1942

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY
DIRECTORS AND OFFICERS

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Leon Fraser
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Jesse R. Lovejoy
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Clarance Stanley
Robert C. Stanley
Bernard E. Sunny
Gerard Swope
Burton G. Tremaine
Lewis B. Williams
Charles E. Wilson
John P. Wilson
Owen D. Young

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Charles E. Wilson.....*President*

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Gerard Swope.....*Honorary President*

Honorary Vice Presidents

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Cummings C. Chesney
Jesse R. Lovejoy
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Pay Order C.M. 06007

1942 DIARY

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Name Frank Fraytta

Street 82 Robbins Ave

City Pittsfield, Mass.

Telephone

GENERAL ELECTRIC COMPANY
SCHENECTADY, NEW YORK

 GEL-100-Q

Printed and Bound in U. S. A.

GENERAL ELECTRIC

General Office, SCHENECTADY, N. Y.

E. O. Shreve, Vice President
Chairman, Apparatus Sales Committee

C. H. Lang, Mgr. Apparatus Sales
Vice-chairman, Apparatus Sales Committee
Schenectady, N. Y.

SALES OFFICES & RESIDENT AGENCIES

OFFICE	ADDRESS	IN CHARGE OF
Akron, O.	335 S. Main St.	G. R. Barclay
Atlanta, Ga.	187 Spring St., N.W.	*E. H. Ginn
Baltimore, Md.	39 W. Lexington St.	J. W. Hicklin
Bangor, Me.	115 Franklin St.	C. A. Hall
Bay City, Mich.	1115 Sixth St.	C. P. Murchison
Beaumont, Tex.	418 Goodhue Bldg.	L. H. Matthes
Binghamton, N. Y.	19 Chenango St.	E. B. Currie
Birmingham, Ala.	600 N. 18th St.	R. T. Brooke
Bluefield, W. Va.	Appalachian Bldg.	C. B. Sykes
Boston, Mass.	140 Federal St.	*T. S. Knight
Buffalo, N. Y.	1 West Genesee St.	Geo. Campbell
Butte, Mont.	20 W. Granite St.	C. A. Champ
Canton, Ohio	700 Tuscarawas St., W.	G. R. Barclay
Cedar Rapids, Ia.	203 Second St., S.E.	G. H. Cornwell
Charleston, S. C.	18 Broad St.	A. W. Baker
Charleston, W. Va.	306 MacCorkle Ave., S. E.	W. L. Alston
Charlotte, N. C.	200 S. Tryon St.	E. P. Coles
Charlottesville, Va.	P. O. Box 21	W. P. Molette, Jr.
Chattanooga, Tenn.	832 Georgia Ave.	M. O. McKinney
Chicago, Ill.	840 S. Canal St.	*W. O. Batchelder
Cincinnati, O.	215 W. Third St.	J. P. Palmer
Cleveland, O.	4966 Woodland Ave.	*L. T. Blaisdell
Columbus, O.	40 S. Third St.	J. A. Davies
Dallas, Tex.	1801 N. Lamar St.	W. B. Clayton
Davenport, Ia.	511 Pershing Ave.	K. A. Hills
Dayton, Ohio	25 N. Main St.	C. W. Hosier
Denver, Colo.	650 Seventeenth St.	*A. L. Jones
Des Moines, Ia.	418 W. Sixth Ave.	R. H. Miller
Detroit, Mich.	700 Antoinette St.	W. D. Cameron
Duluth, Minn.	14 W. Superior St.	C. R. Jacobus
El Paso, Tex.	109 N. Oregon St.	E. C. Wise
Erie, Pa.	10 E. Twelfth St.	J. C. Milling
Evansville, Ind.	123 N.W. Fourth St.	J. E. Bain
Fairmont, W. Va.	511 Jacobs Bldg.	M. Y. Heath
Fergus Falls, Minn.	P. O. Box 197	V. F. Cole
Flint, Mich.	P. O. Box 175	L. A. MacKenney
Fort Wayne, Ind.	127 W. Berry St.	C. E. Becker
Fort Worth, Tex.	408 W. Seventh St.	A. H. Keen

*Commericial Vice President

SALES OFFICES & RESIDENT AGENCIES

OFFICE	ADDRESS	IN CHARGE OF
Grand Rapids, Mich.	148 Monroe Ave., N. W.	M. T. Lawrence
Greenville, S. C.	106 W. Washington St.	J. H. Fowler
Harrisburg, Pa.	32 N. 27th St., Camp Hill, Pa.	J. R. Farrell
Hartford, Conn.	410 Asylum St.	R. B. Ransom
Houston, Tex.	1312 Live Oak St.	E. M. Wise
Indianapolis, Ind.	110 N. Illinois St.	B. Olsen
Jackson, Mich.	212 Mich. Ave., W.	T. J. Tighe
Jackson, Miss.	620 E. Pascagoula St.	L. A. McGraw
Jacksonville, Fla.	237 W. Forsyth St.	F. H. Worthington
Jamestown, N. Y.	121 Hallock St.	W. S. Heston
Kansas City, Mo.	106 W. Fourteenth St.	Geo. Fiske
Knoxville, Tenn.	602 S. Gay St.	A. B. Cox
Lansing, Mich.	1509 Osborn Rd.	M. B. Rann
Lincoln, Nebr.	1985 Harwood St.	W. S. Laird
Los Angeles, Calif.	212 N. Vignes St.	S. E. Gates
Louisville, Ky.	455 S. Fourth St.	M. M. Hughes
Madison, Wis.	111 S. Hamilton St.	F. E. Nordeen
Memphis, Tenn.	8 N. Third St.	G. O. Macfarlane
Miami, Fla.	25 S. E. Second Ave.	J. B. Hiers, Jr.
Milwaukee, Wis.	940 W. St. Paul Ave.	P. Y. Tumy
Minneapolis, Minn.	12 S. Sixth St.	E. M. Pinkerton
Nashville, Tenn.	234 Third Ave., N.	J. H. Barksdale
Newark, N. J.	744 Broad St.	A. W. Lunn
New Haven, Conn.	129 Church St.	C. E. H. Palmer
New Orleans, La.	837 Gravier St.	H. H. Blakeslee
New York, N. Y.	570 Lexington Ave.	*H. H. Barnes, Jr.
Niagara Falls, N. Y.	253 Second St.	C. G. Moore
Norfolk, Va.	267 Bank St.	J. G. Henderson
[illegible]oma Cy, Okla.	119 N. Robinson St.	F. B. Hathaway
[illegible], Nebr.	409 S. 17th St.	J. H. Wilson
[illegible]oria, Ill.	300 E. Virginia Ave.	J. A. Crary
Philadelphia, Pa.	1405 Locust St.	*C. K. West
Phoenix, Ariz.	435 W. Madison St.	G. F. Maughmer
Pittsburg, Kan.	508 W. Euclid St.	O. I. Markham
Pittsburgh, Pa.	535 Smithfield St.	W. B. Spellmire
[illegible]land, Me.	477 Congress St.	W. H. Bingham
[illegible]nd, Ore.	920 S. W. Sixth Ave.	*A. S. Moody
[illegible]nce, R. I.	111 Westminster St.	R. W. Herrick
Reading, Pa.	31 N. Sixth St.	R. B. Hanford
Richmond, Va.	700 E. Franklin St.	H. V. Whitney
Roanoke, Va.	202 S. Jefferson St.	A. R. Hines
Rochester, N. Y.	89 East Ave.	H. C. Ward
Rockford, Ill.	118 S. First St.	W. P. Cleveland

*Commericial Vice President

SALES OFFICES & RESIDENT AGENCIES

OFFICE	ADDRESS	IN CHARGE OF
St. Louis, Mo.	112 N. Fourth St.	E. D. Payne
Salina, Kan.	501 W. Wilson St.	G. O. Sherman
Salt Lake City, Utah	200 S. Main St.	B.C.J.Wheatlake
San Antonio, Tex.	201 Villita St.	I. A. Uhr
San Diego, Calif.	861 Sixth St.	H. A. Cordes
San Francisco, Calif.	235 Montgomery St.	*R. M. Alvord
Schenectady, N. Y.	202 State St.	E. H. Aussicker
Seattle, Wash.	821 Second Ave.	H. E. Plank
Shreveport, La.	206 Market St.	W. N. Petzing
Sioux City, Iowa	3704 Jones St.	C. F. Doran
South Bend, Ind.	112W.JeffersonBlvd.	C. M. Dunn
Spokane, Wash.	421 Riverside Ave.	J. R. Murphy
Springfield, Ill.	607 E. Adams St.	J. A. Nolan
Springfield, Mass.	95 State St.	F. Rogers
Syracuse, N. Y.	113 S. Salina St.	R. M. Darrin
Tacoma, Wash.	1019 Pacific Ave.	N. L. Rose
Tampa, Fla.	1206 North A St.	S. Y. Guess
Temple, Pa.	Genl. Electric Co.	L. R. Dunkle
Toledo, Ohio	420 Madison Ave.	E. H. Howell
Tulsa, Okla.	409 S. Boston St.	E. F. Patterson
Utica, N. Y.	258 Genesee St.	S. Dockstader
Washington, D. C.	806 15th St., N.W.	A. F. E. Horn
Waterbury, Conn.	95 N. Main St.	E. F. Sullivan
Waterloo, Iowa	716 Water St.	S. A. Gibson
Wichita, Kan.	200 E. First St.	C. E. Schoonover
Worcester, Mass.	165 Commercial St.	H. O. Tilton
Youngstown, O.	25 E. Boardman St.	C. E. Orwig
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G-E Motor Dealers and Lamp Agencies in all large cities & towns

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G-E DISTRIBUTOR OUTSIDE UNITED STATES AND CANADA
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GENERAL SALES OFFICES
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For Principal Offices see Page 17.

RADIO BROADCASTING STATIONS

WGY Schenectady KOA Denver KGO Oakland

INTERNATIONAL
RADIO BROADCASTING STATIONS
WGEA, WGEO, Schenectady KGEI San Francisco

TELEVISION STATION
W2XB Schenectady

FREQUENCY-MODULATION STATION
WRGB Schenectady

G-E LAMP DEPARTMENT

J. E. Kewley, Vice President
Nela Park, Cleveland, O.

SALES OFFICES

Division	*Address*	*Manager*
Allegheny	601 East General Robinson St. Pittsburgh, Pa.	D. H. Wyre
Atlantic	General Electric Bldg., 570 Lexington Ave. New York, N. Y.	H. B. Myrtle
Buckeye	543 Terminal Tower Cleveland, Ohio	C. B. Gray
Continental	1405 Locust St. Philadelphia, Pa.	O. F. Haas
Empire	1 W. Genesee St. Buffalo, N. Y.	E. F. Strong
Michigan	1249Washington Blvd. Detroit, Michigan	E. A. Anderson
Midland	842 South Canal St. Chicago, Illinois	A. H. Meyer
Mid-West	2406 Power & Light Bldg. Kansas City, Mo.	H. F. Viot
Mississippi Valley	320 N. Fourth St. St. Louis, Mo.	W.H.Rademacher
Nela Specialty	410 Eighth St., Hoboken, N. J.	C. F. Strebig
New England	50 High St. Boston, Mass.	C. C. Walker
Northern	500 Stinson Blvd. Minneapolis, Minn.	G. E. Nelson
North Pacific	1238 N. W. Glisan St. Portland, Oregon	L. R. Wilson
Pacific	1614 Campbell St. Oakland, Calif.	M. C. Hixson
RockyMountain	1863 Wazee St. Denver, Colorado	G. O. Hodgson
Southeastern	187 Spring St. N. W. Atlanta, Ga.	T. W. Moore
Southwestern	1801 N. Lamar St. Dallas, Texas	R. A. Nungesser
South Pacific	601 West Fifth St. Los Angeles, Calif.	E. P. Markee

G-E APPLIANCE & MERCHANDISE DEPARTMENT

H. L. Andrews, Vice President
Chairman, Appliance Sales Committee
1285 Boston Ave., Bridgeport, Conn.

Appliances, Air Conditioning and Commercial Refrigeration, Sales Offices

City	*Address*	*District Manager*
Atlanta, Ga.	187 Spring St., N. W.	J. M. Walker
Boston, Mass.	140 Federal St.	J. A. Ramsey
Chicago, Ill.	840 South Canal St.	J. S. Strecker
Cleveland, O.	4966 Woodland Ave.	C. W. Hartenfels
Dallas, Tex.	1801 N. Lamar St.	R. V. MacDonald
Minneapolis, Minn.	12 South 6th St.	T. B. Allen
New York, N. Y.	570 Lexington Ave.	Earle Poorman
Philadelphia, Pa.	1405 Locust St.	M. J. Sands
San Francisco, Cal.	235 Montgomery St.	B. M. Tassie

Wiring Material Sales Offices

Atlanta, Ga.	187 Spring St., N. W.	R. R. Morgan
Boston, Mass.	140 Federal St.	J. H. Newman
Chicago, Ill.	840 South Canal St.	G. E. Wickman
Cleveland, Ohio	4966 Woodland Ave.	O. W. Cerny
New York, N. Y.	570 Lexington Ave.	Edward Fox
San Francisco, Cal.	235 Montgomery St.	J. O. Dillingham

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G-E PLASTICS DEPARTMENT

G. H. Shill, Manager
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G-E AIR CONDITIONING & COMMERCIAL REFRIGERATION DEPARTMENT

J. P. Rainbault, Manager
5 Lawrence St., Bloomfield, N. J.

G-E APPLIANCE AND MERCHANDISE DISTRIBUTORS

Code: A. Distributor for all products of the Appliance and Merchandise Department.
B. Distributor for G-E Refrigeration, Ranges, Dishwashers, Water Heaters, Disposalls, Unit Kitchens and Home Laundry Equipment.
C. Distributor for G-E Radio, Cleaners, Small Appliances and Construction Materials.
D. Distributor for G-E Small Appliances and Construction Materials.
E. Radio Factory Distributing Branch.
(1 Also distributes G-E Vacuum Cleaners.
(2 Also distributes G-E Home Laundry Equipment.
(3 Does not distribute G-E Appliances.
(4 Does not distribute G-E Radio.
(5 Does not distribute G-E Construction Materials.
(6 Also distributes G-E Radio.
(7 Also distributes G-E Small Appliances.

State	*City*	*Code*	*Distributor*
Ala.	Birmingham	A	Matthews Elec. Sup. Co., Inc.
	Mobile	A	Matthews Elec. Sup. Co., Inc.
	Montgomery	A	Matthews Elec. Sup. Co., Inc.
Ariz.	Phoenix	B	The George Belsey Co., Ltd.
	Phoenix	C	General Elec. Supply Corp.
Ark.	Little Rock	C	General Elec. Supply Corp.
	Little Rock	A(4	O'Bannon Brothers
Calif.	Bakersfield	B	Valley Electrical Supply Co.
	Fresno	C	General Elec. Supply Corp.
	Fresno	B	Valley Electrical Supply Co.
	Los Angeles	B	The George Belsey Co., Ltd.
	Los Angeles	C	General Elec. Supply Corp.
	Oakland	A	General Elec. Supply Corp.
	Sacramento	A	General Elec. Supply Corp.
	San Diego	B	The George Belsey Co., Ltd.
	San Diego	C	General Elec. Supply Corp.
	San Francisco	A	General Elec. Supply Corp.
Colo.	Colorado Springs	D	Hendrie & Bolthoff M & S Co.
	Denver	C	General Elec. Supply Corp.
	Denver	D	Hendrie & Bolthoff M & S Co.
	Denver	B	B. K. Sweeney, Inc.
	Fort Collins	D	Hendrie & Bolthoff M & S Co.
	Greeley	D	Hendrie & Bolthoff M & S Co.
	Pueblo	D	Hendrie & Bolthoff M & S Co.
Conn.	Bridgeport	C	General Elec. Supply Corp.

G-E APPLIANCE AND MERCHANDISE DISTRIBUTORS

State	*City*	*Code*	*Distributor*
Conn.	Hartford	C	General Elec. Supply Corp.
	Hartford	B	Orkil Electric Co., Inc.
	Meriden	D(3	Connecticut Elec. Equip. Co.
	New Haven	C	General Elec. Supply Corp.
	Waterbury	C	General Elec. Supply Corp.
Del.	Wilmington	D(1	Garrett, Miller & Co.
	Wilmington	A	General Elec. Supply Co.
D. C.	Washington	A	General Elec. Supply Corp.
Fla.	Jacksonville	C	General Elec. Supply Corp.
	Miami	C	General Elec. Supply Corp.
	Tampa	B	General Elec. Co., Florida Distributing Branch
	Tampa	C	General Elec. Supply Corp.
Ga.	Atlanta	B	W. D. Alexander Co.
	Atlanta	C	General Elec. Supply Corp.
	Augusta	D(3	Hart Elec. Supply Co.
	Savannah	C	General Elec. Supply Corp.
	Valdosta	B	W. D. Alexander Co.
Hawaii	Honolulu	A	W. A. Ramsay, Ltd.
Idaho	Boise	A	General Elec. Supply Corp.
Ill.	Chicago	B(1(6	R. Cooper, Jr., Inc.
	Chicago	C	General Elec. Supply Corp.
	Chicago	D	Hawkins Electric Co.
	Chicago	D(1	Metropolitan Elec'l Sup. Co.
	Decatur	D(1	Morehouse & Wells Co.
	Peoria	A(5	R. Cooper, Jr., Inc.
	Peoria	D(1	Universal Electric Co.
	Quincy	C	Crescent Electric Supply Co.
	Rockford	B(1(6	R. Cooper, Jr., Inc.
	Rockford	C	General Elec. Supply Corp.
	Springfield	C	General Elec. Supply Corp.
Ind.	Evansville	A	General Elec. Supply Corp.
	Fort Wayne	C	Protective Elec'l Supply Co.
	Hammond	C	General Elec. Supply Corp.
	Indianapolis	B	Electric Appliances, Inc.

See page 5 for Code and Number References.

G-E APPLIANCE AND MERCHANDISE DISTRIBUTORS

State	*City*	*Code*	*Distributor*
Ind.	Indianapolis	C	General Elec. Supply Corp.
	Muncie	C	General Elec. Supply Corp.
	Richmond	D(1	Richmond Electric Co.
	South Bend	A	South Bend Electric Co.
	Terre Haute	A	Advance Electric Co.
Iowa	Burlington	A	Crescent Electric Supply Co.
	Davenport	A	Crescent Electric Supply Co.
	Des Moines	A	General Elec. Supply Corp.
	Dubuque	A	Crescent Electric Supply Co.
	Mason City	A	Crescent Electric Supply Co.
	Sioux City	A	Crescent Electric Supply Co.
	Waterloo	A	Crescent Electric Supply Co.
Kan.	Wichita	A	General Elec. Supply Corp.
Ky.	Ashland	D(3	Ben Williamson & Co., Inc.
	Lexington	A	General Elec. Supply Corp.
	Louisville	A	General Elec. Supply Corp.
	Paducah	D(3	Henry A. Petter Supply Co.
La.	New Orleans	A	General Elec. Supply Corp.
	Shreveport	A	General Elec. Supply Corp.
Me.	Bangor	A	General Elec. Supply Corp.
	Portland	A	General Elec. Supply Corp.
Md.	Baltimore	A	General Elec. Supply Corp.
Mass.	Boston	C	General Elec. Supply Corp.
	Boston	B(1	General Elec. Co., Boston Distributing Branch
	Lowell	D(3	Atlantic Distributing Co.
	Lynn	D(3	Des Roberts Elec'l Supply Co.
	New Bedford	D(1	Mendell Elec. Sup. Co., Inc.
	Springfield	B	Orkil Electric Co., Inc.
	Springfield	C	General Elec. Supply Corp.
	Worcester	C(4	General Elec. Supply Corp.
	Worcester	A	Coghlin Electric Co.
Mich.	Battle Creek	D	Central Electric Supply Co.
	Detroit	A	General Elec. Supply Corp.
	Detroit	D	Frank C. Teal Co.

See page 5 for Code and Number References.

G-E APPLIANCE AND MERCHANDISE DISTRIBUTORS

State	*City*	*Code*	*Distributor*
Mich.	Detroit	D(3	Tarnow Electric Supply Co.
	Escanaba	D	Delta Hardware Co.
	Grand Rapids	A	General Elec. Supply Corp.
	Kalamazoo	A	General Elec. Supply Corp.
	Lansing	A	General Elec. Supply Corp.
	Muskegon	D	Fitzpatrick Elec. Supply Co.
	Saginaw	A	General Elec. Supply Corp.
Minn.	Duluth	A	General Elec. Supply Corp.
	Minneapolis	A	General Elec. Supply Corp.
	Minneapolis	D(1	Hall Hardware Co.
	Minneapolis	D	Peerless Electrical Co.
	St. Paul	A	General Elec. Supply Corp.
Miss.	Jackson	A	General Elec. Supply Corp.
Mo.	Joplin	A	General Elec. Supply Corp.
	Kansas City	A	General Elec. Supply Corp.
	St. Louis	C	General Elec. Supply Corp.
	St. Louis	B(1	James & Co., Inc.
	St. Louis	D	Shapleigh Hardware Co.
Mont.	Billings	A	General Elec. Supply Corp.
	Butte	A	General Elec. Supply Corp.
Neb.	Omaha	A	General Elec. Supply Corp.
N. H.	Manchester	A	General Elec. Supply Corp.
N. J.	Asbury Park	D(3	Rutkin Electric Supply Co.
	Bloomfield	D(3	Bloomfield Elec'l. Supply Co.
	Atlantic City	D(3	Kay Electric Supply Co.
	Camden	D	Reliance Electric Co.
	Jersey City	C(4	General Elec. Supply Corp.
	Newark	C(4	General Elec. Supply Corp.
	Newark	B	Philip H. Harrison & Co.
	Newark	C(4	E. B. Latham & Co.
	Paterson	C(4	General Elec. Supply Corp.
	Trenton	D	Tab Electric Supply Co., Inc.
N. M.	Albuquerque	D	Hendrie & Bolthoff M & S Co.
N. Y.	Albany	C	Havens Electric Co., Inc.
	Albany	B(7	A. Wayne Merriam, Inc.
	Binghamton	B	Gould-Farmer Co., Inc.

See page 5 for Code and Number References.

G-E APPLIANCE AND MERCHANDISE DISTRIBUTORS

State	*City*	*Code*	*Distributor*
N. Y.	Binghamton	C	Southern Tier Elec.Sup.Co.,Inc.
	Brooklyn	C(4	General Elec. Supply Corp.
	Brooklyn	C(4	Royal-Eastern Elec'l Supply Co.
	Buffalo	A	General Elec. Supply Corp.
	Elmira	C	Southern Tier Elec.Sup.Co.,Inc.
	Glens Falls	D	Glens Falls Elec. Supply Co.
	Jamaica	D	Central Queens Elec. & Lighting Fixture Corp.
	Long Island City	C(4	Royal-Eastern Elec'l Supply Co.
	New York	B	Rex Cole, Inc.
	New York	E(1	General Electric Co., Metropolitan Distributing Branch
	New York	C(4	General Elec. Supply Corp.
	New York	C(4	E. B. Latham & Co.
	New York	C(4	Royal-Eastern Elec'l Supply Co.
	Niagara Falls	A	General Elec. Supply Corp.
	Poughkeepsie	C	Electra Supply Co., Inc.
	Riverhead	D	Central Queens Elec. & Lighting Fixture Corp.
	Rochester	C	General Elec. Supply Corp.
	Rochester	B	Gould-Farmer Co., Inc.
	Syracuse	A	Gould-Farmer Co., Inc.
	Utica	A	Langdon & Hughes Elec. Co.
	White Plains	C(4	General Elec. Supply Corp.
N. C.	Charlotte	B(1	L. W. Driscoll, Inc.
	Charlotte	C	General Elec. Supply Corp.
	Greensboro	D	Electric Supply & Equip. Co.
	Raleigh	C	General Elec. Supply Corp.
N. D.	Fargo	A	Dakota Electric Supply Co.
Ohio	Akron	A	General Elec. Supply Corp.
	Canton	C(2	The Furbay-Sommer Co.
	Cincinnati	C	General Elec. Supply Corp.
	Cincinnati	B	Gies, Inc.
	Cincinnati	D(3	Welsbach Sales Co., Inc.

See page 5 for Code and Number References.

G-E APPLIANCE AND MERCHANDISE DISTRIBUTORS

State	*City*	*Code*	*Distributor*
Ohio	Cleveland	A	General Elec. Supply Corp.
	Columbus	B	Bard, Inc.
	Columbus	C	General Elec. Supply Corp.
	Dayton	C	General Elec. Supply Corp.
	Springfield	D(3	Springfield Elec. Motor Co.
	Toledo	B(7	H. G. Bogart Co.
	Toledo	C	General Elec. Supply Corp.
	Youngstown	C(4	General Elec. Supply Corp.
	Zanesville	D	The Roekel Co.
Okla.	Oklahoma City	A	General Elec. Supply Corp.
	Tulsa	A	General Elec. Supply Corp.
Oreg.	Portland	A	General Elec. Supply Corp.
	Salem	D(1	Eoff Elec. Co.
Pa.	Allentown	A	General Elec. Supply Corp.
	Erie	A	General Elec. Supply Corp.
	Harrisburg	A	Raub Supply Co.
	Indiana	D(3	Whiteman & Co., Inc.
	Johnstown	C(4	General Elec. Supply Corp.
	Lancaster	A	Raub Supply Co.
	Philadelphia	B(1	Judson C. Burns, Inc.
	Philadelphia	C(4	Elliott-Lewis Elec'l Co., Inc.
	Philadelphia	C	General Elec. Supply Corp.
	Philadelphia	D	W. Phila. Elec. Supply Co.
	Pittsburgh	C(4	General Elec. Supply Corp.
	Pittsburgh	B(1(6	Ochiltree Electric Co.
	Reading	A	General Elec. Supply Corp.
	Scranton	A	General Elec. Supply Corp.
	Scranton	D	Scranton Elec. Const. Co.
	Williamsport	A	Lowry Electric Co., Inc.
R. I.	Providence	B	E. Pulver Cook, Inc.
	Providence	C	General Elec. Supply Corp.
S. C.	Charleston	A	Perry-Mann Elec. Co., Inc.
	Columbia	A	Perry-Mann Electric Co., Inc.
	Greenville	D	Graves Electric Supply Co.
S. D.	Deadwood	D	Hendrie & Bolthoff M & S Co.

See page 5 for Code and Number References.

G-E APPLIANCE AND MERCHANDISE DISTRIBUTORS

State	*City*	*Code*	*Distributor*
S. D.	Sioux Falls	A	Crescent Electric Supply Co.
Tenn.	Chattanooga	A	General Elec. Supply Corp.
	Kingsport	D(3	Kingsport Electric Co., Inc.
	Knoxville	A	General Elec. Supply Corp.
	Memphis	A	General Elec. Supply Corp.
	Nashville	A	General Elec. Supply Corp.
Texas	Abilene	A	General Elec. Supply Corp.
	Amarillo	A	General Elec. Supply Corp.
	Dallas	A	General Elec. Supply Corp.
	El Paso	A	General Elec. Supply Corp.
	Fort Worth	A	General Elec. Supply Corp.
	Houston	A	General Elec. Supply Corp.
	San Antonio	A	General Elec. Supply Corp.
Utah	Salt Lake City	A	General Elec. Supply Corp.
Vt.	White River Junction	D(3	Twin State Elec. Supply Co.
Va.	Lynchburg	D	Mid-State Elec'l Supply Co.
	Norfolk	C	General Elec. Supply Corp.
	Richmond	C	General Elec. Supply Corp.
	Richmond	B(1	R. S. Montgomery, Inc.
	Roanoke	C	General Elec. Supply Corp.
	Roanoke	B(1	R. S. Montgomery, Inc.
Wash.	Seattle	A	General Elec. Supply Corp.
	Spokane	A	General Elec. Supply Corp.
	Tacoma	D	Home Electric Co.
W. Va.	Bluefield	D(1	Bluefield Supply Co.
	Charleston	A	Virginian Electric, Inc.
	Clarksburg	D(3	Barnes & Brass Electric Co.
	Wheeling	D	Gee Electric Co.
Wisc.	Appleton	C	General Elec. Supply Corp.
	LaCrosse	A	General Elec. Supply Corp.
	Madison	C	Crescent Electric Supply Co.
	Milwaukee	C	General Elec. Supply Corp.
	Milwaukee	B	E. H. Schaefer Co.

See page 5 for Code and Number References.

G-E AIR CONDITIONING AND COMMERCIAL REFRIGERATION DISTRIBUTORS

Code: A. Distributor for all products.
B. Distributor for Automatic Heating and Packaged and Remote Air Cooling Equipment.
C. Distributor for Packaged Air Cooling, Packaged & Remote Commercial Refrigeration Equipment.
D. Distributor for Packaged and Remote Commercial Refrigeration Equipment.
E. Distributor for Automatic Heating only.
F. Distributor for Gas Heating only.
(1. Does not distribute Automatic Heating.

State	*City*	*Code*	*Distributor*
Ala.	Birmingham	A	Air Engineers, Inc.
Ariz.	Kingman	A	Tarr, McComb and Ware Co.
	Phoenix	A	Capitol Engineering Co.
	Tucson	A	Tidmarsh Engineering Co.
Ark.	Little Rock	A	O'Bannon Bros.
Calif.	Fresno	B	Calif.-Fresno Air Condi. Co.
	Fresno	D	Valley Electrical Supply Co.
	Los Angeles	B	Air Condi. Co. of So. Calif.
	Los Angeles	D	United Com. Sales Company
	Oakland	A	Gen. Air Condi. and H't'g. Co.
	Sacramento	F	Gen. Air Condi. Co. of Pacific
Colo.	Denver	A	B. K. Sweeney, Inc.
Conn.	Bridgeport	A	L. C. Kelley Sales Company
	Hartford	A	Orkil Electric Company, Inc.
	Hartford	B	Sumner L. Willson
	Stamford	B	Auto. Appliance Corporation
Del.	Wilmington	B	Alexander H. McDaniel, Inc.
D. C.	Washington	A1)	Gen. Electric Supply Corp.
	Washington	B	Hudson Air Condi. Corp.
Fla.	Jacksonville	A	Gen. Cooling & Heating Corp.
	Miami	A	Southern Air Condi. Corp.
	St. Petersburg	B	City Fuel Oil and Coal Co.
	Tampa	A	Pioneer Tire Company, Inc.
Ga.	Atlanta	A1)	W. D. Alexander Company
	Atlanta	E	The Murray Company
	Augusta	B	Barrett Supply Company
	Macon	B	L. E. Schwartz & Son
	Savannah	A	United Fuel and Engineer. Co.
Hawaii	Honolulu, T.H.	A	W. A. Ramsey, Ltd.
Idaho	Boise	A	Holmes Electric Appli. Co.
Ill.	Chicago	A	R. Cooper, Jr., Inc.
	Mattoon	A	Automatic Heat Company
	Springfield	B	Schmidt Brothers
Ind.	Fort Wayne	B	Gen. H't'g & Air Condi. Corp.
	Indianapolis	C	Electric Appliances, Inc.
	Indianapolis	B	General Engineering Corp.
	Richmond	B	Richmond Electric Company
	South Bend	A	South Bend Electric Co., Inc.
Iowa	Davenport	A	Crescent Electric Supply Co.
	Des Moines	A	Fred Keating Coal Company
Kan.	Wichita	A	General Air Condi. Company

G-E AIR CONDITIONING AND COMMERCIAL REFRIGERATION DISTRIBUTORS

State	*City*	*Code*	*Distributor*
Ky.	Lexington	B	Allen-Harper Elec. Eng. Corp.
	Lexington	D	Sterling Electric Company
	Louisville	A	General Air Condi. Corp.
La.	New Orleans	A	General Electric Supply Corp.
Me.	Augusta	D	Central Maine Power Co.
	Bangor	B	C. H. Babb & Company
	Bangor	D	Bangor Hydro Electric Co.
	Presque Isle	D	Maine Public Service Co.
Md.	Baltimore	B	Automatic H't'g & Cooling
Mass.	Boston	A	Factory Dist. Br. G. E. Co.
	Boston	*	Thompson Water Cooler Co.
	New Bedford	B	Hawes Electric Company
	Pittsfield	B	Wagner Engineering Corp.
	Springfield	B	General Air Condi. Corp.
	Worcester	D	Coghlin Electric Company
	Worcester	B	W. H. Sawyer Lumber Co.
Mich.	Detroit	A	Detroit Sales Office
	Grand Rapids	A	Owen-Ames-Kimball Co.
	Jackson	A	Paul E. Bengel
	Lansing	A	Barker-Fowler Electric Co.
	Saginaw	E	Air Engineers, Inc.
	Saginaw	C	Kessel and Rummel
Minn.	Duluth	B	Jamar Air Conditioning Co.
	St. Paul	A	Conditioned Air Equip. Co.
Mo.	Kansas City	A	H. H. Wright Company
	St. Louis	C	James and Company
	St. Louis	E	Plumbers Sup. Co. of St. Louis
Mont.	Butte	A	General Electric Supply Corp.
Neb.	Grand Island	B	G. I. Culvert & Metal Works
	Omaha	B	Gordon Fuel Company
	Omaha	D	Sol Lewis
Nev.	Las Vegas	B	Nevada Electric Company
	Reno	B	General Air Conditioning Co.
N. H.	Manchester	B	N. H. Air Conditioning Co.
	Manchester	D	Public Service Co. of N. H.
N. J.	Atlantic City	B	Mack Air Conditioning Corp.
	Newark	D	Philip H. Harrison and Co.
	Newark	B	Northern Air Condi. Corp.
N. Y.	Albany	B	Westover-Wolfe, Inc.
	Binghamton	B	J. H. Christensen, Inc.
	Buffalo	A	W. A. Case and Son Mfg. Co.
	Kingston	A	M. Reina
	New York	B	Metro. Dist. Br. G. E. Co.
	New York	D	Nathan Straus-Duparquet
	Niagara Falls	B	Cataract Ice Company
	Patchogue	B	Alfred L. Hart, Inc.
	Poughkeepsie	A	C. B. Strain & Son
	Schenectady	B	Kalteux Brothers, Inc.
	Schenectady	D	A. Wayne Merriam, Inc.
	Syracuse	B	Joseph Cashier and Co., Inc.

*Water coolers only.

See page 12 for Code and Number References

G-E AIR CONDITIONING AND COMMERCIAL REFRIGERATION DISTRIBUTORS

State	*City*	*Code*	*Distributor*
N. Y.	Syracuse	C	Gould-Farmer Company, Inc.
	Utica	D	Langdon and Hughes Elec. Co.
	White Plains	F	Turner and Harrison, Inc.
N. C.	Charlotte	D	L. W. Driscoll, Inc.
	Raleigh	B	General Air Conditioning Co.
N. D.	Fargo	A	Dakota Electric Supply Co.
Ohio	Akron	A	Hardware and Supply Co.
	Cincinnati	B	Consolidated Engineering Co.
	Cincinnati	D	Gies, Inc.
	Cleveland	B	Ira E. Baker Company
	Cleveland	C	Ramsey Brothers, Inc.
	Columbus	C	Bard, Inc.
	Columbus	B	Jared A. Smith & Company
	Toledo	B	Blackburn-Nelles Company
	Toledo	D	H. G. Bogart Company
Okla.	Oklahoma City	A	General Electric Supply Corp.
Ore.	Portland	D	Dairy's Supply Co., Inc.
	Portland	B	Meier and Frank Co., Inc.
Pa.	Bethlehem	A	Brown-Borhek Company
	Erie	A	A. F. Schultz Company
	Lancaster	A	Raub Supply Company
	Philadelphia	D	Judson C. Burns, Inc.
	Philadelphia	B	S. S. Fretz, Jr., Inc.
	Pittsburgh	B	T. King McCreery, Inc.
	Pittsburgh	D	Ochiltree Electric Company
	Reading	A1)	W. R. Nagle
	Scranton	A1)	Scranton Electric Const. Co.
	Williamsport	A	Lowry Electric Company, Inc.
R. I.	Providence	A	E. Pulver Cook, Inc.
S. C.	Columbia	A	Perry-Mann Electric Co., Inc.
Tenn.	Chattanooga	A	So. Blow Pipe & Roofing Co.
	Knoxville	B	Electric Home Servants Co.
	Knoxville	D	S. H. George & Sons
	Memphis	A	Wallace Johnston Company
	Nashville	A	Walter Keith & Co., Inc.
Tex.	Dallas	A	General Electric Supply Corp.
	Houston	A	Air Conditioning Company
Utah	Salt Lake City	A	Harold H. Holmes Company
Va.	Norfolk	B	Grant Electric Company
	Richmond	B	Carle-Boehling Co., Inc.
	Richmond	C	R. S. Montgomery, Inc.
	Roanoke	B	Richardson-Wayland El.Corp.
Wash.	Seattle	D	Acme Refrigeration Company
	Seattle	B	Seattle Plumbing Supply Co.
	Spokane	A	Zahniser & Warren
	Walla Walla	A	W. R. O'Rourke Co.
W. Va.	Charleston	A	Virginian Electric, Inc.
	Wheeling	B	Schofield Equipment Co., Inc.
Wis.	Milwaukee	A	Pflugradt Company
	Oshkosh	A	C. F. Warning Company

See page 12 for Code and Number References

GENERAL ELECTRIC CONTRACTS CORP.

G. F. Mosher, *President*

570 Lexington Avenue, New York, N. Y.

Northeastern District, H. F. Yotz, Manager
581 Boylston St., Boston, Mass.

Hartford, Conn.
New Haven, Conn.
Schenectady, N. Y.
Syracuse, N. Y.
Utica, N. Y.
Worcester, Mass.

Eastern District, D. D. Chapleau, Manager
570 Lexington Avenue, New York, N. Y.

Allentown, Pa.
Baltimore, Md.
Flushing, N. Y.
Lancaster, Pa.
Newark, N. J.
Newburgh, N. Y.
Norfolk, Va.
Philadelphia, Pa.
Reading, Pa.
Richmond, Va.
Roanoke, Va.
Washington, D. C.
White Plains, N. Y.

Southeastern District, Peter Thomson, Manager
187 Spring Street, N. W., Atlanta, Ga.

Birmingham, Ala.
Charlotte, N. C.
Columbia, S. C.
Jacksonville, Fla.
Miami, Fla.
Raleigh, N. C.
Sumter, S. C.
Tampa, Fla.
Winston-Salem, N. C.

East Central District, J. A. Foley, Manager
1137 Union Commerce Building, Cleveland, Ohio

Akron, O.
Ashland, Ky.
Buffalo, N. Y.
Canton, O.
Cincinnati, O.
Columbus, O.
Detroit, Mich.
Grand Rapids, Mich.
Pittsburgh, Pa.
Toledo, O.

Central District, R. R. Campbell, Manager
846 So. Canal Street, Chicago, Ill.

Evansville, Ind.
Indianapolis, Ind.
Lexington, Ky.
Louisville, Ky.
Milwaukee, Wis.
St. Louis, Mo.

Southwestern District, L. E. Scott, Manager
1801 No. Lamar Street, Dallas, Tex.

Fort Worth, Tex.
Houston, Tex.
Kansas City, Mo.
Memphis, Tenn.
New Orleans, La.
Oklahoma City, Okla.
Shreveport, La.

Western District, Herman Garfinkel, Manager
116 New Montgomery St., San Francisco, Calif.

Los Angeles, Calif.
Portland, Ore.
Sacramento, Calif.
Salt Lake City, Utah
Seattle, Wash.

GENERAL ELECTRIC X-RAY CORPORATION

J. H. Clough, President

2012 Jackson Blvd., Chicago, Ill.

Manufactures and distributes x-ray apparatus for medical, dental and industrial uses; electromedical apparatus; x-ray and electromedical supplies and accessories.

SALES OFFICES

Albany, N. Y.
Atlanta, Ga.
Baltimore, Md.
Birmingham, Ala.
Boston, Mass.
Buffalo, N. Y.
Charlotte, N. C.
Chicago, Ill.
Cincinnati, Ohio
Cleveland, Ohio
Columbus, Ohio
Dallas, Texas
Denver, Colorado
Des Moines, Iowa
Detroit, Mich.
Duluth, Minn.
Elmira, N. Y.
Harrisburg, Pa.
Houston, Texas
Indianapolis, Ind.
Kansas City, Mo.
Los Angeles, Calif.
Memphis, Tenn.
Milwaukee, Wisc.
Minneapolis, Minn.
Nashville, Tenn.
Newark, N. J.
New Haven, Conn.
New Orleans, La.
New York, N. Y.
Oklahoma City, Okla.
Omaha, Nebr.
Philadelphia, Pa.
Pittsburgh, Pa.
Portland, Oregon
Richmond, Va.
Rochester, N. Y.
Salt Lake City, Utah
San Antonio, Texas
San Francisco, Cal.
Seattle, Wash.
Spokane, Wash.
Springfield, Ill.
Springfield, Mass.
St. Louis, Mo.
St. Paul, Minn.
Syracuse, N. Y.
Tampa, Florida
Toledo, Ohio
Tulsa, Okla.
Washington, D. C.

VICTOR X-RAY CORP. OF CANADA, LTD.

Montreal
Toronto
Vancouver
Winnipeg

INTERNATIONAL GENERAL ELECTRIC COMPANY, INCORPORATED

Clark H. Minor, President
570 Lexington Ave., New York, N. Y.
(Cable address INGENETRIC New York)

Conducts the export business of the General Electric Company outside the United States, Canada, & T. H.

All products of General Electric Company, Schenectady, New York, U. S. A., are marked with its registered trademark, the General Electric monogram.

Its principal offices and subsidiaries abroad are:
[Cable Addresses in Brackets]

ARGENTINA—General Electric, S. A., Calle Tucuman 117, Buenos Aires. [INGENETRIC BUENOSAIRES]

BRAZIL—General Electric, S. A., Avenida Almirante Barroso 81, Rio de Janeiro. [INGENETRIC RIO DE JANEIRO]

CHINA—Andersen, Meyer & Company, Ltd., 4 Yuen Ming Yuen Road, Shanghai [DANICA SHANGHAI]

COLOMBIA—International General Electric, S. A. Inc., Barranquilla [INGENETRIC BARRANQUILLA]

CUBA—General Electric Cubana, S. A., Edif. "La Metropolitana," Havana. [GEDECUBA HAVANA]

ENGLAND—International General Electric Co. of New York, Ltd., Crown House, Aldwych, London, W. C., 2. [INGENETRIC LONDON]

FRANCE—International General Electric Co., Inc., 79, Avenue de Champs-Elysees, Paris (8e). [INGENETRIC PARIS]

GERMANY—International General Electric Co., Inc., 4, Alexander Ufer, Berlin, N. W., 40. [INGENETRIC BERLIN]

INDIA—International General Electric Co., (India) Ltd., Thackersey House, Graham Road, Ballard Estate, Bombay. [INGENETRIC BOMBAY]

JAPAN—International General Electric Co., Inc., Sanshin Building, 10 Yurakucho, 1 Chome, Kojimachi-Ku, Tokyo. [INGENETRIC TOKYO]

MEXICO—General Electric, S. A., San Juan de Letran No. 37, Mexico D. F. [INGENETRIC MEXICO CITY]

PHILIPPINES—General Electric Company (P. I.) Inc., 13th and Atlanta Sts., Port Area, Manila. [INGENETRIC MANILA]

PUERTO RICO—International General Electric Company of Porto Rico, 83 Salvador Brau, San Juan, [INGENETRIC SAN JUAN]

SOUTH AFRICA—South African General Electric Co., Ltd., cor. Richards and Webber Streets, Selby, Johannesburg. [INGENETRIC JOHANNESBURG]

VENEZUELA—International General Electric, S. A., Inc., Pajaritos a la Palma 39, Caracas. [INGENETRIC CARACAS]

GENERAL ELECTRIC SERVICE SHOPS

General Electric operates twenty-one Service Shops located in the following cities:

Location	*Address*	*Superintendent*
Atlanta, Ga.	496 Glenn St., S.W.	W. J. Seibert
Buffalo, N. Y.	318 Urban St.	O. A. Anderson
Charleston, W. Va.	306 MacCorkle Ave.	P. E. Fisher
Chicago, Ill.	849 South Clinton St.	D. R. Siewert
Cincinnati, O.	215 W. 3rd St.	L. Higgins
Cleveland, O.	4966 Woodland Ave.	J. S. Archer
Dallas, Texas	1801 N. Lamar St.	W. F. Kasten
Detroit, Mich.	5950 Third Ave.	R. P. Bailey
Houston, Texas	1312 Live Oak St.	F. C. Bunker
Kansas City, Mo.	819 E. 19th St.	N. Nyblad
Los Angeles, Calif.	5203 Santa Fe Ave.	H. A. Simpson
Milwaukee, Wis.	940 W. St. Paul Ave.	H. R. Reese
Minneapolis, Minn.	410 3rd Ave., North	W. W. Carlson
New York, N. Y.	414 W. 13th St.	C. E. Eismann
Philadelphia, Pa.	429 North 7th St.	W. P. Davies
Pittsburgh, Pa.	6519 Penn Ave.	J. J. Durkin
St. Louis, Mo.	1110 Delmar Blvd.	J. E. Maselter
Salt Lake City, Utah	141 So. Third West St.	J. A. McDonald
San Francisco, Cal.	361 Bryant St.	G. K. Koernig
Seattle, Wash.	1508 4th Ave., S.	H. W. Seibert
West Lynn, Mass.	920 Western Ave.	F. W. Brown

The Service Shop nearest you:

Will serve you day or night, Sundays and holidays included.

Is a complete service unit manned by factory-trained engineers and specialists.

Carries a complete stock of General Electric renewal parts to assure original equipment quality.

Has facilities not only for rebuilding equipment but also for testing and checking.

Is prepared to make repairs on your premises.

If there is no Service Shop in your city, refer to our nearest Sales Office listed inside front cover.

GENERAL ELECTRIC APPARATUS WAREHOUSES

Location	*Address*	*In Charge of*
Atlanta, Ga.	490 Glenn St. S.W.	R. L. Brandes
Boston, Mass.	150 Causeway St.	Arthur E. Mason
Buffalo, N. Y.	318 Urban St.	R. K. Bishop
Charleston, W. Va.	306 MacCorkle Ave.	S. B. Gilliland
Chicago, Ill.	840 South Canal St.	D. R. Webb
Cincinnati, Ohio	215 West Third St.	John Avey
Cleveland, Ohio	4966 Woodland Ave.	E. A. Sperber
Dallas, Texas	1801 N. Lamar St.	J. R. Wright
Davenport, Iowa	511 Pershing Ave.	E. J. Wallace
Denver, Colo.	2311 Fifteenth St.	J. E. Appleton
Detroit, Mich.	700 Antoinette St.	M. G. Bean
Houston, Texas	1312 Live Oak St.	W. O'Hara
Kansas City, Mo.	819 E. Nineteenth St.	L. P. Anderson
Los Angeles, Calif.	212 N. Vignes St.	H. E. Adler
Milwaukee, Wis.	940 W. St. Paul Ave.	E. C. Peterson
Minneapolis, Minn.	410 Third Ave., N.	C. R. Salstrom
New York, N. Y.	416 W. Thirteenth St.	H. Scharff
Oklahoma City, Okla.	125 E. California St.	B. F. Dunlap
Omaha, Neb.	814 Dodge St.	L. A. Desterhouse
Philadelphia, Pa.	429 N. Seventh St.	P. H. Cadwell
Pittsburgh, Pa.	6519 Penn Ave.	C. E. Svenson
Portland, Ore.	2031 N. W. 19th Ave.	J. Eckholm
St. Louis, Mo.	1110 Delmar Blvd.	L. R. Gaiennie
Salt Lake City, Utah	350 Pierpont Ave.	J. C. Davis
San Francisco, Calif.	361 Bryant St.	W. H. Atherley
Seattle, Wash.	440 Holgate St.	J. S. Johnston

GENERAL ELECTRIC WORKS

The main office and works of the General Electric Company are situated in Schenectady, N. Y. The products manufactured at the principal works of the company are as follows:

G-E Lamp Department, Nela Park, Cleveland

Works at Bucyrus, Cleveland, Conneaut, Niles, Warren, and Youngstown, Ohio; Buffalo, N. Y., East Boston, Mass., Newark, and Hoboken, N. J., St. Louis, Mo., Providence, R. I., Oakland, Calif., Bridgeville, Pa., and Jackson, Miss. **manufacture** Edison and General Electric MAZDA Lamps for every lighting purpose. Excellent warehousing facilities provide prompt distribution to all points in the U.S.A.

The Schenectady Works, 1 River Road

Turbine Sets (above 10,000 kw.)
Large A-c. and D-c. Generators and Motors
Large Synchronous Motors and Converters
Large Motor-generator Sets
Large Freq.-changer Sets
Large Induction Motors
Phototubes
Generator Voltage Regulators
Synchronous Condensers
Industrial Heating Equip.
Radio Transmitters
Police Radio Equipment
Surface Air Coolers
Electric Refrigerators
Mercury-arc Rectifiers
Industrial Control Devices and Equipment
Marine and Aircraft Equip.
Selsyn Control
Ship Control
Wire and Cable
Vacuum Tubes
Laboratory Products
Automatic & Industrial Welding Equipment
Porcelain Products
Varnish Products
Carbon Brushes
Searchlights
Carrier Current Equipment

The River Works (West Lynn, Mass.) 920 Western Ave.

Turbo Driven Aeroplane Superchargers, Impellers
Motors, Generators and sets (small sizes)
Arc-welding Sets
St. Lighting Transformers
Incandescent Searchlights and Headlights,
Floodlight Projectors
Rayon Spinning Motors
Radio Generator Sets
Arc, Sodium Vapor, and Sodium Mercury Lamps
Traffic Signals & Control
Novalux Street Lighting Fixtures and Control
Tungar Rectifiers
Copper Oxide Rectifiers
Battery Charging Sets
Turbo Generator Sets to 8,000 kw. inclusive
Mechanical Drive Turbines
Steel Gears and Pinions
Land & Marine Reduction Gears
Fabroil and Textolite Products (Plastics)
Worm Wheels

The Bloomfield (N. J.) Works, 5 Lawrence St.

Industrial Control Devices
Air Conditioning Apparatus
Commercial Refrigeration
Oil and Gas Fired Furnaces and Heating Equipment

The Oakland (Calif.) Works, 5441 E. 14th St.

Transformers
Induction Motors

The West Lynn (Mass.) Works, 40 Federal St.

Meters and Instruments
Time Switches
Instrument Transformers
Electrodes for Arc Lamps
Rectifier Tubes
Tungar Bulbs
Thermostats
Thermotels

The Pittsfield (Mass.) Works, 100 Woodlawn Ave.

Power Transformers
Distribution Transformers
Lightning Arresters
Induction & Step Voltage Regulators
Industrial Heating Devices
Capacitors
High-voltage Bushings
High-voltage Testing Apparatus
Instrument Transformers
Plastics
Cable Accessories
Current-limiting Reactors
Primary Cutouts and Fuses
Welding Transformers

The Erie (Pa.) Works, 2901 E. Lake Rd.

Electric Locomotives—Railway, Mining, Industrial, and Diesel-Electric
Motors—Railway, Locomotive, Crane, Mill
Automotive & Bus Motors
Generators and Control
Turbines
Refrigerated Truck Bodies
D-c. Generators for Diesel Electric Locomotives
Railway—Air Compressors, Air-brake Equipments, Controllers, Control Equipments, and Air Conditioning Equipment
Household Refrigerators

The Fort Wayne (Ind.) Works, 1635 Broadway

A-c. Generators and Synchronous Motors (medium)
D-c. Motors, Generators, and Sets
Dynamometers and Brakes
Printing Press Drives
Elevator and Shovel Sets
Fractional h.p. Motors
Transformer Specialties
Refrigeration Machinery
Magnetos
Plastics (molded products)
Magnet Wire

The Bridgeport (Conn.) Works, 1285 Boston Ave.

Wiring Devices
Accessory Equipment
Code and Fixture Wire
Rubber-covered Wire & Cable
Sunlamps
Electric Fans
*Rigid Conduit
‡Flat Irons
†Asbestos-covered Wire
Flexible Conduit and Outlet Boxes
Heating Devices
Home Laundry Equipment
Radio and Television Receivers

*Also manufactured at New Kensington, Pa. branch. †York, Pa. branch. ‡Ontario, Calif. branch.

The Philadelphia (Pa.) Works, 6901 Elmwood Ave.

Metal Enclosed Switchgear
Switchgear Control Equipment
Power Circuit Breakers
Air Circuit Breakers
Network Protectors
Relays
Switching Equipment (Indoor and Outdoor)

The Meriden (Conn.) Works, 34 Cambridge St.

Textolite, Molded, & Cold Molded Products (Plastics).

PRINCIPAL U. S. BROADCASTING STATIONS

Power all stations 50 kw., except KGO - 7.5 and KJR, - 10.

City	Station	Freq. kc.
Albuquerque	*°KOB	1030
Atlanta	°WSB	750
Baltimore	*WBAL	1090
Birmingham	†WAPI	1170
Boston	*WBZ	1030
Charlotte	†WBT	1110
Chicago	†WBBM	780
Chicago	*WENR	890
Chicago	*WLS	890
Chicago	‡WGN	720
Chicago	*WMAQ	670
Cincinnati	†WCKY	1530
Cincinnati	*°WLW	700
Cleveland	°WTAM	1100
Dallas	†KRLD	1080
Dallas	°WFAA	820
Denver	°KOA	850
Des Moines	°WHO	1040
Detroit	†WJR	760
Fort Wayne	*WOWO	1190
Fort Worth	*WBAP	820
Hartford	°WTIC	1080
Hot Springs	*KTHS	1090
Houston	†KTRH	860
Lincoln	†KFAB	1110
Los Angeles	°KFI	640
Los Angeles	†KNX	1070
Louisville	†WHAS	840
Minneapolis	†WCCO	830
Nashville	*°WSM	650
Newark	‡WOR	710
New Orleans	†WWL	870
New York	†WABC	880
New York	°WEAF	660
New York	*WJZ	770
New York	WINS	1000
New York	WHN	1050
Oakland	*KGO	810
Philadelphia	†WCAU	1210
Philadelphia	°KYW	1060
Pittsburgh	*KDKA	1020
Portland	*KEX	1190
Richmond	‡†WRVA	1140
Rochester	*WHAM	1180
St. Louis	†KMOX	1120
Salt Lake Cy.	†KSL	1160
San Antonio	°WOAI	1200
San Francisco	°KPO	680
Seattle	†KIRO	710
Seattle	KJR	1000
Schenectady	°WGY	810
Shreveport	†KWKH	1130
Tulsa	°KVOO	1170

†CBS °NBC Red *NBC Blue ‡Mutual

GENERAL ELECTRIC FIFTEEN YEAR RECORD

(Amounts in thousands)

Year	*Orders Received*	*Net Sales Billed*	*Income from Other Sources*	*Profit Available for Dividends*
1926	$327,400	$326,974	$12,562	$46,672
1927	309,785	312,604	15,396	48,799
1928	348,849	337,189	17,671	54,154
1929	445,803	415,338	21,426	67,290
1930	341,820	376,167	20,075	57,491
1931	252,021	263,275	12,999	40,957
1932	121,726	147,162	11,187	14,404
1933	142,771	136,637	6,967	13,430
1934	183,660	164,797	8,347	19,726
1935	217,362	208,733	9,725	27,844
1936	296,748	268,545	15,279	43,947
1937	379,274	349,740	15,957	63,547
1938	252,176	259,484	8,483	27,729
1939	360,748	304,680	8,576	41,236
1940	654,190	411,938	13,464	56,241

Year	*Dividends**	*Earnings per Share of Common Stock*	*Market Prices of Common Stock*	
			High	*Low*
1926	$22,187	$6.14-a)	95½-a)	79-a)
1927	36,826	6.41	146⅝	81
1928	45,840	7.15	221½	124
1929	42,235	8.97	403	168⅛
1930	48,725	1.90-a)	95⅜-a)	41½-a)
1931	48,725	1.33	54¾	22⅞
1932	18,439	.41	26⅛	8½
1933	14,113	.38	30¼	10½
1934	19,881	.59	25¼	16⅞
1935	20,191	.97	40⅞	20½
1936	43,266	1.52	55	34½
1937	63,274	2.21	64⅞	34
1938	25,899	.96	48	27¼
1939	40,305	1.43	44⅝	31
1940	53,294	1.95	41	26⅛

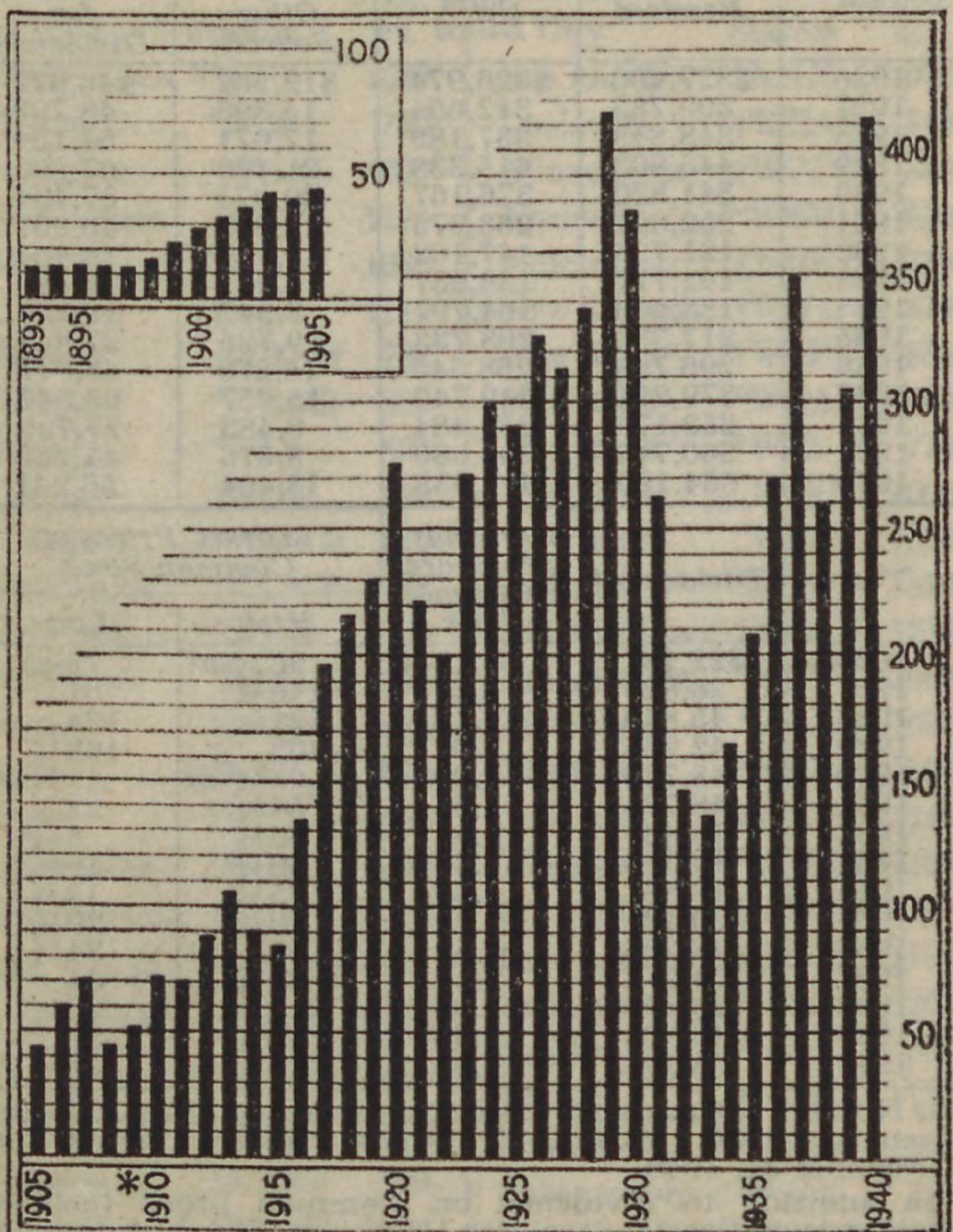
-a) Number of shares increased four for one in May, 1926 and January, 1930. 28,845,927 36/100 shares issued at December 31, 1940.

*In addition to dividends on Common Stock includes dividends on Special Stock for 1922 thru 1934, but does not include the following stock dividends: 1921—4% in Common; 1922-1925 annually 5% in Special; also in 1924, 1 share of Electric Bond and Share Securities Corporation Stock; 1926—$1.00 in Special Stock (after May, 1926 increase in number of shares); and in 1932, 1/6 share of Radio Corporation of America common stock.

GENERAL ELECTRIC NET SALES BILLED

1893-1940

In Millions of Dollars

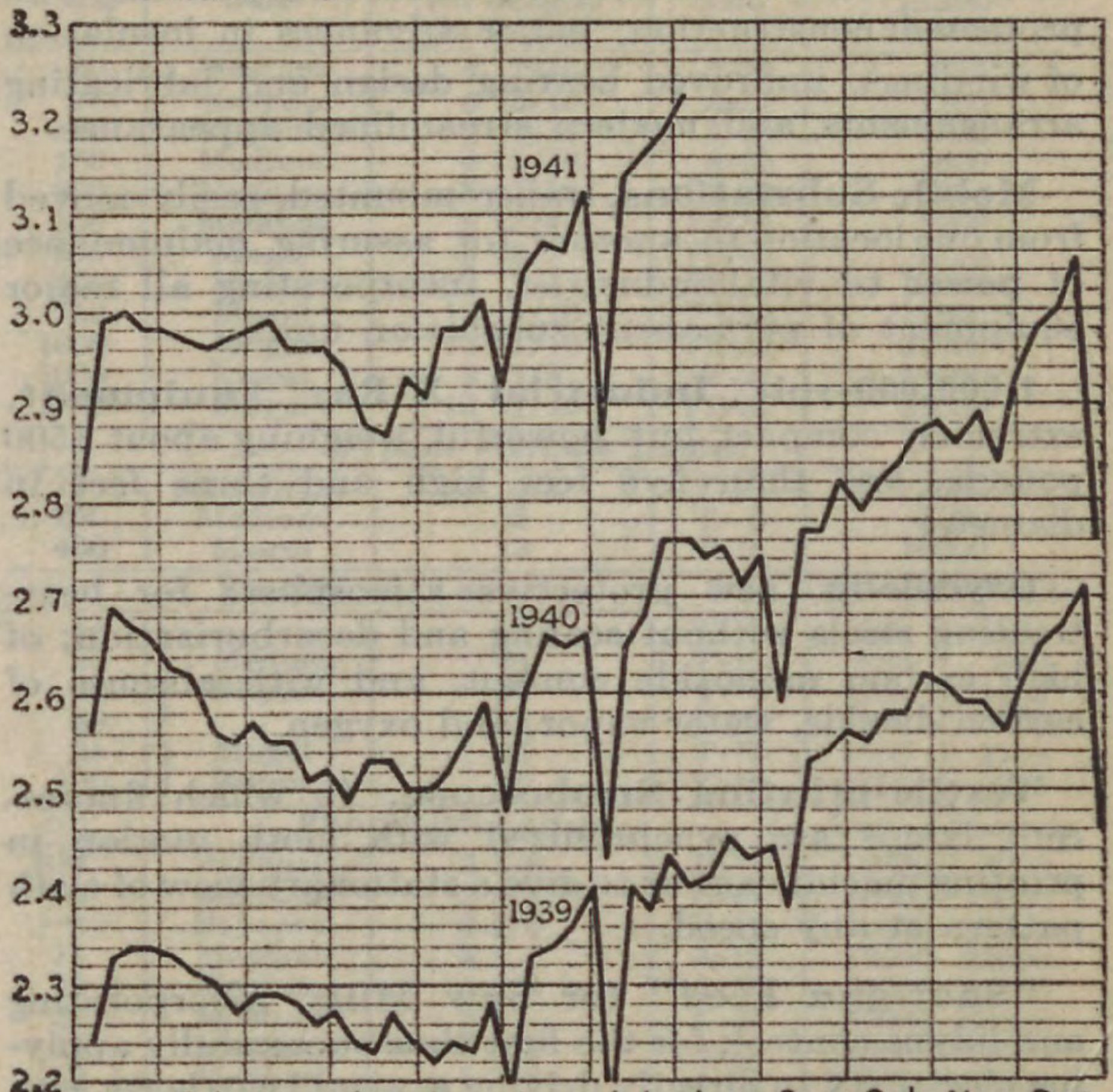


*11 MONTHS

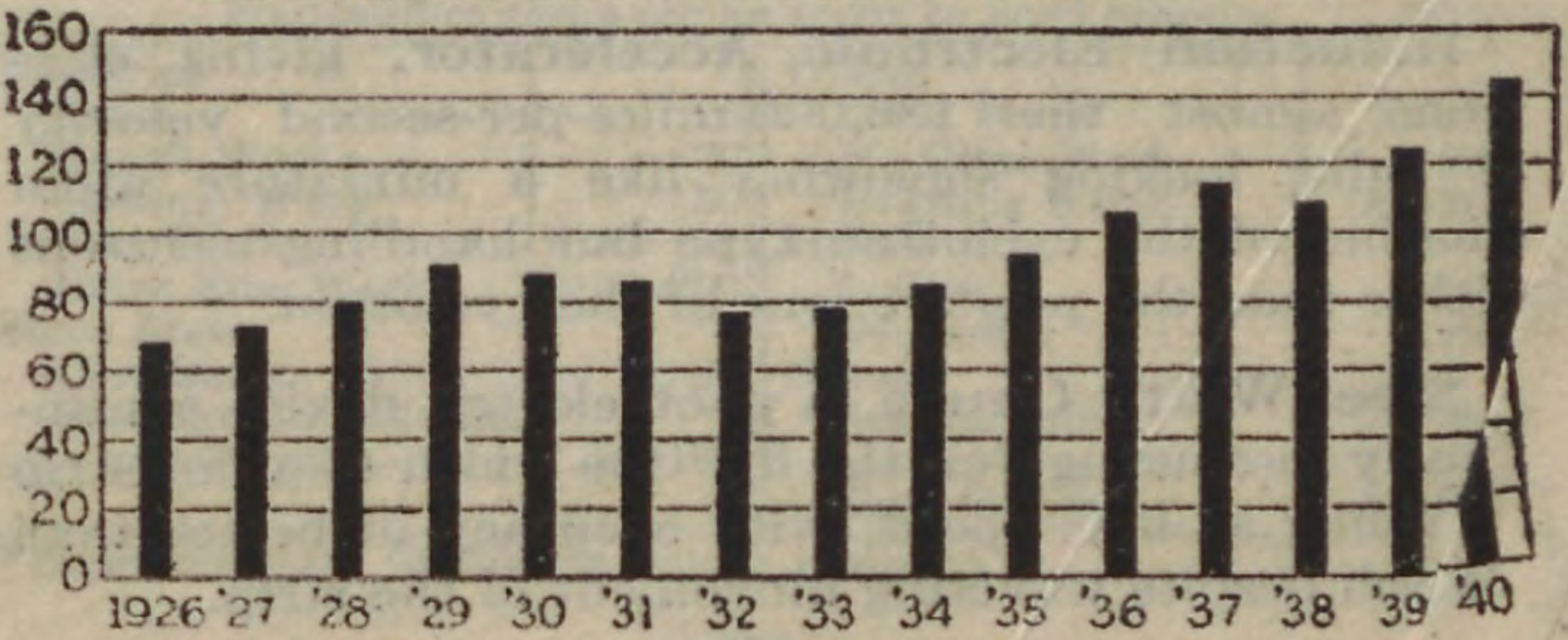
Net Sales Billed for six months period ending June 30, 1941.....$300,332,085

ACHIEVEMENT OF THE ELECTRIC LIGHT AND POWER COMPANIES IN THE U. S. SHOWN IN KILOWATT HOURS OUTPUT

Billions of Kilowatt Hours PER WEEK



Billions of Kilowatt Hours PER YEAR



A FEW RECENT G-E ACCOMPLISHMENTS

Tri-Clad Motors featuring more complete protection than previously available in open motors: new cast-iron protected construction, major advances in insulation of windings, improved bearing design and lubricating arrangements, and modern streamlined appearance.

Mobile Substations, trailer mounted, easily moved from one location to another for assuring maintenance of power to vital industries, incorporating all major equipment of permanent substation units.

1,000,000-volt Industrial X-Ray Equipment, extremely compact but powerful, weighing about 1500 pounds, less than five feet high and three feet in diameter.

Drycolene, new protective atmosphere for heat-treating steels without scaling and decarburization; of high carbon monoxide content, and with absence of carbon dioxide, water vapor, and oxygen.

Textile-printing Stroboscope, in which fluorescent lamps are synchronized with cloth motion in printing machines so as to give a stationary view of cloth pattern at any speed.

"Shot-gun Feed" for Saw Mills, incorporating amplidyne control; for the first time successfully applying electricity to directly driving saw-mill carriages with the desired high acceleration and retardation.

Induction Electronic Accelerator, giving electrons almost the 186,000-miles-per-second velocity of light; looking somewhat like a miniature atom smasher of the cyclotron type but handling electrons rather than the positive ions of the cyclotron.

Steel Width Gauge, a photoelectric device continuously measuring "on the fly" the width of a hot strip traveling at high speed, with accuracy of better than $\frac{1}{64}$ inch despite wavering movement of the strip.

GENERAL ELECTRIC MAZDA LAMPS

General Lighting Service—120 Volts

Watts	Base	Max. Over-All Length In Inches	Bulb	Rated Initial Lumens
60	Medium	4 7/16	A-19	830
75	Medium	5 5/16	A-21	1100
100	Medium	6 1/16	A-23	1600
150	Medium	6 15/16	A-25	2600
200	Medium	8 1/16	PS-30	3700
309	Medium	8 3/4	PS-35	5900
300	Mogul	9 3/8	PS-35	5750
500	Mogul	9 3/4	PS-40	10000
750	Mogul	13 1/16	PS-52	14500
1000	Mogul	13 1/16	PS-52	21000
1000	Bipost	9 1/8	T-24	19500
1500	Mogul	13 1/16	PS-52	33000

Type H Mercury Lamps

100	Admedium	5 5/8	T-10	3500
250	Medium	8	T- 9	7500
400	Mogul	13	T-16	16000

Fluorescent Lamps

				Day-Light	White
15	Medium Bi-pin	18	T- 8	510	585
20		24	T-12	730	860
30		36	T- 8	1250	1400
40		48	T-12	1700	2100
65	Mogul Bi-pin	36	T-17	1800	2100
100		60	T-17	3350	4200

Photoflash Lamps

No.				Lumen-Seconds
SM	Bayonet	2 5/8	B-11	2500- 3000
5	Bayonet	2 5/8	B-11	16000- 18000
6	Bayonet	2 5/8	B-11	16000- 18000
11	Medium	4	A-15	18000- 22000
16	Medium	4 1/4	A-17	40000- 45000
21	Medium	5	A-19	50000- 60000
31	Medium	5 3/8	A-21	70000- 80000
50	Medium	5 3/8	A-21	100000-120000
75	Medium	8 5/16	PS-35	160000-180000

Modern Lighting Standards

Footcandles given are an index to good practice.

Factories		Offices	
Aisles	5	Close Work	30–70
Rough Work	20	No Close Work	20
Medium Work	50	Drafting Room	35–70
Fine Work	* 50–100	Hotels	
Extra Fine Work	*100–200	Lobby	10
Store Areas		Bedrooms	10
Circulation	20	Schools	
Merchandise counters and displays	* 50–100	Auditoriums	10–20
		Classrooms	15–35
		Sight Saving	35–70

*Supplementary lighting is usually required.

DISTANCES OF TRANSMISSION

Distances to which 100-kw, three-phase power can be transmitted over different sizes of hard drawn copper wires at different voltages, assuming an energy loss of 10%, temperature of 25°C, and a power factor of 85%. Distances are proportional to the squares of the voltages and inversely proportional to the kw.

No. AWG	Area in Circular Mils	Voltages at Receiving End					
		2,000	3,000	4,000	5,000	6,000	8,000
		Distance of Transmission in Miles					
Solid							
6	26,250	1.32	2.97	5.28	8.25	11.9	21.2
5	33,100	1.67	3.76	6.67	10.4	15.0	26.7
4	41,740	2.10	4.73	8.40	13.1	18.9	33.7
3	52,630	2.65	5.96	10.6	16.5	23.8	42.4
2	66,370	3.35	7.52	13.4	20.9	30.2	53.5
1	83,690	4.22	9.49	16.9	26.4	38.0	
Strnd'd							
0	105,500	5.20	11.7	20.8	32.5	46.8	
00	133,100	6.55	14.8	26.2	41.0		
000	167,800	8.26	18.6	33.0	51.7		

EQUATIONS FOR CALCULATING SHORT THREE-PHASE TRANSMISSION CIRCUITS CAPACITY NEGLECTED

e_g = Volts line-to-neutral at generator end.
e_r = Volts line-to-neutral at receiver end.
$E = \sqrt{3}\ e$ = Volts phase-to-phase.
R = Resistance of one conductor in ohms.
X = Reactance of one conductor in ohms.
I = Current per phase.
Cos θ = Power factor.

$$I = \frac{\text{Three-phase Watts}}{\sqrt{3}\ E\ (\text{Cos}\ \theta)}$$

Power loss = $3\ I^2R$.

$$e_g = \sqrt{(e_r \cos\theta + IR)^2 + (e_r \sin\theta + IX)^2}.$$

Cos θ and sin θ in these equations correspond to the power-factor angle at the receiver end. For leading power-factor sin θ will be negative.

REACTANCE IN OHMS PER 1000 FT. ONE CONDUCTOR OF SINGLE-PHASE OR THREE-PHASE CIRCUIT
For Triangular Spacing*
25 CYCLES

No. A W G	Inter Axial Distance in Inches				
	12	18	36	60	72
Solid					
8	0.0523	0.0562	0.0628	0.0677	0.0695
7	0.0512	0.0551	0.0617	0.0666	0.0684
6	0.0501	0.0540	0.0606	0.0655	0.0673
5	0.0490	0.0529	0.0595	0.0644	0.0661
4	0.0479	0.0518	0.0584	0.0633	0.0651
3	0.0468	0.0507	0.0573	0.0622	0.0639
2	0.0457	0.0496	0.0562	0.0611	0.0628
1	0.0446	0.0485	0.0551	0.0600	0.0617
Stranded					
0	0.0430	0.0469	0.0535	0.0585	0.0602
00	0.0419	0.0458	0.0524	0.0573	0.0591
000	0.0408	0.0447	0.0513	0.0563	0.0580
0000	0.0397	0.0436	0.0502	0.0551	0.0569
250,000	0.0384	0.0423	0.0489	0.0538	0.0556
300,000	0.0375	0.0414	0.0481	0.0530	0.0547

60 CYCLES

No. A W G	Inter Axial Distance in Inches				
	12	18	36	60	72
Solid					
8	0.1256	0.1349	0.1508	0.1625	0.1667
7	0.1230	0.1323	0.1481	0.1599	0.1641
6	0.1203	0.1296	0.1455	0.1572	0.1614
5	0.1176	0.1270	0.1428	0.1546	0.1587
4	0.1150	0.1243	0.1402	0.1519	0.1561
3	0.1123	0.1216	0.1375	0.1492	0.1534
2	0.1096	0.1190	0.1348	0.1466	0.1507
1	0.1070	0 1163	0.1322	0.1439	0.1481
Stranded					
0	0.1033	0.1126	0.1285	0.1403	0.1445
00	0.1006	0.1099	0.1258	0.1376	0.1418
000	0.0980	0.1073	0.1232	0.1350	0.1392
0000	0 0953	0.1046	0.1205	0.1323	0.1365
250,000	0.0922	0.1015	0.1174	0.1292	0.1333
300,000	0.0902	0.0994	0.1153	0.1271	0.1313

*Multiply flat spacing by 1.26 to obtain eq. Δ

DIAMETER, WEIGHT AND RESISTANCE OF STANDARD ANNEALED COPPER WIRE

Round Solid Conductor

(Based on U. S. Bureau of Standards)

No. AWG	Diameter Mils	Area Circular Mils	Weight Bare Wire Pounds per 1000 Ft.	Resistance at 25° C (77° F)	
				Ohms per 1000 Ft.	Feet per Ohm
0000	460	211,600	640.5	.04998	20,010.
000	410	167,800	507.9	.06302	15,870.
00	365	133,100	402.8	.07947	12,580.
0	325	105,500	319.5	.1002	9,980.
1	289	83,690	253.3	.1264	7,914.
2	258	66,370	200.9	.1593	6,276.
3	229	52,640	159.3	.2009	4,977.
4	204	41,740	126.4	.2533	3,947.
5	182	33,100	100.2	.3195	3,130.
6	162	26,250	79.46	.4028	2,482.
7	144	20,820	63.02	.5080	1,969.
8	128	16,510	49.98	.6405	1,561.
9	114	13,090	39.63	.8077	1,238.
10	102	10,380	31.43	1.018	981.8
11	91	8,234	24.92	1.284	778.7
12	81	6,530	19.77	1.619	617.5
13	72	5,178	15.68	2.042	489.7
14	64	4,107	12.43	2.575	388.3
15	57	3,257	9.858	3.247	308.0
16	51	2,583	7.818	4.094	244.2
17	45	2,048	6.200	5.163	193.7
18	40	1,624	4.917	6.510	153.6
19	36.0	1,288	3.899	8.210	121.8
20	32.0	1,022	3.092	10.35	96.60

DIAMETER, WEIGHT AND RESISTANCE OF STANDARD ANNEALED COPPER WIRE

Round Solid Conductor

(Based on U. S. Bureau of Standards)

No. AWG	Diameter Mils	Area Circular Mils	Weight Bare Wire Pounds per 1000 Ft.	Resistance at 25° C (77° F)	
				Ohms per 1000 Ft.	Feet per Ohm
21	28.5	810.1	2.452	13.05	76.61
22	25.3	642.4	1.945	16.46	60.75
23	22.6	509.5	1.542	20.76	48.18
24	20.1	404.0	1.223	26.17	38.21
25	17.9	320.4	.9699	33.00	30.30
26	15.9	254.1	.7692	41.62	24.03
27	14.2	201.5	.6100	52.48	19.06
28	12.6	159.8	.4837	66.17	15.11
29	11.3	126.7	.3836	83.44	11.98
30	10.0	100.5	.3042	105.2	9.504
31	8.9	79.70	.2413	132.7	7.537
32	8.0	63.21	.1913	167.3	5.977
33	7.1	50.13	.1517	211.0	4.740
34	6.3	39.75	.1203	266.0	3.759
35	5.6	31.52	.09542	335.5	2.981
36	5.0	25.00	.07568	423.0	2.364
37	4.5	19.83	.06001	533.4	1.875
38	4.0	15.72	.04759	672.6	1.487
39	3.5	12.47	.03774	848.1	1.179
40	3.1	9.89	.02993	1,069.	0.9350
41	2.8	7.84	.02374	1,349.	0.7415
42	2.5	6.22	.01883	1,701.	0.5880
43	2.2	4.93	.01493	2,144.	0.4663
44	2.0	3.91	.01184	2,704.	0.3698

DATA ON BARE STRANDED ANNEALED COPPER CABLE—Concentric Lay

(Based on U. S. Bureau of Standards)

Size of Cable Circular Mils	Diam. Inches	No. of Wires	Diam. of Wires Inches	Weight per 1000 Ft. in Lbs.
250,000	0.576	37	0.0822	772
300,000	0.631	37	0.0900	926
400,000	0.729	37	0.1040	1,240
500,000	0.815	37	0.1162	1,540
750,000	0.999	61	0.1109	2,320
1,000,000	1.153	61	0.1280	3,090
1,250,000	1.289	91	0.1172	3,860
1,500,000	1.413	91	0.1284	4,630
1,750,000	1.527	127	0.1174	5,410
2,000,000	1.632	127	0.1255	6,180

Size of Cable Circular Mils	Weight per Mile in Lb.	D. C. Resistance at 25° C. (77°F.)		Feet per Ohm at 25°C.
		Ohms per 1000 Ft.	Ohms per Mile	
250,000	4,076	0.0432	0.2281	23,150
300,000	4,889	0.0360	0.1901	27,750
400,000	6,547	0.0270	0.1426	37,050
500,000	8,131	0.0216	0.1141	46,300
750,000	12,250	0.0144	0.0760	69,450
1,000,000	16,315	0.0108	0.0570	92,600
1,250,000	20,381	0.00863	0.0456	115,900
1,500,000	24,446	0.00719	0.0380	139,100
1,750,000	28,565	0.00616	0.0325	162,300
2,000,000	32,630	0.00539	0.0285	185,500

COPPER WIRE TEMPERATURE CORRECTIONS

(Based on U. S. Bureau of Standards)

Temperature Coefficient of Resistance

At a temperature of 25 degrees Centigrade the "constant mass" temperature coefficient of resistance of standard annealed copper, measured between potential points rigidly fixed to the wire is 0.00385 or 1/259.5 per Centigrade degree.

Resistance values of copper wire given in tables at 25° C. may be corrected for any temperature by means of the following formula:

$R_t = R_{25} [1 + 0.00385 (t - 25)]$, where
R_t = the resistance in ohms at a temperature, t.
R_{25} = the resistance in ohms at 25 degrees, Centigrade
t = the temperature of wire in degrees, Centigrade

Centigrade & Fahrenheit Temperature Scales

Centigrade	Fahrenheit	Centigrade	Fahrenheit	Centigrade	Fahrenheit	Centigrade	Fahrenheit
0	32	30	86	50	122	80	176
5	41	35	95	55	131	85	185
10	50	38	100.4	60	140	90	194
15	59	40	104	65	149	95	203
20	68	42	107.6	70	158	100	212
25	77	45	113	75	167		

Temp. F. = 9/5 (Temp. C.) + 32.
Temp. C. = 5/9 (Temp. F. — 32.)

TENSILE STRENGTH OF COPPER WIRE

No. AWG	Breaking Wt. Lb. Hard Drawn	Breaking Wt. Lb. Annealed	No. AWG	Breaking Wt. Lb. Hard Drawn	Breaking Wt. Lb. Annealed
0000	8310	5650	8	778	440
000	6580	4480	9	617	349
00	5226	3553	10	489	277
0	4558	2813	11	388	219
1	3746	2234	12	307	174
2	3127	1772	13	244	138
3	2480	1405	14	193	109
4	1967	1114	15	153	87
5	1559	883	16	133	69
6	1237	700	17	97	55
7	980	555	18	77	43

ALLOWABLE CURRENT-CARRYING CAPACITIES OF INSULATED CONDUCTORS IN AMPERES

Not more than Three Conductors in Raceway or Cable*

(From National Electrical Code, 1940)

Size AWG or 1000 Circular Mils	50C Code Rubber Type R Moisture Resistant Rubber Type RW	60C Synthetic Types SN, RU Performance Rubber Types RP, RPT	75C Heat-Resistant Rubber Types RH, RHT	85C Paper Varnish Cambric Type V
14	15	18	22	23
12	20	23	27	29
10	25	31	37	38
8	35	41	49	50
6	45	54	65	68
5	52	63	75	78
4	60	72	86	88
3	69	83	99	104
2	80	96	115	118
1	91	110	131	138
0	105	127	151	157
00	120	145	173	184
000	138	166	199	209
0000	160	193	230	237
250	177	213	255	272
300	198	238	285	299
350	216	260	311	325
400	233	281	336	361
500	265	319	382	404
600	293	353	422	453
700	320	385	461	488
750	330	398	475	502
800	340	410	490	514
900	360	434	519	556
1,000	377	455	543	583

Correction Factors for Room Temperatures Over 30C

C.	F.				
40	104	.71	.82	.88	.90
45	113	.50	.71	.82	...
50	122	.00	.58	.75	.80
55	131	...	.41	.67	...
60	140	...	.00	.58	.67

*The above table is based on room temperature of 30C or 86F. For correction factors above 60C see National Electrical Code. In no case shall conductors be installed in such a way that copper temperatures exceed those given in the column headings. For 4 to 6 conductors current capacity is reduced to 80% and for 7 to 9 conductors to 70%.

For single conductor in free air see N.E. Code.

IDENTIFYING CODE LETTERS ON ALTERNATING CURRENT MOTORS

Starting Kva* per Horsepower	NEC NEMA Code Letter	Branch-circuit Protection in % of Motor Full-load Current**			
		Full-voltage Start		Autotransformer Start	
		Max. Fuse Rating	Max. Breaker Setting†	Max. Fuse Rating	Max. Breaker Setting†
0.00– 3.14	A	150	150	150	150
3.15– 3.54	B	250	200	200	200
3.55– 3.99	C	250	200	200	200
4.00– 4.49	D	250	200	200	200
4.50– 4.99	E	250	200	200	200
5.00– 5.59	F	300	250	250	200
5.60– 6.29	G	300	250	250	200
6.30– 7.09	H	300	250	250	200
7.10– 7.99	J	300	250	250	200
8.00– 8.99	K	300	250	250	200
9.00– 9.99	L	300	250	250	200
10.00–11.19	M	300	250	250	200
11.20–12.49	N	300	250	250	200
12.50–13.99	P	300	250	250	200
14.00–	R	300	250	250	200
Wound-rotor	motor‡	150	150	150	150

**Sec. 94304 Chap. 9, NE Code.* ** *Table 26 NE Code.*
‡*Has no code letter.* † *Time limit type.*

$$\text{Start. kva per hp.} = \frac{\text{volts x locked rotor amps}}{\text{1000 x horsepower}} \times \begin{cases} 1 \text{ for 1-phase} \\ 2 \text{ for 2-phase} \\ 1.732 \text{ for 3-phase} \end{cases}$$

Code Letters Usually Applied to Ratings of Motors Normally Started on Full Voltage

Code Letters		E	F	G	H	J	K	L	M	N
Horsepower	3-phase		15 up	10–7½	5	3	2	1½	1	¾
	1-phase	5	3	1½			1	¾	½	

MOTOR WIRING

(Condensed from National Electrical Code 1940)

HP.	Approx. Full Load Amp.	†† Min. Size Wire AWG or MCM Type R	*** Size Conduit in In.	** Rating of Branch Circuit Fuses	Full Load Amp.	†† Min. Size Wire AWG or MCM Type R	Size Conduit in In.	** Rating of Branch Circuit Fuses
3-PHASE SQUIRREL-CAGE INDUCTION MOTORS								
	220 VOLTS				440 VOLTS			
1	3.3	14	½	* 15	1.7	14	½	* 15
1½	4.7	14	½	* 15	2.4	14	½	* 15
2	6	14	½	* 20	3.0	14	½	* 15
3	9	14	½	* 30	4.5	14	½	* 15
5	15	12	½	* 45	7.5	14	½	* 25
7½	22	8	1	* 70	11	14	½	* 35
10	27	8	1	* 80	14	12	½	* 45
15	38	5	1¼	*125	19	10	¾	* 60
20	52	3	1¼	*175	26	8	1	* 80
25	64	2	1½	*200	32	6	1¼	*100
30	77	0	2	*250	39	5	1¼	*125
40	101	000	2	†250	51	3	1¼	†125
50	125	0000	2½	†350	63	2	1½	†175
60	149	300	3	†400	75	0	2	†200
75	180	400	3	†450	90	00	2	†225

*For full-voltage starting of normal torque motors having Code letters F to R.

†For auto-transformer starting of normal torque motors having Code letters F to R.

**The fuse rating may be as much as 400% of motor rated current to permit motor to start but should be kept as low as possible for best short circuit protection. Additional protection of an approved type *must* be provided to protect each motor against normal operating overloads. Thermal air circuit breakers are also extensively used for branch-circuit protection. Ratings in general are somewhat lower than those listed for fuses.

***For 3 conductors in one conduit.

††See note page 37.

MOTOR WIRING

(Condensed from National Electrical Code 1940)

HP.	Full Load Amp.	†† Min. Size Wire AWG or MCM Type R	*** Size Con-duit in In.	** Rating of Branch Circuit Fuses	Full Load Amp.	†† Min. Size Wire AWG or MCM Type R	Size Con-duit in In.	** Rating of Branch Circuit Fuses
SINGLE-PHASE INDUCTION MOTORS								
	115 VOLTS				230 VOLTS			
½	6.7	14	½	20	3.4	14	½	15
¾	9	14	½	30	4.5	14	½	15
1	10.5	14	½	35	5.3	14	½	20
1½	14.5	12	½	45	7.3	14	½	25
2	19	10	¾	60	9.5	14	½	30
3	27	8	¾	80	13.5	12	½	40
5	....	..	....	.....	22	8	¾	60
DIRECT CURRENT MOTORS								
	115 VOLTS				230 VOLTS			
1	8.4	14	½	15	4.2	14	½	15
1½	12.5	12	½	20	6.3	14	½	15
2	16.1	10	¾	25	8.3	14	½	15
3	23	8	¾	35	12.3	12	½	20
5	40	5	1¼	60	19.8	10	¾	30
7½	58	2	1¼	90	28.7	6	1	45
10	75	0	1½	125	38	5	1¼	60
15	112	0000	2	175	56	2	1¼	90
20	140	250	2½	225	74	0	1½	125

**See note page 36.

***For 2 Conductors in one conduit.

††The values given are for not more than three conductors in raceway or cable, and having rubber insulation, other than the so-called performance and heat resisting types. In general, larger current values are permitted for the latter types and for single conductors in free air, for which see National Electrical Code. In order to avoid excessive voltage drop where long runs are involved, it may be necessary to use conductors and conduit of sizes larger than the minimum sizes listed above.

FULL-LOAD AMPERES IN SINGLE-PHASE CIRCUITS OF VARIOUS VOLTAGES

KVA	120v	240v	480v	2400v	4160v
1.5	12.5	6.3	3.1	.63	.36
2.5	20.8	10.4	5.2	1.04	.60
3	25.0	12.5	6.3	1.25	.72
5	41.7	20.8	10.4	2.08	1.20
7.5	62.5	31.3	15.6	3.13	1.80
10	83.3	41.7	20.8	4.17	2.40
15	125	62.5	31.3	6.25	3.61
25	208	104	52.1	10.4	6.01
37.5	313	156	78.1	15.6	9.01
50	417	208	104	20.8	12.0
75	625	313	156	31.3	18.0
100	833	417	208	41.7	24.0
150	1250	625	313	62.5	36.1
200	1667	833	417	83.3	48.1
250	2083	1042	521	104	60.1
333	2775	1388	694	139	80.0
500	4167	2083	1042	208	120

KVA	4800v	7200v	7620v	12,000v	13,200v
1.5	.31	.21	.20	.13	.11
2.5	.52	.35	.33	.21	.19
3	.63	.42	.39	.25	.23
5	1.04	.70	.66	.42	.38
7.5	1.56	1.04	.98	.62	.57
10	2.08	1.39	1.31	.83	.76
15	3.13	2.08	1.97	1.25	1.14
25	5.21	3.47	3.28	2.08	1.89
37.5	7.81	5.20	4.92	3.12	2.84
50	10.4	6.95	6.56	4.16	3.79
75	15.6	10.4	9.84	6.25	5.68
100	20.8	13.9	13.1	8.33	7.58
150	31.3	20.8	19.7	12.5	11.4
200	41.7	27.8	26.2	16.7	15.2
250	52.1	34.8	32.8	20.8	18.9
333	69.4	46.3	43.7	27.8	25.2
500	104	69.5	65.6	41.6	37.9

v = Volts

FULL-LOAD AMPERES IN THREE-PHASE CIRCUITS OF VARIOUS VOLTAGES

KVA	208v	240v	480v	2400v	4160v
4.5	12.5	10.8	5.41	1.08	.62
7.5	20.8	18.0	9.02	1.80	1.04
9	25.0	21.7	10.8	2.17	1.25
10	27.8	24.1	12.0	2.41	1.39
15	41.6	36.1	18.0	3.61	2.08
22.5	62.5	54.1	27.1	5.41	3.12
25	69.4	60.1	30.1	6.01	3.47
30	83.3	72.2	36.1	7.22	4.16
37.5	104	90.2	45.1	9.02	5.20
45	125	108	54.1	10.8	6.25
50	139	120	60.1	12.0	6.94
75	208	180	90.2	18.0	10.4
100	278	241	120	24.1	13.9
112.5	312	271	135	27.1	15.6
150	416	361	180	36.1	20.8
200	555	481	241	48.1	27.8
225	625	541	271	54.1	31.2
300	833	722	361	72.2	41.6
450	1249	1083	541	108	62.5
500	1388	1203	601	120	69.3
600	1665	1443	722	144	83.3
750	2082	1804	902	180	104

KVA	4800v	7200v	8320v	11,500v	12,000v	13,200v
4.5	.54	.36	.31	.23	.22	.20
7.5	.90	.60	.52	.38	.36	.33
9	1.08	.72	.62	.45	.43	.39
10	1.20	.80	.69	.50	.48	.44
15	1.80	1.2	1.04	.75	.72	.66
22.5	2.71	1.8	1.56	1.13	1.08	.98
25	3.01	2.0	1.73	1.26	1.20	1.09
30	3.61	2.4	2.08	1.51	1.44	1.31
37.5	4.51	3.0	2.60	1.88	1.80	1.64
45	5.41	3.6	3.12	2.26	2.16	1.97
50	6.01	4.0	3.47	2.51	2.40	2.19
75	9.02	6.0	5.21	3.77	3.61	3.28
100	12.0	8.0	6.94	5.02	4.81	4.37
112.5	13.5	9.0	7.81	5.65	5.42	4.92
150	18.0	12.0	10.4	7.53	7.22	6.56
200	24.1	16.0	13.9	10.0	9.62	8.76
225	27.1	18.0	15.6	11.3	10.8	9.84
300	36.1	24.0	20.8	15.1	14.4	13.1
450	54.1	36.0	31.2	22.6	21.6	19.7
500	60.1	40.0	34.7	25.1	24.1	21.9
600	72.2	48.0	41.6	30.1	28.9	26.2
750	90.2	60.0	52.0	37.7	36.1	32.8

POWER-FACTOR IMPROVEMENT

Figures below × kilowatt input = kv-a. of capacitance required to improve from one power-factor to another

Original Power-factor %	DESIRED POWER-FACTOR				
	100%	95%	90%	85%	80%
20	4.899	4.570	4.415	4.279	4.149
21	4.656	4.327	4.171	4.036	3.906
22	4.433	4.104	3.949	3.813	3.683
23	4.231	3.902	3.747	3.611	3.481
24	4.045	3.716	3.561	3.425	3.295
25	3.873	3.544	3.389	3.253	3.123
26	3.714	3.385	3.229	3.094	2.964
27	3.566	3.238	3.082	2.946	2.816
28	3.429	3.100	2.944	2.809	2.679
29	3.300	2.971	2.816	2.680	2.550
30	3.180	2.851	2.696	2.560	2.430
31	3.067	2.738	2.583	2.447	2.317
32	2.961	2.632	2.476	2.341	2.211
33	2.861	2.532	2.376	2.241	2.111
34	2.766	2.437	2.282	2.146	2.016
35	2.676	2.347	2.192	2.056	1.926
36	2.592	2.263	2.107	1.972	1.842
37	2.511	2.182	2.027	1.891	1.761
38	2.434	2.105	1.950	1.814	1.684
39	2.361	2.032	1.877	1.741	1.611
40	2.291	1.963	1.807	1.671	1.541
41	2.225	1.896	1.740	1.605	1.475
42	2.161	1.832	1.676	1.541	1.410
43	2.100	1.771	1.615	1.480	1.349
44	2.041	1.712	1.557	1.421	1.291
45	1.985	1.656	1.501	1.365	1.235
46	1.930	1.602	1.446	1.310	1.180
47	1.877	1.548	1.392	1.257	1.128
48	1.828	1.499	1.343	1.208	1.077
49	1.779	1.450	1.295	1.159	1.029
50	1.732	1.403	1.248	1.112	.982
51	1.687	1.358	1.202	1.067	.936
52	1.643	1.314	1.158	1.023	.892
53	1.600	1.271	1.116	.980	.850
54	1.559	1.230	1.074	.939	.808
55	1.518	1.189	1.034	.898	.768
56	1.497	1.150	.995	.859	.729
57	1.442	1.113	.957	.822	.691
58	1.405	1.076	.920	.785	.654
59	1.368	1.040	.884	.748	.618
60	1.333	1.004	.849	.713	.583

POWER-FACTOR IMPROVEMENT

Original Power-factor %	DESIRED POWER-FACTOR				
	100%	95%	90%	85%	80%
61	1.299	.970	.815	.679	.549
62	1.266	.937	.781	.646	.515
63	1.233	.904	.748	.613	.482
64	1.201	.872	.716	.581	.450
65	1.169	.840	.685	.549	.419
66	1.138	.810	.654	.518	.388
67	1.108	.779	.624	.488	.358
68	1.078	.750	.594	.458	.328
69	1.049	.720	.565	.429	.298
70	1.020	.691	.536	.400	.270
71	.992	.663	.507	.372	.241
72	.964	.635	.480	.344	.214
73	.936	.608	.452	.316	.186
74	.909	.580	.425	.289	.158
75	.882	.553	.398	.262	.132
76	.855	.527	.371	.235	.105
77	.829	.500	.344	.209	.078
78	.802	.474	.318	.182	.052
79	.776	.447	.292	.156	.026
80	.750	.421	.266	.130	
81	.724	.395	.240	.104	
82	.698	.369	.214	.078	
83	.672	.343	.188	.052	
84	.646	.317	.162	.026	
85	.620	.291	.136		
86	.593	.265	.109		
87	.567	.238	.082		
88	.540	.211	.056		
89	.512	.183	.028		
90	.484	.155			
91	.456	.127			
92	.426	.097			
93	.395	.066			
94	.363	.034			
95	.329				
96	.292				
97	.251				
98	.203				
99	.142				
100					

EXAMPLE.—Total kw. input of plant from wattmeter reading 100 kw. at a power-factor of 60 per cent. The kv-a. of the capacitor necessary to raise the power-factor to 80 per cent is found by multiplying the 100 kw. by the factor found in the table which is 0.58. 100 kw. $\times$ 0.58 = 58 kv-a. in capacitor capacity. The nearest standard size, of course, is 60 kv-a. and this should be recommended.

EXPRESSION OF RESISTIVITY AND CONDUCTIVITY

(International Electrotechnical Commission and A.I.E.E. Standards)

The international annealed copper standard used as the international basis of 100% conductivity is as follows:

A uniform copper wire one square millimeter cross-section and one meter long at 20°C. = 1/58 ohm = 0.017241 ohm—Standard density of copper at 20°C. is 8.89 and temperature coefficient of resistance is 0.00393 per °C. at 20°C.

Equivalents are:

0.017241 ohm (meter, mm.^{2})
10.371 ohms per circular mil foot.
1.7241 microhm per centimeter cube.
0.67879 microhm per inch cube.
0.15328 ohm (meter, gram).
875.20 pounds per mile-ohm.

HYDRAULIC FORMULAE

Lb. per sq. in. = 0.434 × head of water in feet.
Head in feet = 2.3 × pounds per sq. in.
Weight per cu.ft. of fresh water at 32° F. = 62.42 pounds.
Weight per U. S. gallon of fresh water = 8.34 pounds.

Loss of Head (H) Due to Friction in Pipes

$$H. = \frac{.02 \times L \times V^2}{64.4\ D}$$

L = length of pipe in feet; D = diameter in feet; and V = velocity of flow in feet per second. In calculating the total head to be pumped against, it is common to consider it equal to the sum of the friction head and the actual head.

Horse Power of Waterfall

$$H.\ P. = \frac{62 \times A \times V \times H}{33{,}000}$$

A = Cross-section in sq. ft. of stream flowing over dam.
V = Velocity of flow in feet per minute.
H = Head of fall in feet.

WEIGHTS OF MATERIALS

Materials	Lb. per Cu. Ft.	Sp. gr. $H_2O = 1$
Aluminum, cast	160	2.56
Aluminum, wrought	169	2.71
Antimony	415	6.62
Asbestos Board	74.91	1.2
Balsa	6.9	.11
Benzene	56.1	.90
Bismuth	606	9.7
Brass, cast	527	8.44
Brass, wire	542	8.70
Bronze	544	8.73
Constantan	554	8.9
Copper	554	8.89
Copper, cast	530	8.5
Cork	14–16	.22–.26
Ebonite	72	1.15
Ether, Sulphuric	45.9	.736
German Silver	518	8.3
Glass	149–187	2.4–3
Gold	1206	19.3
Granite	156–187	2.5–3
Iron, cast	443	7.1
Iron, wrought	486	7.8
Lead, wire	708	11.35
Magnalium	125	2
Magnesium		1.74
Mercury, fluid	846	13.56
Molybdenum	640	10.2
Naphtha	53	.85
Nickel, cast	550	8.8
Nitric Acid	76.2	1.22
Oak	38–56	.60–.90
Oil, linseed	58.8	.942
Oil, Turpentine	54.2	.87
Paper	43–72	.7–1.15
Petroleum	54.8	.88
Phosphor Bronze	549	8.8
Platinum	1330	21.4
Sandstone	143.58	2.3
Silver	655	10.5
Steel	489	7.8
Sulphuric Acid (conc.)	114.9	1.84
Tin	454.60	7.3
Tungsten	1173	18.8
Walnut	40.44	.64-.70
Water, pure	62.4	1.000
White Pine (seas.)	31	.5
Zinc, sheet	449	7.2

SPECIFIC RESISTANCE OF METALS AND ALLOYS AT ORDINARY TEMPERATURES

(U. S. Bureau of Standards)

SUBSTANCE	* Specific Resistance	Relative Conductance	SUBSTANCE	Specific Resistance	Relative Conductance
Aluminum 99.57	2.828	60.97	Lead.....	22	7.8
Brass.....	6–9	28.7–19.1	Manganin...	44	3.9
Climax.....	87	1.98	Mercury....	95.8	1.8
Cobalt 99.8%...	9.7	17.7	Molybdenum	5.1	34
Constantan.....	49	3.52	Nickel.....	7.8	22.1
Copper,annealed	1.7241	100%	Nichrome...	100	1.724
Copper, pure....	1.692	102%	Platinum....	10	17.24
Ger. Silver (18X)	30–40	5.7–4.3	Silver.....	1.62	106.4
Iron, 99.98	10	17.24	Superior 23 .	86	2
Wrought Iron...	13.9	12.4	Tungsten....	5.4	31.9

*In ohm-cm x 10^{-6}

MELTING POINTS OF ELEMENTS

(U. S. Bureau of Standards)

ELEMENT	Degrees Fahrenheit	Degrees Centigrade	ELEMENT	Degrees Fahrenheit	Degrees Centigrade
Aluminum....	1220	660	Molybdenum..	4748	2620
Antimony.....	1166	630	Nickel.....	2651	1455
Beryllium....	2462	1350	Nitrogen.....	—346	—210
Bismuth.....	520	271	Oxygen.....	—360	—218
Cadmium.....	609.6	320.9	Palladium.....	2827	1553
Chromium....	2939	1615	Platinum.....	3225	1774
Cobalt.....	2696	1480	Potassium....	144.1	62.3
Copper.....	1981.4	1083	Silver.....	1760.9	960.5
Gold.....	1945.5	1063	Sodium.....	207.5	97.5
Hydrogen.....	—434	—259	Sulphur.....	246	119
Iodine.....	236.3	113.5	Tantalum.....	5162	2850
Iridium.....	4260	2350	Tin.....	449.4	231.9
Iron.....	2795	1535	Titanium.....	3272	1800
Lead.....	621.3	327.4	Tungsten.....	6100	3370
Magnesium....	1204	651	Vanadium....	3110	1710
Manganese....	2300	1260	Zinc.....	786.9	419.4
Mercury.....	—38.0	—38.9			

SPECIFIC HEAT DATA

	Average Specific Heat	Average Watt-hours to Heat 1 Lb. 1 Deg. C.	Average Watt-hours to Heat 1 Lb. 1 Deg. F	Heat of Fusion Watt-hours per Lb.	Lb. per Cu. Ft.
Air (at 68° F.)	0.237	0.125	0.0695	.....	0.07522
Aluminum	0.22	0.116	0.065	.....	.....
Brass	0.089	0.046	0.024	.....	.....
Carbon	0.204	0.107	0.0595	.....	.....
Copper	0.094	0.0495	0.0275	19.2	.....
Graphite	0.12	0.063	0.0352	.....	120–140
Iron, gray cast	0.11	0.058	0.0322	19.2	.....
	0.16	0.085	0.0468	.....	.....
Lead, solid	0.031	0.0163	0.00905	3.1	.....
Lead, fluid	0.037	0.0195	0.0108	.....	.....
Nickel	0.11	0.058	0.0322	28.4	550
Paraffin solid	0.62	0.326	0.181	13.6	54.25–56.75
	0.69	0.363	0.202	.....	.....
Paraffin, fluid	0.71	0.374	0.208	18.5	52.4–57
Pitch	.....	.....	.....	.....	67
Rosin, solid	.....	.....	.....	.....	67
Solder (1 tin, 1 lead)	.....	.....	.....	5.2	.....
Solder (2 tin, 1 lead)	.....	.....	.....	6.3	.....
Tallow	.....	.....	.....	.....	57–60.5
Tar	.....	.....	.....	.....	62–63.4
Tin, solid	0.056	0.0295	0.0164	5.6	455
Tin, fluid	0.064	0.0337	0.0187	.....	436
*Type Metal	0.039	0.0206	0.0114	.....	660
Water (68° F.)	1.0	0.527	0.293	.....	62.4
Ice	0.487	.....	.....	42	57.2
Wax, bees	.....	.....	.....	16.5	60–61
Zinc, cast	0.093	0.049	0.0272	10.3	439–446.5
Zinc, fluid	.....	.....	.....	.....	404

*80 parts lead, 20 parts antimony

CONVERSION TABLE OF EQUIVALENTS

Quantities of Heat (Energy)

1 kw. hr. = 3412.75 Btu. = 860 calories = 1.3414 h.p. hr.
0.74548 kw. hr. = 2544.1 Btu. per hr. = 641.1 calories = 1 h.p. hr.

Rates of Doing Work (Power)

1 kw. = 3412.75 Btu. per hr. = 860 calories per hr = 1.3414 h.p.
0.74548 kw. = 2544.1 Btu. per hr. = 641.1 calories per hr. = 1 h.p.
1 cu. ft. water contains 7.48 gallons, weight 62.4 lb. at 50°F.
1 cu. in. water contains 0.00433 gallons, weight 0.0361 lb.
1 gallon water contains 231 cu. in., 0.1337 cu. ft., weight 8.34 lb.

HEAT UNITS

1 kw.-hr. =	1,000 watt-hr. 1.3414 h.p.-hr. 2,656,000 ft.-lb. 3,600,000 joules. 3412.75 Btu. 860 calories. 367,210 kg.-m. 0.235 lb. carbon oxidized with perfect efficiency. 3.517 lb. water evap. from and at 212°F. 22.75 lb. of water raised from 62° to 212° F.
1 h.p.-hr. =	0.74548 kw.-hr. 1,980,000 ft.-lb. 2,544.1 Btu. 273,750 kg.-m. 0.175 lb. carbon oxidized with perfect efficiency. 2.622 lb. water evap. from and at 212° F. 16.96 lb. water raised from 62° F. to 212° F.
1 lb. carbon oxidized with perfect efficiency. =	14544 heat-units. 1.11 lb. anthracitecoal oxidized. (Var.) 2.5 lb. dry wood oxidized. (Varies) 22 cu. ft. illuminating gas. (Varies) 4.262 kw. hr. 5.72 h.p.-hr. 11,319,000 ft.-lb. 14.99 lb. of water evap. from and at 212°F.
1 lb. water evaporated from and at 212° F. =	0.2843 kw.-hr. 0.3814 h.p.-hr. 970.3 heat-units. 104,400 kg.-m. 1,023,500 joules. 755,100 ft.-lb. 0.0667 lb. of carbon oxidized with perfect efficiency.

Heat

Centigrade (degrees) = 5/9 (Fahrenheit degrees minus 32).
Fahrenheit (degrees) = 9/5 (Centigrade degrees) plus 32.
1 Calorie = 3.9683 Btu.
1 Btu. = 0.251996 calorie.
1 Calorie per kilogram = 1.8 Btu. per pound.
1 Btu. per pound = 0.555556 calories per kilogram.
1 Calorie per liter = 112.37 Btu. per cubic foot.
1 Btu. per cubic foot = 0.008,899 calories per liter.
1 Calorie per cubic meter = 0.11237 Btu. per cubic foot.
1 Btu. per cubic foot = 8.899 calories per cubic meter.

METRIC AND DECIMAL EQUIVALENTS OF COMMON FRACTIONS
(Bureau of Standards)

Fractions of an inch	Decimals of an inch	Millimeters	Fractions of an inch	Decimals of an inch	Millimeters
1/64	.0156	0.397	33/64	.5156	13.097
1/32	.0313	0.794	17/32	.5313	13.494
3/64	.0469	1.191	35/64	.5469	13.891
1/16	.0625	1.588	9/16	.5625	14.288
5/64	.0781	1.985	37/64	.5781	14.684
3/32	.0938	2.381	19/32	.5938	15.081
7/64	.1094	2.778	39/64	.6094	15.478
1/8	.1250	3.175	5/8	.6250	15.875
9/64	.1406	3.572	41/64	.6406	16.272
5/32	.1563	3.969	21/32	.6563	16.669
11/64	.1719	4.366	43/64	.6719	17.066
3/16	.1875	4.763	11/16	.6875	17.463
13/64	.2031	5.159	45/64	.7031	17.859
7/32	.2188	5.556	23/32	.7188	18.256
15/64	.2344	5.953	47/64	.7344	18.653
1/4	.2500	6.350	3/4	.7500	19.050
17/64	.2656	6.747	49/64	.7656	19.447
9/32	.2813	7.144	25/32	.7813	19.844
19/64	.2969	7.541	51/64	.7969	20.241
5/16	.3125	7.938	13/16	.8125	20.638
21/64	.3281	8.334	53/64	.8281	21.034
11/32	.3438	8.731	27/32	.8438	21.431
23/64	.3594	9.128	55/64	.8594	21.828
3/8	.3750	9.525	7/8	.8750	22.225
25/64	.3906	9.922	57/64	.8906	22.622
13/32	.4063	10.319	29/32	.9063	23.019
27/64	.4219	10.716	59/64	.9219	23.416
7/16	.4375	11.113	15/16	.9375	23.813
29/64	.4531	11.509	61/64	.9531	24.209
15/32	.4688	11.906	31/32	.9688	24.606
31/64	.4844	12.303	63/64	.9844	25.003
1/2	.5000	12.700		1.0000	25.400

METRIC EQUIVALENTS
(Bureau of Standards)

Length

Cm.	= .3937	In.	In.	= 2.54	Cm.
Meter	= 3.28	Ft.	Ft.	= .3048	Meter
Meter	= 1.094	Yd.	Yd.	= .9144	Meter
Kilom.	= .621	Mile	Mile	= 1.61	Kilom.

Area

Sq. Cm.	= 0.1550	Sq. in.	Sq. in.	= 6.45	Sq. Cm.
Sq. M.	= 10.76	Sq. ft.	Sq. ft.	= .0929	Sq. M.
Sq. M.	= 1.196	Sq. yd.	Sq. yd.	= .836	Sq. M.
Hectare	= 2.47	Acres	Acre	= 0.405	Hectare
Sq. Kilom.	= .386	Sq. mi.	Sq. mi.	= 2.59	Sq. Kilom.

Volume

Cu. Cm.	= .061	Cu. in.	Cu. in.	= 16.38	Cu. Cm.
Cu. M.	= 35.315	Cu. ft.	Cu. ft.	= .028	Cu. M.
Cu. M.	= 1.308	Cu. yd.	Cu. yd.	= .7645	Cu. M.

Capacity

Liter	= .0353	Cu. ft.	Cu. ft.	= 28.32	Liters
Liter	= .2642	Gal. (U.S.)	Gal.	= 3.785	Liters
Liter	= 61.023	Cu. in.	Cu. in.	= .0164	Liter

Liter = 2.202 lb. of fresh water at 62° F.

Weight

Gram	= 15.432	Grains	Ounce	= 28.35	Gram
Gram	= .0353	Ounce	Lb.	= .454	Kilgm.
Kilogram	= 2.2046	Lbs.	Ton(Sht)	= 907.18	Kilgm.
Kilogram	= .0011	Ton(Sht)	Ton(Sht)	= .907	Met.Ton
Met. Ton	= 1.1025	Ton(Sht)	Ton(Sht)	= 2,000	Lb.
Grain	= .0648	Gram			

Pressure

1 kilogram per sq. cm. = 14.2233 pounds per sq. in.
1 pound per sq. in. = .070307 kilograms per sq. cm.
1 kilogram per sq. meter = .20482 pounds per sq. ft.
1 pound per sq. ft. = 4.8824 kilograms per sq. meter.
1 kilogram per sq. cm. = 0.96784 standard atmosphere.
1 standard atmosphere = 1.033228 kilograms per sq. cm.
1 metric atmosphere = 1 kilogram per sq. cm.
1 standard atmosphere = 14.6959 pounds per sq. in.

METRIC EQUIVALENTS

Electrical Units

1 kilowatt = 1000 watts.
1 kilowatt = 1.3414 h. p.
1 kilowatt = 44,266 foot-pounds per minute.
1 kilowatt = 56.879 Btu. per minute.
1 horse power = 745.48 watts.
1 horse power = 33,000 foot-pounds per minute.
1 horse power = 42.402 Btu. per minute.
1 Btu. (British thermal unit) = 778.26 foot-pounds.
1 Btu. = 0.2930 watt-hour.
1 joule = 1 watt-second.

Miscellaneous

Kilogram-meter = 7.233 foot-pounds.
Foot-pound = .1383 kilogram-meter.
Metric horse power = .986 horse power.
Horse power = 1.014 metric horse power.
Liter per second = 2.12 cubic feet per minute.
Liter per second = 15.85 U. S. gallons per minute.
Angstrom unit (used to express wavelength of light) = 10^{-8} cm.
Absolute temperature (Kelvin scale) = Centigrade temperature + 273.1.
Lumen = unit of luminous flux. One candle radiates 4π lumens.

USEFUL CONVERSION RATIOS

Multiply	By	To Obtain
Diam. Circle	3.1416	Circumference Circle
Diam. Circle	0.886	Side Equal Square
U. S. Gallons	0.8333	Imperial Gallons
U. S. Gallons	0.1337	Cubic Feet
Inches Mercury	0.4912	Pounds per Sq. In.
Feet of Water	0.4335	Pounds per Sq. In.
Cubic Feet	62.4	Pounds of Water
U. S. Gallons	8.343	Pounds of Water
U. S. Gallons	3.785	Liters
Knots	1.152	Miles per hour
Inches	2.540	Centimeters
Yards	0.9144	Meters
Miles	1.609	Kilometers
Cubic Inches	16.39	Cubic Centimeters
Ounces	28.35	Grams
Pounds	0.4536	Kilograms

METRIC CONVERSION

(Note—To find the equivalent, in terms of a unit in the customary system, of a given number of metric units, multiply or divide their number (as indicated) by the factor shown. Thus: 10 millimeters are equivalent to 10 x 0.03937 inches or to 10 ÷ 25.4 inches.)

Millimeters × .03937 = inches; or ÷ 25.4 = inches.
Centimeters × .3937 = inches; or ÷ 2.54 = inches.
Meters × 39.37 = inches.
Meters × 3.28 = feet.
Meters × 1.094 = yards.
Kilometers × .621 = miles; or ÷ 1.6093 = miles.
Kilometers × 3280.8 = feet.
Square millimeters × .00155 = sq. inches; or ÷ 645 = sq. inches.
Square centimeters × .155 = sq. inches; or ÷ 6.45 = sq. inches.
Square meters × 10.764 = square feet.
Square kilometers × 247.1 = acres.
Square kilometers × .3861 = square miles.
Hectares × 2.471 = acres.
Hectares × .003861 = square miles.
Cubic centimeters ÷ 16.387 = cubic inches.
Cubic centimeters ÷ 3.70 = fluid drams (U. S. P.).
Cubic centimeters ÷ 29.57 = fluid ounces (U. S. P.).
Cubic meters × 35.314 = cubic feet.
Cubic meters × 1.308 = cubic yards.
Cubic meters × 264.2 = gallons (231 cubic inches).
Liters × 61.025 = cubic inches.
Liters × 33.81 = fluid ounces (U. S. P.).
Liters × .2642 = gallons (231 cubic inches).
Liters ÷ 3.785 = gallons (231 cubic inches).
Liters ÷ 28.317 = cubic feet.
Hectoliters × 3.53 = cubic feet.
Hectoliters × 2.84 = bushels (2150.42 cubic inches).
Hectoliters × .131 = cubic yards.
Hectoliters × 26.42 = gallons (231 cubic inches).
Grams × 15.432 = grains.
Grams (water) ÷ 29.57 = fluid ounces.
Grams ÷ 28.35 = ounces avoirdupois.
Grams per cubic centimeter ÷ 27.7 = lbs. per cubic inch.
Kilograms × 2.2046 = pounds.
Kilograms × 35.3 = ounces avoirdupois.
Kilograms ÷ 907.18 = short tons (2,000 pounds).
Kilograms per square centimeter × 14.223 = pounds per square inch.
Kilogram meters × 7.233 = foot pounds.
Kilo per meter × .672 = pounds per foot.
Kilo per cubic meter × .062 = pounds per cubic foot.
Kilo per cheval × 2.235 = pounds per horse power.
Kilowatts × 1.34 = h. p. (33,000 foot pounds per minute).
Watts ÷ 746 = horse power.
Centigrade × 1.8 + 32 = degrees Fahrenheit.

WEIGHTS AND MEASURES
(Bureau of Standards)

Troy Weight

24 grains = 1 pwt.
20 pwts. = 1 ounce
12 ounces = 1 pound

Apothecaries' Weight

20 grains = 1 scruple
3 scruples = 1 dram
8 drams = 1 ounce
12 ounces = 1 pound

Avoirdupois Weight

27 11-32 grains = 1 dram
16 drams = 1 ounce
16 ounces = 1 pound
25 pounds = 1 quarter
4 quarters = 1 cwt.
2,000 lbs. = 1 short ton
2,240 lbs. = 1 long ton

Dry Measure

2 pints = 1 quart
8 quarts = 1 peck
4 pecks = 1 bushel
36 bushels = 1 chaldron

Liquid Measure

4 gills = 1 pint
2 pints = 1 quart
4 quarts = 1 gallon
31½ gallons = 1 barrel
2 barrels = 1 hogshead

Long Measure

12 inches = 1 foot
3 feet = 1 yard
5½ yards = 1 rod
40 rods = 1 furlong
8 furlongs = 1 sta. mile
3 miles = 1 league

Square Measure

144 sq. inches = 1 sq. foot
9 sq. feet = 1 sq. yard
43,560 sq. ft. = 1 acre
30¼ sq. yds. = 1 sq. rod
40 sq. rods = 1 rood
4 roods = 1 acre
640 acres = 1 sq. mile

Mariners' Measure

6 feet = 1 fathom
120 fathoms = 1 cable length
7⅛ cable lgths. = 1 mile
5,280 feet = 1 statute mile
6,080 feet = 1 nautical mile

Paper Measure

24 sheets = 1 quire
20 quires = 1 ream
2 reams = 1 bundle
5 bundles = 1 bale

POSTAL RATES AND INFORMATION

Effective August 1st, 1941

First Class includes all letters and sealed parcels, except sealed parcels labeled "This package may be opened for Postal Inspection if necessary". It also includes any open letter or parcel containing writing, typewriting or carbon copy thereof, (except that an invoice or order covering the contents may be inclosed in packages).

Rate 3c for each ounce or fraction thereof, except that when addressed for delivery by same office where mailed the rate is 2c for each oz. or fraction thereof.

Registry Fee: $5—15c; $25—18c; $50—20c; $75—25c; $100—30c; $200—40c; $300—50c; $400—60c; $500—70c; $600—80c; $700—85c; $800—90c; $900—95c; $1000—$1.00. For higher amounts consult your postmaster.

Return receipt, if desired, 3c additional.

Fee for furnishing address where registered matter is delivered—20c additional.

Postal Cards. Regular government issue, 1c each.

Private Mailing or Post Cards not larger than 3-$\frac{9}{16}$ x 5-$\frac{9}{16}$ in., nor smaller than 2-$\frac{3}{4}$ x 4 in., either written or printed—1c.

Second Class (transient). Copies of newspapers or periodicals, entered at P. O. as second class matter, when mailed 1c for each 2 ounces or fraction thereof except when the postage at the rates prescribed for 4th class matter is lower, in which case the latter rates shall apply.

Third Class includes circulars, and other matter not included in the first, second or fourth classes. Weight limit of this class: 8 ounces. 1½c for each 2 oz. or fraction thereof. Over 8 ounces the fourth class (Parcel Post) rates apply.

Exception. Books, catalogues, (of 24 or more pages), seeds, bulbs, roots, and nursery products (up to 8 oz.), 1c for 2 oz. or fraction thereof.

Fourth Class (Parcel Post) weighing over 8 oz. and not over 70 lbs., includes all mailable matter not in first, second or third classes. Size limit 100 inches in length and girth combined. Minimum charge applicable to 10 lb. packages is made on parcels between 84 in., and 100 in., in length and girth combined. Books without advertising, published for cultural or educational purposes, have a special rate 1½c each lb. or fraction.

Fees in Addition to Postage

Special Delivery, 1st. Class only. Up to 2 lbs. 10 cts. Over 2 up to 10 lbs., 20 cts. Over 10 lbs., 25 cts.

Special Delivery, 2nd, 3rd or 4th Class, Parcel Post. Same dispatch and transportation as first class mail, *including immediate delivery after arrival*, 15 cts. to 2 lbs., 25 cts. to 10 lbs., 35 cts. over 10 lbs.

POSTAL RATES AND INFORMATION

Special Handling, Fourth class only. Dispatch and transportation same as first class mail. Does not include special delivery. 10c to 2 lbs., 15c to 10 lbs., and 20c over 10 lbs. in weight.

On rural routes for local delivery the rate is 2c less per parcel and when for other than local delivery is 3c less per parcel.

Zone	Distance	1st. Lb.	Additional Pounds
	Local	7c	1c each add. 2 lbs.
1	Up to 50 mi	8c	1.1c " " 1 lb.
2	50- 150 "	8c	1.1c " " 1 "
3	150- 300 "	9c	2c " " 1 "
4	300- 600 "	10c	3.5c " " 1 "
5	600-1000 "	11c	5.3c " " 1 "
6	1000-1400 "	12c	7c " " 1 "
7	1400-1800 "	14c	9c " " 1 "
8	Over-1800 "	15c	11c " " 1 "

Insurance Rates 3rd and 4th Class Only

Values to $5.00, 5 cts.; to $25.00, 10 cts.; to $50.00, 15 cts.; to $100.00, 25 cts.; to $150.00, 30 cts.; to $200.00, 35 cts. Return receipts, 3c additional.

AIR MAIL INFORMATION

Effective August 1st, 1941

The Air Mail rate is 6c for each ounce or fraction thereof for all classes of matter for delivery in the United States and Canada. Service is performed from coast to coast in 16-19 hours. Mail deposited at any Air Mail point reaches any other similar point within 24 hours.

Flights to Central and South America and the West Indies are made 2 to 7 times per week, rates ranging from 10c to 40c per ½ ounce postage included.

Weekly flights leave for Hawaii and Philippines, alternately routed through to Hong Kong or to Singapore, and every other week flights operate via Hawaii to New Zealand. Rates 20c to 70c per ½ ounce.

Three Trans-Atlantic trips a week to Lisbon; rate 30c per ½ ounce, connecting European Air Services.

FOREIGN POSTAL RATES

Letters may be sent to Canada and all of North, Central and South America and the West Indies, excepting British, French and Dutch colonies, at the rate of 3 cents per ounce or fraction thereof. Postal cards 2c each.

To all other foreign destinations the letter rate is 5c for the first ounce; 3c for each additional ounce. The post card rate 3c.

POPULATION OF PRINCIPAL CITIES IN THE UNITED STATES AND CANADA.

Census of 1930 and 1940.

Bold type indicates cities over 100,000. Others alphabetically. (c) Denotes state capital.

The figures immediately following the name of each state denote the land area (exclusive of inland waters) and population of the entire state.

U. S. Population, 1940 Bureau of Census, 131,669,275.
Land Area United States 3,026,789 sq. mi.

	1930	1940
ALABAMA–51,279 sq. mi. Pop. 2,832,961		
Birmingham	259,678	267,533
Anniston	22,345	25,523
Bessemer	20,721	22,826
Decatur	15,593	16,604
Dothan	16,046	17,194
Gadsden	24,042	36,975
Mobile	68,202	78,720
M'tgomery(c)	66,079	78,084
Selma	18012	19,834
Tuscaloosa	20,659	27,493
ALASKA–586,400 sq. mi. Pop. 60,200		
Fairbanks	2,101	
Juneau(c)	4,043	
Nome	1,213	
Sitka	1,056	
ARIZONA–113,810 sq. mi. Pop. 499,261		
Douglas	9,828	8,623
Phoenix(c)	48,118	65,414
Tucson	32,506	36,818
ARKANSAS–52,525 sq. mi. Pop. 1,949,387		
El Dorado	16,421	15,858
Fort Smith	31,429	36,584
Hot Springs	20,238	21,370
LittleRock(c)	81,679	88,039
N.Little R'k.	19,418	21,137
Pine Bluff	20,760	21,290
CALIFORNIA–155,652sq.mi. Pop. 6,907,387		
LosAngeles	1,238,048	1,504,277
S.Francisco	634,394	634,536
Oakland	284,063	302,163
San Diego	147,995	203,341
Long Beach	142,032	164,271
Alameda	35,033	36,256
Alhambra	29,472	38,953
Bakersfield	26,015	29,252
Berkeley	82,109	85,547
Beverly Hills	17,429	26,823
Burbank	16,662	34,337
Burlingame	13,270	15,940
Eureka	15,752	17,055
Fresno	52,513	60,685
Glendale	62,736	82,582
HuntingtnPk	24,591	28,648
Inglewood	19,480	30,114
Modesto	13,842	16,379
Palo Alto	13,652	16,774
Pasadena	76,086	81,864
Pomona	20,804	23,539
Redlands	14,177	14,324
Richmond	20,093	23,642
Riverside	29,696	34,696
Sacramento(c)	93,750	105,958

POPULATION OF CITIES

	1930	1940
S.Bernardino	37,481	43,646
San Jose....	57,651	68,457
San Mateo..	13,444	19,403
Santa Ana...	30,322	31,921
San. Barbara	33,613	34,958
Santa Cruz..	14,395	16,896
Santa Monica	37,146	53,500
S. Pasadena.	13,370	14,356
Stockton....	47,963	54,714
Whittier....	14,822	16,115
COLORADO–103,658 sq. mi.		
Pop. 1,123,296		
Denver(c)...	**287,861**	**322,412**
Boulder.....	11,223	12,958
Colo.Springs.	33,237	36,789
Pueblo.....	50,096	52,162
CONNECTICUT–4,820 sq. mi.		
Pop. 1,709,242		
Hartford(c)..	**164,072**	**166,267**
New Haven.	**162,655**	**160,605**
Bridgeport...	**146,716**	**147,121**
Ansonia.....	19,898	19,210
Bristol.....	28,451	30,167
Danbury....	22,261	22,339
E.Hartford..	17,125	18,615
Enfield.....	13,404	13,561
Fairfield....	17,218	21,135
Meriden....	38,481	39,494
Middletown.	24,554	26,495
New Britain.	68,128	68,685
N. London..	29,640	30,456
Norwalk....	36,019	39,849
Norwich....	23,021	23,652
Stamford....	46,346	47,938
Stratford....	19,212	22,580
Torrington..	26,040	26,488
Waterbury..	99,902	99,314
W. Hartford.	24,941	33,776
W. Haven...	25,808	30,021

	1930	1940
DELAWARE–1,965 sq. mi.		
Pop. 266,505		
Wilmington..	**106,597**	**112,504**
Dover(c)....	4,800	5,517
New Castle..	4,131	4,414
D. of C.–62 sq. mi.		
Pop. 663,091		
Washington.	**486,869**	**663,091**
FLORIDA–54,000 sq. mi.		
Pop. 1,897,414		
Jacksonville.	**129,549**	**173,065**
Miami.....	**110,637**	**172,172**
Tampa.....	**101,161**	**108,391**
Daytona Bh.	16,598	22,584
Key West...	12,831	12,927
Lakeland....	18,554	22,068
Orlando.....	27,330	36,736
Pensacola...	31,579	37,449
St. Petersburg.	40,425	60,812
Tallahassee(c)	10,700	16,240
W.Palm Bch.	26,610	33,693
GEORGIA–58,725 sq. mi.		
Pop. 3,123,723		
Atlanta(c)...	**270,366**	**302,288**
Albany.....	14,507	19,055
Athens.....	18,192	20,650
Augusta....	60,342	65,919
Columbus...	43,131	53,280
Decatur....	13,276	16,561
LaGrange...	20,131	21,983
Macon.....	53,829	57,865
Rome.....	21,843	26,282
Savannah...	85,024	95,996
Valdosta....	13,482	15,595
Waycross...	15,510	16,763
HAWAII–6,407 sq. mi.		
Pop. 393,000		
Honolulu(c).	**137,582**	
Hilo.....	19,468	

POPULATION OF CITIES

	1930	1940
IDAHO–83,354 sq. mi. Pop. 524,873		
Boise(c)	21,544	26,130
Pocatello	16,471	18,133
ILLINOIS–56,043 sq. mi. Pop. 7,897,241		
Chicago	**3,376,438**	**3,396,808**
Peoria	**104,969**	**105,087**
Alton	30,151	31,255
Aurora	46,589	47,170
Belleville	28,425	28,405
Berwyn	47,027	48,451
Bloomington	30,930	32,868
Blue Island	16,534	16,638
Calumet City	12,298	13,241
Champaign	20,348	23,302
Chicago Hts.	22,321	22,461
Cicero	66,602	64,712
Danville	36,765	36,919
Decatur	57,510	59,305
E. St. Louis	74,347	75,609
Elgin	35,929	38,333
Evanston	63,338	65,389
Forest Park	14,555	14,840
Freeport	22,045	22,366
Galesburg	28,830	28,876
Granite City	25,130	22,974
Harvey	16,374	17,878
Highland Pk.	12,203	14,478
Jacksonville	17,747	19,844
Joliet	42,993	42,365
Kankakee	20,620	22,241
Mattoon	14,631	15,827
Maywood	25,829	26,648
Moline	32,236	34,608
Oak Park	63,982	66,015
Ottawa	15,094	16,005
Quincy	39,241	40,469
Rockford	85,864	84,637
Rock Island	37,953	42,775
Springfield(c)	71,864	75,503
Urbana	13,060	14,064
Waukegan	33,499	34,241
Wilmette	15,233	17,226
INDIANA–36,046 sq. mi. Pop. 3,427,796		
Indianapolis(c)	**364,161**	**386,972**
Fort Wayne	**114,946**	**118,410**
South Bend	**104,193**	**101,268**
Evansville	**102,249**	**97,062**
Gary	**100,426**	**111,719**
Anderson	39,804	41,572
Bedford	13,208	12,514
Bloomington	18,227	20,870
E. Chicago	54,784	54,637
Elkhart	32,949	33,434
Hammond	64,560	70,184
Kokomo	32,843	33,795
Lafayette	26,240	28,798
La Porte	15,755	16,180
Logansport	18,508	20,177
Marion	24,496	26,767
Michigan Cy.	26,735	26,476
Mishawaka	28,630	28,298
Muncie	46,548	49,720
New Albany	25,819	25,414
Richmond	32,493	35,147
Terre Haute	62,810	62,693
Vincennes	17,564	18,228
IOWA–55,586 sq. mi. Pop. 2,538,268		
Des Moines(c)	**142,559**	**159,819**
Burlington	26,755	25,832
Cedar Rapids	56,097	62,120
Clinton	25,726	26,270
Council Bluffs	42,048	41,439
Davenport	60,751	66,039

POPULATION OF CITIES

	1930	1940
Dubuque....	41,679	43,892
Ft. Dodge...	21,895	22,904
Ft. Madison.	13,779	14,063
Iowa City...	15,340	17,182
Keokuk.....	15,106	15,076
Marshalltown	17,373	19,240
Mason City.	23,304	27,080
Muscatine...	16,778	18,286
Ottumwa...	28,075	31,570
Sioux City..	79,183	82,364
Waterloo....	46,191	51,743
KANSAS–81,774 sq. mi.		
Pop. 1,801,028		
Kansas City.	**121,857**	**121,458**
Wichita.....	**111,110**	**114,966**
Arkansas Cy.	13,946	12,752
Atchison ...	13,024	12,648
Coffeyville..	16,198	17,355
Emporia....	14,067	13,188
Hutchinson..	27,085	30,013
Independence	12,782	11,565
Lawrence...	13,726	14,390
Leavenworth	17,466	19,220
Pittsburg....	18,145	17,571
Salina.....	20,155	21,073
Topeka(c)...	64,120	67,833
KENTUCKY–40,181 sq. mi.		
Pop. 2,845,627		
Louisville...	**307,745**	**319,077**
Ashland.....	29,074	29,537
Bowl'g Green	12,348	14,585
Covington...	65,252	62,018
Frankfort(c).	11,626	11,492
Lexington...	45,736	49,304
Newport....	29,744	30,631
Owensboro..	22,765	30,245
Paducah....	33,541	33,765

	1930	1940
LOUISIANA–45,409 sq. mi.		
Pop. 2,363,880		
New Orleans	**458,762**	**494,537**
Alexandria..	23,025	27,066
BatonRouge(c)	30,729	34,719
Bogalusa....	14,029	14,604
LaFayette...	14,635	19,210
Lake Charles	15,791	21,207
Monroe.....	26,028	28,309
Shreveport..	76,655	98,167
MAINE–29,895 sq. mi.		
Pop. 847,226		
Auburn.....	18,571	19,817
Augusta(c)..	17,198	19,360
Bangor.....	28,749	29,822
Biddeford...	17,633	19,790
Lewiston....	34,948	38,598
Portland....	70,810	73,643
S. Portland..	13,840	15,781
Waterville...	15,454	16,688
MARYLAND–9,941 sq. mi.		
Pop. 1,821,244		
Baltimore...	**804,874**	**859,100**
Annapolis(c).	12,531	13,069
Cumberland.	37,747	39,483
Frederick...	14,434	15,802
Hagerstown.	30,861	32,491
MASSACHUSETTS–8,039 s.m.		
Pop. 4,316,721		
Boston(c)...	**781,188**	**770,816**
Worcester...	**195,311**	**193,694**
Springfield..	**149,900**	**149,554**
Fall River...	**115,274**	**115,428**
Cambridge..	**113,643**	**110,879**
N. Bedford..	**112,597**	**110,341**
Somerville..	**103,908**	**102,177**
Lynn.....	**102,320**	**98,123**
Lowell.....	**100,234**	**101,389**

POPULATION OF CITIES

	1930	1940
Arlington...	36,094	40,013
Attleboro...	21,769	22,071
Belmont....	21,748	26,867
Beverly.....	25,086	25,537
Braintree...	15,712	16,378
Brockton....	63,797	62,343
Brookline...	47,490	49,786
Chelsea.....	45,816	41,259
Chicopee....	43,930	41,664
Danvers....	12,957	14,179
Dedham....	15,136	15,508
Everett.....	48,424	46,784
Fitchburg...	40,692	41,824
Framingham.	22,210	23,214
Gardner....	19,399	20,206
Gloucester...	24,204	20,046
Greenfield...	15,500	15,672
Haverhill....	48,710	46,752
Holyoke....	56,537	53,750
Lawrence...	85,068	84,323
Leominster..	21,810	22,226
Malden.....	58,036	58,010
Marlborough	15,587	15,154
Medford....	59,714	63,083
Melrose.....	23,170	25,333
Methuen....	21,069	21,880
Milford.....	14,741	15,388
Milton.....	16,434	18,708
Natick.....	13,589	13,851
Newburyport	15,084	13,916
Newton.....	65,276	69,873
Northampton	24,381	24,794
Norwood....	15,049	15,383
Peabody....	21,345	21,711
Pittsfield....	49,677	49,684
Plymouth...	13,042	13,100
Quincy.....	71,983	75,810
Revere.....	35,680	34,405
Salem.....	43,353	41,213
Saugus.....	14,700	14,825
Southbridge.	14,264	16,825
Taunton....	37,355	37,395
Wakefield...	16,318	16,223
Waltham....	39,247	40,020
Watertown..	34,913	35,427
Westfield....	19,775	18,793
W.Springfield	16,684	17,135
Weymouth..	20,882	23,868
Winchester..	12,719	15,081
Winthrop...	16,852	16,768
Woburn.....	19,434	19,751
MICHIGAN–57,480 sq. mi.		
Pop. 5,256,106		
Detroit....	1,568,662	1,623,452
Grand Rpds..	168,592	164,292
Flint.....	156,492	151,543
Adrian.....	13,064	14,230
Ann Arbor..	26,944	29,815
Battle Creek.	43,573	43,453
Bay City....	47,355	47,956
Benton Hbr..	15,434	16,668
Dearborn...	50,358	63,584
Ecorse.....	12,716	13,209
Escanaba...	14,524	14,830
Ferndale....	20,855	22,523
Hamtramck.	56,268	49,839
Highland Pk.	52,959	50,810
Holland.....	14,346	14,616
Jackson.....	55,187	49,656
Kalamazoo..	54,786	54,097
Lansing(c)...	78,397	78,753
Lincoln Pk..	12,336	15,236
Marquette..	14,789	15,928
Monroe.....	18,110	18,478
Mt. Clemens.	13,497	14,389
Muskegon...	41,390	47,697
MuskegonHt.	15,584	16,047
Owosso.....	14,496	14,424
Pontiac.....	64,928	66,626

POPULATION OF CITIES

	1930	1940
Port Huron..	31,361	32,759
River Rouge.	17,314	17,008
Royal Oak..	22,904	25,087
Saginaw.....	80,715	82,794
S.Ste.Marie..	13,755	15,847
Traverse Cy.	12,539	14,455
Wyandotte..	28,368	30,618
MINNESOTA–80,858 sq. mi. Pop. 2,792,300		
Minneapolis.	**464,356**	**492,370**
St.Paul(c)...	**271,606**	**287,736**
Duluth.....	**101,463**	**101,065**
Austin.....	12,276	18,307
Faribault...	12,767	14,527
Hibbing.....	15,666	16,385
Rochester...	20,621	26,312
St. Cloud...	21,000	24,173
Winona.....	20,850	22,490
MISSISSIPPI–46,362 sq. mi. Pop. 2,183,796		
Biloxi.....	14,850	17,475
Greenville...	14,807	20,892
Gulfport....	12,547	15,195
Hattiesburg.	18,601	21,026
Jackson(c)...	48,282	62,107
Laurel.....	18,017	20,598
Meridian....	31,954	35,481
Natchez....	13,422	15,296
Vicksburg...	22,943	24,460
MISSOURI–68,727 sq. mi. Pop. 3,784,664		
St. Louis....	**821,960**	**816,048**
Kansas City.	**399,746**	**399,178**
Cape Girardeau	16,227	19,426
Columbia...	14,967	18,399
Hannibal....	22,761	20,865
Independence	15,296	16,066
Jeff. City(c).	21,596	24,268
Joplin.....	33,454	37,144
Maplewood..	12,657	12,875
Moberly....	13,772	12,920
St. Joseph...	80,935	75,711
Sedalia.....	20,806	20,428
Springfield..	57,527	61,238
UniversityCy.	25,809	33,023
Webster Grs.	16,487	18,394
MONTANA–146,131 sq. mi. Pop. 559,456		
Anaconda...	12,494	11,004
Billings.....	16,380	23,261
Butte.....	39,532	37,081
Great Falls..	28,822	29,928
Helena(c)...	11,803	15,056
Missoula....	14,657	18,449
NEBRASKA–76,808 sq. mi. Pop. 1,315,834		
Omaha.....	**214,006**	**223,844**
Grand Island	18,041	19,130
Hastings....	15,490	15,145
Lincoln(c)...	75,933	81,984
NEVADA–109,821 sq. mi. Pop. 110,247		
Carson Cy.(c)	1,596	2,478
Reno.....	18,529	21,317
N.HAMPSHIRE–9,031sq.mi. Pop. 491,524		
Berlin.....	20,018	19,084
Claremont...	12,377	12,144
Concord(c)..	25,228	27,171
Dover.....	13,573	14,990
Keene.....	13,794	13,832
Laconia.....	12,471	13,484
Manchester..	76,834	77,685
Nashua.....	31,463	32,927
Portsmouth..	14,495	14,821

POPULATION OF CITIES

	1930	1940
NEW JERSEY–7,514 sq. mi.		
Pop. 4,160,165		
Newark	442,337	429,760
Jersey City	316,715	301,173
Paterson	138,513	139,656
Trenton(c)	123,356	124,697
Camden	118,700	117,536
Elizabeth	114,589	109,912
Asbury Park	14,981	14,617
Atlantic City	66,198	64,094
Bayonne	88,979	79,198
Belleville	26,974	28,167
Bloomfield	38,077	41,623
Bridgeton	15,699	15,992
Clifton	46,875	48,827
East Orange	68,020	68,945
Englewood	17,805	18,966
Garfield	29,739	28,044
Hackensack	24,568	26,279
Harrison	15,601	14,171
Hoboken	59,261	50,115
Irvington	56,733	55,328
Kearny	40,716	39,467
Linden	21,206	24,115
Long Branch	18,399	17,408
Millville	14,705	14,806
Montclair	42,017	39,807
Morristown	15,197	15,270
N.Brunswick	34,555	33,180
N. Bergen	40,714	39,714
Nutley	20,572	21,954
Orange	35,399	35,717
Passaic	62,959	61,394
Perth Amboy	43,516	41,242
Phillipsburg	19,255	18,314
Plainfield	34,422	37,469
Rahway	16,011	17,498
Summit	14,556	16,165
Union City	58,659	56,173
Westfield	15,801	18,458
W.New York	37,107	39,439
W. Orange	24,327	25,662
N.MEXICO–122,503 sq. mi.		
Pop. 531,818		
Albuquerque	26,570	35,449
Santa Fe(c)	11,176	20,325
NEW YORK–47,654 sq. mi.		
Pop. 13,479,142		
New York	6,930,446	7,454,995
Buffalo	573,076	575,901
Rochester	328,132	324,975
Syracuse	209,326	205,967
Yonkers	134,646	142,598
Albany(c)	127,412	130,577
Utica	101,740	100,518
Amsterdam	34,817	33,329
Auburn	36,652	35,753
Batavia	17,375	17,267
Binghamton	76,662	78,309
Cohoes	23,226	21,955
Corning	15,777	16,212
Dunkirk	17,802	17,713
Elmira	47,397	45,106
Endicott	16,231	17,702
Freeport	15,467	20,410
Geneva	16,053	15,555
Glens Falls	18,531	18,836
Gloversville	23,099	23,329
Hornell	16,250	15,649
Ithaca	20,708	19,730
Jamestown	45,155	42,638
Kenmore	16,482	18,612
Kingston	28,088	28,589
Lackawanna	23,948	24,058
Lockport	23,160	24,379
Middletown	21,276	21,908
Mt. Vernon	61,499	67,362
Newburgh	31,275	31,883

POPULATION OF CITIES

	1930	1940
N. Rochelle..	54,000	58,408
Niagara Falls	75,460	78,029
N.Ton'wanda	19,019	20,254
Ogdensburg..	16,915	16,346
Olean.....	21,790	21,506
Ossining....	15,241	15,996
Oswego.....	22,652	22,062
Peekskill....	17,125	17,311
Plattsburg...	13,349	16,351
Port Chester.	22,662	23,073
Poughkeepsie	40,288	40,478
RockvilleCtr.	13,718	18,613
Rome.....	32,338	34,214
Schenectady.	95,692	87,549
Troy.....	72,763	70,304
Watertown..	32,205	33,385
Watervliet..	16,083	16,114
White Plains	35,830	40,327
N. Carolina–48,740 sq. mi.		
Pop. 3,571,623		
Asheville....	50,193	51,310
Charlotte...	82,675	100,899
Durham....	52,037	60,195
Gastonia....	17,093	21,313
Goldsboro...	14,985	17,274
Greensboro..	53,569	59,319
High Point..	36,745	38,495
Raleigh(c)...	37,379	46,897
Salisbury....	16,951	19,037
Wilmington..	32,270	33,407
Wins'-Salem.	75,274	79,815
N. Dakota–70,183 sq. mi.		
Pop. 641,935		
Bismarck(c).	11,090	15,496
Fargo.....	28,619	32,580
Grand Forks.	17,112	20,228
Minot.....	16,099	16,577

	1930	1940
Ohio–40,740 sq. mi.		
Pop. 6,907,612		
Cleveland...	**900,429**	**878,336**
Cincinnati...	**451,160**	**455,610**
Columbus(c).	**290,564**	**306,087**
Toledo.....	**290,718**	**282,349**
Akron.....	**255,040**	**244,791**
Dayton.....	**200,982**	**210,718**
Youngstown.	**170,002**	**167,720**
Canton.....	**104,906**	**108,401**
Alliance.....	23,047	22,405
Ashtabula...	23,301	21,405
Barberton...	23,934	24,028
Cambridge..	16,129	15,044
Chillicothe..	18,340	20,129
ClevelandHts.	50,945	54,992
Cuyahoga Fls.	19,797	20,546
E.Cleveland.	39,667	39,495
E.Liverpool..	23,329	23,555
Elyria.....	25,633	25,120
Findlay.....	19,363	20,228
Hamilton...	52,176	50,592
Ironton.....	16,621	15,851
Lakewood...	70,509	69,160
Lancaster...	18,716	21,940
Lima.....	42,287	44,711
Lorain.....	44,512	44,125
Mansfield...	33,525	37,154
Marion.....	31,084	30,817
Martins Fry.	14,524	14,729
Massillon...	26,400	26,644
Middletown.	29,992	31,220
Newark.....	30,596	31,487
Niles.....	16,314	16,273
Norwood....	33,411	34,010
Piqua.....	16,009	16,049
Portsmouth..	42,560	40,466
Sandusky...	24,622	24,874
Shaker Hts..	17,783	23,393
Springfield..	68,743	70,662

POPULATION OF CITIES

	1930	1940
Steubenville.	35,422	37,651
Tiffin.....	16,428	16,102
Warren.....	41,062	42,837
Zanesville...	36,440	37,500
OKLAHOMA–69,414 sq. mi.		
Pop. 2,336,434		
Okla.City(c).	**185,389**	**204,424**
Tulsa.....	**141,258**	**142,157**
Ardmore....	15,741	16,886
Bartlesville..	14,763	16,267
Chickasha...	14,099	14,111
Enid.....	26,399	28,081
Lawton.....	12,121	18,055
Muskogee...	32,026	32,332
Okmulgee...	17,097	16,051
Ponca City..	16,136	16,794
Shawnee....	23,283	22,053
OREGON–95,607 sq. mi.		
Pop. 1,089,684		
Portland....	**301,815**	**305,394**
Eugene.....	18,901	20,838
Klamath Fls.	16,093	16,497
Salem(c)....	26,266	30,908
PENNSYLVANIA-44,832sq.mi.		
Pop. 9,900,180		
Phila.....**1,950,961**		**1,931,334**
Pittsburgh...	**669,817**	**671,659**
Scranton....	**143,433**	**140,404**
Erie.....	**115,967**	**116,955**
Reading....	**111,171**	**110,568**
Allentown...	92,563	96,904
Altoona.....	82,054	80,214
Bethlehem..	57,892	58,490
Braddock...	19,329	18,326
Butler.....	23,568	24,477
Carbondale..	20,061	19,371
Chester.....	59,164	59,285
Clairton....	15,291	16,381
Coatesville..	14,582	14,006
Dunmore...	22,627	23,086
Duquesne...	21,396	20,693
Easton.....	34,468	33,589
Greensburg..	16,508	16,743
Harrisburg(c)	80,339	83,893
Hazelton....	36,765	38,009
Homestead..	21,141	19,041
Jeannette...	15,126	16,220
Johnstown..	66,993	66,668
Kingston....	21,600	20,679
Lancaster...	59,949	61,345
Lebanon....	25,561	27,206
McKeesport.	54,632	55,355
McKees Rks.	18,116	17,021
Meadville...	16,698	18,919
Monessen...	20,268	20,257
Mt. Carmel..	17,967	17,780
Nanticoke...	26,043	24,387
New Castle..	48,674	47,638
N.Kensingt'n	16,762	24,055
Norristown..	35,853	38,181
Oil City.....	22,075	20,379
Pottstown...	19,430	20,194
Pottsville...	24,300	24,530
Shamokin...	20,274	18,810
Sharon.....	25,908	25,622
Shenandoah.	21,782	19,790
Uniontown..	19,544	21,819
Washington.	24,545	26,166
Wilkes-Barre	86,626	86,236
Wilkinsburg.	29,639	29,853
Williamsport.	45,729	44,355
York.....	55,254	56,712
PUERTO RICO–3,435 sq. mi.		
Pop. 1,597,500		
San Juan(c).	**114,715**	
Mayagues...	37,060	
Ponce.....	53,430	

POPULATION OF CITIES

	1930	1940
RHODE ISLAND–1,067 sq.mi.		
Pop. 713,346		
Prov'ence...	**252,981**	**253,504**
Central Falls	25,898	25,248
Cranston....	42,911	47,085
E.Providence	29,995	32,165
Newport....	27,612	30,532
Pawtucket..	77,149	75,797
Warwick....	23,196	28,757
Woonsocket..	49,376	49,303
S. CAROLINA–30,495 sq.mi.		
Pop. 1,899,804		
Charleston..	62,265	71,275
Columbia(c).	51,581	62,396
Greenville...	29,154	34,734
Spartanburg.	28,723	32,249
S. DAKOTA–76,868 sq. mi.		
Pop. 642,961		
Aberdeen...	16,465	17,015
Pierre(c)....	3,659	4,322
Sioux Falls..	3,362	40,832
TENNESSEE–41,687 sq. mi.		
Pop. 2,915,841		
Memphis...	**253,143**	**292,942**
Nashville(c).	**153,866**	**167,402**
Chattanooga.	**119,798**	**128,163**
Knoxville...	**105,802**	**111,580**
Jackson.....	22,172	24,332
Johnson City	25,080	25,332
TEXAS–262,398 sq. mi.		
Pop. 6,414,824		
Houston....	**292,352**	**384,514**
Dallas.....	**260,475**	**294,734**
San Antonio.	**231,542**	**253,854**
Fort Worth..	**163,447**	**177,662**
Abilene.....	23,175	26,612
Amarillo....	43,132	51,686
Austin(c)....	53,120	87,930
Beaumont...	57,732	59,061
CorpusChristi	27,741	57,301
El Paso.	102,421	96,810
Galveston...	52,938	60,862
Laredo.....	32,618	39,274
Lubbock....	20,520	31,853
Marshall....	16,203	18,410
Port Arthur.	50,902	46,140
San Angelo..	25,308	25,802
Sherman....	15,713	17,156
Temple.....	15,345	15,844
Texarkana..	16,602	17,019
Tyler.....	17,113	28,279
Waco.....	52,848	55,982
Wichita Falls	43,690	45,112
UTAH–82,184 sq. mi.		
Pop. 550,310		
Slt.Lke.Cy(c)	**140,267**	**149,934**
Ogden.....	40,272	43,688
Provo.....	14,766	18,071
VERMONT–9,124 sq. mi.		
Pop. 359,231		
Barre.....	11,307	10,909
Burlington..	24,789	27,686
Montpelier(c)	7,837	8,006
Rutland....	17,315	17,082
VIRGINIA–40,262 sq. mi.		
Pop. 2,677,773		
Richmond(c).	**189,929**	**193,042**
Norfolk.....	**129,710**	**144,332**
Alexandria..	24,149	33,523
Charlottesv'e	15,245	19,400
Danville....	22,247	32,749
Hopewell....	11,327	8,679
Lynchburg..	40,661	44,541
Newp't News	34,417	37,067
Petersburg..	28,564	30,631
Portsmouth..	45,704	50,745
Roanoke.....	69,206	69,287

POPULATION OF CITIES

	1930	1940
WASHINGTON–66,836 sq.mi. Pop. 1,736,191		
Seattle	**365,583**	**368,302**
Spokane	**115,514**	**122,001**
Tacoma	**106,817**	**109,408**
Aberdeen	21,723	18,846
Bellingham	30,823	29,314
Everett	30,567	30,224
Hoquiam	12,766	10,835
Olympia(c)	11,733	13,254
Vancouver	15,766	18,788
Walla Walla	15,976	18,109
Wenatchee	11,627	11,620
Yakima	22,101	27,221
W. VIRGINIA–24,022 sq. mi. Pop. 1,901,974		
Bluefield	19,339	20,641
Charleston(c)	60,408	67,914
Clarksburg	28,866	30,579
Fairmont	23,159	23,105
Huntington	75,572	78,836
Martinsburg	14,857	15,063
Morgantown	16,186	16,655
Moundsville	14,411	14,168
Parkersburg	29,623	30,103
Wheeling	61,659	61,099

	1930	1940
WISCONSIN–55,256 sq. mi. Pop. 3,137,587		
Milwaukee	**578,249**	**587,472**
Appleton	25,267	28,436
Beloit	23,611	25,365
Eau Claire	26,287	30,745
Fond du Lac	26,449	27,209
Green Bay	37,415	46,235
Janesville	21,628	22,992
Kenosha	50,262	48,765
LaCrosse	39,614	42,707
Madison(c)	57,899	67,447
Manitowoc	22,963	24,404
Marinette	13,734	14,183
Oshkosh	40,108	39,089
Racine	67,542	67,195
Sheboygan	39,251	40,638
Shorew'd vil.	13,479	15,184
Stevens Point	13,623	15,777
Superior	36,113	35,136
Waukesha	17,176	19,242
Wausau	23,758	27,268
Wauwatosa	21,194	27,769
West Allis	34,671	36,364
WYOMING–97,548 sq. mi. Pop. 250,742		
Casper	16,619	17,964
Cheyenne(c)	17,361	22,474

PRINCIPAL CITIES IN CANADA
1931 Dominion Census

Montreal, Que	**818,577**	Halifax, N. S.	59,275
Toronto, Ont.	**631,207**	Kitchener, Ont.	30,793
Vancouver, B. C.	**246,593**	London, Ont.	71,148
Winnipeg, Man.	**218,785**	Regina, Sask.	53,209
Hamilton, Ont.	**155,547**	Saint John, N. B.	47,514
Quebec, Que.	**130,594**	Saskatoon, Sask.	43,291
Ottawa, Ont.	**126,872**	Three Rivers, Que.	35,450
Brantford, Ont.	30,107	Verdun, Que.	60,745
Calgary, Alta.	83,761	Victoria, B. C.	39,082
Edmonton, Alta.	79,197	Windsor, Ont.	63,108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NORTH POLE
PEARY 1909
BYRD, 1926
AMUNDSEN 1926
SCHMIDT 1937
ASIA
ARCTIC OCEAN
SVALBARD
SPITSBERGEN (Nor.)
JAN MAYEN (Nor.)
ICELAND (Ice.)
GREENLAND (To Denmark)
Reykjavik
Godthaab
Baffin Bay
Davis Strait
Denmark Strait
Bering Sea
Bering Strait
Cape of Wales
Nome
WRANGEL I.
Yukon R.
Mt. McKinley
ALASKA
Fairbanks
Dawson
Mayo
Whitehorse
KODIAK I.
QUEEN CHARLOTTE IS
Juneau
Prince Rupert
Victoria
VANCOUVER I.
PACIFIC OCEAN
Seattle
Portland
Salt Lake City
San Francisco
Los Angeles
C Mendocino
C San Lucas
Great Bear Lake
Great Slave Lake
Mackenzie R.
Hudson Bay
Hudson Strait
Cape Farewell
LABRADOR
Strait of Belle Isle
NEWFOUNDLAND
St. John's
C Race
Halifax
Boston
New York
Philadelphia
Baltimore
C Hatteras
Washington
Cleveland
Detroit
Buffalo
Toronto
Chicago
Milwaukee
Minneapolis
Omaha
Kansas City
St. Louis
Denver
Dallas
Atlanta
El Paso
Houston
New Orleans
Miami
Key West
Gulf of Mexico
Calgary
Edmonton
Vancouver
Winnipeg
Lake Winnipeg
Quebec
Montreal
Ottawa
James Bay
Missouri R.
Rocky Mts.
Canada
UNITED STATES
MEXICO
Monterrey
Guadalajara
Tampico
Veracruz
Mexico
Gulf of California
Rio Grande
TROPIC OF CANCER
Yucatan Channel
Caribbean Sea
CUBA
Havana
JAMAICA (Br.)
BAHAMA ISLANDS (Br.)
GREATER ANTILLES
LESSER ANTILLES
PUERTO RICO
WEST INDIES
BERMUDA ISLANDS (Br.)
ATLANTIC OCEAN
HONDURAS
GUATEMALA
SALVADOR
NICARAGUA
COSTA RICA
PANAMA
CENTRAL AMERICA
COCOS I.
GALAPAGOS IS
SOUTH AMERICA
NORTH AMERICA
Scale of Miles
0 500
© J. W. CLEMENT CO., BUFFALO, N. Y.
120 Longitude 100 West from 80 Greenwich

UNITED STATES

Western Half

0 100 200 300 400 500

SCALE OF ENGLISH STATUTE MILES

110
105
100
95
45
40
35
30
ALBERTA
SASKATCHEWAN
MANITOBA
ONTARIO
Estevan
Shelby
Kalispell
Flathead Lake
Missoula
Havre
Glasgow
Great Falls
Glendive
Lewistown
MONTANA
Helena
Butte
Bozeman
Billings
Miles City
Dillon
Red Lodge
Minot
Williston
Grand Forks
Devils Lake
NORTH DAKOTA
Medora
Mandan
Bismarck
Jamestown
Wahpeton
Fargo
Crookston
Lake of the Woods
Red L.
Cass Lake
Duluth
Brainerd
St. Cloud
Minneapolis
St. Paul
Mankato
Aberdeen
Watertown
Forest City
Pierre
Huron
Madison
SOUTH DAKOTA
Deadwood
Lead
Black Hills
Hot Springs
Sioux Falls
Yankton
Sheridan
Buffalo
YELLOWSTONE NATIONAL PARK
Newcastle
WYOMING
Lander
Casper
Douglas
Rawlins
Rock Springs
Carbon
Cheyenne
Laramie
Evanston
Chadron
Alliance
O'Neill
Omaha
Fremont
NEBRASKA
Lincoln
Grand Island
North Platte
Hastings
Beatrice
Sioux City
Ft. Dodge
IOWA
Des Moines
Council Bluffs
Nebraska City
St. Joseph
Ogden
Provo
Nephi
Manti
Richfield
Beaver
Greeley
Boulder
Sterling
COLORADO
Denver
Mt. Holy Cross
Grand Jc.
Aspen
Leadville
Colorado Sprs.
Pueblo
Montrose
Gunnison
Cripple Creek
Silverton
Alamosa
La Junta
Durango
Trinidad
Colby
Beloit
Salina
Atchison
Topeka
KANSAS
Great Bend
Hutchinson
Kansas City
Ft. Scott
Dodge City
Wichita
Parsons
Joplin
Raton
Mora
Santa Fe
Gallup
Las Vegas
Albuquerque
Santa Rosa
NEW MEXICO
Socorro
Clifton
Silver City
Roswell
Alamogordo
Las Cruces
Deming
Carlsbad
El Paso
Ciudad Juarez
Casas Grandes
Montezuma
ARIZONA
Prescott
Globe
Tombstone
Bisbee
Nogales
MEXICO
Arkansas City
Enid
Guthrie
Oklahoma City
OKLAHOMA
Kingfisher
Lawton
Purcell
McAlester
Ft. Smith
Ardmore
Denison
Amarillo
Wichita Falls
Sherman
Ft. Worth
Dallas
Waco
Temple
Austin
Houston
San Antonio
Galveston
Del Rio
Uvalde
Eagle Pass
G. of Mex.

90
85
Lake of the Woods
Rainy Lake
Int. Falls
Nipigon
Ft. William
Port Arthur
ISLE ROYALE
LAKE SUPERIOR
Michipicoten
Pangassin
Sault Ste. Marie
Sudbury
MINN.
Grand Marais
Ely
Virginia
Hibbing
Two Harbors
Duluth
Superior
Calumet
Hancock
Keweenaw Pt.
Bessemer
Ishpeming
Marquette
Negaunee
Munising
Ashland
Ironwood
Hinckley
Rice Lake
Iron Mountain
Menominee
Merrill
Marinette
Wausau
Stillwater
St. Paul
Chippewa Falls
Eau Claire
WISCONSIN
Stevens Pt.
Neenah
Oshkosh
Appleton
Green Bay
Manitowoc
Fond du Lac
Sheboygan
Winona
Austin
La Crosse
Baraboo
Madison
Milwaukee
Prairie du Chien
Janesville
Galena
Rockford
Elgin
Racine
Kenosha
Evanston
Chicago
Aurora
Joliet
La Salle
Gary
Mackinaw Cy
St. Ignace
Escanaba
Cheboygan
Alpena
Petoskey
MANITOULIN IS.
Georgian
LAKE HURON
Owen Sound
Traverse City
Cadillac
Saginaw B.
Goderich
Stratford
London
Ludington
West Bay Cy.
Bay City
Saginaw
Muskegon
Grand Rapids
Flint
Port Huron
Sarnia
Lansing
Battle Cr.
Kalamazoo
Ann Arbor
L. St. Clair
Windsor
Jackson
St. Joseph
Adrian
Monroe
LAKE ERIE
Sandusky
CENTRAL TIME
EASTERN TIME
South Bend
Toledo
Cleveland
Akron
Youngstown
Canton
Fostoria
Lima
Marion
OHIO
Bellaire
Zanesville
Columbus
Dayton
Chillicothe
Cincinnati
Newport
Portsmouth
Hamilton
Richmond
Muncie
IOWA
Oelwein
Waterloo
Tama
Dubuque
Cedar Rapids
Iowa City
Muscatine
Ottumwa
Burlington
Keokuk
Davenport
Rock Island
Streator
Kankakee
N. Judson
Ft. Wayne
Logansport
Kokomo
Lafayette
Peoria
Bloomington
ILLINOIS
Lincoln
Danville
Decatur
Paris
Springfield
Pana
Quincy
Macon
Hannibal
Moberly
Mexico
INDIANA
Indianapolis
Terre Haute
Mattoon
Litchfield
Alton
St. Louis
E. St. Louis
Seymour
Vincennes
Madison
New Albany
Centralia
Jeff. Cy.
MO.
De Soto
Ironton
Lebanon
Mt. Vernon
Evansville
Ohio
Cape Girardeau
Leeper
Murphysboro
Owensboro
Louisville
Frankfort
Lexington
Covington
Ashland
Pikeville
Poplar Bluff
Malden
Cairo
Paducah
KENTUCKY
Bowling Green
Hopkinsville
Corbin
Livingston
Huntington
Charleston
White Sulp.
Hinton
Radford
Bristol
Mammoth Spr.
Hoxie
Jonesboro
Paragould
ARK.
Brinkley
Union City
Clarksville
Cumb.
Oneida
Nashville
Morristown
Johnson C.
TENNESSEE
Memphis
Jackson
Columbia
Chattanooga
Cleveland
Knoxville
Asheville
Winston-Salem
NORTH
85 Longitude West
40
45


UNITED STATES
NORTHEASTERN
Scale of Miles
0
400
75
70
40
West 80 from Greenwich 75
70
L. St. John
Chicoutimi
River St. Lawrence
Quebec
Levis
Three Rivers
St. Hyacinthe
Montreal
Sorel
St. Johns
Sherbrooke
Maniwaki
Ottawa R.
North Bay
Pembroke
Hull
Parry Sound
Renfrew
Ottawa
Muskoka Lakes
Muskoka Wharf
Brockville
Barrie
Belleville
Peterboro
Toronto
LAKE ONTARIO
Niagara Falls
Oswego
Utica
Rochester
Buffalo
Schenectady
Albany
Hornell
Binghamton
Olean
Elmira
Ogdensburg
Watertown
Saratoga Sprs.
Malone
Burlington
Montpelier
Rutland
St. Albans
St. Johnsbury
Lewiston
Concord
Bennington
Manchester
Lowell
Salem
Boston
C. Cod
Providence
Fall River
Newport
New London
New Haven
LONG ISLAND
New York
Trenton
Camden
NEW JERSEY
Atlantic City
Cape May
Hartford
CONN.
R.I.
NEW HAMP.
VERMONT
MAINE
Bangor
Augusta
Bath
Portland
Dover
Portsmouth
Oldtown
Mattawamkeag
Calais
Eastport
45°
Houlton
Ashland Jc.
R. St. John
Riviere du Loup
Edmundston
EASTERN
ATLANTIC TIME
PENNSYLVANIA
Cambridge Sprs.
Wilkes-Barre
Williamsport
Scranton
Oil City
New Castle
Altoona
Allentown
Reading
Harrisburg
Pittsburgh
Wheeling
Cumberland
Philadelphia
Lancaster
Wilmington
Baltimore
Dover
DEL.
Hagerstown
Washington
Annapolis
MARYLAND
WEST VIRGINIA
Staunton
Alleghany Mts.
Hot Sprs.
Charlottesville
Richmond
Lynchburg
Petersburg
Roanoke
Danville
Cape Charles
Newport News
Portsmouth
Elizabeth City
Weldon
Greensboro
Durham
Raleigh
Salisbury
NORTH CAROLINA
Goldsboro
Pamlico Sd.
ATLANTIC OCEAN
LAKE ERIE
Dunkirk
Cleveland
Akron
Youngstown
Canton
Bellaire
Zanesville
Columbus
Parkersburg
Huntington
Charleston
Hinton
Radford
Johnson City
Winston-Salem
Asheville
London
Stratford
Brantford
Hamilton
Collingwood
Georgian
Sudbury
Sarnia
St. Clair
©J.W. CLEMENT CO., BUFFALO N.Y.


100
95
90
35
30
25
Manhattan
Hays
Salina
Topeka
Kansas Cy.
Hannibal
Moberly
Springfield
Kansas
Sedalia
Mexico
Litchfield
Alton
Great Bend
Emporia
Ottawa
Jefferson Cy.
Clinton
Centralia
Hutchinson
Newton
Iola
MISSOURI
Mt. Vernon
Nevada
De Soto
Buckl'n
Pratt
Wichita
Ft. Scott
Ironton
Cape
Winfield
Parsons
Pittsburg
Lebanon
Girardeau
Arkansas City
Joplin
Springfield
Leeper
Woodward
Alva
Ponca
Vinita
Aurora
Poplar Bluff
Cairo
Enid
Bartlesville
Monett
Malden
Kingfisher
Guthrie
Tulsa
Eureka Sprs.
Mammoth Spr.
Rogers
Hoxie
Union City
Arapahoe
El Reno
Sapulpa
Tahlequah
Jonesboro
Paragould
Oklahoma City
Muskogee
Okmulgee
Van Buren
Bald Knob
OKLAHOMA
Fort Smith
Memphis
Chickasha
McAlester
Conway
Brinkley
ARKANSAS
Lawton
Mena
Little Rock
Riverton
Ardmore
Red R.
Durant
Hot Springs
Helena
Holly Sprs
Wichita Falls
Gainesville
Pine Bluff
Tupelo
Denison
Paris
Hope
Arkansas Cy
West Point
Sherman
Texarkana
Winona
Bonham
Camden
Greenville
Greenville
Columbus
Ft. Worth
Ranger
Eastland
Dallas
Lewisville
Mt. Pleasant
Marshall
Shreveport
Monroe
MISSISSIPPI
Terrell
Tyler
Cisco
Cleburne
Hillsboro
Vicksburg
Corsicana
Mansfield
Jackson
Brownwood
Waco
Palestine
Vidalia
Natchez
Hattiesburg
Crockett
Alexandria
McComb
Brady
Temple
Taylor
Hearne
LOUISIANA
Lumberton
Lake Charles
Austin
Brenham
Beaumont
La Fayette
Baton Rouge
Mobile
Houston
New Iberia
Biloxi
Yoakum
Orleans
Stafford
San Antonio
Bay City
Morgan Cy.
Eagle Pass
Galveston
Alice
MATAGORDA I.
Laredo
Rockport
Corpus Christi
Laguna de la Madre
Rio Grande
Brownsville
Matamoros
GULF OF M
UNITED STATES
SOUTHEASTERN
Scale of Miles
0
400
© J. W. CLEMENTCO., BUFFALO, N. Y.
95 Longitude West 90 from

85 80 30 25 Greenwich 85 80

Columbus Chillicothe Dayton Grafton & B. Indianapolis Terre Haute Hamilton INDIANA Cincinnati Newport Ports mouth Parkersburg WEST VIRGINIA Huntington Washington & Annapolis Baltimore Dover DEL. Cape May Vincennes Madison New Albany Frankfort Lexington Louisville Owensboro Ohio Pikeville Charleston White Sulp. Spgs. Hinton Staunton Hot Spgs. Charlottesville Richmond Cape Charles Newport News Norfolk Portsmouth Lynchburg Petersburg Radford Roanoke Danville Bristol Greensboro Durham Weldon Elizabeth City Johnson Cy. Winston-Salem Asheville Salisbury Raleigh Knoxville Nashville Columbia Chattanooga Cleveland Saluda Spartanburg Rock Hill Charlotte Pinehurst Southern Pines Gibbsboro New Bern Hatteras Hamlet Greenville Chester Fair Bluff C. Lookout Wilmington Huntsville Dalton Rome Anderson Athens Atlanta Gadsden Anniston Talladega Birmingham Tuscaloosa Jasper Columbia Sumter C. Fear Augusta Griffin Macon Millen Laurens Barnwell Charleston Opelika Selma Montgomery Columbus Helena Beaufort Savannah Americus Albany Eufaula Evergreen Florala Thomasville Jesup Waycross Brunswick JEKYL I. Dupont Valdosta Fernandina Chipley Pensacola Tallahassee Live Oak Jacksonville St. Augustine Palatka Ormond Daytona Titusville C. Canaveral Eau Gallie Melbourne Ocala Cedar Key Sanford Kissimmee Tampa St. Petersburg Bartow L. Okeechobee Punta Gorda Fort Myers West Palm Beach Palm Beach Miami GREAT BAHAMA IS. BAHAMA ISLANDS Nassau ANDROS ISLANDS Florida Bay Key West Havana Matanzas Cape San Blas

INDIANA OHIO KENTUCKY TENNESSEE ALABAMA GEORGIA SOUTH CAROLINA NORTH CAROLINA VIRGINIA MARYLAND DEL. ATLANTIC OCEAN GULF OF MEXICO

CENTRAL STANDARD TIME EASTERN STANDARD TIME


120
160
160
120
80
ELLESME
A R C T I C O C E A N
ARCTIC
ARCHIPELAGO
Nordenskiold
Sea
NEW SIBERIAN
IS.
BANKS I
Pt Barrow
VICTORIA
I
Bering Strait
Lena
ARCTIC CIRCLE
Yukon
ALASKA
Mackenzie
Yakutsk
A S I A
Bering Sea
Juneau
DOMINION OF C NAD
L.Baikal
Irkutsk
Amur
Sea of
Okhotsk
Kamchatka
ALEUTIAN IS
NORTH AMERIC
Seattle
Winnipeg
Montrea
Ottawa
SAKHALIN I
Vladivostok
4265
Peiping
40
Tokyo
4550
San Francisco
UNITED STAT
St. Louis
Chicago
Shanghai
Nanking
China
Sea
1035
Yokohama
3440
MIDWAY I
(U.S.)
Los Angeles
2095
Canton
HAWAIIAN IS.
(U.S.)
MEXICO
Gulf of
Mexico
Calcutta
Hongkong
WAKE I
(U.S.)
Honolulu
4690
Mexico
PHILIPPINE
4850
Manila
GUAM
(U.S.)
P A C I F I C
CENTRAL
AMERICA
BORNEO
DUTCH EAST
SUMATRA
0
Singapore
INDIES
NEW GUINEA
EQUATOR
Guayaq il
JAVA
4425
7099
SAMOA IS.
(Br.)
Coral Sea
FIJI IS
(Br.)
4930
TROPIC OF CAPRICORI
AUSTRALIA
O C E A N
Perth
Sydney
Melbourne
6125
1634
40
TASMANIA
NEW
ZEALAND
MONDAY
SUNDAY
Str. of Magell
A N T A R C T I C O C E A N
ANTARCTIC CIRCLE
WILKES
LAND
SOUTH
VICTORIA
LAND
Ross Sea
120
160
160
Longitude
120
West
80

THE WORLD

MERCATOR PROJECTION

---4425--- Steamship Lines

Distances in Nautical Miles

+ + + International Date Line


110
100
90
80
70
30
20
10
Mexicali
U N I T E D S T A T E S
El Paso
Dallas
Savannah
Nogales
Ciudad Juarez
Mobile
Jacksonville
Hermosillo
Chihuahua
Houston
San Antonio
New Orleans
Guaymas
Piedras Negras
Galveston
Tampa
Nuevo Laredo
Rio Grande
Parral
Torreon
Matamoros
Saltillo
Monterrey
Miami
C. Sable
Florida Str.
Durango
Key West
ANDROS IS.
BAHAMA ISLANDS (Br.)
Nassau
WATLING I. (San Salvador)
TROPIC OF CANCER
C. San Lucas
Mazatlan
Zacatecas
San Luis Potosi
Aguascalientes
Tampico
Havana
WEST INDIES
Guadalajara
Leon
Progreso
C. Catoche
Yucatan Channel
Merida
C. Corrientes
Queretaro
ISLE OF PINES
Santiago
HISPANIOLA
Pachuca
Campeche
HAITI
DOM. REP.
Ciudad Trujillo
REVILLA GIGEDO IS.
Morelia
Veracruz
Bay of Campeche
Yucatan
JAMAICA (Br.)
Kingston
Port au Prince
Manzanillo
México
Popocatepetl
Orizaba
Puebla
Belize
BRITISH HONDURAS
Puerto Mexico
Acapulco
Oaxaca
G. of Honduras
Salina Cruz
GUATEMALA
C. Gracias à Dios
Caribbean Sea
HONDURAS
Tegucigalpa
Guatemala
San Salvador
SALVADOR
NICARAGUA
León
CENTRAL AMERICA
Managua
L. Nicaragua
COSTA RICA
San José
Colon
Panama Canal
PANAMA
Panamá
SOUTH AMERICA
PACIFIC OCEAN
Gulf of Mexico
MEXICO AND CENTRAL AMERICA
Scale of Miles
0
500
© 1932, J. W. CLEMENT CO., BUFFALO, N. Y.
110
100 Longitude West from 90 Greenwich
80


Caribbean Sea
60
50
40
ATLANTIC
OCEAN
Barranquilla
Maracaibo
CURACAO (Du.)
Caracas
TRINIDAD (Br.)
Georgetown
Paramaribo
Cayenne
Valencia
Orinoco R.
VENEZUELA
GUIANA
Medellin
Bogota
Cali
COLOMBIA
EQUATOR
Quito
Guayaquil
ECUADOR
Rio Negro
Manaos
Amazon R.
Madeira R.
Tapajoz R.
Xingu R.
Tocantins R.
Belem (Para)
Fortaleza
C.St.Roque
Recife (Pernambuco)
Macejo
Pt.Parina
PERU
Lima
Callao
Cuzco
L. Titicaca
La Paz
Mt.Illimani
BOLIVIA
Sucre
Arequipa
Arica
Iquique
Antofagasta
TROPIC OF CAPRICORN
Pilcomayo R.
Paraguay R.
PARAGUAY
Asuncion
Tucuman
Cordoba
Santa Fe
Rosario
Valparaiso
Santiago
Concepcion
Buenos Aires
La Plata
Plata R.
URUGUAY
Montevideo
Parana R.
BRAZIL
Cuyaba R.
São Francisco R.
São Salvador (Bahia)
Bello Horizonte
Rio de Janeiro
São Paulo
Curitiba
Santos
Porto Alegre
Temuco
Bahia Blanca
CHILOE I.
CHONOS ARCHIPELAGO
Gulf of St.George
C.Blanco
FALKLAND IS (Br.)
Str.of Magellan
Magallanes
TIERRA DEL FUEGO
C.Horn
SOUTH AMERICA
Scale of Miles
0
500
© J. W. CLEMENT CO., BUFFALO, N. Y.
10
0
10
20
30
40
50
80
70
60
50
40
30
Longitude West from Greenwich


NORWAY
Oslo
SWEDEN
BRITISH ISLES
NORTHERN IRELAND
EIRE
SCOTLAND
ENGLAND
WALES
GREAT BRITAIN
NORTH SEA
DENMARK
NETHERLANDS
BELGIUM
LUXEMBURG
FRANCE
GERMANY
SWITZERLAND
CROATIA
SPAIN
CORSICA
SARDINIA
SICILY
BALEARIC IS.
TYRRHENIAN SEA
ADRIATIC SEA
IONIAN SEA
AFRICA
London
Paris
Berlin
Rome
Vienna
Budapest
Brussels
Amsterdam
Copenhagen
Madrid
Edinburgh
Dublin
Belfast
Glasgow
Manchester
Liverpool
Birmingham
Hamburg
Munich
Prague
Milan
Naples
Marseille
Barcelona
Algiers
Tunis
Palermo
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5 Longitude East 10 from Greenwich 15

CENTRAL EUROPE

As of July 1, 1941

0 400

60 80

U. S. S. R. (RUSSIA)

Khero Irkutsk
Peddar
TAN. TUVA
MONGOLIA
Kuldja
Volga
Astrakhan
Caspian Sea
Aral Sea
Tiflis
Baku
Khiva
Tashkent
Samarkand
Bukhara
Sinkiang
Kashgar
Yarkand
40
Tehran
Baghdad
IRAN
(PERSIA)
Isfahan
Bushire
Herat
AFGHANISTAN
Kabul
Peshawar
CHINA
Tibet
Lhasa
Basra
KUWAIT
Persian G.
Kalat
BALUCHISTAN
Indus
Delhi
NEPAL
BHUTAN
Bandar Abbas
SAUDI ARABIA
Benares
Karachi
INDIA
Jubbulpore
Calcutta
Mandalay
Muscat
Riyadh
Surat
Nagpur
Sholapur
Bombay
BURMA
20
BAY OF BENGAL
ARABIAN SEA
Hyderabad
Rangoon
Goa (Port.)
Bangalore
Madras
Mysore
ANDAMAN IS.
Bangkok
THAILAND (SIAM)
Pondicherry (Fr.)
LACCADIVE IS. (Br.)
Madura
CEYLON
Colombo
NICOBAR IS.
SOKOTRA (Br.)
C. Guardafui
MALDIVE IS. (Br.)
Malacca
MALAY STATES
Singapore
Padang
SUMATRA
Sunda Str.
EQUATOR
INDIAN OCEAN
SEYCHELLES (Br.)
CHAGOS IS. (Br.)
COCOS IS.
Mombasa
Zanzibar
Dar es Salaam
Mozambique
Majunga
Tamatave
Antananarivo
MADAGASCAR (To France)
REUNION (Fr.)
MAURITIUS (Br.)
Beira
Lourenço Marques

AFRICA
and parts of EUROPE AND ASIA

Scale at Equator

0 500 1000 Miles

Mercator Projection

Longitude East 60 from Greenwich 80 100

120 140 160

Irkutsk Chita Kiakhta

U.S.S.R. (RUSSIA) Khabarovsk

MANCHUKUO (MANCHURIA)

Urga MONGOLIA

Harbin Sungari Hsinking

Vladivostok Mukden JAPAN

Dairen CHOSEN (KOREA) SEA

Peiping Port Arthur Keijo(Seoul)

Weihaiwei Kiaochow

Sian Hwang R. Nanking R. Yangtze Hankow

CHINA Shanghai

YELLOW SEA Osaka Nagasaki

SAKHALIN I. KURILE IS. HOKKAIDO Hakodate

JAPAN Tokyo Yokohama

WESTERN PACIFIC

RYUKYU IS.

Foochow FORMOSA (TAIWAN)

Canton Hong Kong (Br.)

TROPIC OF CANCER

PACIFIC OCEAN

Hainan LUZON MARIANAS IS.

Hue FRENCH INDO-CHINA Manila PHILIPPINE

GUAM (To U.S.)

Saigon PALAWAN SAMAR ISLANDS YAP I. CAROLINE ISLANDS

SOUTH CHINA SEA MINDANAO PALAU IS.

SULU IS.

Japancse Mandate

EQUATOR

FEDERATED MALAY STATES Singapore British Brunei BORNEO

MOLUCCAS ADMIRALTY IS. Australian Mandate NAURU (PLEASANT I.) Br. Man.

SUMATRA CELEBES CERAM BISMARCK ARCH. NEW IRELAND

Batavia (To Netherlands) NEW GUINEA NEW BRITAIN SOLOMON IS.

JAVA Surabaya (Port.) TIMOR Torres Str. THURSDAY I.

INDIAN OCEAN Darwin Cooktown CORAL SEA NEW HEBRIDES

North Australia Queensland NEW CALEDONIA Numea

TROPIC OF CAPRICORN

AUSTRALIA

Western Australia South Australia New South Wales

Brisbane

Fremantle Perth Coolgardie Adelaide Sydney Canberra Victoria Melbourne

Albany

Bass Str.

Auckland NORTH ISLAND NEW ZEALAND Wellington SOUTH ISLAND

TASMANIA

120 180

APRIL, 1942

SUN. 19

MON. 20

TUES. 21

WED. 22

THUR. 23

FRI. 24

SAT. 25

APRIL-MAY, 1942

SUN. 26

3 Arrow
1/4 Case

MON. 27

WE 5 7159

TUES. 28

WED. 29

THUR. 30

FRI. 1 MAY

SAT. 2

MAY, 1942

ANdY Sent ~~Jan. 19~~ Rec'd ~~Jan. 30~~ SUN. 3

GENE ~~Jan. 25.~~ ~~Feb. 4~~ ~~Jan. 18~~ MON. 4

NIO M. ~~Jan. 25~~ TUES. 5

IRIS ~~Jan. 25~~ WED. 6

Blefaris ~~Jan. 25~~ ~~Feb. 2~~ THUR. 7

Ward. ~~Jan. 25~~ FRI. 8

SAT. 9

pose

MAY, 1942

SUN. 10

MON. 11

TUES. 12

WED. 13

THUR. 14

FRI. 15

SAT. 16

MAY, 1942

~~January 4, 1944~~ ~~20~~

~~January 19, 1944~~ ~~25~~

SUN. 17

MON. 18

TUES. 19

WED. 20

THUR. 21

FRI. 22

SAT. 23

MAY, 1942

SUN. 24

MON. 25

TUES. 26

WED. 27

THUR. 28

FRI. 29

SAT. 30

MEMORIAL DAY

MAY-JUNE, 1942

SUN. 31

JUNE MON. 1

TUES. 2

WED. 3

THUR. 4

FRI. 5

SAT. 6

JUNE, 1942

SUN. 7

MON. 8

TUES. 9

WED. 10

THUR. 11

FRI. 12

SAT. 13

Dec. 19, 1943 - $20 SUN. 14
Jan. 4, 1944 - 25

Jan. 19, 1944 - 10 FLAG DAY
MON. 15

Feb. 3, 1944 - 30

Feb. 18 1944 - 10 LEFT IT IN
TUES. 16

MARCH 4 1944 - 40

March 18 1944 - 10 LEFT IN
~~MINUS STAMP~~
WED. 17

MARCH 11 1944 to July 15, 1944 $215.00

JULY 15 TO Aug. 15 $58
THUR. 18

AUG. 15 to SEPT. 15 $59

SEPT. 15 to OCT. 5 $30
FRI. 19

Oct. 5 to Oct 20, $27

Oct. 20 to Dec. 1, $99
SAT. 20

Dec. 1, to Dec. 15 $30

Dec. 15 to Jan 1, 1945 29

JUNE, 1942

SUN. 21

Jan 1 to 15, 1945 $46

Jan. 15 to 31, 1945 $30

MON. 22

Jan 31 to Feb 15, 1945 $29
Drew $9 - Left $20

Feb. 15 to March 1, 1945 $3
TUES. 23 $50 Drew $10 - Left $40

Mar. 1 to Mar 15 1945, $20
Drew $15 Left $5

WED. 24

Drew 0 Mar 15 to apr. 1 1945
Left in $65

THUR. 25

apr. 1 to apr 15. 1945
Drew $29, Left $70

apr. 15 to apr. 30, 1945
FRI. 26 Left all in - $90

apr 30 to Sept. 15 - $201

Sept. 15 to Sept. 30 $283
SAT. 27 Left in

JUNE-JULY, 1942

SUN. 28

MON. 29

TUES. 30

JULY

WED. 1

THUR. 2

FRI. 3

SAT. 4

INDEPENDENCE DAY

JULY, 1942

SUN. 5

MON. 6

TUES. 7

WED. 8

THUR. 9

FRI. 10

SAT. 11

JULY, 1942

SUN. 12

MON. 13

TUES. 14

WED. 15

THUR. 16

FRI. 17

SAT. 18

JULY, 1942

SUN. 19

MON. 20

TUES. 21

WED. 22

THUR. 23

FRI. 24

SAT. 25

JULY-AUGUST, 1942

SUN. 26

MON. 27

TUES. 28

WED. 29

THUR. 30

FRI. 31

AUGUST SAT. 1

AUGUST, 1942

SUN. 2 Boot Camp - SAMPSON, N.Y

ELEC. School - DETROIT, MICH

MON. 3 NORFOLK, VA.

O.E. 67 Commissioned - N.O., LA.

"

TUES. 4 SHAKEDOWN - BERMUDA

14 DAYS UNDERWAY { BOSTON, MASS
BIZERTE - TUNISIA, N. AFRICA

WED. 5

20 DAYS NEW YORK

PORTLAND, ME.

THUR. 6

20 DAYS { NORFOLK, VA.
BIZERTE, N. AFRICA

FRI. 7

BOSTON, MASS

CASCO BAY - PORTLAND, ME.

SAT. 8

22 Days { NORFOLK, VA TO
BIZERTE, N.A

.Y MAY 24, - JULY 13, 1943 SUN. 9

ICH. AUG, 4 - NOV. 27, 1943

DEC. 3 - MARCH 27, 1944 MON. 10

ON APRIL 4, 1944

APRIL 18 - MAY 13 TUES. 11

RICA MAY 15 - 24 (1944) - ~~MAY 10~~ JUNE 12-20,

WED. 12

JULY 10 - JULY 22, 1944

JULY 23 - JULY 30 THUR. 13

AUG 3, 1944

CA AUG 33' - AUG. 29, 1944

SEPT. 21 - OCT. 5, 1944 FRI. 14

Oct. 5 to Oct 8, 1944

Oct 1-12, 1944 SAT. 15

Oct 12 to NOV. 2 - to 3, 1944

AUGUST, 1942

SUN. 16 AFRICA TO PALERMO SICILY

25 DAYS { PALERMO TO CHARLESTON, S.C

MON. 17 CHARLESTON TO PANAMA CANAL

TUES. 18

SAN DIEGO, CALIF

PEARL HARBOR

WED. 19

MAR. 5, 1945 - INTERNATIONAL DATE LINE

THUR. 20 ENIWETOK (MARSHALL-IS)

ULITH, (CAROLINE IS)

FRI. 21 Leyte (PHILLIPINES

MANILA, P.I.

SAT. 22 MANILA, P.I

@ CAVITE

CAVITE PORTLAND, ORE

AUGUST, 1942

SUN. 23

Nov. 3, 1944
Nov. 6, 1944

Nov. 6, 1944
DEC. 1, 1944 - JAN. MON 1945

JAN. 11, 1945
JAN. 16, 1945 - JAN 17, 1945

TUES. 25

JAN 25, 1945 - JAN. 27, 1945

FEB. 2, 1945 to MAR. 2, 1945

WED. 26

GAINED 1 DAY

MAR. 9, to MAR 11

THUR. 27

MAR. 16 to MAR, 16.

MAR. 19 to MAR. 21

FRI. 28

MAR. 23, 1945

SAT. 29

AUGUST-SEPTEMBER, 1942

SUN. 30

MON. 31

TUES. 1 SEPTEMBER

WED. 2

THUR. 3

FRI. 4

SAT. 5

SEPTEMBER, 1942

SUN. 6

MON. 7

LABOR DAY

TUES. 8

WED. 9

THUR. 10

FRI. 11

SAT. 12

SEPTEMBER, 1942

SUN. 13

MON. 14

TUES. 15

WED. 16

THUR. 17

FRI. 18

SAT. 19

SEPTEMBER, 1942

SUN. 20

MON. 21

TUES. 22

WED. 23

THUR. 24

FRI. 25

SAT. 26

SEPTEMBER-OCTOBER, 1942

SUN. 27

MON. 28

TUES. 29

WED. 30

THUR. 1 OCTOBER

FRI. 2

SAT. 3

OCTOBER, 1942

SUN. 4

MON. 5

TUES. 6

WED. 7

THUR. 8

FRI. 9

SAT. 10

OCTOBER, 1942

SUN. 11

MON. 12

COLUMBUS DAY

TUES. 13

WED. 14

THUR. 15

FRI. 16

SAT. 17

OCTOBER, 1942

SUN. 18

MON. 19

TUES. 20

WED. 21

THUR. 22

FRI. 23

SAT. 24

OCTOBER, 1942

SUN. 25

MON. 26

TUES. 27

WED. 28

THUR. 29

FRI. 30

SAT. 31

NOVEMBER, 1942

SUN. 1

MON. 2

TUES. 3

WED. 4

THUR. 5

FRI. 6

SAT. 7

se

NOVEMBER, 1942

SUN. 8

MON. 9

TUES. 10

WED. 11

THUR. 12

FRI. 13

SAT. 14

NOVEMBER, 1942

SUN. 15

MON. 16

TUES. 17

WED. 18

THUR. 19

FRI. 20

SAT. 21

NOVEMBER, 1944

SUN. 22 PORTS THE U.S.S.
WISE MAN DE-667 HIT.

MON. 23 NEW ORLEANS LA. - APR. 2
BERMUDA 12SE. APR. 17
Boston, MASS. May 14
BIZERTE, AFRICA JUNE 23
TUES. 24 NEW YORK July 10
MAINE July 23
NORFOLK Aug 1
BIZERTE AFRICA AUG 23
WED. 25 BOSTON, MASS. SEPT. 9
PORTLAND, ME. OCT 5, 1944
YORTOWN, VIRGINIA Oct. 9, 1944
NORFOLK, VA. Oct. 10, 1944
THUR. 26 ARRIVED NORFOLK, Oct 10, 1944
LEFT " " Oct. 12, 1944
THANKSGIVING DAY BIZERTE Oct. 28, 1944
FRI. 27 LEFT " " Oct. 29, 1944
arrived PALERMO, SICILY Oct. 31, 1944
Left " " Nov. 5, 1944
ARRIVED Charleston, S.C. Dec. 1, 1944
SAT. 28 LEFT. " " Jan. 11, 1945
ARRIVED Panama Jan. 16, 1945
LEFT " " Jan. 17, 1945

NOVEMBER-DECEMBER, 1942

ARRived in San Diego Jan. 25, 1945 SUN. 29
left Jan. 27, 1945
ARRived Pearl HarBor - FEB. 2, 1945
left MAR. 2, 1945 MON. 30
ARRived - ENIWETOK MAR. 9, 1945.
left MAR. 11, 1945

arrived in Ylethic (Carolines) Isle. Mar. 1945

DECEMBER TUES. 1

left.

arrived in. Leyte, P.I. WED. 2

left.

arrived in MANILA P.I. THUR. 3

left.

arrived CAVITE FRI. 4

left.

Arrived PORTLAND ORE SAT. 5

left

arrived

left

DECEMBER, 1942

SUN. 6

MON. 7

TUES. 8

WED. 9

THUR. 10

FRI. 11

SAT. 12

DECEMBER, 1942

SUN. 13

MON. 14

TUES. 15

WED. 16

THUR. 17

FRI. 18

SAT. 19

DECEMBER, 1942

SUN. 20 YESTERDAY IS But a DREAM
& TOMMOROW IS JUST a VISION
TO DAY WILL Be a MEMORY

MON. 21

TUES. 22

WED. 23

THUR. 24

FRI. 25

CHRISTMAS DAY

SAT. 26

DECEMBER, 1942

DREAM
SION
y

SUN. 27

MON. 28

TUES. 29

WED. 30

THUR. 31

MEMORANDA

MEMORANDA

D. E. 667, U. S. S. WISEMAN
c/o FLEET POST OFFICE
NEW YORK, N. Y.
DIV. E.

D. E. 667, U. S. S. Wiseman
c/o Fleet Post Office
San Francisco, Calif.

MEMORANDA

FREDERICK REMINGTON
RAY SHOLES BURG

MEMORANDA

D.D. 674 R. Cobb.

D.E. 575 Co. 2, Gorlay

D.E. 702 Co. 2 Richter

D.E. 193 Egan

D.E 764 Co. 2

D.D. 664 Barry

DE 796 Andrews

DE. 584 Hallock

DE 583 C. Russo

TELEPHONE NUMBERS

NAME EXCHANGE NUMBER

John Maley
25 Cole Ave
Pittsfield Mass.

Betty Zimmerman
2034 Lake View
Detroit, Mich.
(Gibson)

TRL-LE 1966

ELVERA Detroit

TO - 71814

Margaret Dexter
4637 Elmwood
Detroit Mich
OL 6142

Mr. Deming
Tapping Instructor
Boys' Club
Pittsfield, Mass

Dick Cobb
[redacted]
Pittsfield Mass

44 HENRY AVE.

1941

	S	M	T	W	T	F	S
JAN.	. .	. .	. .	1	2	3	4
	5	6	7	8	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28	29	30	31	. .
FEB.	. .	. .	. .	. .	. .	. .	1
	2	3	4	5	6	7	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22
	23	24	25	26	27	28	. .
MAR.	. .	. .	. .	. .	. .	. .	1
	2	3	4	5	6	7	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22
	23	24	25	26	27	28	29
	30	31	. .	. .	. .	. .	. .
APR.	. .	. .	1	2	3	4	5
	6	7	8	9	10	11	12
	13	14	15	16	17	18	19
	20	21	22	23	24	25	26
	27	28	29	30	. .	. .	. .
MAY	. .	. .	. .	. .	1	2	3
	4	5	6	7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	29	30	31
JUNE	. .	. .	. .	. .	. .	. .	. .
	1	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16	17	18	19	20	21
	22	23	24	25	26	27	28
	29	30	. .	. .	. .	. .	. .

	S	M	T	W	T	F	S
JULY	. .	. .	1	2	3	4	5
	6	7	8	9	10	11	12
	13	14	15	16	17	18	19
	20	21	22	23	24	25	26
	27	28	29	30	31	. .	. .
AUG.	. .	. .	. .	. .	. .	1	2
	3	4	5	6	7	8	9
	10	11	12	13	14	15	16
	17	18	19	20	21	22	23
	24	25	26	27	28	29	30
	31	. .	. .	. .	. .	. .	. .
SEP.	. .	1	2	3	4	5	6
	7	8	9	10	11	12	13
	14	15	16	17	18	19	20
	21	22	23	24	25	26	27
	28	29	30	. .	. .	. .	. .
OCT.	. .	. .	. .	1	2	3	4
	5	6	7	8	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28	29	30	31	. .
NOV.	. .	. .	. .	. .	. .	. .	1
	2	3	4	5	6	7	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22
	23	24	25	26	27	28	29
	30	. .	. .	. .	. .	. .	. .
DEC.	. .	1	2	3	4	5	6
	7	8	9	10	11	12	13
	14	15	16	17	18	19	20
	21	22	23	24	25	26	27
	28	29	30	31	. .	. .	. .

1942

	S	M	T	W	T	F	S
JAN.	..	..	..	..	*1*	2	3
○ 2	*4*	5	6	7	8	9	10
☾ 10	*11*	12	13	14	15	16	17
● 16	*18*	19	20	21	22	23	24
☽ 24	*25*	26	27	28	29	30	31
FEB.	*1*	2	3	4	5	6	7
○ 1	*8*	9	10	11	*12*	13	14
☾ 8	*15*	16	17	18	19	20	21
● 15	*22*	*23*	24	25	26	27	28
☽ 22	..	..	..	..	..	..	..
MAR.	*1*	2	3	4	5	6	7
○ 2	*8*	9	10	11	12	13	14
☾ 9	*15*	16	17	18	19	20	21
● 16	*22*	23	24	25	26	27	28
☽ 24	*29*	30	31	..	..	..	..
APR.	..	..	..	1	2	3	4
○ 1	*5*	6	7	8	9	10	11
☾ 7	*12*	13	14	15	16	17	18
● 15	*19*	20	21	22	23	24	25
☽ 23	*26*	27	28	29	30	..	..
○ 30	..	..	..	..	..	1	2
MAY	*3*	4	5	6	7	8	9
☾ 7	*10*	11	12	13	14	15	16
● 15	*17*	18	19	20	21	22	23
☽ 23	*24*	25	26	27	28	29	*30*
○ 30	*31*	..	..	..	..	..	..
JUNE	..	1	2	3	4	5	6
☾ 5	*7*	8	9	10	11	12	13
● 13	*14*	*15*	16	17	18	19	20
☽ 21	*21*	22	23	24	25	26	27
○ 28	*28*	29	30	..	..	..	..

	S	M	T	W	T	F	S
JULY	..	..	..	1	2	3	*4*
☾ 5	*5*	6	7	8	9	10	11
● 13	*12*	13	14	15	16	17	18
☽ 21	*19*	20	21	22	23	24	25
○ 27	*26*	27	28	29	30	31	..
AUG.	..	..	..	..	..	..	1
☾ 3	2	3	4	5	6	7	8
● 11	9	10	11	12	13	14	15
☽ 19	*16*	17	18	19	20	21	22
○ 25	*23*	24	25	26	27	28	29
	30	31	..	..	..	..	..
SEP.	..	..	1	2	3	4	5
☾ 2	6	7	8	9	10	11	12
● 10	*13*	14	15	16	17	18	19
☽ 17	*20*	21	22	23	24	25	26
○ 24	*27*	28	29	30	..	..	..
OCT.	..	..	..	..	1	2	3
☾ 2	4	5	6	7	8	9	10
● 9	*11*	*12*	13	14	15	16	17
☽ 16	*18*	19	20	21	22	23	24
○ 23	*25*	26	27	28	29	30	31
NOV.	*1*	2	3	4	5	6	7
☾ 1	8	9	10	11	12	13	14
● 8	*15*	16	17	18	19	20	21
☽ 15	*22*	23	24	25	*26*	27	28
○ 22	*29*	30	..	..	..	..	..
☾ 30							
DEC.	..	..	1	2	3	4	5
● 7	6	7	8	9	10	11	12
☽ 14	*13*	14	15	16	17	18	19
○ 22	*20*	21	22	23	24	*25*	26
☾ 30	*27*	28	29	30	31	..	..

Italics Denote Holidays in Most States

1943

	S	M	T	W	T	F	S
JAN.	..	..	..	..	..	1	2
	3	4	5	6	7	8	9
	10	11	12	13	14	15	16
	17	18	19	20	21	22	23
	24	25	26	27	28	29	30
	31	..	..	..	..	..	..
FEB.	..	1	2	3	4	5	6
	7	8	9	10	11	12	13
	14	15	16	17	18	19	20
	21	22	23	24	25	26	27
	28	..	..	..	..	..	..
MAR.	..	1	2	3	4	5	6
	7	8	9	10	11	12	13
	14	15	16	17	18	19	20
	21	22	23	24	25	26	27
	28	29	30	31	..	..	..
APR.	..	..	..	..	1	2	3
	4	5	6	7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	29	30	..
MAY	..	..	..	..	..	..	1
	2	3	4	5	6	7	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22
	23	24	25	26	27	28	29
	30	31	..	..	..	..	..
JUNE	..	..	1	2	3	4	5
	6	7	8	9	10	11	12
	13	14	15	16	17	18	19
	20	21	22	23	24	25	26
	27	28	29	30	..	..	..

	S	M	T	W	T	F	S
JULY	..	..	..	..	1	2	3
	4	5	6	7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	29	30	31
	..	..	..	..	..	..	..
AUG.	1	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16	17	18	19	20	21
	22	23	24	25	26	27	28
	29	30	31	..	..	..	..
SEP.	..	..	..	1	2	3	4
	5	6	7	8	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28	29	30	..	..
OCT.	..	..	..	..	..	1	2
	3	4	5	6	7	8	9
	10	11	12	13	14	15	16
	17	18	19	20	21	22	23
	24	25	26	27	28	29	30
	31	..	..	..	..	..	..
NOV.	..	1	2	3	4	5	6
	7	8	9	10	11	12	13
	14	15	16	17	18	19	20
	21	22	23	24	25	26	27
	28	29	30	..	..	..	..
DEC.	..	..	..	..	1	2	3	4
	5	6	7	8	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28	29	30	31	..

Low B+ Voltage Produces
a weak Audio output
from the speaker, a
small image & possible
a dim washed out image
Due to partial failure
of the Low-voltage
Power supply.
Also a Hum is noticeable
A.C. ripple in the image
& Black Bars across
The screen

Ripple caused By improper
filtering. Are ① open
filter cond. ② Large Load
ond ckt. Caused By a
short ckt. in another
section; Causes Reduced
output.

Sound Bars on CRT.

Improper alignment of
trap ckts. in Video I.F.
or incorrect tuning of Fine
Tuning.

H.V. Failure with Good Audio, ~~C~~ Causing Blank Screen. Check Filament of C.R.T. Measure Output Lead going into C.R.T. with a K.V. Voltmeter, If Volt. is Low, Replace Oscillator Tube, or H.V. Rect. Tube. Then make Res. Test & Continuity Test of H.V. System.

If Fly Back System is involved, First Measure H.V. with K.V. meter, If Volt. is Zero Check Horiz. Defl. System. If O.K. Then Suc Rect. is Out, or Cond. Rest. Ckt Defective