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STANDARD TIME THROUGHOUT THE WORLD

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STANDARD TIME THROUGHOUT THE WORLD [1]

ABSTRACT

This paper gives a brief historical sketch of the development of the standard time system, a map showing the time zone boundaries in the United States, and a list of the official stations sending out radio time signals. The legal time in nearly every foreign country and in most of the more important islands is also given, compared with both Greenwich mean time and with noon, eastern standard time.

CONTENTS

I. INTRODUCTION

In recent years there has been a great increase in the demand for information regarding time in the various cities and countries of the world. This is largely due to the development of international news services, world-wide telephony, transoceanic aviation, exploration, and the more precise timing of events.

This led to the compilation of Bureau of Standards Circular 280, published in 1925, of which this is a revised and enlarged edition. This revision contains the most up-to-date information available from reliable sources and supersedes the original circular of the same title. The rapid progress being made in world communication will doubtless necessitate further revision from time to time.

Some foreign countries and several States and cities of this country have adopted "summer" or "daylight saving" time for use during the summer months. This time is usually one hour faster than standard time. The subject is given no specific consideration in this circular.

II. HISTORICAL SKETCH

From the earliest civilization man has reckoned time by the apparent motion of the heavenly bodies. The rotation of the earth on its axis from west to east causes these bodies to "rise" in the east

[1] Prepared by Ralph E. Gould, chief time section.

and "set" in the west. Consequently points to the east of us have sunrise before we do, or, as we say, their time is faster than ours; while points to the west have time that is slower than ours. This rotation of the earth about its axis once in 24 hours gives a time change of one hour for every 15° of longitude. That is, if observations were made on the transit of the sun across the meridian at points separated by 15° of longitude, it would be found that the time of transit at two such points would differ by one hour. If the separation of the points of observation were decreased, the difference in time would be decreased in the same proportion. These times would all be true local times, using the transit of the sun across the meridian as a standard.

Since the distance around the earth is less at points not on the Equator than at the Equator the distance on the earth's surface corresponding to a time difference is also less in the same proportion. For example, at the Equator 15° corresponds to about 1,040 miles, while at the latitude of New York 15° corresponds to only about 784 miles. Or, at the Equator, a difference of about 17 miles makes a time difference of one minute, while in the latitude of New York a difference of only 13 miles makes a difference of one minute in true local time.

The need of a uniform time began to be felt in the United States about 1870, and the railroads gradually adopted a system for use on their roads specifying definite important centers or junction points at which changes of one hour should be made. As means of communication still further developed, it became apparent that some system of international time must be established.

In 1884 an international congress was called in Washington to consider the subject of a world standard of time. The world was divided into zones, each covering 15° of longitude, the time for each zone being that of the meridian passing through its approximate center and the time in adjacent zones differing by one hour. The meridian passing through the observatory at Greenwich, England, was chosen as the zero meridian from which all time should be reckoned. Although there was no definite agreement as to the adoption of this time by the different nations, the plan was gradually accepted.

In 1886 Japan made the time of the one hundred and thirty-fifth meridian east, nine hours faster than Greenwich, its standard time. Belgium and the Netherlands adopted Greenwich time in 1893, although the Netherlands later reverted to Amsterdam time, which it now uses. Germany, Italy, Denmark, and Switzerland in 1893–94 each adopted central European time, which is one hour faster than Greenwich, and Bulgaria, Rumania,[2] and Turkey established the time for those countries as two hours faster than Greenwich. The Australian States followed in 1895.

The adoption of time differing from Greenwich by an odd number of half hours soon made its appearance. This slight departure from the original plan is of advantage in some places, since it more nearly agrees with true local time. In New Zealand the time is 11½ hours faster than Greenwich time, in Burma 6½ hours faster, while in India, excepting Calcutta, it is 5½ hours faster. Cape Colony formerly was 1½ hours faster than Greenwich, but in 1903 the legal time was made 2 hours faster than Greenwich.

[2] Rumania is now using one hour faster than Greenwich as its standard.

In 1914 Brazil was divided into time zones on the international basis, and in 1930 Mexico abandoned local time for the zone system. An important change was made in 1924 in the complete zoning of the Soviet Union, which comprises old Russia and Siberia, into 11 time areas. A few countries still retain the time of some important city as the legal time of the country.

The United States, although using the system since 1884, did not legalize it until March 19, 1918, when Congress directed the Interstate Commerce Commission to establish limits for the various time zones in this country. Changes in these boundaries have been made from time to time, in order that the time changes may occur at such points as to result in a minimum of inconvenience. The division lines are not straight, but largely follow the railroads and pass through important cities and junction points. A map (fig. 1) has been prepared, corrected to April 1, 1932, from data furnished by the Interstate Commerce Commission.

III. STANDARD TIME IN THE UNITED STATES

1. TIME ZONES

The United States is divided into four standard time zones, each approximately 15° of longitude in width. All places in each zone use, instead of their own local time, the time counted from the transit of the "mean sun" [3] across the meridian which passes through the approximate center of that zone.

These time zones are designated as eastern, central, mountain, and Pacific, and the time in these zones is reckoned from the seventy-fifth, ninetieth, one hundred and fifth, and one hundred and twentieth meridians west of Greenwich, respectively. The time in the various zones is slower than Greenwich time by 5, 6, 7, and 8 hours, respectively.

The question of changing from the time of one time zone to that of an adjacent zone arises in practice largely in the operation of railroads. Because of the inconvenience of changing the time by the necessary amount of one hour at every point where a railroad crosses one of these boundary lines, the more convenient practice has usually been followed of making the change at some terminal or division point on the road, at some junction point, or at the boundary line between the United States and Canada. The result is that practically the boundaries of the time zones are defined by the lines connecting these points of railroad time change. Because of the location of these railroad junctions or terminals the resulting lines are somewhat irregular.

Figure 1 shows the time zones and boundary lines as defined and corrected to April 1, 1932, by the Interstate Commerce Commission.

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[3] The interval between successive passages of the sun across the meridian is somewhat variable, and for this reason apparent solar days are unequal. Therefore, mean time has been adopted, which is kept by a fictitious or "mean sun" moving uniformly in the Equator at the same average speed as that of the real sun, thus making days of equal length. It is "mean noon" when this "mean sun" crosses the meridian.

2. CITIES ON TIME ZONE BOUNDARIES

There are listed below some of the more important cities on the boundaries of the time zones.

(*a*) The following municipalities located on the boundary between the eastern and the central time zones use eastern standard time:

Detroit, Mich.
Toledo, Ohio, and all other cities in Ohio situated on this boundary.
Williamson, W. Va.
Dungannon, Va.
Bristol, Va.
Asheville, N. C.
Franklin, N. C.
McDonough, Ga.
Macon, Ga., and points on Southern Railway between McDonough and Macon.
Perry, Ga.
Thomasville, Ga.
Apalachicola, Fla.

All other places on this boundary use central standard time.

(*b*) The following municipalities located on the boundary between the central and the mountain time zones use central standard time:

Murdo, S. Dak.
Mackenzie, S. Dak.
Phillipsburg, Kans.
Stockton, Kans.
Plainville, Kans.
Ellis, Kans.
Liberal, Kans.

All other places on this boundary use mountain standard time.

(*c*) All municipalities on the boundary between the mountain and the Pacific time zones use mountain standard time except Huntington, Oreg., which uses Pacific standard time.

3. TERRITORIES AND INSULAR POSSESSIONS

Standard time is also used in the Territories outside of the continental United States. The places and the time used are given below:

Alaska (see Table 2)	10 hours slower than Greenwich.
Guam	9½ hours faster than Greenwich.
Hawaii	10½ hours slower than Greenwich.
Panama	5 hours slower than Greenwich.
Philippines	8 hours faster than Greenwich.
Puerto Rico	4 hours slower than Greenwich.

4. TIME IN SEVERAL LARGE CITIES OF THE UNITED STATES AT 12 NOON, EASTERN STANDARD TIME

Atlanta, Ga	11. 00 a. m.	Milwaukee, Wis	11. 00 a. m.
Baltimore, Md	12. 00 noon	Minneapolis, Minn	11. 00 a. m.
Birmingham, Ala	11. 00 a. m.	Newark, N. J	12. 00 noon
Boston, Mass	12. 00 noon	New Haven, Conn	12. 00 noon
Charleston, S. C	12. 00 noon	New Orleans, La	11. 00 a. m.
Chicago, Ill	11. 00 a. m.	New York, N. Y	12. 00 noon
Cincinnati, Ohio	12. 00 noon	Norfolk, Va	12. 00 noon
Cleveland, Ohio	12. 00 noon	Omaha, Nebr	11. 00 a. m.
Columbus, Ohio	12. 00 noon	Philadelphia, Pa	12. 00 noon
Dallas, Tex	11. 00 a. m.	Pittsburgh, Pa	12. 00 noon
Denver, Colo	10. 00 a. m.	Portland, Oreg	9. 00 a. m.
Des Moines, Iowa	11. 00 a. m.	Providence, R. I	12. 00 noon
Detroit, Mich	12. 00 noon	Richmond, Va	12. 00 noon
Hartford, Conn	12. 00 noon	Rochester, N. Y	12. 00 noon
Houston, Tex	11. 00 a. m.	Salt Lake City, Utah	10. 00 a. m.
Indianapolis, Ind	11. 00 a. m	San Francisco, Calif	9. 00 a. m.
Kansas City, Mo	11. 00 a. m.	Seattle, Wash	9. 00 a. m.
Los Angeles, Calif	9. 00 a. m.	St. Louis, Mo	11. 00 a. m.
Louisville, Ky	11. 00 a. m.	St. Paul, Minn	11. 00 a. m.
Memphis, Tenn	11. 00 a. m.	Washington, D. C	12. 00 noon

IV. TIME SIGNALS IN UNITED STATES

The best generally available source of accurate time is the time signal as transmitted by telegraph from the United States Naval Observatory and broadcast by radio from Arlington, Va., and certain other naval stations as listed in the table below.

All naval time signals are made in a standard manner, which is as follows:

The signals begin five minutes before the hour and consist of a dash on each second, except that no dashes are sent on the seconds listed below:

55 minutes; 29, 51, and 56 to 59 seconds.
56 minutes; 29, 52, and 56 to 59 seconds.
57 minutes; 29, 53, and 56 to 59 seconds.
58 minutes; 29, 54, and 56 to 59 seconds.
59 minutes; 29, and 51 to 59 seconds.

Beginning exactly on the hour a much longer dash is sent. In all cases the exact second is denoted by the beginning of the dash, the end being without significance. It will be noted that the number of seconds sounded immediately following the single second omission and preceding the long omission at the end of each minute indicates the number of minutes of the signal yet to be sent. For instance, the signal for 56 minutes and 52 seconds is omitted and then 3 seconds are sounded, indicating that 3 minutes of the signal remain to be transmitted.

These time signals, if received directly and automatically are seldom in error by as much as 0.20 second. The average error is generally less than 0.03 second.

Of the stations listed, the first two automatically transmit the signal as received from the Naval Observatory at Washington, with errors averaging only 0.02 to 0.06 second. Most of the other stations automatically reradiate, and the error is somewhat larger. The signal, however, is sufficiently exact for commercial use.

TABLE 1.—*Radio transmission of time signals* [1]

Station	Call letters	Frequency	Wave length	Signal sent
		Kilocycles	*Meters*	
Arlington, Va.	NAA	113	2,653	3 a. m., 12 noon, and 10 p. m., eastern standard time.
		690	434.5	
		4,015	74.7	
		8,870	33.8	
		12,045	24.9	
		16,060	18.7	
Annapolis, Md.	NSS	17.8	16,844	Same as Arlington.
Astoria, Wash. (North Head)	NPE	102	2,939.4	9 a. m., Pacific standard time.
Balboa, Canal Zone (Darien)	NBA	46	6,517.8	1 p. m. and 11 p. m., eastern standard time.
Cavite, P. I.	NPO	56	5,353.9	11 a. m. and 10 p. m., Philippine standard time.
		108	2,776.1	
		8,872	33.8	
		13,308	22.5	
Colon, Canal Zone	NAX	132	2,771.4	Same as Balboa.
Eureka, Calif.	NPW	108	2,776.1	9 a. m. Pacific standard time.
Great Lakes, Ill.	NAJ	122	2,457.5	12 noon, eastern standard time.
Key West, Fla.	NAR	106	2,828.5	Do.
New Orleans, La.	NAT	104	2,882.9	Do.
Honolulu, T. H. (Pearl Harbor).	NPM	26.1	11,487	1.30 p. m., Hawaiian standard time.
San Diego, Calif. (Chollas Heights).	NPL	102	2,939.4	9 a. m., Pacific standard time.
San Francisco, Calif. (Mare Island).	NPG	42.8	7,005.1	Do.
		66	4,542.7	
		108	2,776.1	

[1] The values given in this table are subject to change by the Navy Department.

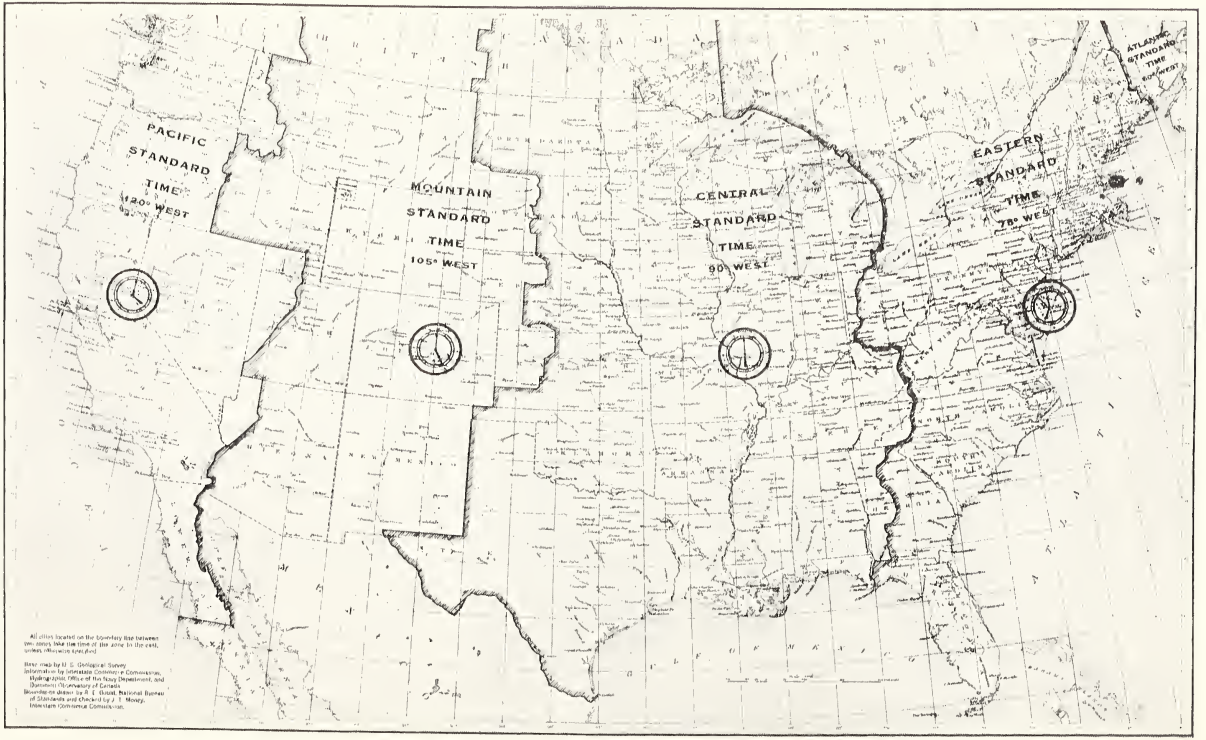

FIGURE 1.—*Standard Time Zones of the United States, with parts of Canada and Mexico, as of April 1, 1932*

NOTE.—Since the preparation of this map, the time zones of Mexico have been changed by presidential decree. Effective April 1, 1932, all of Mexico, excepting the northern territory of Lower California, takes the time of the ninetieth meridian west, 6 hours slower than Greenwich.

FIGURE 2.—*Standard Time Zones of the World*

This map shows the approximate boundaries of the time zones as used under the International Standard Time Zone System, with the Greenwich meridian as zero.

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V. TIME IN FOREIGN COUNTRIES

Nearly every country of the world has established a legal time upon which to operate, and also a legal time for islands and dependencies under its control. (See fig. 2.) The following table shows the authorized time and compares this time with both Greenwich, England, and Washington, D. C. Where the legal time conforms to the International Standard Time System the standard-time meridian is indicated.

TABLE 2.—*Time compared with Greenwich mean time and Washington, D. C., noon*

Country	General location	Standard meridian	Time compared with Greenwich		Noon at Washington, D. C. (eastern standard time)		Remarks
			H. M. S.		H. M. S.		
Admiralty Islands	South Pacific	150° E.	10	fast	3	[1] a. m.	
Afghanistan	Asia (70° E.)						No standard time.
Alaska	North America						
Ketchikan		120° W.	8	slow	9	a. m.	
Cordova, Sitka, Southern portion		135° W.	9	slow	8	a. m.	
Central portion		150° W.	10	slow	7	a. m.	
Aleutian Islands, West coast		165° W.	11	slow	6	a. m.	
Albania	Europe	15° E.	1	fast	6	p. m.	Central European time
Algeria	Africa	0°	0		5	p. m.	Adopted Mar. 9, 1911.
Andaman Island	Indian Ocean	97° 30′ E.	6 30	fast	11 30	p. m.	
Angola	Africa	15° E.	1	fast	6	p. m.	
Anguilla Island	West Indies	60° W.	4	slow	1	p. m.	
Antigua Island	do	60° W.	4	slow	1	p. m.	
Arabia	Asia (45° E.)						No standard time.
Aden			2 59 54	fast	7 59 54	p. m.	
Argentina	South America	60° W.	4	slow	1	p. m.	Adopted May 1, 1920.
Aru Islands	East Indies (135° E.).						No standard time.
Ascension Island	South Atlantic	15° W.	1	slow	4	p. m.	
Auckland Island	South Pacific (165° E.).						Do.
Austral Islands	South Pacific	150° W.	10	slow	7	a. m.	
Australia	do						
Western Australia		120° E.	8	fast	1	[1] a. m.	
Central Australia, Northern Territory, South Australia		142° 30′ E.	9 30	fast	2 30	[1] a. m.	
New South Wales, Queensland, Victoria		150° E.	10	fast	3	[1] a. m.	
Austria	Europe	15° E.	1	fast	6	p. m.	Central European time.
Azore Islands	North Atlantic	30° W.	2	slow	3	p. m.	
Bahama Islands	do	75° W.	5	slow	12	noon	Adopted Feb. 1, 1912.
Balleny Islands	Antarctic Ocean (162° E.).						No standard time.
Barbados Island	West Indies	60° W.	4	slow	1	p. m.	
Bear Island	Arctic Ocean (20° E.).						Do.
Bechuanaland	Africa	30° E.	2	fast	7	p. m.	
Belgium	Europe	0°	0		5	p. m.	Western European time.
Bennett Island	Arctic Ocean	150° E.	10	fast	3	[1] a. m.	
Bermuda Islands	North Atlantic	60° W.	4	slow	1	p. m.	
Bessarabia	Europe	15° E.	1	fast	6	p. m.	Central European time.
Bolivia	South America		4 33	slow	12 27	p. m.	La Paz time.

[1] The time noted is in the morning of the following day.

TABLE 2.—*Time compared with Greenwich mean time and Washington, D. C., noon*—Continued

Country	General location	Standard meridian	Time compared with Greenwich		Noon at Washington, D. C. (eastern standard time)		Remarks
			H. M. S.		H. M. S.		
Borneo	East Indies						
British North Borneo (Labuan).		120° E.	8	fast	1	[1] a. m.	
Dutch Borneo:							
Balik Papan			8 20	fast	1 20	[1] a. m.	
Pontianak			7 17	fast	12 17	[1] a. m.	
Sarawak		112° 30′ E.	7 30	fast	12 30	[1] a. m.	
Southern part							No standard time.
Brazil	South America						Adopted Jan. 1, 1914.
Fernando Noronha Island		30° W.	2	slow	3	p. m.	
Isle da Trinidade							
Bahia							
Ceara							
Esperito Santo							
Goyaz							
Maranhao							
Minas-Geraes							
Para							
Parana							
Parahyba		45° W.	3	slow	2	p. m.	
Pernambuco							
Piauhy							
Rio de Janeiro							
Rio Grande do Norte							
Rio Grande do Sul							
Santa Catherina							
Sao Paulo							
Amazonas		60° W.	4	slow	1	p. m.	
Matto Grosso							
Acre Territory		75° W.	5	slow	12	noon	
Bulgaria	Europe	30° E.	2	fast	7	p. m.	Eastern European time
Burma	Asia	97° 30′ E.	6 30	fast	11 30	p. m.	
Cameroon	Africa						
British		15° E.	1	fast	6	p. m.	
French		15° E.	1	fast	6	p. m.	Adopted Jan. 1, 1912.
Campbell Island	Antarctic Ocean (170° W.).						No standard time.
Canada and Newfoundland.	North America						
Belle Isle							
Labrador (coast)			3 31	slow	1 29	p. m.	St. Johns time.
Newfoundland							
Anticosti Island							
Cape Breton Island							
Labrador (interior)							
Magdalen Island		60° W.	4	slow	1	p. m.	Atlantic standard time.
New Brunswick							
Nova Scotia							
Quebec (east of 68° W.)							
Sable Island							
Melville Peninsula							
Ontario (east of 90° W.)		75° W.	5	slow	12	noon.	Eastern standard time.
Quebec (west of 68° W.)							
Southampton Island							
Manitoba							
Northwest Territories (eastern).		90° W.	6	slow	11	a. m.	Central standard time.
Ontario (west of 90° W.)							
Alberta							
Northwest Territories (middle).		105° W.	7	slow	10	a. m.	Mountain standard time.
Saskatchewan							
British Columbia							
Northwest Territories (western).		120° W.	8	slow	9	a. m.	Pacific standard time.
Yukon		135° W.	9	slow	8	a. m.	Yukon standard time.

[1] The time noted is in the morning of the following day.

TABLE 2.—*Time compared with Greenwich mean time and Washington, D. C., noon*—Continued

Country	General location	Standard meridian	Time compared with Greenwich		Noon at Washington, D. C. (eastern standard time)		Remarks
			H. M. S.		H. M. S.		
Canada and Newfoundland—Continued.							
Arctic Islands:							
Baffin Island							
Banks Island							
Boothnia Peninsula							
Ellesmore Island							
Melville Island							
North Devon Island							No standard time.
North Somerset Island.							
Prince of Wales land							
Victoria Island							
Canary Islands	North Atlantic	15° W.	1	slow	4	p. m.	
Cape Verde Islands	do	30° W.	2	slow	3	p. m.	
Caroline Islands	South Pacific						
Western		150° E.	0	fast	3	[1] a. m.	
Eastern		165° E.	1	fast	4	[1] a. m.	
Celebes Islands	East Indies (120° E.).						Do.
Macassar			7 57 37	fast	12 57 37	[1] a. m.	
Ceram Island	East Indies (120° E.).						Do.
Amboina			8 33	fast	1 33	[1] a. m.	
Chad	Africa	15° E.	1	fast	6	p. m.	
Chagos Archipelago	Indian Ocean	75° E.	5	fast	10	p. m.	
Chatham Island	South Pacific	172° 30′ E.	11 30	fast	4 30	[1] a. m.	
Chile	South America	75° W.	5	slow	12	noon	Adopted Sept. 1, 1918.
China	Asia						
Interior							No standard time.
East coast		120° E.	8	fast	1	[1] a. m.	
Hoihau		105° E.	7	fast	12	midnight	
Hong Kong		120° E.	8	fast	1	[1] a. m.	
Luichow		105° E.	7	fast	12	midnight	
Pakhoi		105° E.	7	fast	12	midnight	
Cocos Islands (Keeling)	Indian Ocean	97° 30′ E.	6 30	fast	11 30	p. m.	
Colombia	South America	75° W.	5	slow	12	noon	
Comoro Islands	Indian Ocean	45° E.	3	fast	8	p. m.	
Congo	Africa						
Belgian		15° E.	1	fast	6	p. m.	
French		15° E.	1	fast	6	p. m.	Adopted Jan. 1, 1912.
Cook Islands	South Pacific (160° W.).		10 38	slow	6 22	a. m.	
Corsica Island	Mediterranean Sea.	0°	0		5	p. m.	
Costa Rica	Central America.	90° W.	6	slow	11	a. m.	Adopted Jan. 15, 1921.
Crete Island	Mediterranean Sea.	30° E.	2	fast	7	p. m.	
Cuba	West Indies	75° W.	5	slow	12	noon	
Curacao Island	Carribean Sea (69° W.).		4 36	slow	12 24	p. m.	
Cyprus Island	Mediterranean Sea.	30° E.	2	fast	7	p. m.	
Czechoslovakia	Europe	15° E.	1	fast	6	p. m.	Central European time.
Dahomey	Africa	0°	0		5	p. m.	Adopted Jan. 1, 1912.
Danzig	Europe	15° E.	1	fast	6	p. m.	Central European time.
Denmark	do	15° E.	1	fast	6	p. m.	Do.
Dominica Island	West Indies	60° W.	4	slow	1	p. m.	
Dominican Republic	do		4 40	slow	12 20	p. m.	
Ecuador	South America						
Guayaquil			5 19 24	slow	11 40 36	a. m.	
Quito			5 14 6.7	slow	11 45 53.3	a. m.	
Egypt	Africa	30° E.	2	fast	7	p. m.	
El Salvador	Central America.	90° W.	6	slow	11	a. m.	
England	British Isles	0°	0		5	p. m.	Western European time.

[1] The time noted is in the morning of the following day.

TABLE 2.—*Time compared with Greenwich mean time and Washington, D. C., noon*—Continued

Country	General location	Standard meridian	Time compared with Greenwich		Noon at Washington, D. C. (eastern standard time)		Remarks
			H. M. S.		H. M. S.		
Eritrea	Africa	45° E.	3	fast	8	p. m.	
Estonia	Europe	30° E.	2	fast	7	p. m.	Eastern European time.
Tallinn			1 38 57	fast	6 38 57	p. m.	
Ethiopia	Africa (40° E.)						No standard time.
Falkland Islands	South Atlantic	60° W.	4	slow	1	p. m.	
Faroe Islands	British Isles	0°	0		5	p. m.	Western European time.
Fernando Po Island	South Atlantic	0°	0		5	p. m.	
Fiji Islands	South Pacific	180° E.	12	fast	5	[1] a. m.	
Finland (Soumi)	Europe	30° E.	2	fast	7	p. m.	Eastern European time.
Flores Island	East Indies (120° E.).						No standard time.
Formosa Island (Taiwan)	China Sea	120° E.	8	fast	1	[1] a. m.	
France	Europe	0°	0		5	p. m.	Western European time. Adopted Mar. 9, 1911.
Gabon	Africa	15° E.	1	fast	6	p. m.	
Galapagos Islands	South Pacific (90° W.).						No standard time.
Gambia	Africa		1 06	slow	3 54	p. m.	
Germany	Europe	15° E.	1	fast	6	p. m.	Central European time.
Gibraltar	do	0°	0		5	p. m.	Western European time.
Gold Coast	Africa	0°	0		5	p. m.	
Great Lyakhov Island	Arctic Ocean	135° E.	9	fast	2	[1] a. m.	
Greece	Europe	30° E.	2	fast	7	p. m.	Eastern European time. Adopted July 28, 1916.
Greenland	Arctic Ocean						
Interior							No standard time.
Angmagssalik		45° W.	3	slow	2	p. m.	
Disko Island		45° W.	3	slow	2	p. m.	
Scoresby Sound		30° W.	2	slow	3	p. m.	
Western coast		45° W.	3	slow	2	p. m.	
Grenada Island	West Indies	60° W.	4	slow	1	p. m.	
Guadeloupe Island	do	60° W.	4	slow	1	p. m.	Adopted June 8, 1911.
Guadalupe Island	North Pacific (120° W.).						No standard time.
Guam Island	North Pacific	150° E.	10	fast	3	[1] a. m.	Guam standard time.
Guatemala	Central America.						No standard time.
Guiana	South America						
British			3 45	slow	1 15	p. m.	
Dutch			3 40 35	slow	1 19 25	p. m.	
French		60° W.	4	slow	1	p. m.	Adopted Jan. 1, 1911.
Guinea	Africa						
French		15° W.	1	slow	4	p. m.	Adopted Jan. 1, 1912.
Portuguese		15° W.	1	slow	4	p. m.	
Hainan Island	China Sea	105° E.	7	fast	12	midnight	
Haiti, Republic of	West Indies	75° W.	5	slow	12	noon	
Halmahera Island	East Indies (120° E.).						No standard time.
Ternate		127° 30′ E.	8 30	fast	1 30	[1] a. m.	
Hawaiian Islands	North Pacific	157° 30′ W.	10 30	slow	6 30	a. m.	Hawaiian standard time.
Hebrides Islands	British Isles	0°	0		5	p. m.	
Honduras	Central America.	90° W.	6	slow	11	a. m.	
British Honduras		90° W.	6	slow	11	a. m.	
Hungary	Europe	15° E.	1	fast	6	p. m.	Central European time.
Iceland	North Atlantic	15° W.	1	slow	4	p. m.	

[1] The time noted is in the morning of the following day.

TABLE 2.—*Time compared with Greenwich mean time and Washington, D. C., noon*—Continued

Country	General location	Standard meridian	Time compared with Greenwich		Noon at Washington, D. C. (eastern standard time)		Remarks
			H. M. S.		H. M. S.		
India	Asia	82° 30′ E.	5 30	fast	10 30	p. m.	Indian standard time.
Calcutta			5 53 20.8	fast	10 53 20.8	p. m.	
Chattagong			6 07	fast	11 07	p. m.	
Ceylon		82° 30′ E.	5 30	fast	10 30	p. m.	Indian standard time.
French Establishments		82° 30′ E.	5 30	fast	10 30	p. m.	Adopted July 18, 1911.
Portuguese Goa		82° 30′ E.	5 30	fast	10 30	p. m.	Indian standard time.
Indo-China	Asia	105° E.	7	fast	12	midnight	Adopted May 1, 1931.
Iraq	do	45° E.	3	fast	8	p. m.	
Ireland	British Isles	0°	0		5	p. m.	Western European time.
Italy	Europe	15° E.	1	fast	6	p. m.	Central European time.
Ivory Coast	Africa	0°	0		5	p. m.	Adopted Jan. 1, 1911.
Jamaica	West Indies	75° W.	5	slow	12	noon	Adopted Feb. 1, 1912.
Jan Mayen Island	Arctic Ocean (10° W.).						No standard time.
Japanese Empire	Asia	135° E.	9	fast	2	[1] a. m.	Japanese standard time.
Korea (Chosen)		135° E.	9	fast	2	[1] a. m.	
Java	East Indies		7 20	fast	12 20	[1] a. m.	
Juan Fernandez Island	South Pacific	75° W.	5	slow	12	noon	
Karaginski Island	Bering Sea	165° E.	11	fast	4	[1] a. m.	
Kenya	Africa	37° 30′ E.	2 30	fast	7 30	p. m.	
Kodiak Island	Gulf of Alaska	150° W.	10	slow	7	a. m.	
Komandorski Islands	Bering Sea	165° E.	11	fast	4	[1] a. m.	
Kotelni Island	Arctic Ocean	135° E.	9	fast	2	[1] a. m.	
Kuril Islands	Japan	135° E.	9	fast	2	[1] a. m.	
Laccadive Islands	Indian Ocean	82° 30′ E.	5 30	fast	10 30	p. m.	
Latvia	Europe	30° E.	2	fast	7	p. m.	Eastern European time.
Liberia	Africa		0 44	slow	4 16	p. m.	
Libia	do	15° E.	1	fast	6	p. m.	
Liechtenstein	Europe	15° E.	1	fast	6	p. m.	Central European time.
Lithuania	do	15° E.	1	fast	6	p. m.	
Lombok Island	East Indies (115° E.).						No standard time.
Lord Howe Island	South Pacific	150° E.	10	fast	3	[1] a. m.	
Loyalty Islands	do	165° E.	11	fast	4	[1] a. m.	
Luxemberg	Europe	15° E.	1	fast	6	p. m.	Central European time.
Macao	China Sea	120° E.	8	fast	1	[1] a. m.	
Macquarie Island	Antarctic Ocean (160° E.).						No standard time.
Madagascar Island	Indian Ocean	45° E.	3	fast	8	p. m.	Adopted July 1, 1911.
Madeira Island	North Atlantic	15° W.	1	slow	4	p. m.	
Mahon Island	Mediterranean Sea.	0°	0		5	p. m.	
Malay States, Confederated.	Asia	105° E.	7	fast	12	midnight	
Maldive Islands	Indian Ocean		4 54	fast	9 54	p. m.	
Malta Island	Mediterranean Sea.	15° E.	1	fast	6	p. m.	
Marianas Islands	South Pacific	150° E.	10	fast	3	[1] a. m.	
Marquesas Islands	do	150° W.	10	slow	7	a. m.	
Marshall Islands	North Pacific	165° E.	11	fast	4	[1] a. m.	
Martinique Island	West Indies	60° W.	4	slow	1	p. m.	Adopted May 1, 1911.
Mauritania	Africa	15° W.	1	slow	4	p. m.	Adopted Jan. 1, 1912.
Mauritius Island	Indian Ocean	60° E.	4	fast	9	p. m.	

[1] The time noted is in the morning of the following day.

TABLE 2.—*Time compared with Greenwich mean time and Washington, D. C., noon*—Continued

Country	General location	Standard meridian	Time compared with Greenwich	Noon at Washington, D. C. (eastern standard time)	Remarks
			H. M. S.	H. M. S.	
Mexico (except Lower California north of 28°), Lower California (north of 28° N.).	Central America.	90° W.	6 slow	11 a. m.	Adopted Apr. 1, 1932.
		120° W.	8 slow	9 a. m.	
Miquelon Island	Gulf of St. Lawrence.	60° W.	4 slow	1 p. m.	Adopted May 15, 1911. Atlantic standard time.
Monaco	Europe	0°	0	5 p. m.	Western European time.
Mono Island	East Indies (155° E.)				No Standard time.
Morocco	Africa	0°	0	5 p. m.	
Mozambique	do	30° E.	2 fast	7 p. m.	
Nauru Island	South Pacific	165° E.	11 fast	4 [1] a. m.	
Netherlands	Europe		0 19 32.1 fast	5 19 32.1 p. m.	Amsterdam time.
New Britain Island	East Indies	150° E.	10 fast	3 [1] a. m.	
New Caledonia Island	South Pacific	165° E.	11 fast	4 [1] a. m.	Adopted Jan. 13, 1912.
New Guinea Island	East Indies (140° E.).				
Western part					No standard time.
Eastern part: New Guinea, Papua		150° E.	10 fast	3 [1] a. m.	
New Hebrides Islands	South Pacific	165° E.	11 fast	4 [1] a. m.	Adopted Jan. 13, 1912.
New Ireland	East Indies	150° E.	10 fast	3 [1] a. m.	
New Siberia Island	Arctic Ocean	150° E.	10 fast	3 [1] a. m.	
New Zealand	South Pacific	172° 30′ E.	11 30 fast	4 30 [1] a. m.	
Nicaragua	Central America.		5 45 10 slow	11 14 50 a. m.	Managua time.
Nicobar Islands	Indian Ocean	97° 30′ E.	6 30 fast	11 30 p. m.	
Nigeria	Africa	15° E.	1 fast	6 p. m.	Adopted Sept. 1, 1919.
Niger Territory					
Western	do	0°	0	5 p. m.	Adopted Jan. 1, 1912.
Eastern		15° E.	1 fast	6 p. m.	
Norfolk Island	South Pacific		11 12 fast	4 12 [1] a. m.	
Norway	Europe	15° E.	1 fast	6 p. m.	Central European time.
Nova Zembla Island	Arctic Ocean	60° E.	4 fast	9 p. m.	
Nunivak Island	Bering Sea	165° W.	11 slow	6 a. m.	
Nyasaland	Africa	30° E.	2 fast	7 p. m.	
Oceania, French	South Pacific	150° W.	10 slow	7 a. m.	Adopted Oct. 1, 1912.
Ogasawara Island	Japan	135° E.	9 fast	2 [1] a. m.	
Orkney Islands	British Isles	0°	0	5 p. m.	
Palau Island	East Indies	135° E.	9 fast	2 [1] a. m.	
Palestine	Asia	30° E.	2 fast	7 p. m.	
Palma Island	Mediterranean Sea.	0°	0	5 p. m.	
Panama	Central America.	75° W.	5 slow	12 noon	
Canal Zone		75° W.	5 slow	12 noon	Eastern standard time.
Paraguay	South America		3 37 12 slow	1 22 48 p. m.	Asuncion time.
Persia	Asia (55° E.)				No standard time.
Peru	South America	75° W.	5 slow	12 noon	
Philippine Islands	China Sea	120° E.	8 fast	1 [1] a. m.	Philippine standard time.

[1] The time noted is in the morning of the following day.

TABLE 2.—*Time compared with Greenwich mean time and Washington, D. C., noon*—Continued

Country	General location	Standard meridian	Time compared with Greenwich	Noon at Washington, D. C. (eastern standard time)	Remarks
			H. M. S.	H. M. S.	
Poland	Europe	15° E.	1 fast	6 p. m.	Central European time Adopted Sept. 16, 1919.
Portugal	Europe	0°	0	5 p. m.	Western European time. Adopted Jan. 1, 1912.
Pribilof Islands	Bering Sea	165° W.	11 slow	6 a. m.	
Principe Island	South Atlantic	0°	0	5 p. m.	
Puerto Rico	West Indies	60° W.	4 slow	1 p. m.	Puerto Rican standard time.
Queen Charlotte Islands	Gulf of Alaska	120° W.	8 slow	9 a. m.	
Raratonga Island	South Pacific		10 38 slow	6 22 a. m.	
Reunion Island	Indian Ocean	60° E.	4 fast	9 p. m.	Adopted June 1, 1911.
Rhodes Island	Mediterranean Sea.	30° E.	2 fast	7 p. m.	Eastern European time.
Rhodesia	Africa	30° E.	2 fast	7 p. m.	
Rio de Oro	do	15° W.	1 slow	4 p. m.	
Rio Muni	do	0°	0°	5 p. m.	
Rumania	Europe	15° E.	1 fast	6 p. m.	
Sakhalin Island	Sea of Japan	135° E.	9 fast	2 [1] a. m.	Japanese standard time.
Samoa Islands	South Pacific				
Eastern		165° W.	11 slow	6 a. m.	
Western		172° 30′ W.	11 30 slow	5 30 a. m.	
Sandalwood Island	East Indies (120° E.).				No standard time.
Sandwich Islands	South Atlantic (25° W.).				Do.
Sardinia Island	Mediterranean Sea.	15° E.	1 fast	6 p. m.	
Savage Island	South Pacific		11 20 slow	5 40 a. m.	
Scotland	British Isles	0°	0	5 p. m.	Western European time.
Senegal	Africa	15° W.	1 slow	4 p. m.	Adopted Jan. 1, 1912.
Seychelles Islands	Indian Ocean	60° E.	4 fast	9 p. m.	
Shetland Islands	British Isles	0°	0	5 p. m.	Western European time.
Siam	Asia	105° E.	7 fast	12 midnight.	Adopted Apr. 1, 1920.
Sicily Island	Mediterranean Sea.	15° E.	1 fast	6 p. m.	Central European time.
Sierra Leone	Africa	15° W.	1 slow	4 p. m.	
Sokotra Island	Arabian Sea	45° E.	3 fast	8 p. m.	
Solomon Islands	South Pacific (160° E.).				No standard time.
Somaliland	Africa				
British			2 59 54 fast	7 59 54 p. m.	Aden time.
French coast		45° E.	3 fast	8 p. m.	Adopted July 1, 1911.
Italian		45° E.	3 fast	8 p. m.	
South Georgia Islands	South Atlantic		2 07 slow	2 53 p. m.	
South Orkney Islands	South Atlantic (45° W.).				No standard time.
South Shetland Islands	South Atlantic (60° W.).				Do.
Southwest Africa	Africa	30° E.	2 fast	7 p. m.	
Soviet Union (U. S. S. R.)	Europe and Asia				
Central Black Soil Area (western)					
Crimean S. S. R.					
Ivanovo Industrial Area (western)					
Karelian S. S. R.		30° E.	2 fast	7 p. m.	
Kola Peninsula					
Leningrad Area					
Moldavian S. S. R.					
Moscow Industrial Area					

[1] The time noted is in morning of the following day.

TABLE 2.—*Time compared with Greenwich mean time and Washington, D. C., noon*—Continued

Country	General location	Standard meridian	Time compared with Greenwich	Noon at Washington, D. C. (eastern standard time)	Remarks
			H. M. S.	H. M. S.	
Soviet Union—Contd.					
Northern Area (western).					
Ukrainian S. S. R.		30° E.	2 fast	7 p. m.	
Western Area					
White Russian S. S. R.					
Abkhasian S. S. R.					
Adzharsk S. S. R.					
Armenian S. S. R.					
Azerbaidjan S. S. R.					
Bashkirian S. S. R. (western).					
Central Black Soil Area (eastern).					
Chuvash S. S. R.					
Daghestan S. S. R.					
Georgian S. S. R.					
German Volga S. S. R.					
Ivanovo Industrial Area (eastern).					
Kalmyk Area		45° E.	3 fast	8 p. m.	
Kazak S. S. R. (western)					
Lower Volga Area					
Mari Area					
Middle Volga Area					
Nakhichevan S. S. R.					
Nizhni-Novgorod Area					
North Caucasian Area					
Northern Area (central)					
Tatar S. S. R.					
Tvanovo Industrial Area (eastern).					
Ural Area (western)					
Votiak Area					
Zyryan Area (western)					
Badakhshansk Area					
Bashkir S. S. R. (eastern).					
Kara Kalpak Area					
Kazak S. S. R. (central)					
Middle Volga Area (southeastern).					
Northern Area (northeastern).		60° E.	4 fast	9 p. m.	
Tadzhik S. S. R.					
Turkmen S. S. R.					
Ural Area (central)					
Uzbek S. S. R.					
Zyryan Area (eastern)					
Kazak S. S. R. (eastern)					
Kirghiz S. S. R.					
Siberian Area (western)		75° E.	5 fast	10 p. m.	
Ural Area (eastern)					
Yamal Peninsula					
Oyrat Area		90° E.	6 fast	11 p. m.	
Siberian Area (central)					
Mongolo-Buryat S. S. R.					
Siberian Area (eastern)					
Yakutsk S. S. R. (western).		105° E.	7 fast	12 midnight	
Far Eastern Area (western).					
Siberian Area (southeastern).		120° E.	8 fast	1 [1] a. m.	
Yakutsk S. S. R. (west central).					
Far Eastern Area (west central).					
Sakhalin Island		135° E.	9 fast	2 [1] a. m.	
Yakutsk S. S. R. (central).					

[1] The time noted is in the morning of the following day.

TABLE 2.—*Time compared with Greenwich mean time and Washington, D. C., noon*—Continued

Country	General location	Standard meridian	Time compared with Greenwich	Noon at Washington, D. C. (eastern standard time)	Remarks
			H. M. S.	H. M. S.	
Soviet Union—Contd.					
Far Eastern Area (central).					
Yakutsk S. S. R. (east central).		150° E.	10 fast	3 [1] a. m.	
Far Eastern Area (east central).					
Kamchatka		165° E.	11 fast	4 [1] a. m.	
Yakutsk S. S. R. (eastern).					
Far Eastern Area (eastern).		180° E.	12 fast	5 [1] a. m.	
Spain	Europe	0°	0	5 p. m.	Western European time. Adopted Jan. 1, 1901.
Spitzbergen	Arctic Ocean (15° E.).				No standard time.
Santa Cruz Islands	South Pacific	165° E.	11 fast	4 [1] a. m.	
Staten Island	South Atlantic	60° W.	4 slow	1 p. m.	
St. Croix Island	West Indies	60° W.	4 slow	1 p. m.	
St. Helena Island	South Atlantic		0 23 slow	4 37 p. m.	
St. Lawrence Island	Bering Sea	165° W.	11 slow	6 a. m.	
St. Lucia Island	West Indies	60° W.	4 slow	1 p. m.	
St. Matthew Island	Bering Sea	165° W.	11 slow	6 a. m.	
St. Miguel Island	North Atlantic	30° W.	2 slow	3 p. m.	
St. Thomas Island (Sao Thome).	South Atlantic	0°	0	5 p. m.	
St. Thomas Island	West Indies	60° W.	4 slow	1 p. m.	
St. Vincent Island	do	60° W.	4 slow	1 p. m.	
Straits Settlements	Asia	105° E.	7 fast	12 midnight	
Sudan	Africa				
Anglo-Egyptian		30° E.	2 fast	7 p. m.	
French:					
Eastern		0°	0	5 p. m.	
Western		15° W.	1 slow	4 p. m.	
Sumatra	East Indies (100° E.).				Do.
Benkalis		97° 30′ E.	6 30 fast	11 30 p. m.	
Benkulen			7 20 fast	12 20 [1] a. m.	
Emma Harbor			6 42 fast	11 42 p. m.	
Muntok			7 20 fast	12 20 [1] a. m.	
Padang			6 42 fast	11 42 p. m.	
Sweden	Europe	15° E.	1 fast	6 p. m.	Central European time.
Switzerland	do	15° E.	1 fast	6 p. m.	Do.
Syria	Asia	30° E.	2 fast	7 p. m.	
Tanganyika	Africa	45° E.	3 fast	8 p. m.	
Tasmania	Australia	150° E.	10 fast	3 [1] a. m.	
Thaddaeus Island	Arctic Ocean	150° E.	10 fast	3 [1] a. m.	
Timor Island	East Indies	120° E.	8 fast	1 [1] a. m.	
Kupang			8 15 fast	1 15 [1] a. m.	
Timor Laut	East Indies (135° E.).				No standard time.
Togoland	Africa	0°	0	5 p. m.	
Tonga Islands	South Pacific		12 20 fast	5 20 [1] a. m.	
Trinidad, British	West Indies	60° W.	4 slow	1 p. m.	
Tripolitania	Africa	15° E.	1 fast	6 p. m.	
Tuamotu Archipelago	South Pacific	150° W.	10 slow	7 a. m.	
Tunisia	Africa	15° E.	1 fast	6 p. m.	Adopted Apr. 12, 1911.
Turkey	Europe and Asia	30° E.	2 fast	7 p. m.	Eastern European time.
Ubangi Shari	Africa	15° E.	1 fast	6 p. m.	
Uganda	do	37° 30′ E.	2 30 fast	7 30 p. m.	
Union of South Africa	do				
Cape Colony					
Natal					
Orange Free State		30° E.	2 fast	7 p. m.	
Transvaal					

[1] The time noted is in the morning of the following day.

TABLE 2.—*Time compared with Greenwich mean time and Washington, D. C., noon*—Continued

Country	General location	Standard meridian	Time compared with Greenwich	Noon at Washington, D. C. (eastern standard time)	Remarks
			H. M. S.	H. M. S.	
United States of America	North America				
Eastern		75° W.	5 slow	12 noon	
Central		90° W.	6 slow	11 a. m.	
Mountain		105° W.	7 slow	10 a. m.	
Pacific		120° W.	8 slow	9 a. m.	
Uruguay	South America	52° 30′ W.	3 30 slow	1 30 p. m.	
Venezuela	do	67° 30′ W.	4 30 slow	12 30 p. m.	
Virgin Islands	West Indies	60° W.	4 slow	1 p. m.	
Volcano Islands	Japanese Sea	135° E.	9 fast	2 [1] a. m.	
Wales	British Isles	0°	0	5 p. m.	Western European time.
Wrangell Island	Arctic Ocean	180° E.	12 fast	5 [1] a. m.	
Yap Island	Japanese Sea	135° E.	9 fast	2 [1] a. m.	
Yugoslavia	Europe	15° E.	1 fast	6 p. m.	Central European time.
Zanzibar Island	Indian Ocean	45° E.	3 fast	8 p. m.	

[1] The time noted is in the morning of the following day.

VI. SOURCES OF INFORMATION

In compiling the material given in this circular, much valuable information was derived from the following sources:

Annuaire de Bureau des Longitudes, France, 1892–1931.

British Hydrographic Office Map—Time Zone Map of the World.

Guide Book to Soviet Union, 1928, by A. Rado.

Geographic News Bulletin No. 2, February 21, 1931, United States Bureau of Foreign and Domestic Commerce.

United States Hydrographic Office Map 5192, August, 1931—Time Zone Map of the World.

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VII. OTHER GOVERNMENT PUBLICATIONS ON STANDARD TIME

The following Government publications are available at the prices quoted.

Bureau of Standards Miscellaneous 84, Standard Time Conversion Chart. 10 cents.

Bureau of Standards Miscellaneous 111, Time Zone Map of the United States. 10 cents.

These may be secured from the Superintendent of Documents, Government Printing Office, Washington, D. C.

The following map may be purchased from the Hydrographic Office of the Navy Department, Washington, D. C., for 50 cents.

Time Zone Chart of The World. No. 5192.

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