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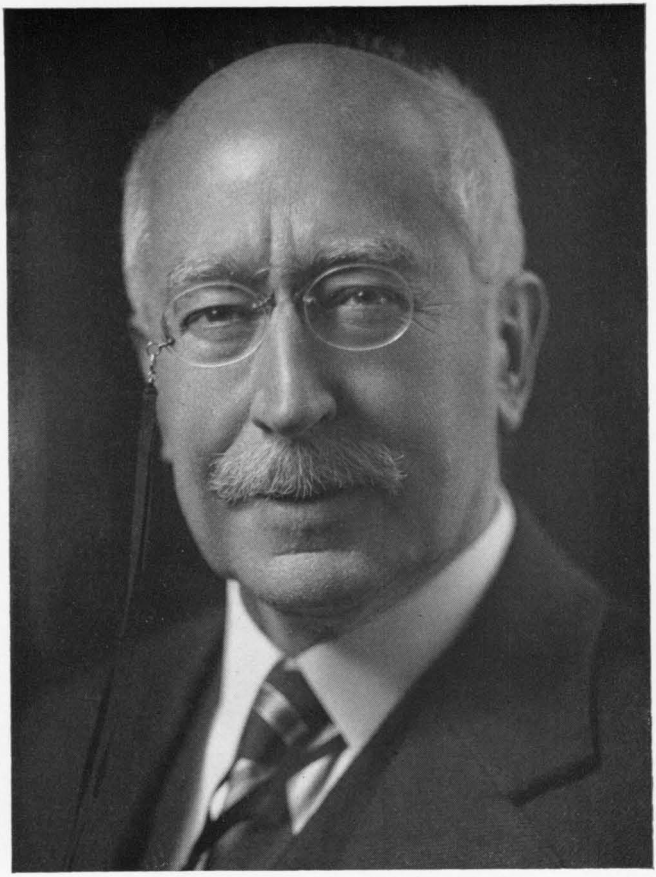
MARSTON TAYLOR BOGERT

1868—1954

A Biographical Memoir by

LOUIS P. HAMMETT

Biographical Memoir



Marston T. Bogert

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April 18, 1868–March 21, 1954

BY LOUIS P. HAMMETT

MARSTON TAYLOR BOGERT was born in Flushing, New York, on April 18, 1868, and died in New York City on March 21, 1954. His long and intensely active professional life was connected intimately and continuously with Columbia University, with the development of organized activity in chemistry in the United States, and with the fostering of international cooperation in science.

Bogert entered Columbia College in 1886, having graduated from the Flushing Institute, a well-known private school. His undergraduate record was remarkable. It included the grade of A in every course; the award of honors in German, Spanish, Italian, botany, and geology; the captainship of a famous freshman crew; the college championship in tennis; honors in football, shot-putting, and pole vaulting; membership as a flute player in the college orchestra; and the presidency of his class in the sophomore and in the senior years.

After Bogert was graduated with the degree of A.B. in 1890 he entered the new Columbia School of Mines in the course of analytical and applied chemistry. His academic record continued to be distinguished, and he obtained the degree of Ph.B. in 1894. When, during this curriculum, it became time for him and seven or eight classmates to take a course in organic chemistry, C. E. Colby, who had taught the course as adjunct

professor, became ill, and the school was unable to find a replacement. Consequently, the students were told to teach themselves, and Bogert, who during his career published several hundred scientific papers in organic chemistry, never had any formal instruction in the subject. Neither did he follow the fashion of a trip abroad for a German doctorate. Instead he accepted an appointment to give instruction in organic chemistry at Columbia and advanced there through various grades, attaining the full professorship in 1904. He continued in that position with the title of Professor of Organic Chemistry until he retired in 1939 as Emeritus Professor of Organic Chemistry in Residence.

Bogert arrived at Columbia at a time when, under the leadership of Burgess and of Butler, a small college was in the early stages of an expansion that led to a great university, and his abilities found their opportunity in that expansion. The graduate faculty of pure science had been established in 1892, and Bogert's first research publication, "A New Synthesis in the Quinazoline Group" (with A. H. Gotthelf), appeared in the *Journal of the American Chemical Society* in March of 1900. From then on, brilliant young men flocked to his laboratory to be trained for careers in research and went forth to assume positions of importance in academic life and in the rapidly expanding chemical industry. It is a revealing comment on the times and the place that, while Bogert remained firm in his attachment to synthetic organic chemistry, many of his students refused to be typecast by their doctorates in that field: H. T. Beans became a pioneer in the revolution in instruction in analytical chemistry; J. M. Nelson initiated important advances in what later came to be called physical organic chemistry and in biological chemistry; M. Heidelberger became one of the world's great microbiologists; F. D. Snell founded one of this country's leading chemical consulting firms; G. Scatchard be-

came a distinguished physical chemist. These men were self-taught in their fields as Bogert had been in his.

Bogert was a polished lecturer, and his teaching evidenced clearly his lifelong love affair with the intricacies of structural organic chemistry. For Columbia University he carried the usual burdens of membership on committees, and he served on the University Council in 1908–1911 and 1916–1919. He was a charter member of the Columbia chapters of Sigma Xi and of Phi Lambda Upsilon. Columbia recognized his accomplishments and his services to the university by an honorary Sc.D. degree in 1929, by the Egleston Medal in 1939, and by the Charles Frederick Chandler Medal in 1949. He had received an honorary LL.D. degree from Clark University in 1909.

Bogert's professional career accompanied a phenomenal growth in chemistry in the United States, and he was an active participant in the parallel development of professional organizations. The American Chemical Society, which now numbers more than 100,000 members, had about one percent of that membership in the mid-nineties when Bogert began to take an active part in its affairs. In 1901 he was chairman of the New York section, and in 1907 and 1908 he was president of the national Society. In the latter position he introduced an organizational reform that established divisions of the Society, each representing a major portion of the field of chemical science and technology. This averted a threatened schism that would have set up separate societies for applied and for pure chemists. He was awarded the Nichols Medal of the New York section in 1905 and the Priestley Medal of the national Society in 1938.

Bogert was elected to the National Academy of Sciences in 1916. He led in the establishment of the Division of Chemistry and Chemical Technology of the National Research Council in 1917 and was its first chairman. In 1898 he became one of one hundred fifty-four charter members of the Chemists' Club of New

York, which has played an important role in the chemical life of metropolitan New York. The dining room of the club where Bogert presided at so many dinner meetings over the years has been named the Bogert Room in his honor. He was a member of the American Philosophical Society, the American Academy of Arts and Sciences, the Washington Academy of Sciences, the National Institute of Social Sciences, the American Association for the Advancement of Science, and the American Association of University Professors. He was a Fellow of the Chemical Society (London) and a Gold Medalist of the American Institute of Chemists; a member of Phi Beta Kappa, of Sigma Xi, and of Phi Lambda Upsilon; and a member of the Century Association, the Cosmos Club, the Royal Societies Club (London), the Hunters' Fraternity of America, and the Chevy Chase Club.

During the First World War Bogert served as a consultant to many government agencies and as a member of numerous boards and committees. He was commissioned lieutenant colonel in the U.S. Army in March 1918 and promoted to colonel in the Chemical Warfare Service in July of that year. He was honorably discharged from the army in May 1919. For the rest of his life his friends referred to him as Colonel, a form of address that he much enjoyed.

From 1900 on, Bogert had been active in the New York section of the British Society of Chemical Industry, and in 1912–1913 he was president of the parent Society. He also lent his support to the New York section of the French Société de Chimie Industrielle. In 1927 he was appointed to give lectures at the Charles University in Prague as the first Carnegie Professor of International Relations. While in Czechoslovakia, he was awarded honorary degrees by the Charles University and by the University of Bratislava and was made a Commander of the Order of the White Lion of Czechoslovakia. Following his participation over many years in international conferences on chemistry, he was elected president of the International Union

of Pure and Applied Chemistry in 1938. His devotion and tact were in large measure responsible for the successful re-establishment of that Union after the Second World War, and he himself felt that that was one of his most valuable accomplishments.

The first Bogert to come to this country arrived from Holland in 1663, the year before the British took New Amsterdam from the Dutch. Many of his descendents were prominent citizens of New York, and Marston's father, Henry Augustine Bogert, was a well-known lawyer in that city. He was also a graduate of Columbia College, as were Marston's three brothers. In 1893 Marston married Charlotte E. Hoogland. They had two daughters, Annette H. and Elsie B. The Bogerts's homes in New York City and at Belgrade Lakes, Maine, were happy and friendly ones. Bogert was an active participant in the affairs of the Reformed church.

Bogert was distinguished in appearance, striking in personality, and gifted with wit and eloquence. He was the perfect presiding officer at all public occasions and was constantly in demand for that function.

BIBLIOGRAPHY

KEY TO ABBREVIATIONS

Am. Perfum. Essent. Oil Rev. = American Perfumer and Essential Oil Review
Chem. Eng. News = Chemical Engineering News
Chem. Listy = Chemike Listy
Chem. Rev. = Chemical Reviews
Columbia Univ. Q. = Columbia University Quarterly
Columbia Univ. Sch. Mines Q. = Columbia University School of Mines Quarterly
Collect. Czech. Chem. Commun. = Collection of Czechoslovak Chemical Communications
Color Trade J. = Color Trade Journal
Drug Cosmetic Ind. = Drug and Cosmetic Industry
Ind. Eng. Chem. = Industrial and Engineering Chemistry
Ind. Eng. Chem. (News Ed.) = Industrial and Engineering Chemistry, News Edition
J. Am. Chem. Soc. = Journal of the American Chemical Society
J. Chem. Educ. = Journal of Chemical Education
J. Franklin Inst. = Journal of the Franklin Institute
J. Ind. Eng. Chem. = Journal of Industrial and Engineering Chemistry
J. Org. Chem. = Journal of Organic Chemistry
J. Soc. Chem. Ind., London = Journal of the Society of Chemical Industry, London
Orig. Commun. 8th Int. Congr. Appl. Chem. = Original Communications of the 8th International Congress of Applied Chemistry
Proc. Nat. Acad. Sci. = Proceedings of the National Academy of Sciences
Rec. Trav. Chim. Pays-Bas = Recueil des Travaux Chimiques des Pays-Bas

1897

Carbon compounds used in medicine, classified according to chemical structure. Columbia Univ. Sch. Mines Q., 19:47–88.

1898

Charles Edwards Colby (obituary notice). J. Am. Chem. Soc., 20: 139–41.

1900

With A. H. Gotthelf. A new synthesis in the quinazoline group. J. Am. Chem. Soc., 22:129–32.

With A. H. Gotthelf. Direct synthesis of ketodihydroquinazolines from orthoamino acids. J. Am. Chem. Soc., 22:522–34.

1901

With L. Boroschek. Some experiments with the mononitroorthophthalic acids. J. Am. Chem. Soc., 23:740–61.

1902

With D. C. Eccles. Production of the imides of succinic and glutaric acids by the partial hydration of the corresponding nitriles. J. Am. Chem. Soc., 24:20–25.

With W. F. Hand. Synthesis of alkylketodihydroquinazolines from anthranilic nitrile. J. Am. Chem. Soc., 24:1031–50.

1903

Normal heptyl thiocyanate and some new alkyl esters of dithiocarbamic acid. J. Am. Chem. Soc., 25:289–91.

With H. C. Breneman and W. F. Hand. Synthesis of alkylthioketodihydroquinazolines from anthranilic nitrile. J. Am. Chem. Soc., 25:372–80.

With L. Kohnstamm. *p*–Aminobenzonitrile. J. Am. Chem. Soc., 25:478–83.

Mononitro–*o*–phthalic acids. J. Am. Chem. Soc., 25:767–70.

With W. F. Hand. 3,5–Dibrom–2–aminobenzoic acid; its nitrile and the synthesis of quinazolines from the latter. J. Am. Chem. Soc., 25:935–47.

With C. H. Zieme. Production of anisic acid by the oxidation of aniseed oil. Columbia Univ. Sch. Mines Q., 24:500–509.

1904

With H. T. Beans. Metaaminobenzonitrile and some of its derivatives. J. Am. Chem. Soc., 26:464–99.

1905

A card index stock list for use in university departments of organic chemistry. Science, 21:750–52.

With V. J. Chambers. Synthesis of 5–nitro–4–ketodihydroquinazolines from 6–nitro–2–aminobenzoic acid, 6–nitro–2–acetylaminobenzoic acid, and from the corresponding nitro acetylanthranil. J. Am. Chem. Soc., 27:649–58.

With A. W. Dox. Condensation of succinylosuccinic acid diethyl

ester with guanidine. A derivative of 1,3,5,7–naphthotetrazine, a new heterocycle. J. Am. Chem. Soc., 27:1127–40.

With A. Hoffman. Some acyl derivatives of homoanthranilic nitrile, and the 7–methyl–4–ketodihydroquinazolines prepared therefrom. J. Am. Chem. Soc., 27:1293–1301.

With A. W. Dox. Condensation of succinylosuccinic acid diethyl ester with acetamidine: 2,6–dimethyl–4,8–dihydroxy–9,10–dihydro–1,3,5,7–naphthotetrazine. J. Am. Chem. Soc., 27:1302–5.

With H. A. Seil. Synthesis of 2–methyl–5–nitro–4–ketodihydroquinazolines from 6–nitro acetanthranil and primary amines. J. Am. Chem. Soc., 27:1305–10.

With R. G. Wright. Some experiments on the nitro derivatives of fluorescein. J. Am. Chem. Soc., 27:1310–16.

With S. H. Steiner. Synthesis of 7–nitro–2–alkyl–4–ketodihydroquinazolines from 4–nitro acetanthranilic acid, and from 4–nitro acetanthranil. J. Am. Chem. Soc., 27:1327–31.

Notes from the Department of Organic Chemistry. Columbia Univ. Q., 8:70.

With W. F Hand. 5–Brom–2–aminobenzoic acid and some of its derivatives. J. Am. Chem. Soc., 27:1476–84.

1906

With W. F. Hand. Preparation of 6–brom–4–ketodihydroquinazolines from 5–brom–2–aminobenzoic acid and certain of its derivatives. J. Am. Chem. Soc., 28:94–104.

With V. J. Chambers. 5–Amino–4–ketodihydroquinazoline and 5–amino–2–methyl–4–ketodihydroquinazoline. J. Am. Chem. Soc., 28:207–13.

With A. W. Dox. Condensation of succinylosuccinic esters with amidines. J. Am. Chem. Soc., 28:398–99.

With R. R. Renshaw. Dimethyl–4–aminophthalate and certain of its acyl derivatives. J. Am. Chem. Soc., 28:617–24.

With H. A. Seil. Quinazolines. XV. A 3–aminoquinazoline and the corresponding 3,3′–diquinazolyl, from 6–nitroacetanthranil and hydrazine hydrate. J. Am. Chem. Soc., 28:884–93.

With E. P. Cook. Quinazolines. XVI. Synthesis of 6–nitro–2–methyl–4–ketodihydroquinazolines from 5–nitroacetanthranil and primary amines. J. Am. Chem. Soc., 28:1449–54.

Edmund Howd Miller (obituary notice). Columbia Univ. Q., 9:37–

39: also in Zeitschrift für Angewandte Chemie, 19:2141–42 and J. Am. Chem. Soc., 29:3–5.

1907

With J. D. Wiggin and J. E. Sinclair. Quinazolines. XVII. Synthesis of quinazoline carboxylic acids from 4–aminoisophthalic acid and from aminoterephthalic acid. J. Am. Chem. Soc., 29: 82–87.

A strange case of poisoning. J. Am. Chem. Soc., 29:239–40.

With H. A. Seil. Quinazolines. XVIII. 2,3–Dialkyl–4–quinazolones and the products obtained by alkylating 2–alkyl–4–quinazolones (2–alkyl–4–hydroxyquinazolines). J. Am. Chem. Soc., 29:517–36.

With J. M. Nelson. Quinazolines. XIX. Synthesis of 1,3,6,8–naphthotetrazines from *p*–diaminoterephthalic acid and from certain of its derivatives. J. Am. Chem. Soc., 29:729–39.

1908

American chemical societies. J. Am. Chem. Soc., 30:164–82.

The American Chemical Society. Engineering and Mining Journal, 85:617.

The stimulus given chemical research and invention by suitable recognition. J. Soc. Chem. Ind., London, 27:266.

With W. Klaber. Quinazolines. XX. Certain 7–nitro–2–methyl–4–quinazolines from 4–nitroacetanthranil. J. Am. Chem. Soc., 30:807–16.

With R. R. Renshaw. 4–Amino–*o*–phthalic acid and some of its derivatives. J. Am. Chem. Soc., 30:1135–44.

Departmental notes. Columbia Univ. Q., 10:372.

1909

Chemistry and the conservation of our mineral resources. (Address at 2d Joint Conference on Conservation of Natural Resources) Conservation, 15:14–17.

The function of chemistry in the conservation of our natural resources. J. Am. Chem. Soc., 31:125–54.

With F. L. Jouard. 3–Amino–*o*–phthalic acid and certain of its derivatives. J. Am. Chem. Soc., 31:483–90.

With C. E. May. Quinazolines. XXI. Certain quinazoline oxygen

ethers of the type –N:C(OR)– and the isomeric –NR.CO– compounds. J. Am. Chem. Soc., 31:507–13.

Chemistry and the conservation of our forests and minerals. Columbia Univ. Sch. Mines Q., 30:217–38.

With A. H. Kropff. Some amino and nitroamino derivatives of benzoic, metatoluic and metaphthalic acids. J. Am. Chem. Soc., 31:841–48.

With R. A. Gortner. Quinazolines. XXII. 2–Methyl–3–amino–4–quinazolone and certain of its derivatives. J. Am. Chem. Soc., 31:943–47.

With A. H. Kropff. Quinazolines. XXIII. 6–Methyl–7–aminoquinazolones, 7–nitroquinazolone–6–carboxylic acids, and 1,3,7,9–naphthotetrazines. J. Am. Chem. Soc., 31:1071–78.

With R. A. Gortner. Quinazolines. XXIV. Oxalyl anthranilic compounds and quinazolines derived therefrom. J. Am. Chem. Soc., 32:119–28.

Chemistry and the conservation of our mineral resources. (Address at the Joint Conference between the National Conservation Commission and Governors of States, State Conservation Commissions, and Citizens' Conservation Committees) U.S. Senate Document No. 676, pp. 145–50.

1910

The game butcher. Maine Woods and Maine Sportsman, 32:8.

Chemistry and the conservation of our water resources. J. Franklin Inst., 169:385–88; also in Chemical Engineer, 11:127–28.

Review of some recent investigations in the quinazoline group. J. Am. Chem. Soc., 32:784–95.

Instability of alloxan. J. Am. Chem. Soc., 32:809–10.

With C. G. Amend and V. J. Chambers. Quinazolines. XXV. Synthesis of 6– and 7–amino–2–methyl–4–quinazolones from 4– and 5–acetaminoacetanthranils. J. Am. Chem. Soc., 32:1297–1312.

With L. E. Wise. Some derivatives of *p*–aminobenzonitrile. J. Am. Chem. Soc., 32:1494–99.

With G. D. Beal and C. G. Amend. Quinazolines. XXVI. Synthesis of some stilbazoles, hydrazones and Schiff bases in the 4–quinazolone group. J. Am. Chem. Soc., 32:1654–65.

1911

With R. A. Gortner and C. G. Amend. Quinazolines. XXVII. Synthesis of 3–aminoaryl–4–quinazolones from acylanthranils and aromatic diamines. J. Am. Chem. Soc., 33:949–62.

1912

With M. Heidelberger. Quinazolines. XXVIII. 4–Quinazolone–2–phthalones and certain of their derivatives. J. Am. Chem. Soc., 34:183–201, 554.

With G. D. Beal. Quinazolines. XXIX. Stilbazoles, hydrazones and Schiff bases of the 4–quinazolone group. J. Am. Chem. Soc., 34:516–24.

With G. A. Geiger. Quinazolines. XXX. Bromination and nitration of 4–quinazolones, the corresponding aminoquinazolones, and certain other new 4–quinazolones. J. Am. Chem. Soc., 34:524–34.

American commission on organic nomenclature. Am. Chem. J., 47:360; also in J. Ind. Eng. Chem., 4:309–10.

With G. A. Geiger. Quinazolines. XXXI. Action of methyl and ethyl iodides upon 4–quinazolones. J. Am. Chem. Soc., 34:683–93.

With L. E. Wise. *p*–Aminobenzonitrile and certain of its derivatives. III. J. Am. Chem. Soc., 34:693–702.

Classification of carbon compounds. Proceedings of the American Philosophical Society, 51:252–68; also in American Journal of Pharmacy, 84:405–13.

With H. L. Fisher. Preparation and properties of 5–aminoquinoline–6–carboxylic acid and certain related compounds. Orig. Commun. 8th Int. Congr. Appl. Chem., 6:37–44; also in J. Am. Chem. Soc., 34:1569–76.

Synthesis of 1,3,7–naphthoisotriazines; derivatives of a new heterocyclic system. Orig. Commun. 8th Int. Congr. Appl. Chem., 6:45–50; also in J. Am. Chem. Soc., 34:1576–80.

1913

The chemical industries and the universities. (Presidential Address, Society of the Chemical Industry, Liverpool) J. Soc. Chem. Ind., London, 37:720–25.

1914

With R. M. Isham. Preparation and properties of certain methoxylated carbinols, olefins and ketones, derived from trimethylgallic acid. J. Am. Chem. Soc., 36:514–30.

With A. Bender. Quinazolines. XXXII. Some quinazolones, benzimidazoles, and related compounds derived from *s*–pseudocumidine. J. Am. Chem. Soc., 36:568–84.

1915

Two convenient forms of receiver for fractional distillations under diminished pressure. J. Ind. Eng. Chem., 7:785–86.

The special value of research in pure chemistry. Science, 42:737–46.

With E. Plaut. Synthesis of certain substituted syringic acids. J. Am. Chem. Soc., 37:2723–34.

1916

The industries and the universities. J. Ind. Eng. Chem., 8:445–47. (Reprint in: Columbia Alumni News, 8:170–73.)

With J. R. Tuttle. Synthesis of *p*–cymene–2–monocarboxylic acid and of *p*–cymene–3–monocarboxylic acid, together with certain of their derivatives. J. Am. Chem. Soc., 38:1349–68.

With G. Scatchard. Quinazolines. XXXIII. A new and sensitive indicator for acidimetry and alkalimetry, and for the determination of hydrogen ion concentrations between the limits of 6 and 8 on the Sörensen scale. J. Am. Chem. Soc., 38:1606–15.

1917

The National Research Council and the mobilization of our research resources in science. Journal of the National Institute of Social Sciences, 3:61–68.

The National Research Council and its chemistry committee. J. Am. Chem. Soc., 39:841–56.

1919

With J. K. Marcus. Synthesis of aminoflavones, of flavone–azo–beta–naphthol dyes, and of other flavone derivatives. J. Am. Chem. Soc., 41:83–107.

With J. Ehrlich. A unique case of a liquid that exhibits a minimum solubility in an unstable region. J. Am. Chem. Soc., 41:741–45.

With J. Ehrlich. Synthesis of certain substituted pyrogallol ethers, including a new acetophenetide derived from the ethyl ether of syringic acid. J. Am. Chem. Soc., 41:798–810.

With C. P. Harris. Synthesis of some homologs of the terpenes, derivatives of 1,4–diisopropyl cyclohexane. J. Am. Chem. Soc., 41:1676–90.

With G. Scatchard. Quinazolines. XXXIV. Synthesis of certain nitro and amino benzoylene ureas and some compounds related thereto. J. Am. Chem. Soc., 41:2052–68.

1920

Chemical warfare. Journal of the Engineers' Club (Philadelphia), pp. 248–54.

1921

Certification: a difficult problem. Chemical and Metallurgical Engineering, 24:241.

Influence of a synthetic dye industry upon our national welfare. Chemical Age, 29: 97–98.

The bearing of a synthetic dye industry upon our national welfare. J. Franklin Inst., 191:445–72. (Reprinted as American Dyes Institute Bulletin A209 and Columbia University Engineering and Scientific Papers of the Schools of Mines, Engineering and Chemistry, No. 4.)

The new marvels of chemistry in your everyday life. American Magazine, 92:18–19.

Science and disarmament. Technical Association of Pulp and Paper Industry, Papers, 4th series, pp. 122–25.

Chemical preparedness. New Jersey Chemical Society Year Book, pp. 52–53.

1922

With E. M. Abrahamson. Thiazoles. I. Derivatives of 2–phenyl–benzothiazole. Synthesis of an analog of cinchophen (atophan). J. Am. Chem. Soc., 44:826–37.

The flower and the organic chemist: perfumes, natural and synthetic. J. Ind. Eng. Chem., 14:359–64; also in Am. Perfum. Essent. Oil Rev., 17:114–16, 162–64; General Chemical Bulletin, 8:270–77. Reprinted as Columbia University Engineering and Scientific

Papers of the Schools of Mines, Engineering and Chemistry, No. 9.

With M. Meyer. Thiazoles. II. 2–*para*–Tolylbenzothiazole, dehydrothio–*para*–toluidine, and some related compounds. J. Am. Chem. Soc., 44:1568–72.

With Y. G. Chen. Selenium organic compounds. I. Synthesis of 2–methyl–4–selenoquinazolone, 2–phenyl–benzoselenazole, and some derivatives of the latter. J. Am. Chem. Soc., 44:2352–57.

With A. Ruderman. Some condensation reactions with *para–para*–bis (dimethylamino) benzohydrol (Michler's hydrol). J. Am. Chem. Soc., 44:2612–21.

The autumn meeting of the National Academy of Sciences and Columbia's part in it. Columbia Alumni News, 14:102–3.

1923

With P. P. Herrera. Selenium organic compounds. II. Synthesis of diaryl thiophenes and diaryl selenophenes. J. Am. Chem. Soc., 45:238–43.

With L. P. Curtin. Relation between molecular structure and odor in trisubstituted benzenes. I. Derivatives of *para*–methoxyacetophenone. J. Am. Chem. Soc., 45:2161–67.

With M. A. Mandelbaum. Action of sulfur upon *para*–toluidine in the presence of litharge. Thio–*para*–toluidine, its constitution and some new derivatives. J. Am. Chem. Soc., 45:3045–55.

1924

Columbia University establishes course in perfume chemistry. Am. Perfum. Essent. Oil Rev., 18:575–76.

With E. M. Slocum. Synthesis of some new higher aliphatic glycols and unsaturated primary alcohols. Am. Perfum. Essent. Oil Rev., 18:621–26.

With E. M. Slocum. Preparation of various aliphatic halides and halohydrin compounds. J. Am. Chem. Soc., 46:763–68.

With H. Clark. Quinazolines. XXXV. Stereoisomeric styryl derivatives of some 4–quinazolone alkyl iodides, and their bearing upon the problem of photosensitizing dyes. J. Am. Chem. Soc., 46:1294–1301.

With F. D. Snell. Thiazoles. III. Preparation of dehydrothio–*p*–toluidine and some of its derivatives. Color Trade J., 14:109–13, 151–54.

With F. D. Snell. Thiazoles. IV. Synthesis of benzothiazoles from orthonitrochlorobenzene. J. Am. Chem. Soc., 46:1308–12.

With F. H. Bergeim. Thiazoles. V. Constitution of Columbia Yellow (Chloramine Yellow) and the synthesis of some related compounds. Color Trade J., 15:63–68.

With H. H. Hopkins. Selenium organic compounds. III. Preparation of a selenium derivative of cinchophen type. J. Am. Chem. Soc., 46:1700–1702.

With H. H. Hopkins. Selenium organic compounds. IV. Synthesis of benzo–bis–selenazoles and selenazolo–benzothiazoles, new heterocyclic systems. J. Am. Chem. Soc., 46:1912–17.

With F. H. Bergheim. Constitution of Columbia Yellow (Chloramine Yellow). Proc. Nat. Acad. Sci., 10:318–22.

With M. Chertcoff. A new group of dyes from poison gases through the 2–aminothiazoles as intermediates. The preparation of thiazole dyes of Doebner Violet type. Proc. Nat. Acad. Sci., 10:418–20.

With P. S. Nissen. Synthesis of Terephthal Green and Terephthal Brilliant Green from cymene. Proc. Nat. Acad. Sci., 10:421–26.

With P. S. Nissen. Further experiments in the field of terephthalic acid derivatives. Proc. Nat. Acad. Sci., 10:426–33.

With J. J. Ritter. Constitution of the so-called "Pechmann Dyes" and the mechanism of their formation from beta-benzoylacrylic acid. Proc. Nat. Acad. Sci., 10:363–67.

With M. Chertcoff. Thiazoles. VI. A new group of dyes from poison gases through the 2–aminothiazoles as intermediates. The preparation of thiazole dyes of Doebner Violet type. J. Am. Chem. Soc., 46:2864–71.

With F. P. Nabenhauer. Quinazolines. XXXVI. A quinazoline analog of cinchophen (atophan). The synthesis of new quinazolinecarboxylic acids from isatin and from *ortho*–amino–acetophenone. J. Am. Chem. Soc., 46:1702–7.

With F. P. Nabenhauer. Quinazolines. XXXVII. Some preliminary observations on the behavior of phthalic anhydride with the reaction methyl groups of certain quinazolines. J. Am. Chem. Soc., 46:1932–36.

With J. J. Ritter. Unsaturated ketonic acids. I. The constitution of the so-called "Pechmann Dyes" and the mechanism of their formation from beta–benzoylacrylic acid. J. Am. Chem. Soc., 46:2871–79.

1925

With C. N. Andersen. Selenium organic compounds. V. A simple method for the synthesis of 2–substituted benzoselenazoles. Proc. Nat. Acad. Sci., 11:217–18.

With J. J. Ritter. Unsaturated ketonic acids. II. Some experiments with beta-benzoylacrylic acid and related compounds. J. Am. Chem. Soc., 47:526–35.

Research in perfume chemistry. Am. Perfum. Essent. Oil Rev., 20: 137–38; also in Oil, Paint and Drug Reporter, 107:22 and Perfumers' Journal, 6:12, 54, 56, 58.

With A. Stull. Odor and chemical constitution in the benzothiazole group. Am. Perfum. Essent. Oil Rev., 20:453.

With A. Stull. Thiazoles. VII. Behavior of *o*–aminophenyl mercaptan with aldehydes, ketones and gem-dihalides: the synthesis of benzothiazoles. J. Am. Chem. Soc., 47:3078–83.

With H. B. Corbett. Thiazoles. X. Synthesis of some 2–phenyl–benzothiazole arsonic acids. Proc. Nat. Acad. Sci., 11:768–72.

Benzalaniline. In: *Organic Synthesis,* ed. by C. S. Marvel, vol. V, pp. 13–15. New York, John Wiley & Sons, Inc.

1926

With C. N. Andersen. Selenium organic compounds. VI. Bromine, sulfo and mercury derivatives of 2,4–diphenyl–selenophene and experiments with some related compounds. J. Am. Chem. Soc., 47:223–31.

With A. Stull. Thiazoles. VIII. Condensation of *o*–aminophenyl mercaptan and *o*–aminophenyl disulfide with acid chlorides, anhydrides and esters. J. Am. Chem. Soc., 48:248–54.

With R. L. Evans. New dye intermediates: 2,4–diaminophenyl oxide, 2–nitro–4–aminophenyl oxide and 2,4–diaminophenyl oxide. Ind. Eng. Chem., 18:299–302.

With H. B. Corbitt. Thiazoles. IX. Derivatives of 2–phenyl–benzothiazole. J. Am. Chem. Soc., 48:783–88.

With R. W. Allen. Thiazoles. XI. Synthesis of 2–(*p*–aminophenyl)–5–methylbenzothiazole and incidental compounds: isomers of dehydrothio–*p*–toluidine and of Chloramine Yellow. Ind. Eng. Chem., 18:532–33.

Cooperation between the American Manufacturers of Toilet Articles

and the Organic Laboratories of Columbia University. Am. Perfum. Essent. Oil Rev., 21:128–29.

1927

Synthetic Organic Chemistry in the Study of Odorous Compounds. New York, Columbia University Press. 25 v.

Organic medicinals. Chapter XXI in: *A Survey of American Chemistry,* National Research Council. New York, Chemical Company, Inc.

Perfume library for Columbia. Am. Perfum. Essent. Oil Rev., 21:644.

Rare volumes in Surgeon General's library. Am. Perfum. Essent. Oil Rev., 21:656.

Survey of chemotherapeutic researches in progress in the United States, and the promotion of cooperation between organic chemists and pharmacologists. Journal of the American Pharmaceutical Association, 16:123–29.

With A. Stull. Odor and chemical constitution in the benzoselenazole group. Am. Perfum. Essent. Oil Rev., 22:63.

With R. W. Allen. Thiazoles. XII. Synthesis of new isomers of dehydrothio–*para*–toluidine and of some related compounds: the connection between chemical constitution and tinctorial properties in the Thioflavine and Chloramine Yellow groups. J. Am. Chem. Soc., 49:1315–24.

With I. A. Updike. Thiazoles. XIII. Synthesis of 2–aryl 6–dimethylamino–benzothiazoles from 2–amino–5–dimethyl aniline thiosulfuric acid and aromatic aldehydes. J. Am. Chem. Soc., 49:1373–82.

Work of the Research Department, American Manufacturers of Toilet Articles, May 1926–May 1927. Am. Perfum. Essent. Oil Rev., 22:119–24.

With W. H. Taylor. Synthesis and study of certain new derivatives of phenacetin. J. Am. Chem. Soc., 49:1578–84.

With A. Stull. Selenium organic compounds. VII. Synthesis of 2–phenyl–, 2–furyl– and 2–thienylbenzoselenazoles, of 2–phenyl–benzoselenazole–4′–arsonic acid and of other benzoselenazoles. J. Am. Chem. Soc., 49:2011–16.

With E. M. McColm. Quinazolines. XXXVIII. Synthesis of some new analogs of cinchophen and intermediate products. J. Am. Chem. Soc., 49:2650–54.

With L. P. Curtin. Experiments in wood preservation. IV. Preservative properties of chlorinated coal-tar derivatives. Ind. Eng. Chem., 19:1231–34.

With L. Smidth. Thiazoles. XIV. Synthesis of 2–*ortho*– and *meta*-aminophenyl–6–methyl–benzothiazoles; new isomers of dehydrothio–*para*–toluidine, and of incidental compounds. J. Am. Chem. Soc., 49:3135–37.

1928

With L. Smidth. Interaction of sulfur and *para*–toluidine in the presence of litharge: thio–*para*–toluidine and related compounds. J. Am. Chem. Soc., 50:428–36.

Science, the individual and the state. J. Chem. Educ., 5:168–76; also in Chem. Listy, pp. 270–76 and Cesky Drogista (Prague) 29: 162–63.

Maison de la Chimie. Ind. Eng. Chem. (News Ed.), 6:3; also in Chemie et Industrie, 18:965–66.

Science in the interest of peace. J. Chem. Educ., 5:381–90.

With S. P. Burns. A bibliography of perfumery, soap and cosmetics. Am. Perfum. Essent. Oil Rev., 23:77.

Recent investigations in the chemistry of the thiazoles and selenazoles. Chem. Listy, pp. 225–28. (In Czech)

Odor and chemical constitution. Chem. Listy, pp. 228–29. (In Czech)

Technical Museums. Vestnik Technickeho Musea Ceskoslovenskeho, Rocnik XV, Dislo 2, Brezen, 9–12. (In Czech)

With I. Goldstein. Odor and molecular structure: derivatives of 5–aceto carvacryl methyl ether and certain other 1,2,4,5–tetra–substituted benzenes. Am. Perfum. Essent. Oil Rev., 23:524–26.

1929

Survey of technical literature. Am. Perfum. Essent. Oil Rev., 23: 666, 730; *ibid.*, 24:139, 463.

With F. R. Elder. Synthesis of 6–hydroxypiperonylic acid and incidental compounds. J. Am. Chem. Soc., 51:532–38.

With B. B. Coyne. Syringinc acid and its derivatives. J. Am. Chem. Soc., 51: 569–76.

With G. H. Connitt. Some of the reactions of 3–hydroxy–6–aminotoluene and of certain of its derivatives. J. Am. Chem. Soc., 51:900–915.

Chemical constitution and the musk odor. Molecular structure and synthesis of odorous components to which natural substances owe their musk aroma. Am. Perfum. Essent. Oil Rev., 24:15–17, 235–38, 357–58.

American Manufacturers of Toilet Articles reference collection of perfume materials. Am. Perfum. Essent. Oil Rev., 24:29.

Annual Report of Research Department, American Manufacturers of Toilet Articles. Am. Perfum. Essent. Oil Rev., 24:73–77.

Edgar Fahs Smith, chemist. Science, 69:557–65. [Reprint in: *Memorial Service for Edgar Fahs Smith,* University of Pennsylvania and J. Am. Chem. Soc., 51(Nov.):57–72.]

With F. G. Hess. Thiazoles. XV. Benzothiazole arsenicals of arsphenamine (Salvarsan) type. Rec. Trav. Chim. Pays-Bas, 48:904–11.

Veda a Prumysl (Science and industry). Proceedings of the Masaryk Academy of Work (Prague), 3:49–62; also in Nova Prace (Prague), 11:68.

With H. G. Eusted. Some pharmacological reactions of benzothiazole. Proceedings of the Society for Experimental Biology and Medicine, 26:721–22.

Survey of current literature. Am. Perfum. Essent. Oil Rev., 24:524, 604.

With D. Davidson. Aldehydes. I. Comparison of rates of oxidation of several aldehydes. Am. Perfum. Essent. Oil Rev., 24: 587–88.

1930

With D. Davidson. Aldehydes. II. Comparison of rates of oxidation of several aldehydes. Am. Perfum. Essent. Oil Rev., 24: 667–68.

Survey of technical literature. Am. Perfum. Essent. Oil Rev., 24: 675, 732; *ibid.,* 25:14, 88, 164, 240, 364, 432, 556, 649.

With H. P. Howells. Chemistry of the acyl *p*–quinones: A contribution to the solution of the "Pechmann Dyes" problem. J. Am. Chem. Soc., 52:837–50.

Nomenclature of organic chemistry. Am. Perfum. Essent. Oil Rev., 24:736–37.

With I. W. Greenberg. Unsaturated ketonic acids. III. Behavior of Pechmann dyes with amines. Some di–(imido ethers) of diphenacylfumaric and diphenacylmaleic acids and their tinctorial properties. Collect. Czech. Chem. Commun., 2:83–94.

With E. H. Manann. Beta–phenylethyl alcohols. Some new derivatives and the influence of structure upon odor in this group. Am. Perfum. Essent. Oil Rev., 25:19–21, 75–77.

With A. D. Hirschfelder and P. G. I. Lauffer. Acridine series. Synthesis of isomers of proflavine and of neutral acriflavine. Collect. Czech. Chem. Commun., 2:383–96.

Recent vanillin patents. Am. Perfum. Essent. Oil Rev., 25:303–4.

With T. Hasselström. Action of ultraviolet light on terpenes. I. Action on citronellal. J. Am. Chem. Soc., 52:4093–98.

With G. Powell. Aldehydes. III. Synthesis of simple and of substituted alpha–alkylcinnamic aldehydes. Am. Perfum. Essent. Oil Rev., 25:617–20.

1931

Survey of technical literature. Am. Perfum. Essent. Oil Rev., 25: 695, 784; *ibid.*, 26:172.

With M. G. Sevag. Thiazoles. XVI. Synthesis and study of new aminotoluthiazoles and derivatives from 2,5–diaminotoluene–4–thiosulfuric acid. J. Am. Chem. Soc., 53:660–70.

With G. Powell. Synthesis of simple and of substituted 2–alkylcinnamic alcohols, including a monomolecular cubebin. J. Am. Chem. Soc., 53:1605–10.

With G. Powell. Aldehydes. IV. Catalytic reduction of simple and substituted cinnamic aldehydes. J. Am. Chem. Soc., 53: 2747–55.

With D. Davidson. Aldehydes. V. Autoxidation of *alpha–normal*–amylcinnamic aldehyde. *Cis*– and *trans–alpha–normal*–amylcinnamic acids. J. Am. Chem. Soc., 53:3122–30.

Recent progress in the field of synthetic perfumes. (Dohme Lecture) J. Chem. Educ., 8:1311–34.

With T. Hasselström. Investigations in the retene field. I. Synthesis of some new retene derivatives. J. Am. Chem. Soc., 53: 3462–66.

With T. Hasselström and R. Firmenich. Menthenes. Synthesis of *p*–menthene–1[2], *p*–menthene–2, *p*–menthene–3, *p*–menthene–8 and intermediate compounds. Am. Perfum. Essent. Oil Rev., 26:377–80.

With J. H. Bartlett. Thiazines. I. Syntheses in the *peri*–naphtho–*meta*–thiazine group. J. Am. Chem. Soc., 53:4046–57.

Twenty-five years' progress in aromatic chemicals. Am. Perfum. Essent. Oil Rev., 26:489–92.

With W. S. Taylor. Thiazoles. XVII. An investigation of the connection between constitution and color in the thioflavine group. *Collect. Czech. Chem. Commun.*, 3:480–98.

1932

Charles Frederick Chandler, 1836–1925. In: National Academy of Sciences, *Biographical Memoirs,* 14:125–81. Washington, National Academy of Sciences.

With D. Davidson. Some alpha–alkylcinnamic acids and their derivatives. J. Am. Chem. Soc., 54:334–38.

With D. Davidson. Pyrimidine azo derivatives. J. Am. Chem. Soc., 54:831.

With J. A. Handy and D. Davidson. Some technical problems of the perfume and cosmetic industry. Ind. Eng. Chem. (News Ed.), 10:25.

Charles Lathrop Parsons. Ind. Eng. Chem., 24:362–63.

Science in the interest of peace. Columbia Alumni News, 23:5–7.

With D. Davidson. Azo derivatives of the pyrimidines. Proc. Nat. Acad. Sci., 18:215–22.

Recent isoprene chemistry. Chem. Rev., 10:265–94.

With H. G. Husted. Contribution to the pharmacology of the benzothiazoles. Journal of Pharmacology and Experimental Therapeutics, 45:189–208.

With T. Hasselström. Investigations in the retene field. II. *alpha*–Retene carboxylic acid and some of its derivatives. Proc. Nat. Acad. Sci., 18:417–22.

A layman watches pharmacy's re–awakening. New York Journal of Pharmacy, 9:179–82.

With D. Davidson. Isovioluric acid (alloxan–6–oxime). Proc. Nat. Acad. Sci., 18:490–96.

With H. G. Husted. Thiazoles. XVIII. Synthesis of 2–phenylbenzothiazole–5–carboxylic acid and derivatives. J. Am. Chem. Soc., 54:3394–98.

Structure of vitamin A and the synthesis of ionenes. Science, 76: 475–76.

With D. Davidson. Oxidation colors derived from 5,6–diaminouracil. J. Am. Chem. Soc., 54:4754.

1933

The mechanism of the ionene synthesis. Science, 77:197–98.

Process for the synthesis of phenanthrene and of phenanthrene derivatives. Science, 77:289.

With D. Davidson. Preparation of 5–aminouracil and of some of its derivatives. J. Am. Chem. Soc., 55:1667–68.

With R. B. Conklin. Synthesis of acenaphthene–*peri*–metathiazines and of some dyes derived therefrom. J. Am. Chem. Soc., 55: 1705–10.

With R. B. Conklin. Constitution of certain acenaphthenesulfonic acids. Collect. Czech. Chem. Commun., 5:187–203.

With E. G. McDonough. Autoxidation of aldehydes. Drug Cosmet. Ind., 32:312–13, 332–38, 514, 533–34, 536, 538, 540.

With R. O. Roblin, Jr. Formation of cyclic acetals from aldehydes or ketones and alkylene oxides. J. Am. Chem. Soc., 55:3741–45.

With S. J. Marion. Chemical examination of the volatile oil of *Sarothra gentianoides* L. and the detection therein of normal nonane. J. Am. Chem. Soc., 55:4187–96.

With G. S. Stomatoff. The synthesis of some alkylphenanthrenes and alkylphenanthrene–10–carboxylic acids. Rec. Trav. Chim. Pays-Bas, 52:584–92.

1934

With D. Davidson. Synthesis of condensed polynuclear hydrocarbons by the cyclodehydration of aromatic alcohols. I. Indanes. J. Am. Chem. Soc., 56:185–90.

With D. Davidson and R. O. Roblin, Jr. Synthesis of polynuclear hydrocarbons by the cyclodehydration of aromatic alcohols. J. Am. Chem. Soc., 56:248.

With P. M. Apfelbaum. Synthesis of 1,1,2,6–tetramethyltetralin and the constitution of irene. Science, 79:280.

Recent contributions to our knowledge of the chemistry of vitamin A. J. Chem. Educ., 11:203–7.

With D. Davidson and P. M. Apfelbaum. Synthesis of condensed polynuclear hydrocarbons by the cyclodehydration of aromatic alcohols. II. The synthesis of ionenes. J. Am. Chem. Soc., 56: 959–63.

With T. Hasselström. Investigations in the retene field. III. Some

new nitroretenols, nitrofluorenones and related compounds. J. Am. Chem. Soc., 56: 983–85.

Poison ivy. Drug Cosmet. Ind., 34:507.

New Charabot process for floral oils. Am. Perfum. Essent. Oil Rev., 29:124.

With D. Price. Synthesis of certain methoxychalcones and methoxy–benzal–beta–coumaranones from methoxyacetophenones and nitrobenzaldehydes. J. Am. Chem. Soc., 56:2442–49.

With D. Price and A. Dingwall. Influence of chemical constitution upon visible color and other tinctorial properties in the case of certain structurally related methoxychalcones and methoxybenzalcoumaranones. J. Am. Chem. Soc., 56:2483–87.

1935

With R. O. Roblin, Jr., and D. Davidson. Synthesis of condensed polynuclear hydrocarbons by the cyclodehydration of aromatic alcohols. III. The cyclization of some phenylated alcohols and related olefins. J. Am. Chem. Soc., 57:151–59.

With E. B. Marr. Quinazolines. XXXIX. Synthesis of quinazoline derivatives structurally analogous to the angostura alkaloids galiopine and galipine. J. Am. Chem. Soc., 57:729–32.

With E. B. Marr. Quinazolines. XL. Synthesis of a quinazoline derivative structurally related to papaverine. J. Am. Chem. Soc., 57:1329–30.

With S. E. Cairncross. Quinazolines. XLI. Synthesis of some new 4–quinazolone derivatives from *p*–bromoaniline, formaldehyde and hydrochloric acid. Collect. Czech. Chem. Commun., 7: 548–54.

With D. Davidson. Preparation of aromatic alcohols by the crossed Cannizzaro reaction with formaldehyde. J. Am. Chem. Soc., 57:905.

With B. Naiman. Thiazoles. XX. Synthesis of benzothiazoles from aldehydes and *o*–aminothiophenol. J. Am. Chem. Soc., 57:1529–33.

With B. Naiman. Thiazoles. XXI. Synthesis of indirubin types by condensation of 2–methylbenzothiazoles with isatins. J. Am. Chem. Soc., 57:1660–63.

With M. G. Ast. Thiazoles. XXII. Synthesis of some 6–methoxy– and 5,6–dimethoxybenzothiazoles and of certain dyes obtainable therefrom. Rec. Trav. Chim. Pays-Bas, 54:917–30.

With T. Hasselström. Investigations in the retene field. IV. The synthesis of 6–thioretenol and of certain related and derived compounds. J. Am. Chem. Soc., 57:1579–81.

With T. Hasselström. Certain sapinic acids obtained from various species of pine and spruce. J. Am. Chem. Soc., 57:2118–21.

With V. J. Mikeska. Synthesis of certain phenylated benzoxazoles and derivatives. J. Am. Chem. Soc., 57:2121–24.

With V. J. Mikeska. Preparation and tinctorial properties of certain benzoxazole dyes. J. Am. Chem. Soc., 57:2513–17.

1936

With S. E. Cairncross. Quinazolines. XLII. Synthesis of certain new 3,4–dihydroquinazoline derivatives from *p*–aminobenzoic acid, formaldehyde and hydrochloric acid. Collect. Czech. Chem. Commun., 8:57–66.

With J. G. Hildebrand, Jr. The Beckmann rearrangement of certain 2–alkyl cyclopentanone and cyclohexanone oximes. J. Am. Chem. Soc., 58:650–53.

With D. E. Adelson. Investigations in the retene field. V. The structure of 6–acetylretene. J. Am. Chem. Soc., 58:653–54.

With E. A. Robinson. Synthesis of substituted 5,6–benzocinchoninic acids by the Doebner and by the Pfitzinger reactions. J. Org. Chem., 1:65–75.

Connection between odor and constitution in the benzothiazole group. III. Am. Perfum. Essent. Oil Rev., 32:51.

With D. E. Adelson and T. Hasselström. Investigations in the retene field. VI. Retenediphenic acid and some of its derivatives. J. Am. Chem. Soc., 58:871–73.

The onward march of synthetic organic chemistry. Chemist, 13: 535–49.

A spirane by-product in the phenanthrene synthesis. Science, 84: 44.

With D. Papa. Quinazolines. XLIII. Synthesis of a quinazoline derivative structurally analogous to cusparine. J. Am. Chem. Soc., 58:1701–3.

With V. J. Mikeska and N. T. Farinacci. Allotropic forms of diphenylsulfone and the determination of their transition point. J. Am. Chem. Soc., 58:1869–71.

With R. M. Orcutt. Synthesis of 1,1–dimethyl–6,7–methylenedioxytetralin. J. Am. Chem. Soc., 58:2055–56.

With R. M. Orcutt. Synthesis of 1,1,2–trimethyl–5,6–methylenedioxyindane from safrole. J. Am. Chem. Soc., 58:2057–59.

With J. G. Hildebrand. An efficient expansible mechanical stirrer and its use in organic syntheses. Collect. Czech. Chem. Commun., 8:391–95.

With H. v. B. Joy. Thiazines. III. Synthesis of cyanine dyes of the *peri*–naphthometathiazine series. J. Org. Chem., 1:236–44.

With D. Perlman and D. Davidson. Synthesis of phenanthrenes from hydroxyl derivatives of beta–phenylethylcyclohexanes and the nature of the by-product. J. Org. Chem., 1:288–99.

With D. Perlman and D. Davidson. Synthesis and properties of certain spiranes from phenylpropylcyclanols. J. Org. Chem., 1: 300–304.

With D. E. Adelson. Retene field. VII. Certain fluorenones and phenanthridones from retenediphenic acid. J. Am. Chem. Soc., 58:2236–39.

The research chemist, mankind's devoted and indispensable servant. Science, 84:425–30.

1937

With D. E. Adelson. Retene field. VIII. Synthesis of 3′–methyl–5,6–cyclopentenoretene. J. Am. Chem. Soc., 59:399–401.

With R. B. Akin. Synthesis of 1,4–dimethyl–6,7–methylene dioxyphenanthrene and of certain substituted 9,10–dimethyl–1,2,5,6–dibenzanthracenes. J. Am. Chem. Soc., 59:1564–67.

With R. B. Akin and G. S. Stamatoff. Synthesis of 1,4–dimethylphenanthrene by the Pschorr reaction and the nonidentity of the product with the 1,4–dimethylphenanthrene of Bardhan and Sengupta. J. Am. Chem. Soc., 59:1268–72.

With D. Perlman. Dehydration of beta-phenylethyl–3–methylcyclohexan–1–ol. J. Am. Chem. Soc., 59:2534–36.

With G. W. Pope. The constitution of the methylionones. J. Org. Chem., 2:276–87.

1938

Carotenoids: the polyene pigments of plants and animals. Chapter IV in: *Organic Chemistry: An Advanced Treatise,* ed.

by H. Gilman, vol. II, pp. 1138–1220. New York, John Wiley & Sons, Inc.

Chandler Centenary: introductory address. Ind. Eng. Chem., 30: 118–20.

With D. Papa and D. Perlman. Synthesis of 1,4–dimethylphenanthrene by cyclodehydration methods. J. Am. Chem. Soc., 60: 319–21.

With E. C. Sterling. An approach to the synthesis of fichtelite. Science, 87:196, 234.

With P. M. Apfelbaum. Synthesis of 1,1,2,6–tetramethyltetralin and the constitution of irene. J. Am. Chem. Soc., 60:930–33.

With D. Price and D. Davidson. Synthesis of condensed polynuclear hydrocarbons by the cyclodehydration of aromatic alcohols. VII. Cyclodehydration involving the Wagner rearrangement. J. Org. Chem., 2:540–45.

The chemist as defender of his fatherland. Science, 88:19–21.

From the cradle to the grave. (Priestly Medal address) Ind. Eng. Chem. (News Ed.), 16:553–61.

With R. M. Orcutt. Application of cyclodehydration reactions to some safrole derivatives. Roczniki Chemii, 18:732–38.

Il chimico difensore della patria. Atti del X Congresso Internazionale di Chemica, 1:307–12.

1939

With J. Werner. Synthesis from thujaketone of some new hydroterpenoids. J. Org. Chem., 3:578–87.

With D. E. Adelson. Chemistry of retene. Chem. Rev., 24:135–76.

With E. C. Sterling. Synthesis of 12–methylperhydroretene (abietane) and its non-identity with fichtelite. J. Org. Chem., 4:20–29.

With C. A. Fetscher. Quinazolines. XLIV. Synthesis of some new quinazoline derivatives of veratrole akin to alkaloids. J. Org. Chem., 4:71–88.

With M. Levitz and D. Perlman. Products of the cyclizing dehydration of 1–beta–phenylethylcyclohexanol–1 and the synthesis of spirocyclohexane–1,1–indanone–3. Science, 90:114–15.

With H. H. Fox. Thiazoles. XXIII. Synthesis of certain benzothiazoles structurally related to quinoline antimalarials. J. Am. Chem. Soc., 61:2013–17.

With J. T. Cassaday. Synthesis of 1,4–dimethyl–6,7–dihydroxy-

phenanthrene from *para*–xylylacetic acid and 6–nitroveratraldehyde by the Pschorr reaction. J. Am. Chem. Soc., 61:2461–63.

With J. T. Cassaday. Synthesis of some new 1,4–dimethylphenanthrenes structurally related to morphol. J. Am. Chem. Soc., 61:3055–57.

With J. T. Cassaday. Application of the Pschorr reaction to alpha–(*para*–xylylene)–2,5–di–(6′–aminodimethylcaffeic acid). Synthesis of 9,10–dimethyl–2′,3′,6′,7′–tetramethoxy–1,2,5,6–dibenzanthracene. J. Am. Chem. Soc., 61:3058–61.

With R. M. Orcutt. Synthesis of 2–methylphenanthrene from *l*–methone. J. Org. Chem., 4:543–47.

International Union of Chemistry. Ind. Eng. Chem. (News Ed.), 17:710; also in Science, 90:491–92.

1940

With L. T. Coggeshall, L. H. Cretcher, L. F. Small, and T. H. Sollmann. The National Research Council Committee on Chemotherapy—Origin and Subjects. News Ed. (Am. Chem. Soc.), 18: 657–58.

With E. J. Mills, Jr. Synthesis of some new pyrimidines and uric acids from cystamine. J. Am. Chem. Soc., 62:1173–80.

1941

With D. D. Mossman. *Bergamot Oil.* American Pharmaceutical Association Monograph No. 2, 122 pp.

With R. M. Orcutt. Scianthrene and the synthesis of 1–isopropyl–7–methylphenanthrene. J. Am. Chem. Soc., 63:127–31.

With S. A. Cassaday. Retene field. XI. Synthesis of retopyridines (naphthoquinolines) from 3–aminoretene. J. Am. Chem. Soc., 63:703–8.

With S. A. Cassaday. Retene field. XII. Synthesis of 10–phenanthr[2,3–*b*]azepine derivatives by the Beckmann rearrangement of a tetrahydrobenzoretene ketoxime. J. Am. Chem. Soc., 1452–55.

With A. A. Plentl. Synthesis of tricyclic hydrocarbons related to stilbestrol. J. Am. Chem. Soc., 63:989–95.

With A. A. Plentl. Optical isomers of *cis*–9–methyl–1–decalone. J. Org. Chem., 6:669–83.

With O. N. Jitkow. Relationship between structure and odor in the case of certain derivatives of 2,2,4–trimethyl–Δ^3–cyclohexenealdehyde. J. Am. Chem. Soc., 63:1979–84.

With A. N. Nathan. Synthesis of pyrimidine and purine derivatives of cystamine and a new type of thiazolidenopyrimidine. J. Am. Chem. Soc., 63:2361–66.

With H. H. Fox. Thiazoles. XXIV. Some interesting exchange reactions between 6–alkoxy–7–nitrobenzothiazoles and alcohols. J. Am. Chem. Soc., 63:2996–99.

1942

Harry Linn Fisher: career and accomplishments. Chemist, 19:19–27.

With M. Levitz. Dehydrogenation. II. Spirocyclopentane–1,1′–tetralin. J. Am. Chem. Soc., 64:1719–20.

With E. J. Masters. Thiazoles. XXV. Some new thiazolidinopyrimidines of barbituric acid type. J. Am. Chem. Soc., 64:2709–12.

The influence of Egloff on the progress of American chemistry. Chemist, 19:270–74.

With E. J. Masters. Thiazoles. XXVI. Some acyl derivatives of 2–aminothiazole. J. Am. Chem. Soc., 64:2712–13.

1943

With F. Linsker. Amidino arsenicals. I. *p*–Amidinophenylarsonic acid and 4,4′–diamidinoarsenobenzene. J. Am. Chem. Soc., 65: 932–35.

With F. Brody. Synthesis of a pyridine analog of hydnocarpic acid and of a lower homolog. J. Am. Chem. Soc., 65:1075–80.

With F. Brody. Thiazoles. XXVII. A thiazole analog of hydnocarpic acid. J. Am. Chem. Soc., 65:1080–82.

With M. Levitz. Dehydrogenation. III. Dehydrogenation of a methyl spiran. J. Org. Chem., 8:253–55.

With K. C. Frisch. The search for superior antimalarials. I. Experiments in the veratrole group. J. Org. Chem., 8:331–38.

With K. C. Frisch and M. Silverman. Unexpected rearrangement in the application of the Skraup reaction to 3–nitro–4–aminoveratrole. J. Am. Chem. Soc., 65:2432–34.

Harrison E. Howe. Chem. Eng. News, 21:678.

1944

With K. Frisch. The search for superior antimalarials. II. Synthesis of 6,7–dimethoxyquinoline derivatives and of some incidental compounds. J. Org. Chem., 9:338–51.

With F. Linsker. Amidino arsenicals. II. Some trivalent arsenicals. J. Am. Chem. Soc., 66:191–92.

1945

Memorial meeting in honor of Marie Sklodowska Curie. Bulletin of the Polish Institute of Arts and Sciences in America, 3:200–201.

With M. Levitz. The search for superior drugs for tropical diseases. I. Derivatives of quininaldehyde and 6,7–dimethoxycinchoninaldehyde. J. Org. Chem., 10:341–46.

With F. Misani. The search for superior drugs for tropical diseases. II. Synthetic studies in the quinoline and phenanthroline series. Skraup and Conrad–Limpach–Knorr reactions. J. Org. Chem., 10:347–65.

With F. Misani. The search for superior drugs for tropical diseases. III. Further experiments in the quinoline group. J. Org. Chem., 10:458–63.

1946

With M. Silverman. Synthesis of some indene and dihydronaphthalene derivatives related to stilbestrol. J. Org. Chem., 11:34–49.

With F. Linsker. *N*–oxides of atebrin and plasmochin. J. Am. Chem. Soc., 68:192–93.

Addresses given at Parsons testimonial banquet: Introductory remarks. Chem. Eng. News, 24:1204.

The International Union of Chemistry. Chem. Eng. News, 24: 2608–9.

1947

The rebuilding and advance of the International Union of Chemistry. Chem. Eng. News, 25:1426–28; also in Chemistry and Industry, 447–49.

Wtih J. Ehrlich. Experiments in the veratrole and quinoxaline groups. J. Org. Chem., 12:522–34.

1949

International organization of chemists. Chem. Eng. News, 27:1992–95.

GERMAN PATENTS

228,796, Klasse 22a, Gruppe 1 Verfahren zur Darstellung von Azofarbstoffen

236,848, Klasse 12a, Gruppe 6 Verfahren zur Darstellung von 2,4–Diamino–*i*–phtalsaeure bezw. ihre Acidylderivate

U.S. PATENTS

1,012,055, Azo Dyestuffs

1,032,734 Products obtainable from 4,6–diamino–1,3–xylene and process of making

1,574,337 Dyestuff Intermediates