938, during which time Dr. Ullmann was actively engaged on the campus.

To another personage belongs much credit for inspiring an interest in the early activities of the Department. This was Mr. Henry C. Huettig, who for 57 years was a member of the Department, a faithful stockroom keeper and lecture assistant. No Lehigh man since 1878 failed to know Henry. To him books and poems were dedicated in spite of the fact that he often "ruled the roost" with a stern hand. As this is being written word comes that he has just passed away, on September 2, 1941.
CHARLES MAYER WETHERILL (1825-1871)
Lehigh's First Professor of Chemistry

Ever since the founding of Lehigh University the Department of Chemistry has been a potent factor in its development. The choice for the first occupant of the Chair of Chemistry was Charles Mayer Wetherill, Ph.D., M.D., appointed in 1866 by President Henry Coppee. Though but five years of Dr. Wetherill's life were spent on the Lehigh Campus it is certain that his influence started the growth of one of Lehigh's largest departments.

Local records are meager in the facts of these earliest days. The Alumni Directory and Drinker's History of Lehigh each contribute one line to the hasty inquirer about Lehigh's first chemist. But the name of Wetherill is one of the oldest in our nearby City of Brotherly Love, and so to Philadelphia and Wetherill's Alma Mater, the University of Pennsylvania, we go for our information.

One of Penn's greatest alumni the renowned Edgar Fahs Smith, Professor of Chemistry and later Provost, wrote an illuminating biography of our Dr. Wetherill. This seventy page tribute establishes Wetherill as one of the outstanding American chemists of his day. From this series of articles which appeared in 1929 (posthumously arranged by Dr. C. A. Browne, after Smith's death) in the Journal of Chemical Education, the writer has abstracted freely.

Ever since 1682 when Christopher Wetherill emigrated from England to this country we find the Wetherill influence. The name is associated with the first manufacture of cloth in Philadelphia. A Wetherill was such a staunch supporter of Washington's cause that he (Samuel W. 1736-1816) was expelled from the Society of Friends and later founded the Society of Free Quakers. This same ancestor
manufactured drugs and chemicals and was the first manufacturer of white lead in America. Through several generations the name was associated - and still is - with the scientific production of paints and pigments.

From this lineage came Charles Mayer Wetherill, son of Charles Wetherill and Margaretta Mayer - the eldest of five children. His schooling was done in private schools of Philadelphia where he excelled in languages. At the age of sixteen he began his studies at the University of Pennsylvania where he received first honors in the Class of 1845. His friendship with able Professors such as A. D. Bache and John F. Frazer determined his future career in chemistry. Professor Bache later became Superintendent of the U. S. Coast Survey and was a source of help and inspiration to Wetherill on many occasions.

Graduating with Charles Wetherill were his cousin Samuel Wetherill and Samuel G. Rosengarten, men whose names became renowned in several fields of scientific endeavor. Samuel Wetherill came to Bethlehem and manufactured the first zinc oxide made in the United States. Rosengarten became a manufacturing chemist and carried on in the well known firm founded by his father. The firm Rosengarten and Company continued from 1823 to 1927 when it merged with Merck and Company.

Wetherill went from Penn to the practical analytical laboratory of J. C. Booth and M. H. Boye in Philadelphia. A year later he set out for foreign study in Paris where he worked with Pelouze and attended lectures by the famous chemists Gay-Lussac, Dumas, and Regnault. In 1847 he went to Germany and continued his researches for the doctorate under the celebrated Dr. Justus Liebig.
at the University of Giessen. The young student was able to publish three papers in the field of organic chemistry from his European researches. Liebig characterized his work as accomplished with "remarkable industry and enthusiasm."

In addition to enlarging his scientific knowledge and experience Wetherill formed lifelong friendships with two American students who became famous professors of chemistry – Dr. R. Ogden Doremus and Dr. Wolcott Gibbs.

Back in his native City of Philadelphia Wetherill opened a laboratory and school for instruction in chemistry in 1849. Here for four years he performed sundry analyses, published papers and delivered regular series of lectures before the Franklin Institute. Offers came to fill various positions. In 1850 he was offered the position of U. S. Assayer for California at a salary of $5000, but for some reason Wetherill refused. Honors also came. In 1851 he was elected to the American Philosophical Society and in 1853 he received the honorary degree of Doctor of Medicine from the New York Medical College. This latter came as a result of Wetherill's interest in foods, drugs, etc. His most important contribution to medical chemistry was a paper written in 1855, "On Adipocire and Its Formation." It attracted wide interest and added to his prestige.

In 1853 Wetherill closed his laboratory to accept an appointment from his uncle, John Price Wetherill. He was to act as mineralogist and chemist in charge of collecting samples of Pennsylvania minerals to be displayed at the Crystal Palace Exposition in New York in 1854. This was the first international exposition held in the United States. Wetherill collected not merely specimens
but facts and figures concerning the early industrial operations in our State. This widened his interests and one year later we find him travelling far into the West to study the copper works of the Lake Superior district, and the lead districts of Wisconsin, Illinois and Iowa. He also visited and studied the Indians of Minnesota and Dakota (Chippewas, Winnebagos and Sioux.) An account of these travels was published in German, but there remains no English account.

By 1865 Wetherill was seeking a permanent professorship. An offer to come to the College of Physicians and Surgeons in New York was declined because of the poor remuneration entailed. His career turned westward to the home town of a young lady whom he had met the year before. In 1857 Dr. Wetherill married Miss Mary C. Benbridge of Lafayette, Indiana. Failing temporarily in acquiring an academic post he turned again to analytical work and to problems of sanitation and illumination. He was a crusader for improvements in milk and water supply. He wrote his longest treatise - a book entitled "The Manufacture of Vinegar," which remained a standard in its field for years.

In 1861 with the outbreak of the war Wetherill turned his eyes east for a position. The new Department of Agriculture was being formed and Wetherill became its first chemist. The salary was but $1600 per year, but there were great opportunities for service.

Shortly after his arrival in Washington he was detailed by President Lincoln to do special work for the Army on a study of a new type of gunpowder. This required his leave of absence for months at a time in Philadelphia. Friction arose between him and his superior Commissioner Isaac Newton of the Department of Agricul-
ture. Newton thought Wetherill neglected his official duties and ousted him without pay. A Congressional Committee exonerated Wetherill and voted him his back salary. The result, however, was a transfer of Dr. Wetherill to a more desirable post in the Smithsonian Institute with his friend Dr. Joseph Henry. Here he stayed for two years doing various researches. His most elaborate research was a study of the warming and ventilating of the National Capitol.

Wetherill made a thorough investigation of his problem with a resultant ninety page report. (Executive Document No. 100 of the House of Representatives, 39th Congress). Dr. Smith describes it as "work conducted with such thoroughness and attention to detail that it ranked for many years as the most authoritative and comprehensive chemical treatise upon the ventilation of public buildings." He showed that the average of 4.5 volumes of carbonic acid per 10,000 volumes of air was far superior to that of public buildings in Europe. He criticized the low humidity and suggested humidifiers.

Wetherill's interest in the varying composition of the atmosphere and his suggested analyses for different sections of the United States was interrupted by his acceptance of the Chair of Chemistry at the newly formed Lehigh University.

Dr. Wetherill's acceptance of a Chair at Lehigh was literally just about that. But there was promise and opportunity, a challenge to help the handful of professors and students under Dr. Henry Coppee to found a great University. The Professor's salary for the first year was $2400. A house was to be built as soon as practicable - rent free. His laboratory was to be in Christmas
Hall. The apparatus and specimens for demonstration were brought by Wetherill - boxes of them collected from all corners of the country and abroad. Some specimens and glassware of Wetherill's are still to be found in the condensed chemical museum - carefully preserved by his successors - Chandler and Ullmann.

That Dr. Wetherill was ambitious for his small department is proven by his printing of "A Syllabus of Lectures on Chemical Physics for the First Class of Lehigh University, September 3, 1866. Printed at Allentown, 1867." In 1868 his "Lecture Notes of Chemistry" appeared. This latter was a text of 112 pages, an outline of material which the Professor developed by experiments, demonstrations and specimens. The introductory page of his early text is interesting because it shows the reverent attitude of our first professors.

Lecture I

Introduction

Simplest Expression of all Human Knowledge

Souls

Matter GOD Force

Homo Minister et Interpres Natura

Relation of Souls, Matter and Force, and their dependence upon God, expressed by the diagram of a triangle.

(a) At the apex, Soul, with its attributes of mind, responsibility to the Creator, and relation to other souls, to Matter and to Force, constituting Man.

(b) At one angle of the base, Matter.

(c) At the remaining angle, Force.
The whole dependent upon the will of the Almighty.

Indestructibility of (a), (b), (c).

(a) Souls are indestructible; but capable of changing condition.

(b) Matter also indestructible and changing condition. Explain.

The chemistry courses which were introduced at Lehigh were considered to be the most complete of any offered at the time in this country. In addition to courses offered to Civil Engineers, Mechanical Engineers and Mining and Metallurgical students there was a complete curriculum for the School of Analytical Chemistry. The courses listed for this course were as follows:

Junior Schoolmen

Qualitative Analysis - (Fresenius), English translation. Use of the blowpipe (Plattner). Use of the spectroscope. General Chemistry (Miller's Inorganic). Lectures by the Professor and constant practice in the Laboratory.

Physics - Lectures on Chemical Physics.

Senior Schoolmen


By 1867 Wetherill obtained an assistant, Mr. S. P. Sharples, from his friend Dr. Wolcott Gibbs of the Lawrence Scientific School.
That year he was able to publish a research on the interesting mineral Itacolumite (articulite) in the American Journal of Science. There followed other papers under his own hand or by his students. It is interesting to see the paper designated as No. 1 Contribution from the Department of Chemistry of Lehigh University. The writer has counted approximately forty papers published by Wetherill. Doubtless there were others. It was while writing a scientific paper on Sunday morning, March 5, 1871 before going to church that Dr. Wetherill was overtaken by a heart attack and died quietly in his study.

Thus passed Lehigh's first Professor of Chemistry in his prime. His career had been varied by wide contacts, friendships and travel. He was an eminent lecturer, author, and consultant. One of his students Dr. Samuel P. Sadtler later became an eminent chemist and teacher. He carried the torch to Dr. Edgar Fahs Smith, a forementioned biographer of Wetherill, and inspired him to take our Dr. Wetherill as the theme for his last work.

At Wetherill's funeral in Philadelphia the entire Class of 1871 attended. The last member of this class to survive was Dr. Henry Sturgis Drinker, our former President. He wrote that "Wetherill was a good teacher, much liked by his students, and a gentlemen." Another pupil wrote:

"He was one of those 'golden natures' who help us form ideals of life."
"Billy" Chandler the strong man of chemistry from 1871 to 1906 was one of the dominant campus figures of that era. Builder of the Chemical Laboratory (1884) which bears his name, Director of the Library from 1879, he was also acting President of the University during 1895 and 1904-05. His fame and influence, when coupled with that of his illustrious brother Dr. C. F. Chandler of Columbia, spread to international spheres. Much of the impetus acquired by the present Lehigh Department of Chemistry dates from the pioneer work of our Doctor Chandler.

The Chandlers, of New England stock, trace descendants to English settlers of 1637 in Massachusetts. William Henry was born in New Bedford on December 13, 1841. His father Charles Chandler (merchant), was of a botanical bent, and often took his sons for walks in the study of nature. This influence, together with early impressions of hearing lectures by Louis Agassiz, turned the Chandler boys to science. When older brother Charles took up the study of chemistry William followed suit. William Chandler was graduated from Union College in 1862. Then followed five years of practical experience, as chemist with the copper works at New Bedford until 1864 and from 1864-7 with the Swan Island Guano Company.

In 1867 the Chandler brothers were reunited at Columbia. Charles had been a teacher at Union College, when William was a student there. Now they were both on the staff. It was during this period 1867-71, while William was working for his A.M. degree and also teaching, that the brothers began an important literature venture.

The Chandlers saw the need for an American chemical journal.
The American reprint of the English "Chemical News" had been discontinued, and the Chandlers began publishing "The American Chemist" — forerunner of present publications of the American Chemical Society. Its scope as outlined in the first issue was "devoted to Theoretical, Analytical, and Technical Chemistry" and it was successfully published through seven volumes until April, 1877. The editors were busy men who combined lecturing, investigation, writing, and travel.

During this period William Chandler was called to Bethlehem to the chair of chemistry at Lehigh University in 1871. This vacancy arose upon the death of Lehigh's first professor of chemistry Dr. Charles Mayer Wetherill. Here while Lehigh was making strides as a rising technical institution Chandler continued his long career as chemist, librarian and author. (In 1872 he received the Ph.D. degree from Hamilton College).

Two years after coming to Bethlehem Dr. William Chandler married Mary Elizabeth Sayre in 1873. In 1878 he became Director of the new Library, erected by Asa Packer in honor of his daughter Mrs. Lucy Packer Linderman. Here with a liberal endowment he was in a position to purchase fine books and build up the second largest college library in Pennsylvania. While most complete in engineering and technical works it also boasts rare editions in literary fields, such for example as our first editions of Shakespeare.

Perhaps the greatest work which "Billy" Chandler performed at Lehigh was the erection in 1884-85, of the unique laboratory which bears his name. Built of native sandstone, it was originally designed to house departments of chemistry, metallurgy, and mineralogy. His careful plans included adequate ventilation through immense chimneys, maximum lighting (by gas and by God), a system of speaking tubes for
South Side
Wm. H. Chandler Chemistry Laboratory (1925)
Showing West Wing Constructed in 1922

North Side
Wm. H. Chandler Chemistry Laboratory (1925)
communication, centralized stockrooms, a large lecture room well arranged for visibility, and well-equipped laboratories. He also included a chemical museum, and it was one of his happy tasks to add continually new specimens for his boys. The building cost $200,000, a huge sum for the times, and was the best laboratory of its day. That "Billy" was proud and careful of his building is attested by a humorous note in The Epitome for 1887. "Students wishing to take friends through the laboratory must make a deposit of fifty cents with Professor Chandler, to provide for wear upon the building."

Not the least of "Billy" Chandler's abilities was his prowess as a master of exposition and demonstration in his general chemistry lectures. In this he was ably assisted by Henry C. Huettig, whose connection with Lehigh is perhaps longer than any living man. For over fifty years Henry was stock room man and lecture assistant.

In his later years Chandler undertook the monumental task of editing an encyclopedia. It was a three-volume edition of 1,700 pages, with many diagrams and colored maps. There were four assistant editors and many experts handling special fields, but Chandler was Editor-in-Chief, and himself contributed the material for twelve major fields of information. All this while he did, or directed, work of investigation for surrounding industries - zinc, iron, coal and cement.

The combined teaching activities of the Chandlers cover some 80 years of influence touching directly perhaps 40,000 students. The indirect influence through their writings and through students of their students can never be completely evaluated.
THE PERIOD 1894-1938

by HARRY M. ULLMANN, PH.D.

My earliest information about Lehigh and its Department of Chemistry was conveyed by Paul J. Dashiell, a fellow graduate student at Johns Hopkins who was teaching the organic chemistry at Lehigh. Dashiell visited the Hopkins Laboratory with a left ear partly torn off, earned in playing football for the Lehigh team, which, like the baseball team, was uniformly triumphant under his native athletic prowess. Athletic rules, even in those days, required that participants in games must be students. So, as the teacher in one of the most important subjects he had to qualify as a student by taking an undergraduate course, which he did by enrolling in two weeks of instruction in photography. Dashiell was prominent later as coach at the Naval Academy where he was Professor in charge of Chemistry. Dashiell returned to Hopkins to complete his doctorate study and was succeeded as teacher of organic chemistry by William B. Schober, who had attained to his doctorate at that institution. Dr. Schober advanced to the Professorship of Organic Chemistry and Head of the Department from 1907-1914 when he retired because of ill health. Professor Schober was later succeeded as Head by Professor Harry M. Ullmann who had taken his doctorate in the group with Schober in 1892. When Michael D. Sohon, A.C. '90, resigned his position here as Instructor in Quantitative Analysis to pursue graduate study at Johns Hopkins, Schober proposed the name of Ullmann to Professor William H. Chandler. The recommendation was considered favorably and another teacher of the Hopkins tradition was inducted into the chemistry corps.
In 1894 when I came here the department had been housed for 10 years in the central section of the present building, omitting the end T's on the east and west. The dimensions were 219 feet in length by 44 feet in width, with a wing to the south occupied by the Metallurgical Department.

In the Register of the founding year, 1866, and for many years thereafter the department was called School of Analytical Chemistry, and the degree given graduates was Analytical Chemist, A.C. In the Register for 1872-73 title of the curriculum was changed to Course in Chemistry, with the degree still A.C. in accord with the preponderant approach to chemistry, which was mainly on the side of chemical analysis. Later, it was permitted to change these degrees of A.C. to B.S. in Chemistry when desired, on application to the University.

In the first year of Professor Chandler's administration, 1871, The Chemical Society of The Lehigh University was founded and has been active continuously in a highly successful career for seventy years. It admitted, according to its statement, "by election," students from all departments of the University, and sponsored a reading room well supplied with scientific periodicals, including eighteen of the principal English and American journals. The Society met weekly for literary exercises. Notable speakers were invited. Among the honorary members of the society were more than sixty of the most distinguished scientists of Europe and the United States. (See University Register for '72-'73, page 26). In 1874 the title of the society was expanded to "The Chemical and Natural History Society of the Lehigh University." This permitted the choice of speakers on topics in sciences other than chemistry. At that time was written, "The Collections of Chemical
Preparations and of Botanical and Zoological Specimens," belonging to the society. During the past year parties have been sent to Texas and Brazil to collect specimens for these cabinets. (Reference to specimen cases in the Packer Hall Museum). This society did much to make Lehigh and the Department of Chemistry widely known. The Register for 1874-75, page 31, states that, "Among the honorary members of the society are more than one hundred of the most distinguished scientists in Europe and the United States."

The same Register felt justified in the statement, page 21, "The chemical laboratories and lecture room of the Lehigh University are not surpassed in excellence by any similar establishment in the United States, being supplied with all modern improvements. The collection of specimens, apparatus and models illustrating general and applied chemistry, are already important and rapidly increasing."

As time went on and the number of students increased, Qualitative and Quantitative Analysis were moved out of Packer Hall and into a barn that had been fitted up, located just about where the present Mining Building is. It is reported that this barn was convenient to the brewery building that is now Price Hall, and it has even been said on the authority of good old Henry Huettig that occasionally beer found its way surreptitiously into the laboratory.

In 1894 when I joined the staff here there were 499 students enrolled in the University, and of this number 41 were in the Course in Chemistry. The subjects listed were 10, — Theoretical Chemistry, Analytical Chemistry, Gas Analysis, Assaying, Organic Chemistry, Industrial Chemistry, Toxicology, Sanitary Chemistry, Photographic Chemistry, and Microscopy. Today there are 87, many of them closely related. Of the subjects in '94, I taught Analytical Chemistry on
the Quantitative side, Gas Analysis, and Sanitary Chemistry. The
other teachers in addition to Professor Chandler at that time were
Frederick W. Spanutius, M.S. in Qualitative Analysis and Assaying,
and W. B. Schober, Ph.D. in Organic and Theoretical Chemistry.

In 1895 I obtained an Assistant, Nathaniel Thurlow, who had
graduated in the previous year. The following year student enroll­
ment dropped, a probable sequence of the panic of '95, and Mr. Thurlow
left us for research on synthetic camphor at Buffalo. This experience
made him valuable to Dr. Baekeland whose assistant he was in the dis­
covery of Bakelite, first of synthetic plastics. The department staff
was again increased by one assistant in 1900, whose main duties again
lay in the teaching of Quantitative Analysis. This was William
Gummere, who remained with us two years and then joined the forces
of John A. Roebling's Sons Company and rose through the positions of
chemist and metallurgist to high executive duties with that company.

Among the earliest assistants, and two who have continued
with the University to the present day, are Alpha A. Diefenderfer who
joined in 1902 and George C. Beck who came to us in 1904 from the
laboratory of the New Jersey Zinc Company. Dief. is still with us
as Professor and George is his assiduous and faithful Assistant Prof­
essor. Together these men have upheld serious and strict discipline,
admixed with personal hard work and helpfulness at the student's
elbow. Professor Diefenderfer's great joy of the year, in which he
glories, is the annual Christmas Dinner of the Chemical Society. All
details, food, songs, play, and presents have been developed and are
supervised by Dief. The cheer of this dinner of students, teachers
and guests has repeatedly moved Dean Max McConn to voice the opinion
that the Department of Chemistry and Chemical Engineering at Lehigh
evinced the greatest esprit de corps that he had ever known of anywhere. Undoubtedly a system of teacher advisers and student advisees, meeting weekly, had much to do with promoting this happy and understanding association.

In 1903 Dr. Thomas M. Drown, previously at M.I.T., was President of the University. Massachusetts Tech. had instituted a curriculum in Chemical Engineering and with the permission of Professor Chandler and on consultation with Dr. Drown a curriculum was laid out by me for Lehigh. It was Dr. Drown's opinion that the arrangement at M.I.T. was in his time too strong in Mechanical Engineering and rather weak in Chemistry. As laid out here at Lehigh, "In this course the training is essentially chemical and the graduates are primarily chemists with a good knowledge of Mechanical Engineering." Since that time, both at M.I.T. and at Lehigh as the field became more specialized the main stress has been placed on the engineering of machines and industrial apparatus adapted to large-scale chemical processes and operations, and instruction is arranged toward carrying manufacturing operations from the laboratory findings into large scale production.

Increase in students and in the importance of manufacturing demanded a full-time teacher in these industrial applications. The first teacher of professorial status was Samuel H. Salisbury, Assistant Professor 1912-17, who resigned to join M.I.T. as chief of their intensive instruction in chemical engineering as exemplified in the cement industry at the plant of the Atlas Portland Cement Co. He was succeeded by Dale S. Chamberlin who came to us from the coke, gas and by-products industry and since leaving us is developing the manufacture and sales of textile oils. During the incumbency of Associate Professor Chamberlin the title of the course as the engineering content
grew was changed to Chemical Engineering. In 1928 appointment was
made of Charles W. Simmons who had a varied valuable experience. He
is still in charge of this most important and interesting field of
engineering. With his graduate students he has developed important
phases of evaporation and condensation. A spirited assistant was
Dr. Harry B. Osborn, Jr., now Research and Development Engineer in
inductive heating with Tocco, the Ohio Crankshaft Company.

In the year 1903-04 I obtained permission from Prof. Chandler
to inaugurate a course in Physical Chemistry for seniors. This impor­
tant branch had its first special Instructor allotted in the person
of Dr. D. J. McAdam, who has since done notable work in metallography
and the fatigue of metals at the Annapolis Laboratory of the U. S. Navy.
McAdam was followed in Physical Chemistry by Dr. J. Hunt Wilson, who
after 6 years joined Lafayette and is now head of the Department of
Chemistry at that institution. Since Dr. Wilson's resignation the
study of Physical Chemistry has been under the charge of Dr. Warren
W. Ewing (Chicago). Dr. Ewing is known primarily for his outstanding
work in hydrates, and he has incidentally carried forward work on zinc
pigments. He was assisted for seven years by R. J. DeGray who resigned
to join the Brooklyn, N. Y. Research Laboratory of Socony-Vacuum Oil
Company. DeGray was followed here by Hilton A. Smith, Ph.D. (Harvard)
who is carrying forward important work in the kinetics of gas reactions
and of esterifications and is in charge of graduate instruction in
Kinetics. Dr. Thomas H. Hazlehurst, Jr. (Hopkins) has the graduate
instruction in Thermodynamics and is developing some aspects of surface
phenomena.

After Professor Chandler died in November, 1906, Dr. Schober
was made Professor and Dr. Vahan S. Babasinian took over the course
in Organic Chemistry. Organic Chemistry Laboratory, required of junior students, had at that time an attendance of six. The original organic chemistry laboratory had desk room for a maximum of 12 students. Today there are always something like 65 juniors in Chemistry and Chemical Engineering, augmented by 10 or 15 students interested in Organic Chemistry from other curricula. Judson G. Smull was added to the Organic Chemistry staff as numbers increased and is continuing as Assistant Professor. Dr. Babasinian died in May, 1939, after 33 years of valiant, kindly service, and Drs. Schultz and Amstutz joined the organic staff.

Professor Schober was compelled to withdraw from the department because of ill health in 1914, and Dr. H. M. Ullmann assumed the headship. After the period of the war with its many exemplifications of the scope of chemistry in war and in peace, there arose a greatly enhanced interest in chemistry and its industrial applications, with a corresponding increase in the election of that subject by college students. Industry too awoke to the need of more chemistry research. Fellowships were established here by E. I. du Pont de Nemours & Co.; also by Rohm and Haas Co. By 1921 the eastern wing of the laboratory, 60' x 37', was ready for occupancy. The increased numbers of students had risen from 52 in 1910 to 175 in 1920.

Dr. H. S. Drinker resigned the Presidency in 1923 to become President Emeritus and Honorary Trustee, and was succeeded by Dr. Charles Russ Richards who brought forward the Lehigh Institute of Research toward the development of graduate study and research. In this connection an interesting and unique development of research spirit was manifested by freshman students in chemistry subjects. Under the leadership of Stanley B. Adams, Met. E., '29, they embraced his idea
of allotting deposit residues in chemistry laboratory deposits to a fund for furtherance of graduate research in chemistry by a Lehigh student. As officially stated in the Register: "In the spring of 1927 members of the Class of 1930 (freshmen) established the Student Chemistry Foundation in honor of Harry M. Ullmann, Head of the Department of Chemistry. This fund provides two research fellowships for Lehigh University graduates only, carrying an annual stipend of $750 each." Subsequent freshman classes have contributed to the fund which now amounts to a sum of $21,000. In establishing and administering the fund Mr. Adams was ably assisted by Professor H. V. Anderson, Ch.E. (Mich.) who had joined the department in 1918 and Professor J. S. Long, Chem. Eng. '14, who took up teaching here after graduation, later went away on leave for his Ph.D. study, and severed his teaching connection in 1934 to become Chemical Director of Devoe and Raynolds Co. Professor Anderson has continued his interest in freshmen and has the responsibility for X-ray instruction and research for graduate students.

Under the Institute of Research new and additional industrial fellowships were sponsored in varied fields. Under Professor J. S. Long, several fellowships for research in drying oils in which study he was preeminent were obtained:—The Archer-Daniels-Midland Co. and the Wm. O. Goodrich Co. Research Fellowships (3), the Raybestos-Manhattan Co., now continued under Professor C. W. Simmons, Professor of Chemical Engineering. Since Dr. Long has become associated with Devoe and Raynolds Co. the department has had their fellowship and one assistantship in certain industrial applications of colloid chemistry, directed by Professor H. A. Neville.

Professor Dale S. Chamberlin, 1917-1930, attracted and supervised fellowships of The Columbian Carbon Co. on carbon black and of
the R. K. Laros Silk Company on silk and the fabrication of silk
textiles. Under Dr. E. R. Theis, who joined the department in 1927
as Assistant Professor of Chemical Engineering, and who has specialized
in tanning, fellowships from the following companies have been attracted:
Barrett Leather Co., Hunt Rankin Leather Co., Seton Leather Co.,
of America, Corn Products Refining Co.

Professor C. W. Simmons in addition to the Raybestos-Manhattan Company's fellowship carried the fellowship of Stroock and
Wittenberg.

A fellowship of the Textile Foundation under the U. S. Department
of Commerce was held for a period of years throughout the existence
of these fellowships under the Foundation.

The William L. Heim Research Fellowship was established by
William L. Heim, '02 toward research in X-rays, directed by Professor
Anderson.

Four annual prizes, the William H. Chandler prizes in
Chemistry of $25 each were established in 1920 by the gift of Mrs.
Mary E. Chandler of Bethlehem, widow of Professor William H. Chandler.
These prizes have been a source of keen stimulation toward excellence
in studies.

With increase in the number of undergraduates attached to
curricula in the department and with the institution of a distinct
Graduate School under President C. C. Williams, 1935 - the number of
students had again grown beyond the capacity of the laboratory. In
1938 the east wing was completed, largely from donations by Alumni.
The Trustees have named this wing the HARRY M. ULLMANN CHEMISTRY
LABORATORY "in recognition of his service as head of the Chemistry
Provision was made in the exceptionally high ground floor for added facilities in Chemical Engineering, in which field Lehigh had been one of the institutions accredited by the American Institute of Chemical Engineers since 1932. Special individual research laboratories for graduate study were installed.

Provision was also made for a modern laboratory for instruction of the University’s freshmen. In the foregoing resume adequate attention to the Department’s instruction of the University’s freshmen has not been arranged. This has always been the special charge of the head of the department with the pleasant duty of making the freshman lectures more interesting and of increased educational content. In recent years he has been assisted by Professor Robert D. Billinger, who has also made some of the demonstrations of value in his visits to preparatory schools in attracting some of their best college material to Lehigh.

With the completion of the wing named in his honor, Dr. Ullmann had come to the retiring age and was continued as Professor Emeritus. The position of Head of the Chemistry and Chemical Engineering Department was filled by the appointment of Dr. Harvey A. Neville who had been a most valued member of the department since 1927.

At the present writing there are 6 Professors, 2 Associate Professors, 6 Assistant Professors, 2 Instructors, 5 Assistants. Dr. C. A. Buck, ’87 is Lecturer on Procurement of Raw Materials.

The total of students in curricula of the department is 315. Of this number 261 are in the Curriculum of Chemical Engineering and 54 are in the Chemistry Curriculum. Graduate students total 29, 5 studying toward the Doctorate and 24 toward the Master's Degree; 25
going forward in chemistry and 4 in chemical engineering.

Honorable mention should be given to a gentleman whose term of service as lecture assistant and stockroom supervisor is probably an academic record. Henry Cornelius Huettig is the man who for some 55 years "ruled the roost" in this capacity. Known to thousands of students as "Henry" his fame has become so much a classic that books and poems have been dedicated to him. In his early years Henry entered into the pranks and confidences of the students so heartily that returning alumni would seek him to reminisce about the bygone days. He was a guide to both staff and students, and a faithful servant of the University from 1883 to 1938. Succeeding Henry is his capable grandson John H. Schumacher whose abilities are confined to the increased work of business manager for the stockroom.

Left to right—
1st row—Prof. H. V. Anderson, Dr. E. R. Theis, Dr. V. S. Babasinian, Dr. H. M. Ullmann, Prof. A. A. Diefender, Dr. H. A. Neville, Dr. W. E. Ewing.
2nd row—Prof. G. C. Beck, Mr. J. G. Smull, Mr. J. N. Roper, Mr. A. K. Long, Dr. R. D. Billinger, Dr. T. H. Hazlehurst.
3rd row—Mr. R. J. DeGray, Prof. C. W. Simmons, Mr. H. B. Osborn.

DEPARTMENTAL STAFF
(1935)
Henry C. Huettig
Lecture Assistant and Stock Room Keeper for 57 years.
(Deceased Sept. 2, 1941).

John H. Schumacher
Stock Room Manager (1938- )
Grandson of Henry C. Huettig
James Scott Long, Ch.E., M.S., Ph.D.

Prominent alumnus ('14); member of staff from 1914 to 1934; Author of several texts and numerous research papers on paint and drying oils (see bibliography list).

Technical Director of Devoe and Raynolds Co., Inc., and donor of several industrial fellowships.
The members of the Lehigh Valley Section and his many other friends were shocked to hear of the death of Professor Vahan S. Babasinian, on May 24, 1939. Death came after a brief illness, and was due to pneumonia.

Professor Babasinian was the son of the Rev. and Mrs. S. H. Babasinian, and was born November 28, 1876 in Marsovan, Asia Minor. He received the A. B. degree from Anatolia College, in Turkey in 1895. Some few years after the A. B. degree was received, he, with other younger men came to America, all on the quest of more learning. Professor Babasinian had completed a course in Theology at Hartford Theological Seminary, and was preaching in a Congregational Church in Providence, Rhode Island for some time, when the scientific urge drew him away from this first calling. He matriculated at Brown University where he received the A. M. degree in 1903 and Ph.D. in 1906. From 1903 to 1906, he served as an instructor in Chemistry at Brown. It was at this time that he first heard of Lehigh University through Dr. J. A. Bucher, a Lehigh graduate, and at that time a research professor of Chemistry at Brown.

Dr. Babasinian came to Lehigh University in 1906, and received the full professorship in 1922. He was always regarded as one of the ablest and best lecturers on the Lehigh campus. His advice and counsel were eagerly sought by his colleagues and students, who had all learned that he gave advice only after thorough and careful consideration.

Professor Babasinian gave considerable time to research on the derivatives of thiophene; and he was on sabbatical leave from his duties at the University, was preparing a Monograph on Thiophene Chemistry, and had hoped to have it completed in September. A literary executor has been appointed to complete this important work for publication, so that the results of many years of intensive work may not be lost to the scientific world.

Dr. Babasinian was active in the organization of a chapter of the Society of Sigma Xi at Lehigh University and was the first president of the Lehigh chapter.

As a member of the Tau Beta Pi honorary society, his counsel and advice were eagerly sought by the members of this society. He was a member of the American Association for the Advancement of Science, and the American Association of University Professors.

Along with his life work as a teacher of Organic Chemistry, Dr. Babasinian found time to organize the Association of Armenian Students in America with headquarters in Philadelphia.

Dr. Babasinian's home was in Fresno, California. During the summer vacations, he hiked around the immense lakes and mountains of the High Sierras, averaging several hundred miles every summer.

In the summer of 1909, he was a member of the Summer School faculty of the University of California. During the World War, Dr. Babasinian enlisted in the Chemical Warfare Service and was stationed at the American University, Washington, D.C. He made many new acquaintances with many prominent men of Science and Industry, during this period. This resulted in an important research on Indanthrene Vat Dyes, with the issue of a patent on the subject, and assigned to the duPont Company. He returned to Lehigh University in 1919.

He was intensely interested in music, and was a regular attendant at the Bach festival, given at Lehigh every year.

The Section mourns deeply the loss of this reserved, kind, gentle man, this student of literature, and music, naturalist, scientist, and teacher, one who proved a true friend to scores of students, to colleagues, and to many others throughout the country.

By JUDSON G. SMULL.
INSTRUCTIONAL STAFF

(Note: This list was taken from University Registers and the Lehigh Alumni Directory, 1937).

AMSTUTZ, Edw. D., B.S., M.S., Ph.D., Instr. in Chem. '38-'41, Asst. Prof. '41.

ANDERSON, Harold V., B.Ch.E. (Univ. of Mich. '12) M.S. '25, Instr. in Chem. '13-'21, Asst. Prof. '21-30, Assoc. Prof. '30-41, Prof. '41-.


BABASINIAN, Vahan S., A.B. (Anatolia Col. '95), A.M. (Brown Univ. '03), Ph. D. '06, Instr. in Chem. '06-'09, Asst. Prof. '09-'11, Assoc. Prof. Organic Chem., '11-'22, Prof. '22-'39.

BAILEY, Edgar H. S., Ph.B., (Yale '73), Ph.D. (Ill. Welseyan Univ. '83), Instr. in Chem. '74-'83.

BAIRD, Julian W., M.A., Ph.D., Instr. in Chem., 1883-86.

BEATTIE, Frederick S., Ph.B. (Brown '06), Instr. in Chem. '06-'09, Asst. Prof. Org. Chem. Lowell Textile.

BECK, George C., A.C. '03, Asst. in Chem. '04-'05, Instr. '05-'13, Asst. Prof. Quant. Anal. '13-

BERKELEY, William N., B.S. (St. John's Col. '96), Ph.D. (Johns Hopkins '99), Instr. in Chem. '07-'08), Managing Dir. Yonkers Museum of Science & Arts.

BILLINGER, Robert D., Ch.E. '21, M.S. '25, Ph.D. (Univ. Cincinnati '29), Instr. in Chem. '23-'26, Asst. Prof. of Chem. '26-'39, Assoc. Prof. '39-

BLOOM, Edgar B., A.B. (Hiram Col. '23), M.S. (Ohio State Univ. 1926), Ph.D. Ohio State Univ. '28), Instr. in Chem. '23-'30.


BOYD, Harold G., Ch. E. '18, Instr. in Chem. '18-'20.

BROWN, Carlton E., Ch.E. '27, Asst. in Chem. '27-'30.

BUCH, Newton W., A.C. '01, Asst. in Chem. '01-'02, Instr. '03-'05, Instr. in Met. & Mineralogy, '07-'08, Instr. in Met. '08-'09, Amer. Cyan. Co., 30 Rockefeller Plaza, N. Y.
BUCK, Charles A., B.S. in Chem. '87, Eng.D., Lecturer on Procuremen of Raw Materials, '33-.


CALMAN, John W. J., S.D. (M.I.T. '03), Asst. in Chem. '05-'06.

CANTERO, Robert C., B.S. (Queen's Univ. '13), M.S. '20, M.A. (Univ. Toronto, '22), Ph.D. (Univ. of Cin. '26), Instr. in Chem. '22-'24, Asst. Prof. Chem. Eng., '26-'27, Asst. Prof. in Chem., Univ. of Cin., Assoc. Prof. Univ. of W. Va., deceased 1940.


CHANDLER, Wm. H., A.B., A.M. (Univ. Univ. '62, Columbia Univ. '71), Ph.D. (Hamilton Col. '72), Prof. of Chem. '71-'06, Dir. of Library, '73-'06, Acting Pres. ('04-'05). Died Nov. 23, 1906.

CLUTTER, Oswin R., Ph.B. (Grove City Col.) Asst. in Chem. Feb.-June, 1913, New Concord, O.


COBB, Philip H., A. B. (Bowdoin Col. '02) Ph.D. (Johns Hopkins '05) Asst. Prof. of Organic Chem., '18-'20, Assoc. Prof. of Research Chem., '20-'22, South Portland, Me.

COLEY, Albert L., Ph.B. (Columbia '31), Instr. in Chem., '33-'36.

CONGDON, Ernest Arnold, Ph.B. (Columbia '37), Instr. in Chem. '39-'91, Died April 6, '17.

CRESSY, Charles R., B.S. (Univ. of Minn. '98), Instr. in Indus. Eng. '10-'12.

DARBY, Edw. H., A.B. (Clark Univ. '14) A.M. (Clark Univ. '15), Ph.D. (Clark Univ. '17), Instr. in Chem. '18-'20.


DeGRAY, Richard J., Ch.E. '27, M.S. '23, Asst. in Chem. '23-'30, Instr. '30-'35, Diesel Engine Research Socony-Vacuum Co., Brooklyn, N.Y.
DIEFENDERFER, Alpha A., A.C. '02, M.S. '08, Asst. in Chem. '02-'03, Instr. '03-'12, Asst. Prof. '12-'17, Assoc. Prof. of Quant. Anal. & Assaying '17-'30, Prof. '30.


EDGAR, Arthur, B.S., '05, M.D. '08, Ph.D. (M.I.T. '12), Asst. in Chem. '05-'09, Died 1913.


EWING, Warren W., B.S. (Parsons Col. '12), M.S. (Univ. Chicago '15), Ph.D. (Univ. Chicago '20), Asst. Prof. of Physical Chem. '20-'28, Assoc. Prof. '28-'38, Prof. '38 -.


FORNOFF, F. J., A.B. (Illinois '36), M.S. (Ohio State '37), Ph.D. '39, Instr. in Chem. '40-.

FOX, Frederick, Jr., B.S. (M.I.T. '35), Ph.D. (Univ. of Leipzig '90), Instr. in Chem. '91-'92, Analyt. Chem., 77 State St., Portland, Me.


FREAR, Clyde L., B.S. (Syracuse Univ. '14), B.Sc. (Queen's Univ. Kingston, Ont. '16), Asst. in Chem. '16-'17, Instr. Sept.-Dec. '17, Chemist Merrell-Soule Co., Syracuse, N.Y.

GRAY, Archibald E., B.S. (Eureka Col. '22), M.S. (Univ. of Ill. '23), Ph.D. (Univ. of Ill. '25), Instr. in Chem. '26-'28.


HAUSER, Charles R., B.S., M.S., Ph.D., Inst. in Chem. '28-'29, Duke Univ., Durham, N. C.

HAWLEY, R.S., B.S. (Ch.E.), A.B., Asst. in Chem. '40-.

HAZLEHURST, Thos. H., A.B. (Col. of Charleston '23), Ph.D. (Johns-Hopkins '27) Instr. in Chem. '27-'30, Asst. Prof. '30-'39, Assoc. Prof. '39-.

HEIBERGER, Charles A., B.S. in Ch.E. '35, Asst. in Chem. '35-'38, Ph.D. '38.
HEINS, E., B.S. '39, M.S. '41, Asst. in Chem. '39-'41.

HITCHCOCK, Romyn, Instr. in Chem. '73-'74.


JOYCE, Asa W., B.S. (St. John's Col. '13) Ph.D. (Yale '16), Asst. in Chem. '13-'14, Chem. Foundation Inc., 85 Beaver St., N. Y. C.


KELLER, John C., B.S. (Colgate '21) Ph.D. (Cornell '26), Instr. in Chem. '26-'27.

KINGSBURY, Francis B., A.B. (Harvard '09) A.M. (Harvard '12), Ph.D. (Harvard '14), Asst. in Chem. '09-'10, Instr. in Physiological Chem., Univ. of Minnesota, Minneapolis, Minn.

KNAUSS, Calvin A., B.S. in Chem. (Muhlenberg '23), M.S. '25, Asst. in Chem. '26-'27, Nuodex Products, Inc.

LAKE, Charles N., Ph.D., Instr. in Chem., '86-'88.

LAKE, Dyer B., B.S. (Syracuse Univ. '09) M.S. (Syracuse Univ. '10) Ph.D. (Clark Univ. '16), Instr. in Chem. '16-'18.

LENOX, Lionel R., Ph.B. (Columbia '33), Instr. in Chem. '38-'91, d. 7/25/27.

LEVENDOR, H. S., B.S. (Chem. Eng.) '37, Asst. in Chem. '37-'41, Ph.D. '41, General Foods, Jersey City, N. J.


LONG, Austin K., B.S. in Ch.E. '34, M.S. '36, Grad. Asst. in Chem. '34-'35, Asst. '35-'36.

LONG, James S., Ch.E. '14, M.S. '15, Ph.D. (Johns-Hopkins '22), Asst. in Chem. '14-'15, Instr. '15-'17, Asst. Prof. of Inorg. Chem. '17-'20, Assoc. Prof. '20-'23, Prof. '23-'34, Devoe & Raynolds Co., Louisville, Ky.
LUNN, Edw. G., B.Sc. (Univ. of Chicago, '22), Ph.D. (Univ. of Calif. '26), Instr. in Chem. '26.


McADAM, Dunlop, J., Jr., A.B. (Wash. & Jefferson Col. '97), A.M. (Wash. & Jef. '00), M.S. (U. of P. '06), Ph.D. (U. of P. '38), Asst. in Chem. '07-'08, Instr. '08-'10, Metallurgist U.S. Naval Eng. Experiment Sta., Annapolis, Md.

McGUIRE, Charles H., B.S. (Clarkson Col. Tech. '10), Asst. in Chem. '10-'11, Instr. '11-'16.

MARSH, Charles W., Ph.D., Instr. in Chem. '37-'39.

McREYNOLDS, J. P., A.B., Ph.D., Instr. in Chem. '38-'40, Ohio State U.

MILLER, Clinton F., B.S. in Chem. '34, Grad. Asst. in Chem. '34-'36, Devoe & Raynolds Co., Brooklyn, N. Y.


MERTZ, John C., B.S. in Ch.E., Lehigh '31, Ph.D. Yale '36, Instr. in Chem. '36-'41, Asst. Prof. '41 Univ. of Conn.

MOELLER, Walter, Ph.B., Instr. in Chem. '35-'37.

NEVILLE, Harvey A., A.B. (Randolph-Macon '18), M.A. (Princeton '20), Ph.D. (Princeton '21), Asst. Prof. of Chem. '27-'30, Assoc. Prof. '30-'38, Prof. and Head of Dept. '38-.

ODOM, Wm. F., B.S. (Clemson Col.), M.S. '13, Asst. in Chem. '11-'12, Instr. '12-'14, Supt. Sayles-Biltmore Bleacheries, Biltmore, N. C.

OLPP, Archibald E., A.C. '03, M.D. (U. of P. '03), Asst. in Chem. '03-'04, 314 Bergenline Ave., Union City, N. J.

OPDYCKE, Lawrence H., B.S. (Rutgers '13), A.M. (Columbia '16), Ph.D. (Johns-Hopkins '22), Asst. Prof. of Chem. '22-'26.


PIERLE, Chester A., A.B. (DePauw Univ. '09), M.S. '11, Ph.D. (Univ. of Wis., '19), Asst. in Chem. '09-'10, Instr. '10-'11, West Texas State Teachers' Col., Canyon, Texas.

PUDDICOMBE, Sydney J., Ph.B. (Yale '14), Asst. in Chem. Feb.-June, '15, 1956 Chapel St., New Haven, Conn.

REICHERDT, G. H., B.S. (Rutgers '39), M.S. (Lehigh '41), Asst. in Chem. '39-'41.


ROSE, Arthur, B.A. (Univ. of Cin. '25), Ph.D. (Univ. of Cin. '27), Instr. in Chem. '29-'30, Assoc. Prof. of Chem., Pa. State Col.

SALISBURY, Samuel H., Jr., B.S. '06, M.S. '15, Asst. in Chem. '06-'07, Asst. Prof. '12-Feb. '17, Atlas Portland Cement Co., 25 Broadway, N. Y. C.

SCHOBER, Wm. B., B.S. (St. John's Col. '36), A.M. (St. John's Col. '90), Ph.D. (Johns-Hopkins '92), Instr. in Chem. '92-'04, Asst. Prof. '04-'06, Acting Prof. '06-'07, Prof. '07-'14, d. 8/35/.

SCHULTZ, R. F., Ph.D., Instr. in Chem. '37-'39, Asst. Prof. '39-'41, Hercules Powder Co., Wilmington, Del.

SERFASS, E. J., B.S. (in Ch.E.) '33, M.S. '35, Ph.D. '38, Asst. in Chem. '36-'37, Instr. '37-'39, Asst. Prof. '40-.


SIMMONS, Charles Wellington, B.Sc. (Queen's Univ. '20), M.S. '22, Instr. in Chem. Eng. '23-'29, Asst. Prof. '29-'36, Assoc. Prof. '36-'40, Prof. '40-.


SOHON, Michael Druck, A.C. '90, M.S. '95, Ph.D. (Johns-Hopkins), Instr. in Chem. '91-'94, 224 Bell Ave., Hasbrouck Hts., N.J.

SPANUTIUS, Frederick William, Ph.B. (Yale '83), M.S. (Ohio State Univ. '90), Instr. in Chem. '92-'03. Died 6/19/15.

SMITH, Hilton A., Ph.D., Instr. in Chem. '35-'39, Asst. Prof. '39-'41, Univ. of Tenn., Knoxville, Tenn.

STEIN, C. W. C., B.S., Asst. in Chem. '36.


STICKLER, Paul James, B.S. in Ch. E. '35, Grad. Asst. in Chem. '36.

STRUB, P. T. W., B.S. in Ch.E., Asst. in Ch.E., '39-'41.

TAYLOR, N. W., B.S. '37, Asst. in Chem. '37-'38.

THEIS, Edwin R., Ch.E. Ph.D., Asst. Prof. of Ch.E. '27-'30, Assoc. Prof. '30-'38, Prof. of Chem., '38-, 1021 Raymond Ave., Beth., Pa.


THURLOW, Nathaniel, A. C. '95, Asst. in Chem. '95-'96, 1 W. 68th St., N.Y.C.

ULLMANN, Harry Maas., A.B. (Johns-Hopkins '39), Ph.d. (Johns Hopkins '92), Instr. in Chem. '94-'04, Asst. Prof. '04-'10, Assoc. Prof. '10-'12, Prof. '12-'38, Prof. Emeritus, '38-, 20 W. Church St., Beth., Pa.

VAN HAAGEN, Walter K., B.S., Asst. in Chem. '08-'09.

WALDBAUER, Louis Julius, B. Chem. (Cornell '17), M.Sc. (McGill Univ.) '22, Ph.D. (McGill Univ. '23), Instr. in Chem. '24-'26, Prof. of Chem., Univ. of Iowa, Iowa City, Iowa.

WETHERILL, Charles M., Ph.D., M.D., Prof. of Chem., '66-'71, Died Mar. '71.


WILLIAMS, Waldo W., B.S. (Guilford Col. '28), M.S. (Univ. of N.C. '30), Instr. in Chem. '30-'32.


WITTMER, Martin, E.M. '32, Instr. in Chem. '32-'33.
PUBLICATIONS

This list of publications by staff members of the Department is an attempt to show the chronological output of published articles and researches pertaining to chemistry written at Lehigh University. Within each year the arrangement is alphabetical by authors. No previous records were kept over long periods and this one does not claim to be all inclusive. The task of compilation has been interesting, though arduous, and the list is believed to be fairly complete.

Acknowledgment is made for the kind help of the following members of the Class of 1941 for assistance in this phase of the work: J. E. Andrews, A. Descheemaeker, L. F. Dieringer, L. J. McKinley, R. D. Miller, D. Richards, R. L. Tilton.

1866-71


20. Schober, W. B. and Kiefer, H. E., "On the Action of Certain Alco-


1897-01


1902-06


The practical methods of organic chemistry, 2nd Amer. ed. (Review).


1907-11


1912-16

31. McAdam, D. J., Jr. and Pierle, C. A., "The Solubility of Sodium

1923


1924


1925


56. Long, J. S. and Wentz, G., "Rate of Molecular Weight Increase in

57. W. A. Patrick and Long, J. S., "Adsorption of Butane by Silica

58. Sinkinson, E., "Some Observations on the Transition of Coal to

1926

Ind. Eng. Chem. 18, 340 (1926).

No. 8, Aug. '26.


785, Aug. '26, by Bradley Stoughton and R. D. Billinger.

Chem. 50, 899-901 (1926).

64. Cantelo, R. C. "The Separation of the Phosphate Ion in Qualitative

Flames," Gas Age-Record 57, 41-3, 52, (1926).

66. Long, J. S. and Wentz, G. "Rate of Molecular Weight Increase in
the Boiling of Linseed and China Wood Oils," Ind. Eng. Chem. 18,
1245-8 (1926).

1927


70. Ewing, E. W., "Calcium Nitrate I. The Temperature-Composition Relations of the Binary System Calcium Nitrate Water," J.A.C.S.


1928


91. Anderson, H. V. and Clark, G. L., "Zonal Structure of Silica


1930


Silk. J. 49, No. 10, 64-6 (1930).

of Gelatin and Similar Materials and the Relation of Hydration 
to Swelling," Colloid Symposium Annual 7, 41-9 (1930).

of Gelatin. I. Hydration of Gelatin and its Relation to 

Gelatin, II. Method of Determining Transition Temperatures of 

118. Simmons, C. W., Long, John D., "Tower Absorption Coefficients, II, 

istry of Soaking. IV. Influence of the Gaseous Environment of 

120. Theis, E. R., "Critical Study of the Biochemistry of Soaking, V."

121. Theis, E. R., "Effect of Postmorten Action upon N₂ Distribution of 


the Volume Change Method, II and III." Ind. Eng. Chem., 22, 
64-9 (1930).

Assoc., 19, 326-7 (1930).

U. S. Patent 1753539-April 8, 1930.


1932


No. 1, page 144,(1932.) Complete title in Journal: "Quantita­tive Experiments in Elementary Chemistry. II. A Measure of
Catalysis."

152. Hazlehust, T. H., "Presentation of Second Law Theory. II. A

153. Ewing, W. W., "Calcium Nitrate III. Heats of Hydration and of
Solution of the Binary System Calcium Nitrate-Water," J.A.C.S.,
54, 1335 (1932).


155. Long, J. S., "Drying Oils," Am. Paint J. 16, #17 54f (1932);
cf. C. A. 25, 4417 (a lecture).

156. Long, J. S. and Moore, C. N., "Action of Cathode Rays on Drying

and Rayon J., 51, No. 6, 45-6, 79, 80, 82 (1932).


159. Theis, E. R. and Goetz, "Chrome Tanning, I. The Role Played by
NaCl in Chrome Liquors upon Chrome Tanning," Ind. Eng. Chem., 24,
304-7 (1932).

160. Theis, E. R. and Hunt, F. S., "Fat-Liquoring of Chrome Leather,


1933


1935


1936


205. Hazlehurst, T. H. and Martin, H. C. and Brewer, L., "The


1937


1938


1939


249. Osborn, H. B., Jr. and Simmons, C. W., "Countercurrent Absorp-


1940


293. Ullmann, H. M., "Burners, such as Bunsen Burners", U.S.P. 2,171,816, Sept. 5, 1940.
BIOGRAPHICAL SKETCHES
OF
THE CHEMISTRY FACULTY
JUNE, 1941.
AMSTUTZ, Edward Delbert, Asst. Prof. of Chemistry.
b. New Athens, Ohio, May 1, 1909; h. 6'1", w. 155#.
m. Frances Dean VanSchaack, children - 2.
Edn. College of Wooster, B.S. '30, Inst. of Paper Chemistry, M.S. '32,
Cornell University, Ph.D. '36.
Member A.C.S., A.A.U.P.
Publ. - Investigation of Certain Problems in Heterocyclic Chemistry -
3 publications.
Experience: Cornell - Asst. '33-36, Union College, '36-38, Lehigh
'38-
Church: Presbyterian.
Chief Duties: Org. Chem. lecture and lab., E.D.T.
Hobby: Fishing.
ANDERSON, Harold Victor, Professor of Chemistry.
b. Manistique, Michigan, April 4, 1890; h. 5'11", w. 155#.
m. Judith Botvidson, one child.
Edn. Manistique Public Schools - 1896-1908, Univ. of Michigan, B.S. in
C h. E. '12, Lehigh Univ., M.S. '25, Univ. of Illinois 1928-29 course
in X-ray Tech.
Frat. and Soc.: Sigma Xi, Phi Eta Sigma, Alpha Chi Sigma, Kappa Sigma.
Publ.: Chemical Calculations, 4th ed, 1940; Qualitative Analysis with
T. H. Hazlehurst, 3rd ed, 1941; twelve research articles, chiefly
x-ray studies.
Experience: Chemist, Dixie Portland Cement Co., Richard City, Tenn,
1914-18, May '18-Oct. '18, Chemist, Air Nitrates Corp., Muscle
Shoals, Ala.; Lehigh Univ. 1918-
Civic activity: School Director (Treasurer) Salisbury Township, Lehigh
Co., Pa.
Chief Duties: In charge of Freshman Chem., X-ray Tech.
Hobby: Gardening.
BECK, George Calton, Asst. Prof. Chem.
b. Huntingdon, Penna., July 4, 1878, h. 5' 10", w. 155#.
Edn. Williamsport Dickinson Seminary, B.S., Johns Hopkins Univ.,
Lehigh, A. C. '03.
Member American Chemical Society.
Experience: Chief Chemist, New Jersey Zinc Co., Palmerton, Pa., '03-'04.
Asst. Prof. Quant. Anal. Lehigh 1904-.
Church: Holy Trinity Lutheran Church.
Chief Duties: Assisting in Quant. Lab., Assaying.
BILLINGER, Robert Dominick, Assoc. Prof. of Chemistry.

b. Reading, Pa., Oct. 17, 1899, h. 5', 8 1/2", w. 155#.

m. Evelyn Anna McCarthy.

Edn. Shenandoah, Pa., H. S. '17, Lehigh U., Ch. E. '21, M.S. '25, g.s.

Yale U., '26-'27, U. of Cincinnati, Ph.D. '29.

Frat. & Soc. - Tau Beta Pi, Alpha Chi Sigma, Sigma Xi, Newcomen Society.


Expts. (1937) with H. A. Smith.

(articles) 40 in fields of chem. educ., history of chem., metallurgy and phys. Chem.


Church: Episcopalian (vestryman).


Hobbies: travel, writing, photography.
DIEFENDERFER, Alpha Albert, Prof. of Chemistry.
b. Jenner Cross Roads, Pa., April 25, 1881, h. 5'6", w. 180#.
m. E. Olive Girvin.
Edn. Allentown, Pa. R. S. 1898, Lehigh U., E.S. 1902, M.S. '03, g.s.
Frat. & Soc. - Tau Beta Pi, Haines Scholarship.
Scien. Discoveries: Numerous devices to shorten the time in Quant. Anal.
Experience: 39 yrs. at Lehigh
Church: Christ Evangelical and Reformed, Beth.
Chief Duties: Prof. of Quant. Anal. and Assaying.
EWING, Warren Walter, Prof. of Chem.
b. Winterset, Iowa, Nov. 4, 1889, h. 5'6", w. 125#.
m. Adah Shawver.
Frat. & Soc. Kappa Phi Kappa, Sigma Xi.
Member, A.C.S., A.A.A.S.
Publ. some 20 articles on Physical Chemistry research.
Experience: Mission H. S. Fategharh, India, 1912-16, Marshalltown, Iowa H. S. 1916-17, Lehigh Univ. Assis. Prof. 1920, Assoc. Prof. 1938, Prof. 38-.
Chief Duties: Physical Chem. Lecturer.
Hobby: Gardening.
FORNOFF, Frank Junior, Instructor.
b. Mt. Carmel, Illinois, March 29, 1914, h. 5'10", w. 145#.
Frat. & Soc., Phi Beta Kappa, Phi Kappa Phi, Phi Lambda Upsilon, Phi Eta Sigma, Sigma Xi, Proctor and Gamble Fellow at Ohio State.
Member A.C.S.
Researches done on the nature of ceric oxide, rare earth separations; heat capacities of certain rare earth salts from low temperatures to room temperature.
Experience: National Research Fellow in Chem., 1939-40, Univ. of Calif. Instructor, Lehigh Univ. 1940-.
Church: Methodist.
HAZLEHURST, Thomas Huger, Jr., Assoc. Prof. Chem.
b. Corinth, Miss., March 11, 1906, h. 5'7", w. 145#.
m. Edith P. Blackburn, children - 1.
Edn. Porter Military Academy, Charleston, S. C., College of Charleston, 1923, A.B., Johns Hopkins Univ., 1927, Ph.D.
Member A.C.S.; Sigma Xi; Gamma Alpha.
(Articles) in the field of Thermodynamics 3, Chemical Education, 10, Colloid Chemistry, 5.
Experience. College of Charleston, Lab. asst. in Chemistry, 1921-3, Lab. asst. in Physics, 1922-3, Asst. in English, 1922-3.
Lehigh University, Inst. in Chem. 1927-30; Asst. Prof. 1930-8, Assoc. Prof. 1939-.
Hobby: Punning.
MERTZ, John Clewell, Asst. Prof. Chem.
b. Allentown, Pa., July 20, 1910, h. 5' 10 1/2'', w. 155#.
m. Jacqueline Nock, children - 1.
Honors, Soc.: Tau Beta Pi Prize, Wilbur Scholarship, Chandler Chem.
Prize, Tau Beta Pi, Phi Beta Kappa, Sigma Xi, Pi Mu Epsilon,
Univ. Scholar (Yale'34-35).
Member A.C.S.
Experience: Instr. in Chem. Lehigh '36-'41, Asst. Prof. '41-.
Church: Evangelical Congregational.
Publ. 4 articles.
SCHULTZ, Raymond Frederick, Assistant Prof. of Chemistry
b. Milwaukee, Wisconsin, February 11, 1908, h. 5' 11 1/2", w. 158#.
m. Emma Margaret Dietz.
Edn. North Division High School, Milwaukee, 1921-25, Univ. of Wisconsin,
B.S. 1926-1930, Harvard University, M. A., Ph. D., 1930-34.
and Amyl Alcohols,"J.A.C.S.
Several patents pending.
Exp.: Assistant in Org. Chem., Harvard Univ., 1930-34; Head assistant
for one year; E. I. du Pont de Nemours & Co., 1934-37; Assistant
Prof. of Chemistry, Lehigh University, 1937-41.
Church: Evangelical Lutheran.
SERFASS, Earl James, Asst. Prof. Chem.

b. Allentown, Pa., Dec. 12, 1912, h. 5'11", w. 205#.
m. Mabel Dowling

Member A.C.S., Am. Leather Chemists Assn., Sigma Xi.

Publ:-(articles) on leather in the J. Am. Lea. Chem. Assn. with Dr. Theis. Also papers covering textiles, oils and analytical instru.

Scienc. disc.: 2 instruments for rapid industrial analyses: "Electron Ray Titration Unit," "Vacuum Tube Relay."

Experience: Hunt-Rankin Leather Research Fellow, 1933, Senior Fellow for Textile Foundation until 1936, then Senior Research Fellow for National Oil Products Co., Instructor in Chem. Dept. 1937-59, Assist. Prof. '39-.

Chief Duties: Freshman lab. inst., collaborated with Dr. Mertz on instituting revised course in Adv. Anal. Chem. Dr. Serfass also instituted a lab course in Anal. Phases of Ind. Biochem.

Hobby: Electrical devices.
SIMMONS, Charles Wellington, Prof. of Chem. Eng.
b. Kingston, Ontario, Sept. 28, 1897, h. 6'1", w. 185#.
m. Mary V. Elliot, children - 2.
Edn. B.Sc. Queens (Can.), 1920, M.S. Lehigh, 1928.
Frat. & Soc. Tau Beta Pi, Sigma Xi, Kappa Alpha, A.F. & A.M.
Publ. 10 articles in field of counter current absorption and 7 others in other phases of chem. eng.
Church: Presbyterian.
Hobby: Gardening.
SMITH, Hilton Albert, Asst. Prof. Chem.

b. Plymouth, N. Y., Sept. 4, 1908, h. 5'10", w. 160#.
m. Elizabeth Zarbaugh, children - 3.


Member A.C.S., Sigma Xi, Alpha Chi Sigma.

Publ. (books), "General Chemistry Expts." with R. D. Billinger.
(articles), Twenty in phys. chem.: Heats of Reaction, Esterification Kinetics, etc.

Experience: Assistant, Harvard Univ. 1930-33; Research Asst., Rockefeller Foundation (at Harvard) 1934-35; Instructor, Lehigh, 1935-39, Asst. Prof. Lehigh, 1939-


Hobby: Music.
SMULL, Judson Gray, Asst. Prof. of Chem.
b. Altoona, Pa., 1882, h. 5'10", w. 175#.
m. Margaret Montgomery Erwin (dec.), children - 2.
Frat.: A.T.O.
Member A.C.S., Sigma Xi.
Church: Moravian. Member General Board of Elders, former member School Board, Moravian Prep. School.
Chief Duties: Organic Lab.
THEIS, Edwin Raymond, Prof. of Chem. Eng.

b. Newport, Ky., July 8, 1896, h. 5' 6 1/2", w. 175#.
m. Martha Pauling, children – 2.
Frat. & Soc. Tau Beta Pi, Delta Sigma Phi, Sigma Xi.
Publ. in chemistry of the proteins, lipids, and subjects related to
the leather industry.

Ord. Res. 1933. Research assoc. and assoc. director, tanners
research lab, Cincinnati, 21-26; assoc. sci. director, Frederick
Stearns and Co., Detroit, 27; assoc. prof. chem. eng. Lehigh, 27–,
director tanning research, asst. prof. 27-30, assoc. prof. 30-38,
prof. of chem. 38–.

Chief duties: Directing division of Industrial Biochem.
Hobby: Traveling.
Quantitative Analytical Laboratory
(1925)

General Chemistry (Freshman) and
Qualitative Analytical Laboratories
(1925)
Sub-Freshman Day Exhibits (1940)
F. J. Morath, C. H. Reischardt, H. S. Lewison, J. C. Hurts, E. J. Griss
Sec. from 1. to 2. W. W. Anderson, W. N. Ewing, A. A. Diefenderfer, H. A. Neville
On Floor: 1. to 2. E. Heins, P. T. M. Strub, R. F. Schultz, T. H. Hazlehurst