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CEMENT

Publications by Members of the Staff of the National Bureau of Standards, together with a list of Federal Specifications.

CONTENTS

GENERAL INFORMATION

Some of the publications in this list have appeared in the regular series of publications of the Bureau and others in various scientific and technical journals. Unless specifically stated, papers are not obtainable from the National Bureau of Standards.

Where the price is stated, the publication can be purchased from the Superintendent of Documents, Government Printing Office, Washington 25, D.C. The prices quoted are for delivery to addresses in the United States and its territories and possessions and in certain countries which extend the franking privilege. In the case of all other countries, one-third the cost of the publication should be added to cover postage. Remittances should be made either by coupons (obtainable from the Superintendent of Documents in sets of 20 for $1.00 and good until used), or by check or money order payable to the "Superintendent of Documents, Government Printing Office," and sent to him with order. Letter Circulars are obtainable, without charge, from the Bureau. Publications marked "OP" are out of print, but, in general, may be consulted at technical libraries.

For papers in other scientific or technical journals, the name of the journal or of the organization publishing the article is given in abbreviated form with the volume number (underscored), page, and year of publication, in the order named.

Serial letters are used to designate the several series of Bureau publications:

T = "Technologic Paper." T1 to T370. This series was superseded by the "Bureau of Standards Journal of Research" in 1928.

RP = "Research Paper." These are reprints of articles appearing in the "Bureau of Standards Journal of Research" and the "Journal of Research of the National Bureau of Standards," the latter being the title of this periodical since July 1934 (volume 13, number 1).

C = "Circular."

LC = "Letter Circular."

Circular C24 and supplements, the complete list of the Bureau's publications (1901-1944), is sold by the Superintendent of Documents for $1.30. Announcement of new publications is made each month in the Technical News Bulletin which is obtainable by subscription at $1.00 a year.

PART I. - TECHNOLOGIC PAPERS

	Series	Price
Tests of the absorptive and permeable properties of portland cement mortars and concretes, together with tests of dampproofing and waterproofing compounds and materials. R.J.Wig and P.H.Bates. Tech. Pap. BS 1, (1910-12).	T3	OP
The effect of high-pressure steam on the crushing strength of portland cement and concrete. R.J.Wig.Tech. Pap. BS 1, (1910-12).	T5	OP
Action of the salts in alkali water and sea water on cement. P.H.Bates, A.J.Phillips and R.J.Wig. Tech. Pap. BS 2, (1912-14).	T12	OP
Variation in results of sieving with standard cement sieves. R.J.Wig and J.C.Pearson. Tech. Pap. BS 3, (1911-16).	T29	OP
Standardization of no.200 cement sieves. R.J.Wig and J.C.Pearson. Tech. Pap. BS 4, (1913-14).	T42	OP
Hydration of portland cement. A.A.Klein and A.J.Phillips. Tech. Pap. BS 5, (1914-15).	T43	OP

PART I. - TECHNOLOGIC PAPERS (Continued)

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Value of the high pressure steam tests of portland cement. R.J.Wig and H.A.Davis. Tech. Pap. BS 5, (1914-15).	T47	OP
An air analyzer for determining the fineness of cement. J.C.Pearson and W.H.Sligh. Tech. Pap. BS 5, (1914-15).	T48	OP
Properties of the calcium silicates and calcium aluminate occurring in normal portland cement. P.H.Bates and A.A.Klein. Tech. Pap. BS 8, (1916-17).	T78	OP
The properties of portland cement having a high magnesia content. P.H.Bates. Tech. Pap. BS 9, (1916-17).	T102	OP
Effect of Cal as an accelerator of the hardening of portland cement mixtures. R.N.Young. Tech. Pap. BS 14, (1920-21).	T174	OP
Cementing qualities of the calcium aluminates P.H.Bates. Tech. Pap. BS 15, (1921).	T197	OP
Tests of caustic magnesia made from magnesite from several sources. P.H.Bates, R.N.Young and P. Rapp. Tech. Pap. BS 17, 529 (1922-24).	T239	OP

PART II. - RESEARCH PAPERS

Reaction of water on calcium aluminates. L.S.Wells. BS J. Research 1, 951 (1928).	RP34	OP
The sulphoaluminates of calcium. W.Lerch, F.W.Ashton and R.H.Bogue. BS J. Research 2, 715 (1929).	RP54	10¢
Influence of magnesia, ferric oxide, and soda upon the temperature of liquid formation in certain portland cement mixtures. W.C.Hansen. BS J. Research 4, 55(1930).	RP132	OP
The X-ray method applied to a study of the constitution of portland cement. L.T.Brownmiller and R.H.Bogue. BS J. Research 5, 813 (1930).	RP233	10¢

PART II. - RESEARCH PAPERS (Continued)

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Determination of magnesium in portland cement and similar materials by the use of 8-hydroxyquinoline. J.C.Redmond and H.A.Bright. BS J. Research 6, 113 (1931).	RP265	0P
The decomposition of tricalcium silicate in the temperature range, 1,000-1,300°C. E.T.Carlson. BS J. Research 7, 893(1931).	RP381	5¢
The system $CaO-Na_2O-Al_2O_3$. L.T.Brownmiller and R.H.Bogue. BS J. Research 8, 289 (1932).	RP414	5¢
The system: $CaO-B_2O_3$. E.T.Carlson. BS J. Research 9, 825 (1932).	RP510	5¢
The precipitation and titration of magnesium oxyquinolate in the presence of calcium oxalate, and its application in the analysis of portland cement and similar silicates. J.C.Redmond. BS J. Research 10, 823(1933).	RP569	5¢
The activity coefficients of hydroxyl ion in solutions of calcium hydroxide at 30°C. E.P.Flint and L.S.Wells. BS J. Research 11, 163 (1933).	RP584	5¢
Heat of hydration of portland cement pastes W.Lerch and R.H.Bogue. J. Research NBS 12, 645 (1934).	RP684	0P
Study of the system $CaO-SiO_2-H_2O$ at 30°C and the reaction of water on the anhydrous calcium silicates. E.P.Flint and L.S.Wells. J. Research NBS 12, 751 (1934).	RP687	0P
Investigation of commercial masonry cements. J.S.Rogers and R.L.Blaine. J. Research NBS 13, 811 (1934).	RP746	0P
Effect of granulometric composition of cement on the properties of pastes, mortars, and concretes. J. Arthur Swenson, Lacey A. Wagner, and George L. Pigman. J. Research NBS 14, 419 (1935).	RP777	0P
Effect of calcium chloride on portland cements and concretes. Paul Rapp. J. Research NBS 14, 499 (1935).	RP782	0P

PART II. - RESEARCH PAPERS (Continued)

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Behavior of high-early-strength cement concretes and mortars under various temperature and humidity conditions. Louis Schumen and Edward A. Pisapia. J. Research NBS 14, 723 (1935).	RP799	OP
A study for the preparation of a specification for high-early-strength portland cement. G. Rupert Gause. J. Research NBS 15, 421(1935).	RP839	OP
Studies of the quaternary system CaO-MgO-2CaO.SiO_2-5CaO.3Al_2O_3. H.F.McMurdie and Herbert Insley. J. Research NBS 16, 467 (1936).	RP884	5¢
Effects of partial prehydration and different curing temperatures on some of the properties of cement and concrete. F.B. Hornibrook, G.L.Kalousek, and C.H.Jumper. J. Research NBS 16, 487 (1936).	RP887	5¢
A rapid method for the determination of silica in portland cement. Edwin E.Maczkowske. J. Research NBS 16, 549 (1936).	RP891	5¢
Determination of sulphuric anhydride in portland cement by means of the Wagner turbidimeter. Robert B. Rudy. J. Research NBS 16, 555 (1936).	RP893	5¢
Distribution of compounds in portland cement. J. Arthur Swenson and E.P.Flint. J. Research NBS 17, 261 (1936).	RP910	5¢
Structural characteristics of some constituents of portland cement clinker. Herbert Insley. J. Research NBS 17, 353 (1936).	RP917	5¢
The system lime-boric oxide-silica. E.P. Flint and Lansing S. Wells. J. Research NBS 17, 727 (1936).	RP941	OP
Determination of sulphur occurring as sulphide in portland cement. Harry A. Bright. J. Research NBS 18, 137 (1937).	RP968	5¢
Studies on a portion of the system: CaO-Al_2O_3-Fe_2O_3. Howard F. McMurdie. J. Research NBS 18, 475 (1937).	RP987	5¢

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Method for approximating the glass content of portland cement clinker. William Lerch and Lorrin T. Brownmiller. J. Research NBS 18, 609 (1937).	RP997	10¢
Hydration of magnesia in dolomitic hydrated limes and putties. L.S.Wells and K. Taylor. J. Research NBS 19, 215 (1937).	RP1022	OP
Approximate glass content of commercial cement clinker. Wm. Lerch. J. Research NBS 20, 77 (1938).	RP1066	5¢
Minor constituents in portland cement clinker H. Insley and H.F.McMurdie. J. Research NBS 20, 173 (1938).	RP1074	10¢
Heats of hydration and transition of calcium sulfate. E.S.Newman and L.S.Wells. J. Research NBS 20, 825 (1938).	RP1107	5¢
Studies of heat of solution of calcium and magnesium oxides and hydroxides. K. Taylor and L.S.Wells. J. Research NBS 21, 133(1938).	RP1121	5¢
Effect of glass content upon the heat of hydration of portland cements. Wm. Lerch. J. Research NBS 21, 235 (1938).	RP1127	10¢
Phase equilibria studies on mixtures of the compounds $4CaO.Al_2O_3.Fe_2O_3$ - $2CaO.Fe_2O_3$ - $K_2O.Al_2O_3$. Wm. C. Taylor. J. Research NBS 21, 315 (1938).	RP1131	5¢
Relation of composition and heats of solution of portland cement clinker. Herbert Insley, Einar P. Flint, Edwin S. Newman and J. Arthur Swenson. J. Research NBS 21, 355 (1938).	RP1135	10¢
Formation of hydrated calcium silicates at elevated temperatures and pressures. E.P. Flint, L.S.Wells and H.F.McMurdie. J. Research NBS 21, 617 (1938).	RP1147	OP
Wear resistance of portland cement floors. L. Schuman and John Tucker, Jr. J. Research NBS 23, 549 (1939).	RP1252	OP

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Application of vibrators for measuring mortar consistency and fabricating mortar cubes. R.L.Blaine and J. Tucker, Jr. J. Research NBS 24, (1940).	RP1273	10¢
The nature of the glass in portland cement clinker. H. Insley. J. Research NBS 25, 295 (1940).	RP1324	10¢
Studies on the system lime-ferric oxide-silica. M.D.Burdick. J. Research NBS 25, 395(1940).	RP1340	5¢
Hydrothermal and X-ray studies of the garnet-hydrogarnet series and the relationship of the series to hydration products of portland cement. E.P.Flint, Howard F. McMurdie, and Lansing S. Wells. J. Research NBS 26, 13(1941).	RP1355	10¢
Effect of heat treatment and cooling rate on the microscopic structure of portland cement clinker. George W. Ward. J. Research NBS 26, 49 (1941).	RP1358	10¢
X-ray studies of components in the system $PbO-B_2O_3$ and $K_2O-PbO-SiO_2$. Howard F. McMurdie. J. Research NBS 26, (1941).	RP1392	5¢
Relationship of the garnet-hydrogarnet series to the sulfate resistance of portland cement. E.P.Flint and L.S.Wells. J. Research NBS 27, August (1941).	RP1411	5¢
Behavior of calcium sulfate at high temperatures. Edwin S. Newman. J. Research NBS 27, August (1941).	RP1413	5¢
The system $2CaO.SiO_2-K_2O.CaO.SiO_2$ and other phase equilibria studies involving potash-Wm. C. Taylor. J. Research NBS 27, September (1941).	RP1421	10¢
Structure of tri-calcium silicate. H.F. McMurdie. J. Research NBS 27, December(1941).	RP1437	5¢
Ten-year tests of high-early strength cement concretes. Louis Schuman. J. Research NBS 30, December (1942).	RP1508	5¢

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Further phase-equilibrium studies involving the potash compounds of portland cement. W.C. Taylor. J. Research NBS 30, January (1943).	RP1512	10¢
Composition and physical properties of aqueous extracts from portland cement clinker pastes containing added materials. George L. Kalousek, C.H.Jumper and J.T.Tregoning. J. Research NBS 30, March (1943).	RP1530	10¢
Effect of added materials on some properties of hydrating portland cement clinkers. E.S. Newman, R.L.Blaine, C.H.Jumper and G.L. Kalousek. J. Research NBS 30, April(1943).	RP1533	10¢
Nature of prismatic dark interstitial material in portland cement clinker. W.C.Taylor. J. Research NBS 30, May (1943).	RP1536	15¢
Study of the system $CaO-Al_2O_3-H_2O$ at temperatures of 21°C and 90°C. L.S.Wells, W.F.Clarke, and H.F.McMurdie. J. Research NBS 30, May(1943).	RP1539	10¢
Ten year tests on commercial masonry cements. R.L.Blaine. J. Research NBS 31, July(1943).	RP1548	5¢
Tensile and other properties of concretes made with various types of cement. Louis Schuman and John Tucker, Jr.J. Research NBS 31, August (1943).	RP1552	10¢
X-ray patterns of hydrated calcium silicates. H.F.McMurdie and E.P.Flint. J. Research NBS 31, October (1943).	RP1560	5¢
Dicalcium silicate solid solutions. K.T. Greene. J. Research NBS 32, January (1944).	RP1570	10¢
Thermal expansion of concrete aggregate materials. Walter H. Johnson and Willard H. Parsons. J. Research NBS 32, March(1944).	RP1578	10¢
Studies of portions of the quaternary system soda-lime silica-water at 25°C. George L. Kalousek. J. Research NBS 32 June (1944).	RP1590	10¢

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Analogy of hydrated calcium silicoaluminates and hexacalcium aluminate to hydrated calcium sulphoaluminates. E.P.Flint and Lansing S. Wells. J. Research NBS 33, December(1944).	RP1623	5¢
Spectrographic determination of sodium, potassium and lithium in portland cement with the direct-current carbon arc. Armin W. Helz. J. Research NBS 34, February(1945).	RP1633	10¢
Extraction of alumina from clays and high-silica bauxites. E.P.Flint, W.F.Clarke, E.S.Newman, Leo Shartsis, D.L.Bishop, and Lansing S. Wells. J. Research NBS 36, January (1946).	RP1691	10¢
Effect of some added materials on dicalcium silicate. Edwin S. Newman and Lansing S. Wells. J. Research NBS 36,February(1946).	RP1696	10¢
Phase equilibrium relations in a portion of the system Na_2O-CaO-Al_2O_3-SiO_2. Kenneth T. Greene and R.H.Bogue. J. Research NBS 36, February (1946)	RP1699	10¢

PART III. - CIRCULARS

Materials for the household (nontechnical information on use of cement). Cir BS(1917).	C70	OP
Caustic magnesia cement. Cir. BS (1922).	C135	OP
Stucco investigations at the Bureau of Standards with recommendations for portland cement stucco construction. Cir. BS (1926).	C311	OP

PART IV. - LETTER CIRCULARS
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The development of standard sieve specifications in the United States. (1931).	LC311
Policy of the National Bureau of Standards with regard to tests for outside agencies(1939).	LC544
Standard specifications for sieves. (1940).	LC584

PART IV. - LETTER CIRCULARS (Continued)
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Building materials, building standards, home building; Publications of the National Bureau of Standards (list). (1940).	LC592	
Concrete and reinforced concrete (1946).	LC838	
Structural clay products, stone, and masonry (1946).	LC824	

PART V. - FEDERAL SPECIFICATIONS

The specifications listed below are issued by the Federal Specifications Executive Committee, Procurement Division Building, Washington, D.C. Copies may be secured from the Superintendent of Documents, Government Printing Office, this city, at the prices indicated:

Cement; magnesia	HH-M-61	5¢
Cement; pipe-covering	HH-P-386a	5¢
Cements, hydraulic; general specifications (Methods for sampling, inspection and testing).	SS-C-158b	10¢
Cement; masonry	SS-C-181b	5¢
Cement; portland	SS-C-192	5¢
Cement; portland, pozzolana	SS-C-208	5¢
Sieves; standard, testing	RR-S-366	5¢

PART VI. - OUTSIDE PUBLICATIONS

The articles listed below are not for distribution or sale by the Government, but may be consulted at most large libraries or in some cases may be purchased directly from the publishers.

The effect of high pressure steam on the crushing strength of portland cement mortar and concrete. R.J.Wig. Proc. Am. Soc. Testing Materials (American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.) 11, 580 (1911); also Tech. Pap. BS, T5, 1, (1910-12).

Present status of iron ore cement. P.H.Bates. J. Nat. Assn. Cement Users (American Concrete Institute, 7400 Second Blvd., Detroit, Mich.) 566 (1912).

Action of the salts in alkali water and sea water on cement. R.J.Wig and P.H.Bates. J. Franklin Inst. (Journal of the Franklin Institute, 20th and Parkway, Phila., Pa.), 175, 65 (1913); also Tech. Pap. BS, T12, 2, (1912-14).

The constitution of portland cement. P.H.Bates. J. Nat. Assn. Cement Users, 368 (1913).

Errors in the methods of determining the time of setting of cement. G.M.Williams. Proc. Am. Soc. Testing Materials, 14, Part II, 172 (1914).

Time of setting of cement. G.M. Williams. Proc. Am. Soc. Testing Materials, 14, Part II, 200 (1914).

Properties of portland cement having a high MgO content. P.H. Bates. Proc. Am. Concrete Inst., 10, 470 (1914).

Some properties of white portland cement. P.H.Bates. J. Am. Ceram. Soc. (American Ceramic Society, 2525 N. High St., Columbus, Ohio), 16 551 (1914).

Some further results obtained in investigations of the properties of portland cement having a high MgO content. P.H.Bates. Proc. Am. Concrete Inst., 11, (1915).

The effect of fine grinding and a higher SO_3 content upon the physical properties of portland cement. P.H.Bates. Proc. Am. Soc. Testing Materials. 15, Part II, 126 (1915).

Process and apparatus for separating and analyzing granular materials. Patent 1,186,525. U.S. Patent Office, Washington, D.C., June 8, 1916. (Price 10 cents).

PART VI. - OUTSIDE PUBLICATIONS (Continued)

What is the trouble with concrete in seawater? R.J.Wig and Lewis R. Ferguson. Eng. News-Record. Series of five articles (McGraw-Hill Publishing Co., Inc., 330 W. 42d St., New York, N.Y.), Sept. 1917.

The hydraulic properties of the calcium aluminates. P.H.Bates. J. Am. Ceram. Soc., 1, 679 (American Ceramic Society, 2525 N. High St., Columbus, Ohio), (Oct. 1918).

Cements producing quick hardening concretes. P.H.Bates. Proc. Am. Soc. Testing Materials, (American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.) 19, Part II, 429 (1919).

Specifications for the U.S. Standard Sieve Series. J.C.Pearson. Proc. Am. Concrete Inst., (American Concrete Institute, 7400 Second Blvd., Detroit, Mich.) 16, 49 (1920).

Effect of age of test pieces in soundness tests of portland cement. J.R.Dwyer. Concrete - Cement Mill Edition (Concrete Publishing Co., 400 W. Madison St., Chicago, Ill.), 17, 87 (Dec. 1920).

Shrinkage of cement mortars and its importance in stucco construction. J.C.Pearson. Proc. Am. Concrete Inst., 17, 133(1921).

Time of set of concrete. Watson Davis. Proc. Am. Soc. Testing Materials, 21, Part II, 995 (1921).

Relation between tensile and compressive strengths of cement mortars. J.R.Dwyer. Concrete - Cement Mill Edition, 18, 123 (June, 1921).

Plastic magnesia cements. P.H.Bates and Roy N. Young. J. Am. Ceram. Soc., 4, 570 (July 1921).

The application of the fundamental knowledge of portland cement to its manufacture and use. P.H.Bates. J. Franklin Inst. (Franklin Institute, 20th and Parkway, Phila., Pa.) 193, 289 (March, 1922).

Inspection of portland cement. J.R.Dwyer and Roy N. Young. Concrete 21, Aug. and Sept. 1922.

Need of research in the portland cement industry. P.H.Bates. Chem.& Met. Eng. (Chemical and Metallurgical Engineering, McGraw-Hill Publishing Co., 330 W. 42d St., New York, N.Y.), 29, 462 (Aug. 30, 1922).

PART VI. - OUTSIDE PUBLICATIONS (Continued)

What properties and methods of making portland cement need further investigation? P.H.Bates. Proc. Am. Soc. Testing Materials, (American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.) 23, Part II, 160 (1923).

Late data on fine grinding and additional SO_3 to cements. P.H.Bates. Proc. Am. Soc. Testing Meterials, 23, Part II, 248 (1923).

Discussion on the "Meaning and microscopic measurement of average particle size." J.C.Pearson. J. Am. Ceram. Soc. (American Ceramic Society, 2525 N. High St., Columbus, Ohio), 6, 121 (May 1923).

The possibility of improving hydraulic cements. P.H.Bates. Proc. Portland Cement Assn. (Portland Cement Association, 33 West Grand Ave., Chicago, Ill.), May 21, 1923.

Discussion of aluminate cement-portland cement. P.H.Bates. Proc. Am. Concrete Inst. (American Concrete Institute, 7400 Second Blvd., Detroit, Mich.), 20 355 (1924).

New Process of making high alumina cement. P.H.Bates. Rock Products (Tradepress Publishing Corp., 309 W. Jackson Blvd., Chicago, Ill.), May 30, 1925.

Fine grinding of cement increases strength of concrete. Morris Temin and W.H.Sligh. Concrete, 27, 47 (Sept. 1925).

Portland cement research. R.H.Bogue. Proc. Am. Soc. Testing Materials, 26, Part II, 403 (1926).

High alumina hydraulic cements. P.H.Bates. Ind.& Eng. Chem. (Industrial and Engineering Chemistry, 1155 16th St. NW, Washington, D.C.) 18, 554 (June 1926).

A digest of the literature on the constitution of portland cement clinker. R.H.Bogue. Concrete (Concrete Publishing Co., 400 W. Madison St., Chicago, Ill.) July 1926 to Feb. 1927.

Studies on the system $CaO-Fe_2O_3-SiO_2$. W.C.Hansen and R.H.Bogue. J. Am. Chem. Soc. (American Chemical Society, The Ohio State University, Columbus, Ohio), 48, 1261 (1926).

The determination of uncombined lime in portland cement. W.Lerch and R.H.Bogue. Ind.& Eng. Chem. 18, 739 (1926).

PART VI. - OUTSIDE PUBLICATIONS (Continued)

Long time tests of high magnesia cements. P.H.Bates. Proc. Am. Soc. Testing Materials (American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.), 27, Part II, 324 (1927).

Portland cement in concrete engineering. R.H.Bogue. Proc. Am. Concrete Inst. (American Concrete Institute, 7400 Second Blvd., Detroit, Mich.), 23, 355 (1927).

Why time is a factor in the study and use of cement. P.H.Bates. Proc. Am. Concrete Inst., 23, 436 (1927).

The preparation and optical properties of calcium hydroxide crystals. F.W.Ashton and Raymond Wilson. Am. J. Sci. (American Journal of Science, 502 Sterling Tower, New Haven, Conn.) 13, 209 (1927).

Studies on the system $CaO-Al_2O_3-SiO_2$: The composition of $8CaO+Al_2O_3+2SiO_2$. W.C.Hansen, W. Dyckerhoff, F.W.Ashton, and R.H.Bogue. J. Phys. Chem. (Journal of Physical Chemistry, William & Wilkins Co., Baltimore, Md.) 31, 607 (1927); Rock Products (Tradepress Publishing Corp., 309 W. Jackson Blvd., Chicago, Ill.), 30, April 16, 1927.

The preparation of optically clear selenium for use in index media. L.T.Brownmiller. Am. Mineral. (American Mineralogical Society of America, U.S.Geological Survey, Washington, D.C.), 12, 43 (1927).

X-ray diffraction measurements on some of the pure compounds concerned in the study of portland cement. E.A.Harrington. Am. J. Sci., 13, 467 (1927).

The present status of portland cement and the possibilities of super cements. P.H.Bates. Rock Products, 30, 77 (Dec. 1927).

The combination of lime in portland cement compounds. Preliminary investigation. W.C.Hansen and R.H.Bogue. Ind.& Eng. Chem., 19, 1260 (1927).

Studies on the hydrolysis of compounds which may occur in portland cement. W. Lerch and R.H.Bogue. J. Phys. Chem., 31, 1627 (1927).

Cement as a factor in the workability of concrete, P.H.Bates and J.R.Dwyer. Proc. Am. Concrete Inst., 24, 43 (1928).

PART VI. - OUTSIDE PUBLICATIONS (Continued)

Notes on the progress of some studies of the crazing of portland cement mortars. P.H.Bates and C.H.Jumper. Proc. Am. Concrete Inst., (American Concrete Institute, 7400 Second Blvd., Detroit, Mich.) 24, 179 (1928).

Limes, structural cements, and plasters. P.H.Bates and J.M. Porter. Survey Am. Chem. (Survey of American Chemistry, National Research Council, Washington, D.C.), Third Annual, 1928.

Further studies on portland cement compounds by the X-ray diffraction method. W.C.Hansen. J. Am. Ceram. Soc. (American Ceramic Society, 2525 N. High St., Columbus, Ohio), 11, 68 (Feb. 1928).

A digest of the literature on the nature of the setting and hardening processes of portland cement. R.H.Bogue. Rock Products (Tradepress Publishing Corp., 309 W. Jackson Blvd., Chicago, Ill.), May to Sept. 1928.

Modern cements - A study of the characteristics of the hydraulic cements of today. P.H.Bates. Eng. News-Record (Engineering News-Record, McGraw-Hill Publishing Co., 330 W. 42d St., New York, N.Y.) 100, 887 (June 7, 1928); 932 (June 14, 1928).

Studies on the system calcium oxide-alumina-ferric oxide. W.C.Hansen, L.T.Brownmiller, and R.H.Bogue. J. Am. Chem. Soc. (American Chemical Society, The Ohio State University, Columbus, Ohio), 50, 396 (1928).

Equilibrium studies on alumina and ferric oxide combinations of these with magnesia and calcium oxide. W.C.Hansen and L.T. Brownmiller. Am. J. Sci. (American Journal of Science, 502 Sterling Tower, New Haven, Conn.), 15, 225(1928).

Phase equilibria in the system $2CaO.SiO_2.MgO$-$5CaO.3Al_2O_3$. W.C.Hansen. J. Am. Chem. Soc., 50, 3081 (1928).

The cause of unsoundness in portland cement. W. Lerch. Concrete-Cement Mill Edition (Concrete Publishing Co., 400 W. Madison St., Chicago, Ill.) 35, 109 (July 1929); 115 (Aug. 1929).

Calculation of compounds in portland cement. R.H.Bogue. Ind. & Eng. Chem. (Anal. Edition) (Industrial and Engineering Chemistry, 1155 16th St. NW, Washington, D.C., 1, 192 (Oct. 1929).

High strength, high-early-strength, and waterproof concrete. P.H.Bates. Engrs. and Engg. (Engineers and Engineering - Ceased publication with vol. 49, Mar. 1932)46, 177(July 1929).

PART VI. - OUTSIDE PUBLICATIONS (Continued)

Variations in standard portland cements. P.H.Bates. Proc. Am. Concrete Inst. (American Concrete Institute, 7400 Second Blvd., Detroit, Mich.), 26, 65 (1930).

The relation between the strengths of cements developed by mortar specimens and concrete specimens. J.R.Dwyer and P.H.Bates. Proc. Am. Soc. Testing Materials (American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.), 30, Part II, 598(1930).

Some properties of high alumina cement from six countries. P.H. Bates. Proc. New Intern. Assoc. Testing Materials (New International Association for Testing Materials, Leonhardstrasse 27, Zurich, Switzerland, Group B, 210(1930).

Revised procedure for the determination of uncombined lime in portland cement. Wm. Lerch and R.H.Bogue. Ind. and Eng. Chem. (Anal. Edition) - (Industrial and Engineering Chemistry, 1155 16th St. NW, Washington, D.C.), 2, 296 (July 15, 1930).

The X-ray method applied to a study of the constitution of portland cement. L.T.Brownmiller and R.H.Bogue. Am. J. Sci. (American Journal of Science, 502 Sterling Tower, New Haven, Conn.), 20, 241 (1930); also BS J. Research 5, 813 (1930), RP233.

Suggested investigations of high alumina cements. P.H.Bates. Proc. New Intern. Assoc. Testing Materials, (1931).

Cement and concrete (Chapter XXVIII, Annual Survey of American Chemistry, 1930). John Tucker, Jr. Annual Survey Am. Chem. (National Research Council, Washington, D.C.), May 1931.

Can cement durability be predicted? E.T.Carlson and P.H.Bates. Eng. News-Record (Engineering News-Record, McGraw-Hill Publishing Co., 330 W. 42d St., New York,N.Y.), 107, 130(July 23, 1931).

The decomposition of tricalcium silicate in the temperature range 1000°-1300°C. E.T.Carlson. Rock Products (Tradepress Publishing Corp., 309 W. Jackson Blvd., Chicago, Ill.), XXXIV, 52, Dec. 5, 1931; also BS J. Research 7, 893 (1931), RP381.

Natural cement mortar found strong after half a century. P.H.Bates. Eng. News-Record, 108, 96 (Jan. 21, 1932).

Notes on hardening cements at the boiling point of water.P.H. Bates, and R.L.Blaine. Proc. Am. Concrete Inst. 28, 531(1932).

The system $CaO-Na_2O-Al_2O_3$. L.T.Brownmiller and R.H. Bogue. Am. J. Sci. 23, 501 (1932); also BS J. Research 8, 289(1932),RP414.

PART VI. - OUTSIDE PUBLICATIONS (Continued)

The chemical analyses of the particles of various sizes of ground cement. E.T.Carlson and P.H.Bates. Rock Products (Tradepress Publishing Corp., 309 W. Jackson Blvd., Chicago, Ill.) XXXV, 18, Oct. 22, 1932.

The hydration of tricalcium aluminate. W.D.Foster. Proc. Am. Concrete Inst., 29, 189(1932).

Status of specifications for hydraulic cements in the United States. P.H.Bates. Proc. Am. Soc. Testing Materials (1916 Race St., Philadelphia 3, Pa.) 33, Part II, 462 (1933).

A rapid method for determination of the specific surface of portland cement. L.A.Wagner. Proc. Am. Soc. Testing Materials, 33, Part II, 553 (1933).

Present day cement and cement of 20 years ago. P.H.Bates. Eng. News-Record (McGraw-Hill Publishing Co.,330 W. 42d St., New York, N.Y.), 110, 492 (1933).

A compilation of phase-rule diagrams of interest to the ceramist and silicate technologist. F.P.Hall and Herbert Insley. J. Am. Ceram. Soc. (American Ceramic Society, 2525 N. High St., Columbus Ohio), 16, 483 (1933).

Progress report on the reaction of calcium chloride on portland cement. L.S.Wells and Paul Rapp. Proc. Highway Research Board (National Research Council, Washington, D.C.) Thirteenth Annual Meeting, 291 (Dec. 1933).

Heat of hydration of portland cement pastes. Wm. Lerch and R.H. Bogue. Concrete - Cement Mill Section (Concrete Publishing Co., 400 W. Madison St., Chicago, Ill.) 42, 36 (1934); also 39(1934); also J. Research NBS 12, 645(1934) RP684.

A simple apparatus for determining heat of hydration of portland cement. Wm. Lerch. Eng. News-Record, 113, 523(1934).

Hydration of portland cement compounds. R.H.Bogue and Wm. Lerch. Ind. and Eng. Chem. (Industrial and Engineering Chemistry, 1155 16th St., NW, Washington, D.C.), 26, 837 (1934).

Influence of composition on volume constancy and salt resistance of portland cement pastes. R.H.Bogue, Wm. Lerch, and W.C.Taylor. Ind. and Eng. Chem., 26, 1049(1934).

Effect of calcium chloride on portland cements and concretes. Paul Rapp. Proc. Highway Research Board, Fourteenth Annual Meeting, Dec. 1934.

PART VI. - OUTSIDE PUBLICATIONS (Continued

Trends in the production and use of various types of hydraulic cements. P.H.Bates. Proc. Am. Concrete Inst. (American Concrete Institute, 7400 Second Blvd., Detroit, Mich.) 31, 225 (1935).

Compounds in portland cement revealed by high-temperature research upon cement components. R.H.Bogue. Ind.& Eng. Chem., (Industrial and Engineering Chemistry, 1155 16th St. NW, Washington, D.C.) 27, 1312 (1935).

A study of the system lime-potash-alumina. L.T.Brownmiller. Am. J. Sci. (American Journal of Science, 502 Sterling Tower, New Haven, Conn.) 29, 260 (1935).

Determination of specific surface of portland cement raw mixtures by means of Wagner turbidimeter. T. Asano. Rock Products (Tradepress Publishing Corp., 309 W. Jackson Blvd., Chicago, Ill.)39, Feb. 1936.

The use of blast furnace slags in the manufacture of hydraulic cements. P.H.Bates. Proc. Nat. Slag Assoc. (National Slag Association, Earle Bldg., Washington, D.C.), 1936.

Effect of departure from planeness of bearing surfaces on the compressive strength of 2-in. mortar cubes. J.R.Dwyer, Proc. Am. Soc. Testing Materials (American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.) 36, Part II, 351 (1936).

Controlling the heat of hydration of cements. - P.H.Bates. Proc. Internat'l Assn. for Testing Materials, London Congress, April 1937, p 262.

Method for approximating the glass content of portland cement clinker. Wm. Lerch and L.T.Brownmiller (Paper no. 32, Portland Cement Association Fellowship, National Bureau of Standards, Washington, D.C., May 1937.

Some effects of heat treatment on portland cement clinker. Wm. Lerch and W.C.Taylor. Portland Cement Association Fellowship Paper no. 33, July 1937; Concrete,M.S., 45, 199, 217(1937).

The Cement Reference Laboratory - J.R.Dwyer. Am. Soc. Testing Materials, Bul., no. 87, 12 (Aug. 1937).

Some suggested practices in the estimation of particle size gradation of granular materials. J.R.Gran. Am. Soc. Testing Materials, Bul. no.88, 17(Oct. 1937) Pit & Quarry, 30, no.10, 69(1938).

PART VI. - OUTSIDE PUBLICATIONS (Continued)

The hydrated calcium silicates. E.P.Flint and Lansing S. Wells. Trans. Am. Geophysical Union (National Academy of Sciences, Wash., D.C.), part 1, 261 (Dec. 1937).

The structure of the glassy phase of portland cement clinker. L.T.Brownmiller. Am. J. Science, New Haven, Conn., 35, 241(1938).

Supplement to a compilation of phase-rule diagrams of interest to the ceramic and silicate technologist. E.P.Hall and H. Insley. J. Am. Ceramic Soc. (2525 N. High St., Columbus, Ohio), 17, 210 May 1938.

Effect of glass content upon the heat of hydration of portland cement. William Lerch. Paper no. 36, Portland Cement Association Fellowship (National Bureau of Standards, Wash.D.C.) Aug;1938.

Phase equilibria studies on mixtures of the compounds $4CaO.Al_2O_3$. Fe_2O_3-$2CaO.Fe_2O_3$-$K_2O.Al_2O_3$. Wm. C. Taylor. Paper no.37, Portland Cement Association Fellowship, Washington, D.C.),Sept. 1938.

Constitution of portland cement clinker. R.H.Bogue. Reprint from Proc. Symposium on chemistry of cements(Stockholm, Sweden)(1938).

Mineralizers in cement. E.P.Flint. Rock Products (Tradepress Publishing Corp., 309W.Jackson Blvd.,Chicago,Ill.)42, Oct.1939.

Theories (approved and otherwise) and specifications for portland cement. P.H.Bates. An abstract of the Edgar Marburg Lecture read before the annual meeting of the Am. Soc. Testing Materials (American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.), in Atlantic City, June 26, 1940. Pit & Quarry, 37, (Sept. 1940).

Oxides extracted in Merriman's test of portland cement. E.P.Flint and P.H.Bates. Rock Products 43, no.10, 46 (Oct. 1940).

Studies of the measurement of specific surface by air permeability. R.L.Blaine. Bul.Am. Soc. Testing Materials no.108, Jan. 1941.

Potassium sulfate as a constituent of portland cement clinkers. G.L.Kalousek, C.H.Jumper, and J.J.Tregoning. Rock Products, April 1941.

Rapid method for determining alkalies in cement. F.W.Glaze. Rock Products, 44, no.7, p 42 (July, 1941).

Studies of the sulfate resistance of portland cements. G.Rupert Gause. Amer.Soc. Testing Materials,Bul. no.112, 17(Oct. 1941).

PART VI. - OUTSIDE PUBLICATIONS (Continued)

Comparison of sonic and other measurements of mortar bars exposed to sulfate solutions. F.B.Hornibrook. American Soc. for Testing Materials Bul. no.113, 25(December, 1941).

Effect of calcium chloride on readings of a volumeter inclosing portland cement pastes and on linear changes of concretes.J.C. Yates. Proc. Hwy. Research Board 21(1941).

Portland cement and the "plastic" concrete. R.H.Bogue. Paper no.41. Portland Cement Assoc. Fellowship (National Bureau of Standards, Washington, D.C.)(January, 1942).

Effects of added materials on properties of portland cement. George L. Kalousek. Pit & Quarry (538 S. Clark St., Chicago, Ill.) September, 1943.

Some properties of portland pozzolana cements. G.Kalousek and C.H.Jumper. Journal American Concrete Institute (Nov. 1943).

Alkali etching tests on concrete aggregates. W.H.Parsons and H. Insley. J. American Concrete Institute (January 1944).

Effect of calcium chloride on water requirements and other properties of concrete made with plain and treated cements. H.C. Vollmer. Proc. Highway Research Board, 23 (1944).

Factors affecting the thermal expansion of concrete aggregate materials. Willard H. Parsons and Walter H. Johnson. J. American Concrete Institute. (April 1944).

The effects of certain variations in consistency and curing conditions on the compressive strengths of cement-lime mortars. G.J.Fink. Am. Soc. Testing Materials Proceedings 44, p.780 (June 1944).

Thermal expansion of aggregates. W.H.Johnson and W.H.Parsons. Pit & Quarry 43 (August 1944).

Reactivity of aggregate constituents in alkaline solutions. L. Bean and J.J.Tregoning. J. American Concrete Institute (Sept. 1944).

Effectiveness of various treatments and coatings for concrete in reducing the penetration of kerosene. F.B.Hornibrook. J. American Concrete Institute (September, 1944).

PART VI. - OUTSIDE PUBLICATIONS (Continued)

Properties of highly hydrated dolomitic masonry limes and certain of their cement-lime mortars. G.J.Fink and Emil Trattner. Proc. Am. Soc. Testing Materials, June 1945.

Effect of heat on portland cements containing Vinsol resin. Leonard Bean and Albert Litvin. Am. Soc. Testing Materials Bul. no. 135, p 30 (Aug. 1945).

The testing of portland cements containing interground Vinsol resin. R.L.Blaine, J.C.Yates, and J.R.Dwyer. Proc. Am. Soc. Testing Materials (August 1945).

Spectrophotometric determination of titania in portland cement. J.J.Diamond. Rock Products (309 W. Jackson Blvd., Chicago 6, Ill.) 49, no.4, 103(April 1946).

Determination of Vinsol resin in portland cement. Leonard Bean and R.B. Peppler. Rock Products 49, no.7, 71 (July 1946).

Notes on test of permeation of concretes by gasoline vapor. R.L.Blaine, Concrete (Concrete Publishing Corp., 400 W. Madison St., Chicago 6, Ill.), 54, October 1946.