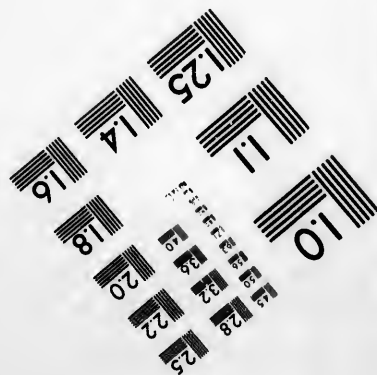
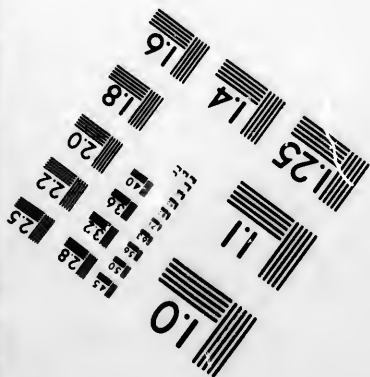
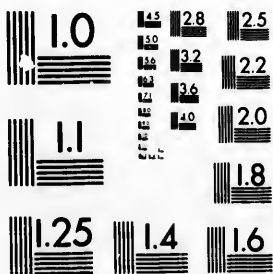


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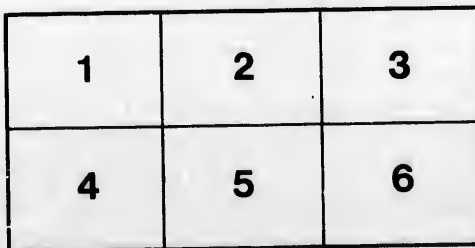
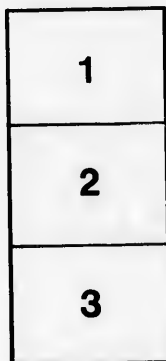
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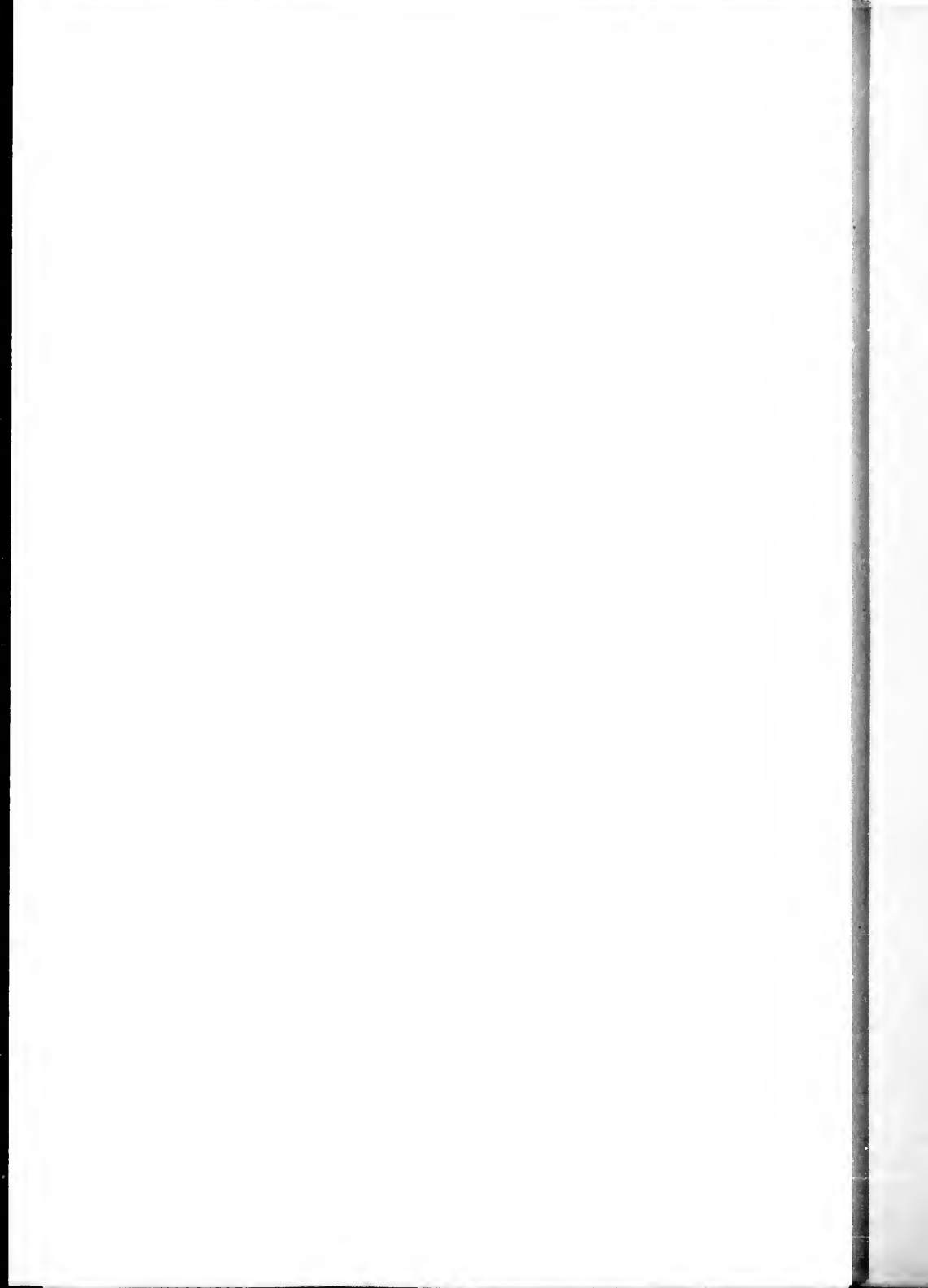
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## ANNUAL REPORT OF THE SPECIAL COMMITTEE ON UNIFORM STANDARD TIME.

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PRESENTED JANUARY 21st, 1891.

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The Special Committee on Uniform Standard Time begs leave to report:

In the last annual report of the Committee it was brought to the notice of the Society that the Government of the United States had not taken any action on the resolutions and recommendations of the International Conference, held in Washington in 1884, and that as Standard Time, so universally adopted in civil life throughout North America, is in complete accord with the resolutions of the Conference, it would be in the public interests to have the recommendations authoritatively recognized by Act of Congress. The suggestions of the Committee having been accepted at the annual meeting, it was considered advisable to ascertain the views of the members generally. The Board of Direction accordingly submitted to letter-ballot the draft of a memorial, representing to the Government of the United States:

*First.*—That, in the opinion of this Society it would be in the general interests of the United States to accept formally the resolutions of the International Conference, held at Washington in 1884.

*Second.*—That, in the opinion of this Society, it would be in the general interests to legalize, by Act of Congress, the now common system of regulating time-reckoning by hour meridians.

*Third.*—That, in the opinion of this Society, it would be in the general interests to embrace in an Act of Congress a permissive clause, authorizing and legalizing the use of the 24-hour notation.

It was decided by letter-ballot on March 5th that the memorial should be adopted—226 voting “yea,” 7 voting “nay”; the majority in favor being 219. The memorial has since been duly forwarded to Washington and presented to the President of the United States, and to both Houses. A bill has likewise been prepared in accordance with the terms of the memorial, having in view the desired legislation. This bill has been presented and referred to committees in both Houses. A printed copy of the Senate Bill is appended hereto. (See Appendix No. 1.)

At the last annual meeting the Committee submitted a detailed statement establishing that a majority of the railway managers in the United States and Canada were in favor of the 24-hour notation. Evidence has since been received from officers of railways not before heard from, and the Committee is now enabled to report that the total number of railway authorities who have communicated directly with the Society,

1891  
(47)  
C. 2

expressing themselves in favor of the proposed change to the 24-hour notation of time, is as follows, viz.:

|  |       |
|--|-------|
| 1. Presidents, Vice-Presidents and General Managers .. | 135   |
| 2. General Superintendents.....                        | 77    |
| 3. Superintendents.....                                | 114   |
| 4. General Traffic Managers.....                       | 12    |
| 5. Engineers.....                                      | 65    |
|  | <hr/> |
| Total.....   | 403   |

The aggregate length of railway with which these officers are connected is estimated at about 140 000 miles. A list, revised up to the present date, of railway managers in favor of the new notation of time is appended. (See Appendix No. 2.)

From these facts it is plain that the proposal to adopt the 24-hour notation in the working of railways on this continent, meets with general concurrence, and obviously what is required on the part of those who are responsible for the administration of the railway service of the country, to effect the desired change, is to act in accord, and by joint arrangement to fix upon some date when the new notation may be brought into general use for railway purposes. The Committee therefore respectfully recommends that the question of change, together with evidence of the harmony of opinion which prevails, be brought by this Society in a formal manner to the attention of the General Time Convention and the Board of Railway Presidents at their next periodical meetings.

The advantages of the 24-hour notation are beginning to be recognized in various branches of civil life. In hospitals, for example, to prevent mistakes by nurses in the administration of medicine, in recording temperatures, and in other matters, the new system is being gradually introduced; also in weather tables and in the recording of meteorological readings; indeed in departments where simplicity of system and accuracy is essential the new notation is being spontaneously brought into use in many quarters. For two or three years back the Canadian Almanac has abandoned the old notation and substituted the new. It is in connection with railway service, however, that the general introduction of the 24-hour notation may mainly be looked for, and the Committee cannot doubt that, thus brought into use, the intelligence of the community will welcome the change; the ready acceptance of "Standard Time" by the general public throughout the United States and Canada, directly on its adoption by the railway authorities, seven years ago, may be instanced. Although it cannot be expected that the 24-hour notation will so speedily come into common use, there are grounds for the belief that eventually it will prevail and become universal.

The Committee has the satisfaction to report that a communication has been received from the Director-General of Railways in India,

which gives official announcement of the fact that the 24-hour notation has recently come into use on all the railways throughout the Indian Empire, and that this result is partly in consequence of the satisfactory trial of the new system on some of the lines during the past few years.

The Committee has received the strongest assurances from all quarters that wherever the new notation has been adopted in the working of railways, it continues to give increased satisfaction. Experience has shown that the change can be effected with great ease, absolute safety and without creating any disturbing influence in any direction. When your Committee reported a year ago, the 24-hour notation was then in use on less than 4 000 miles of railway. It has now been permanently adopted on an aggregate length exceeding 20 000 miles.

The time-reform movement has for some years attracted much attention in Austria, Hungary, Germany, Italy, France and Belgium, and there is every prospect of the principle of Standard Time being adopted throughout Central Europe at an early day.

An official correspondence has been placed in the possession of the Committee which establishes that the British Government has taken steps which will tend to promote the general adoption of Standard Time and the 24-hour notation in all the British possessions. This correspondence can scarcely fail to be of interest to every member of this Society, inasmuch as we learn by it that the reform in time-reckoning which the American Society of Civil Engineers has taken a leading part in bringing to its present satisfactory condition, meets with the approval and hearty recommendation of the highest scientific authorities in the service of the British Government. The committee in England which has so favorably reported on the universal adoption of Standard Time and the 24-hour notation, consists of the Astronomer Royal, the Superintendent of the Nautical Almanac, the Hydrographer to the Admiralty, and the Secretary of the Science and Art Department, South Kensington, together with Professor Adams and General Strachey, both of whom were delegates at the Washington Conference of 1884.

A memorandum, prepared by a member of the Special Committee on Uniform Standard Time, setting forth the principles of time-reckoning long advocated by this Society, has been endorsed by these distinguished men, and recently has been sent by the British Government to the governments of all the British possessions around the globe, with a view to the adoption of Standard Time generally and of the 24-hour notation for railway time-tables. The railway companies of England, Ireland and Scotland have likewise been recommended to adopt the 24-hour notation. A copy of this document with its accompanying map is appended hereto. (See Appendix No. 3.)

In concluding this report, the Committee feels that it is not out of place to remark that, as the Members of this Society have in an important manner been associated with the construction of the great artificial



highways of commerce on this continent, it was eminently fit and proper that the American Society of Civil Engineers should take a prominent part in promoting a reform in time-reckoning, and in advancing a movement calculated to render the railway system more perfect, its administration more simple, and the railway service more safe to the general public. The Committee feels warranted in pointing out that the important results already secured are in a great measure attributable to the support and countenance given to the movement from the first days of its inception by this Society. It must likewise be obvious that the advantages yet to result will not be confined to the United States, to Canada or to this continent; that the beneficial influence of the American Society of Civil Engineers, in connection with a much-needed reform, which concerns all persons every moment of their lives, will be felt eventually in every civilized country.

This Committee was first appointed at the Convention of the Society held in Montreal in June, 1881. During these (nearly) ten years it has been the earnest endeavor of the members of the Committee to carry out the instructions with which they have from time to time been charged, and they trust they may be permitted to express the satisfaction felt by them with regard to the results so far accomplished. There only remains to complete the labors of the Committee the general introduction of the 24-hour notation throughout this country. There is a reasonable expectation that the reform is now on the eve of adoption in connection with the railways of the United States and Canada, and as that event would practically complete the object for which the Committee was originally appointed, they respectfully submit that the Committee may then with propriety be discharged.

The Committee avail themselves of this opportunity to express their deeply-felt thanks for the confidence which has invariably been reposed in them year by year.

Respectfully submitted,

SANDFORD FLEMING, *Chairman.*

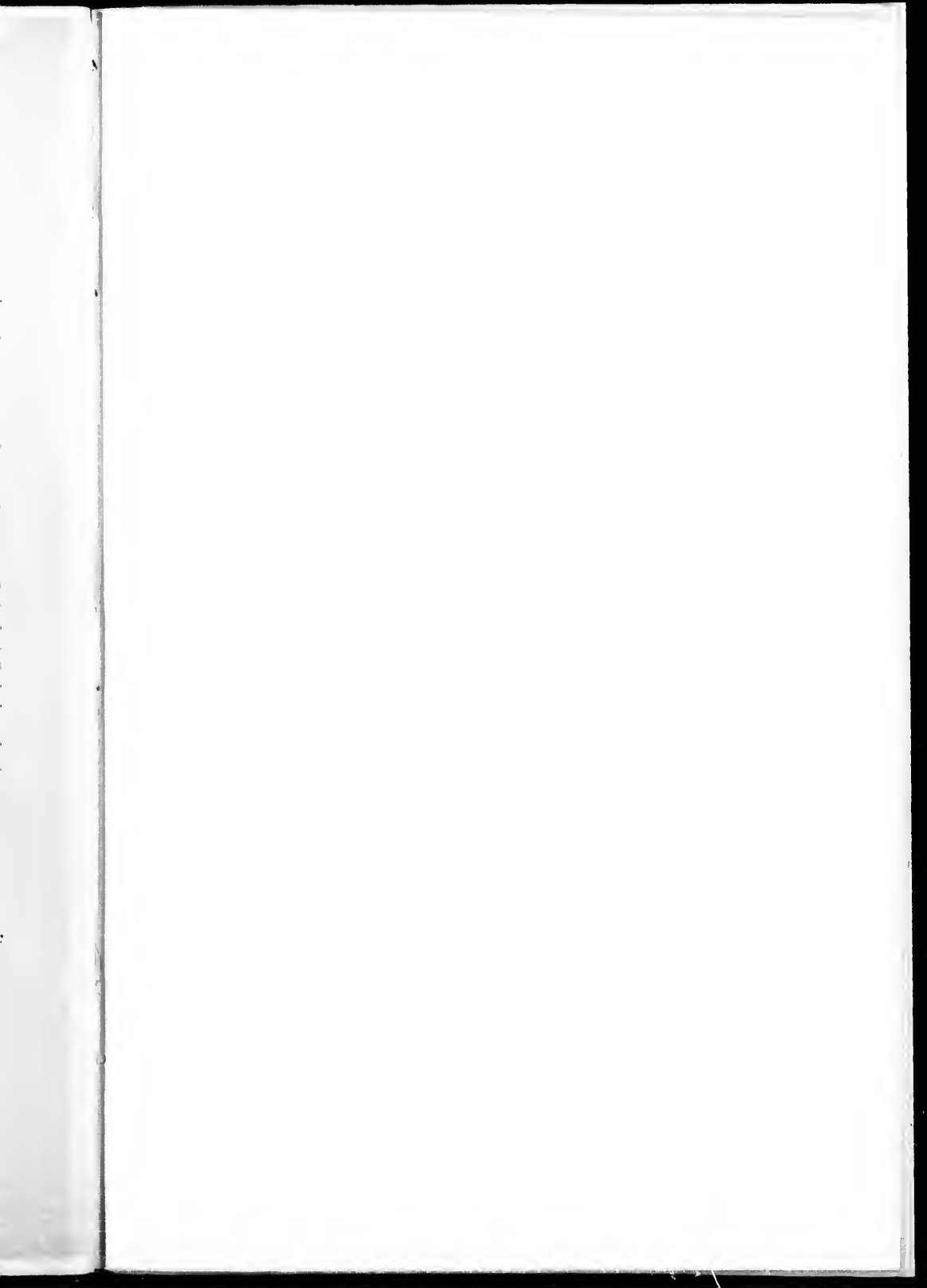
CHARLES PAINE,

THOMAS EGLESTON,

JOHN M. TOUCEY,

*Members of Committee.*

Approved, William P. Shinn, President of the Society, *ex-officio* member of the Committee.





## APPENDIX No. 1.

51ST CONGRESS,  
2D SESSION.

S. 4879.

## IN THE SENATE OF THE UNITED STATES.

JANUARY 16, 1891.

Mr. EVARTS introduced the following bill; which was read twice and referred to the Committee on the Judiciary.

## A BILL

Respecting the reckoning of time throughout the United States.

Whereas an act was passed in eighteen hundred and eighty-two to authorize the President of the United States to call an international conference to fix on and recommend for universal adoption a common prime meridian, to be used in the reckoning of longitude and in the regulation of time throughout the world; and

Whereas in pursuance of the said act a conference was held at Washington in eighteen hundred and eighty-four, at which twenty-six nations were represented by delegates duly appointed; and

Whereas the said conference, after prolonged deliberation, with substantial unanimity passed resolutions embodying the principles which should govern in the measurement and notation of time, and recommended the meridian passing through the observatory at Greenwich, England, as a prime meridian for all nations; and

Whereas the "hour meridian system," commonly called standard time, now in general use in the United States, is in accordance with the said resolutions and is based on the said prime meridian as an initial standard and has been found to be much to the advantage of interstate commerce; and

Whereas, since the general adoption throughout the United States of the mode of reckoning known as standard time, doubts have arisen as to the reckoning which has force in law, and it is expedient to remove all such doubts: Therefore,

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That time throughout the United States shall be reckoned in accordance with the hour meridian system, commonly called standard time, and the prime meridian recommended by the Washington International Conference of eighteen hundred and eighty-four shall be the initial standard for reckoning time; and the meridians which are a multiple*

of fifteen degrees from the prime meridian shall be the hour meridians or substandards by which the local reckoning of time shall be regulated; and the reckoning of time throughout the United States shall be in agreement with the reckoning of civil time on the prime meridian, excepting only with respect to the commencement of the day and the notation of the hours, which shall be as hereinafter provided; in all other respects the division and subdivision of the day into hours, minutes, and seconds in the United States shall be synchronous with the divisions and subdivisions of the day on the prime meridian.

SEC. 2. That the commencement of the day and the notation of the hours in different time sections of the United States shall differ from the commencement of the civil day and the notation of the hours on the prime meridian as follows:

(a) In the time sections where the reckoning of time is regulated by hour meridian number seventeen, or the substandard meridian which is seventy-five degrees west longitude, the reckoning shall be five hours behind the reckoning on the prime meridian.

(b) In the time section where the reckoning of time is regulated by hour meridian number eighteen, or the substandard meridian which is ninety degrees west longitude, the reckoning shall be six hours behind the reckoning on the prime meridian.

(c) In the time sections where the reckoning of time is regulated by hour meridian number nineteen, or the substandard meridian which is one hundred and five degrees west longitude, the reckoning shall be seven hours behind the reckoning on the prime meridian.

(d) In the time section where the reckoning of time is regulated by hour meridian number twenty, or the substandard meridian which is one hundred and twenty degrees west longitude, the reckoning shall be eight hours behind the reckoning on the prime meridian.

SEC. 3. That the time sections referred to in section two of this act embrace the country on each side of and contiguous to the substandard meridians therein mentioned; but it shall be competent for the constituted authorities of any State, city, incorporated towns or villages, or by the commissioner or courts of any county to adopt the substandard by which to reckon time, as shall seem to them most convenient, and such standard shall be legal and shall be recognized by the courts and officials of the United States; and the time for judicial, municipal, registration, or other purposes in any locality shall, unless otherwise specified, be held to be according to the reckoning so adopted and commonly used by the inhabitants of such locality.

SEC. 4. That the hours of the day may, in any locality, be numbered in a single series of numbers, from zero to twenty-four, and this method of designating the hours, commonly known as "the 'twenty-four hour notation,'" shall be equally valid with that of numbering the hours in two series of twelve hours each, distinguished as ante-meridian and post-meridian hours.

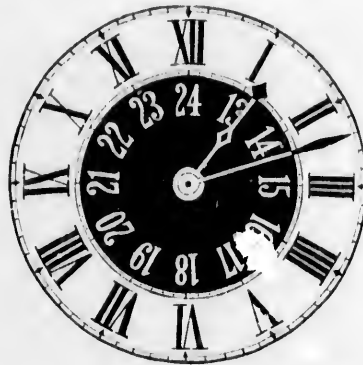
SEC. 5. That this act shall come into force on \_\_\_\_\_, anno Domini, eighteen hundred and ninety-one.

APPENDIX No. 2.

RAILWAY MANAGERS IN FAVOR

-- OF THE --

NEW NOTATION OF TIME.



The following is a list of railway men who have sent replies favoring the adoption of the 24-hour notation as soon as a considerable majority of railway authorities assent :

THE LIST COMPRISES :

|  |           |
|--|-----------|
| Presidents, Vice-Presidents and General Managers.... | 135       |
| General Superintendents .....                        | 77        |
| Superintendents.....                                 | 114       |
| Chief Engineers.....                                 | 65        |
| General Traffic Managers.....                        | 12        |
| Total.....   | <hr/> 403 |

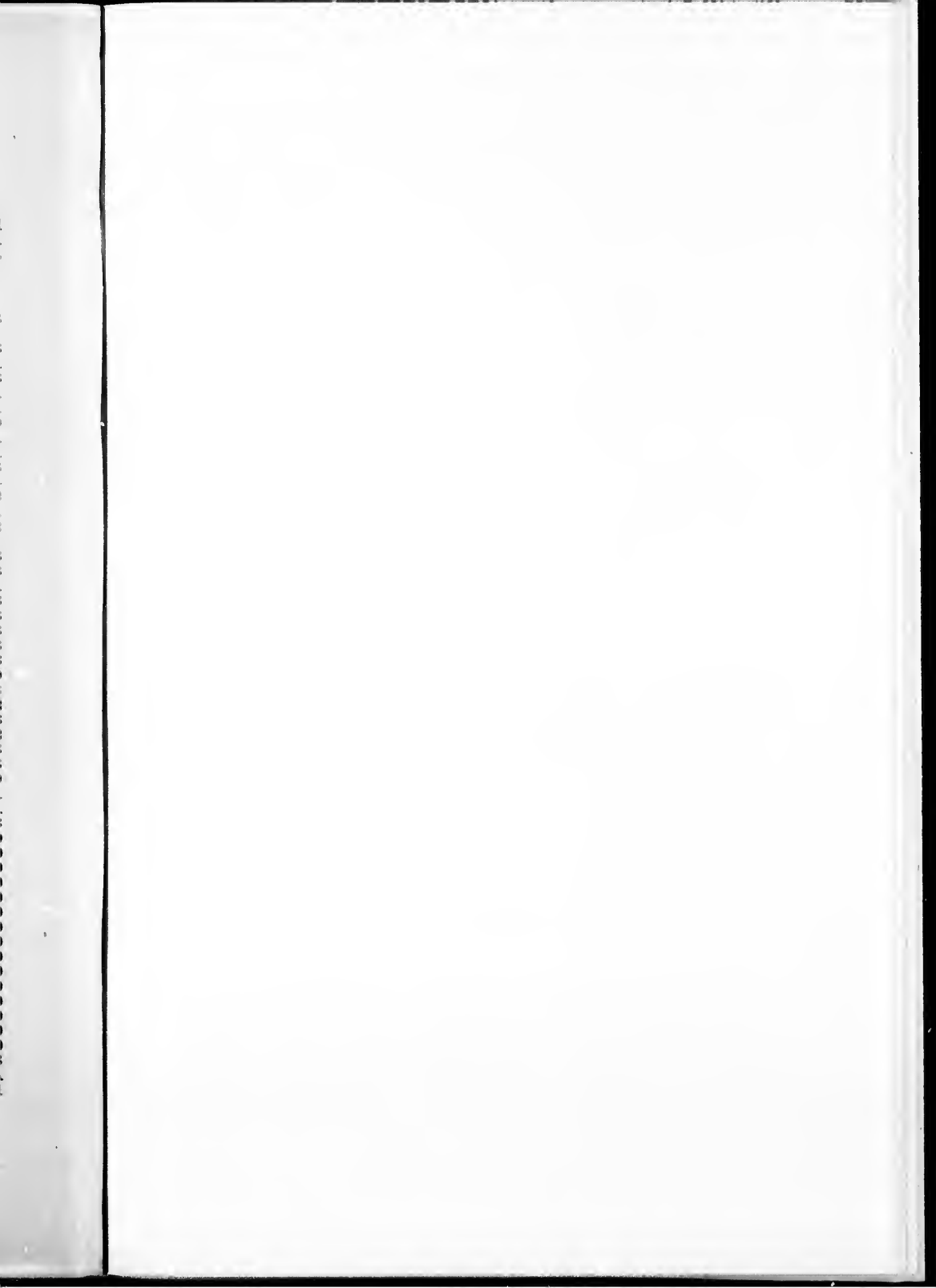
A large number of prominent persons not connected with railways have also sent replies in favor of the new time notation. Only an exceedingly small percentage of all heard from in every quarter have expressed an opinion unfavorable to the change.

It has been suggested that the change should be effected simultaneously on all railways six months after an agreed date, which date may be chosen by the General Time Convention and the Board of Railway Presidents.

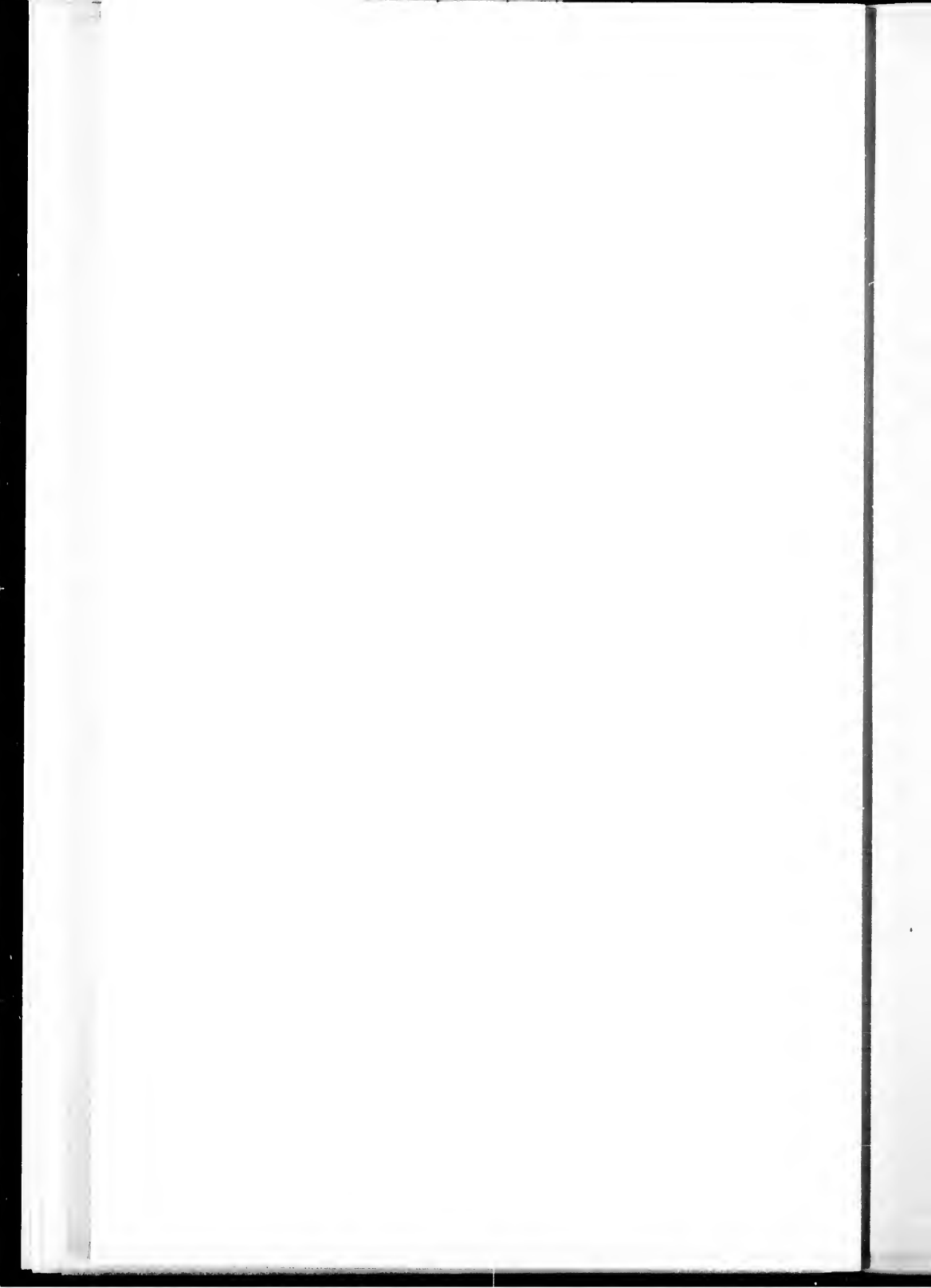
(List corrected up to January, 1891.)

NOTE.—The years given in the last column indicate the time suggested for effecting the change, in some of the replies received in 1889. The letter A in last column refers to list published in August, 1889; the letter B to list published in January, 1887; the letter C to list published in 1884.

|                                 |                   |                     |      |
|---------------------------------|-------------------|---------------------|------|
| Adirondack                      | C. E. Durkee      | Supt                | B    |
| Alabama Midland                 | C. M. Craig       | Asst. Engr.         | 1891 |
| Adirondack Valley               | David McCargo     | Gen. Supt.          | B    |
| Arkansas Valley                 | H. Wood           | Gen. Supt.          | A    |
| Atchison, Topeka & Santa Fé     | A. A. Robinson    | Gen. Man.           | B    |
| Atchison, Topeka & Santa Fé     | D. I. Chase       | Gen. Man.           | A    |
| Atchison, Topeka & Santa Fé     | Avery Turner      | Supt.               | 1891 |
| Atchison, Topeka & Santa Fé     | H. V. Hinckley    | Off. Engr.          | 1890 |
| Atlantic Coast Line, Rich. Div. | H. Walters        | Gen. Supt.          | A    |
| Atlantic Coast Line, Char. Div. | John F. Divine    | Gen. Supt.          | A    |
| Atlantic & N. Carolina          | W. Dunn           | Supt.               | B    |
| Atlantic & Pacific              | S. W. Robinson    | Eng. Brdgs.         | —    |
| Baltimore & Ohio                | S. Spencer        | V. Pres.            | C    |
| Baltimore & Ohio                | G. B. Hazlehurst  | Eng. Brdgs.         | 1891 |
| Baltimore & Ohio                | James G. Dagon    | Supt. Brdgs.        | 1892 |
| Beech Creek                     | A. G. Palmer      | Supt.               | 1891 |
| Belair, Zanesville & Cincinnati | W. R. Compton     | Gen. Man.           | B    |
| Bennington & Rutland            | F. C. White       | Gen. Supt.          | B    |
| Boston, Hoosac Tunnel & West    | C. A. Coombs      | Gen. Man.           | A    |
| Boston, Hoosac Tunnel & West    | Chas. H. Covy     | Supt.               | B    |
| Boston, Barre & Gardner         | H. H. Marshall    | Supt. & Tr. Man.    | B    |
| Boston & Lowell                 | C. S. Metten      | Gen. Supt.          | B    |
| Boston & Providence             | Albert A. Folsom  | Supt.               | B    |
| Boston, R. Beach & Lynn         | C. A. Hammond     | Supt.               | B    |
| Brazos & Northern               | G. Y. Wisner      | 2nd V. Pres.        | 1890 |
| Brooklyn, Bath & C. I.          | Geo. A. Gunter    | Gen. Man.           | B    |
| Brooklyn, Bath & West End       | John P. Heindell  | Gen. Supt.          | 1892 |
| Brunswick & Western             | H. S. Morse       | Gen. Man.           | B    |
| Buffalo & Geneva                | Paul S. King      | Ch. Eng.            | 1892 |
| Buffalo, N. Y. & Phil.          | Geo. S. Gatchell  | Gen. Supt.          | B    |
| Buffalo, N. Y. & Phil.          | J. W. Watson      | Supt.               | B    |
| Buffalo, Rochester & Pittsburgh | G. W. Bartlett    | Gen. Supt.          | 1890 |
| Burlington, Cedar Rapids & N.   | Robert Williams   | V. P. & Supt.       | A    |
| Burlington, Cedar Rapids & W.   | C. J. Ives        | Gen. Supt.          | A    |
| California Southern Ry.         | J. N. Victor      | Supt.               | B    |
| Canadian Government             | C. Schreiber      | Gen. Man.           | 1890 |
| Canadian Government             | D. Pottinger      | Chief Supt.         | 1890 |
| Canadian Government             | P. S. Archibald   | Chief Eng.          | 1890 |
| Canadian Government             | J. E. Price       | Supt.               | 1890 |
| Canadian Government             | J. J. Wallace     | Supt.               | 1890 |
| Canadian Government             | A. R. Macdonald   | Supt.               | 1890 |
| Canadian Pacific                | W. C. Van Horne   | President.          | 1890 |
| Canadian Pacific                | T. G. Shaughnessy | Asst. Pres.         | 1890 |
| Canadian Pacific                | George Olds       | Gen. Tr. Man.       | 1890 |
| Canadian Pacific                | Henry Beaty       | Man. S. L.          | 1890 |
| Canadian Pacific                | T. A. Mackinnon   | G. Sup. O & A. Div. | 1890 |
| Canadian Pacific                | C. W. Spencer     | Gen. Supt. E. Div.  | 1890 |
| Canadian Pacific                | Wm. Whyte         | Gen. Supt. W. Div.  | 1890 |
| Canadian Pacific                | Harry Abbott      | Gen. Supt. P. Div.  | 1890 |
| Canadian Pacific                | W. T. Jennings    | Eng. & Man. Cons.   | 1890 |
| Cape Fear & Yadkin Valley       | J. S. Morrison    | Gen. Supt.          | B    |
| Cape Fear & Yadkin Valley       | J. W. Fry         | Gen. Supt.          | A    |
| Catasauqua & Fogelsville        | C. W. Chapman     | Supt. & Eng.        | 1891 |







|                                     |                          |                                 |      |
|-------------------------------------|--------------------------|---------------------------------|------|
| Central of Georgia.....             | M. S. Belknap.....       | Gen. Man.....                   | A    |
| Central of Georgia.....             | Wm. Rogers.....          | Gen. Supt.....                  | B    |
| Central of Georgia.....             | C. E. Marrin.....        | R. Master.....                  | 1892 |
| Central Iowa Ry.....                | D. P. Phelps.....        | Asst. Supt.....                 | B    |
| Central N. England & Western.....   | S. B. Opdyke, Jr.....    | Gen. Supt.....                  | 1890 |
| Central N. England & Western.....   | Geo. N. Merrill.....     | Res. Eng.....                   | 1890 |
| Central Pacific.....                | J. H. White.....         | Supt.....                       | B    |
| Central Vermont.....                | J. W. Hobart.....        | Gen. Man.....                   | B    |
| Central Vermont.....                | C. A. Converse.....      | Asst. Supt.....                 | B    |
| Central of New Jersey.....          | J. H. Olhausen.....      | Gen. Supt.....                  | —    |
| Charleston, Cin. & Chicago.....     | John F. Jones.....       | Supt. & Tr. Man.....            | —    |
| Charleston & Savannah.....          | C. S. Gadsden.....       | Gen. Supt.....                  | 1891 |
| Chattoro Ry.....                    | F. H. Oliphant.....      | Gen. Man.....                   | B    |
| Chesapeake & Ohio.....              | J. T. Harahan.....       | Gen. Man.....                   | 1891 |
| Chesapeake & Ohio.....              | H. D. Whitcomb.....      | Con. Eng.....                   | 1890 |
| Chesapeake & Ohio.....              | T. C. Eggleston.....     | Eng. M. W.....                  | 1891 |
| Chesapeake, Ohio & S. W.....        | J. L. Frazier.....       | Supt.....                       | B    |
| Chicago, Burlington & Northern..... | Geo. B. Harris.....      | Gen. Man.....                   | A    |
| Chicago, Burlington & Quincy.....   | J. Potter.....           | V. Pres.....                    | C    |
| Chicago, Burlington & Quincy.....   | F. Lawler.....           | Div. Eng.....                   | 1891 |
| Chicago, Fair. & Eau Claire.....    | G. A. Foster.....        | Asst. Gen. Man.....             | B    |
| Chicago & East Illinois.....        | O. S. Lyford.....        | V. P. & Gen. Man.....           | 1892 |
| Chicago & N. Michigan.....          | J. H. V. Agnew.....      | Gen. Supt.....                  | 1892 |
| Chicago & N. Western.....           | C. Palmer.....           | Supt. Bridges.....              | 1891 |
| Chicago, Santa Fé & Cal.....        | E. G. Nourse.....        | Asst. Eng.....                  | 1892 |
| Chicago, M. & St. Paul.....         | A. I. Earling.....       | Gen. Supt.....                  | 1891 |
| Chicago, M. & St. Paul.....         | L. B. Rock.....          | Supt.....                       | B    |
| Chicago, M. & St. Paul.....         | Onward Bates.....        | Supt. Bridges.....              | 1891 |
| Chicago, M. & St. Paul, W. Div..... | J. H. Lakey.....         | Supt.....                       | B    |
| Chicago & Atlantic.....             | J. H. Parsons.....       | Supt.....                       | A    |
| Chicago & Atlantic.....             | Fred. Broughton.....     | Gen. Man.....                   | A    |
| Chicago & Grand Trunk.....          | A. B. Atwater.....       | Supt.....                       | 1891 |
| Chicago & Grand Trunk.....          | W. H. Pettibone.....     | Supt.....                       | B    |
| Chicago & N. Western.....           | J. I. M. W. Whitman..... | Gen. Man., at 6 months' notice. |      |
| Chicago, Rock Island & Pacific..... | W. I. Allen.....         | Gen. Supt.....                  | 1892 |
| Chicago, Rock Island & Pacific..... | H. F. Royce.....         | Gen. Supt.....                  | A    |
| Chicago, Rock Island & Pacific..... | A. Kimball.....          | V. Pres.....                    | B    |
| Chicago, Rock Island & Pacific..... | R. H. Chamberlin.....    | Supt.....                       | B    |
| Chicago, St. Paul & Kansas.....     | John M. Eagan.....       | Gen. Man.....                   | 1891 |
| Chicago & West Indiana.....         | B. Thomas.....           | V. P. & Gen. Man.....           | 1890 |
| Chippewa Val. Ch. & W. Mich.....    | A. M. Nichols.....       | Gen. Supt.....                  | B    |
| Cincinnati, Ham. & Dayton.....      | C. C. Waite.....         | V. Pres.....                    | B    |
| Cincinnati, Jackson & Wash.....     | R. W. Buckmaster.....    | Sup. Trans.....                 | A    |
| Cincinnati & Musk. Valley.....      | F. G. Darlington.....    | Supt.....                       | 1890 |
| Cincinnati & Musk. Valley.....      | W. C. Cushing.....       | Eng. M. W.....                  | 1890 |
| Cincinnati, N. O. & Texas.....      | W. C. Jewett.....        | Res. Eng.....                   | 1892 |
| Cincinnati, N. O. & Texas.....      | R. Carroll.....          | Gen. Supt.....                  | B    |
| Cincinnati, N. O. & Texas.....      | G. B. Nicholson.....     | Ch. Eng.....                    | 1891 |
| Cincinnati, N. O. & Texas.....      | Ward Baldwin.....        | Asst. Eng.....                  | 1891 |
| Cincinnati Union Depot.....         | R. L. Read.....          | Eng.....                        | —    |
| Cincinnati, Van W. & Mich.....      | E. Garrison.....         | Gen. Man.....                   | B    |
| Cincinnati, Washington & Balt.....  | J. H. Stewart.....       | Gen. Man.....                   | A    |
| Cleveland, Ak. & Columbus.....      | N. Monsarratt.....       | Pres. & Gen. Man.....           | A    |
| Cleveland, Cin. Ch. & St. L.....    | E. A. Hermann.....       | Asst. Eng.....                  | —    |
| Cleveland & Canton.....             | J. W. Wardwell.....      | Supt.....                       | 1891 |
| Cleveland & Canton.....             | H. A. Kennedy.....       | Asst. Supt.....                 | 1890 |
| Cleveland, Col. Cin. & Ind.....     | J. D. Layng.....         | Pres.....                       | A    |
| Cleveland, Col. Cin. & Ind.....     | G. M. Mead.....          | Gen. Man.....                   | A    |
| Cleveland, Lorain & Wheeling.....   | W. B. Hanten.....        | Eng.....                        | 1891 |
| Colorado Midland.....               | H. Collbran.....         | Asst. Gen. Man.....             | 1891 |

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| Columbus, Shawnee & Hocking     | F. I. Piard        | V. P. & Gen. Man.  | 1891 |
| Columbus, Hocking Val. & T.     | G. E. Carr         | Gen. Supt.         | B    |
| Columbus & Western              | E. A. Flewellan    | Gen. Man.          | B    |
| Conotton Valley                 | Samuel Briggs      | Gen. Man.          | B    |
| Coudersport & Port Alleg        | B. A. McClure      | Gen. Supt.         | B    |
| Concord & Montreal              | H. E. Chamberlin   | Gen. Traf. Man.    | 1891 |
| Dayton, Ft. Wayne & Chicago     | I. E. Gimperling   | Gen. Man.          | 1891 |
| Delaware & Hudson               | H. G. Young        | Gen. Man.          | A    |
| Delaware & Hudson               | C. D. Hammond      | Supt.              | 1891 |
| Delaware & Hudson               | J. W. Bardick      | Gen. Pas. Agt.     | A    |
| Delaware & Hudson               | A. J. Swift        | Chief Eng.         | 1890 |
| Delaware, Lack. & Western       | Chas. C. Rose      | Div. Eng.          | 1890 |
| Delaware, Lack. & Western       | W. B. Phelps       | Supt.              | B    |
| Des Moines, N. W.               | W. Oglivie         | Supt.              | 1893 |
| Denver & Rio Grande             | S. T. Smith        | Gen. Man.          | 1890 |
| Denver & Rio Grande             | C. Lydon           | Supt.              | B    |
| Denver & Rio Grande             | R. E. Briggs       | Ch. Eng.           | 1890 |
| Denver, Utah & Pacific          | L. M. Fouts        | Supt.              | A    |
| Denver, Texas & Fort Worth      | F. E. Bissell      | Supt. & C. E.      | 1890 |
| Detroit, Mack. & Marquette      | D. McCool          | Gen. Supt.         | B    |
| Detroit, Lansing & Northern     | F. M. Drake        | Asst. Supt.        | 1892 |
| Detroit, Lansing & Northern     | Job Tuthill        | Ch. Asst. Eng.     | 1892 |
| Detroit, Lansing & Northern     | J. J. McLean       | Chief Eng.         | 1892 |
| Duluth & Iron Range             | M. I. Carpenter    | V. Pres.           | 1892 |
| Dunkirk, All. Val. & Pittsburgh | Chas. A. Chute     | Asst. Supt.        | 1891 |
| Dunkirk, All. Val. & Pittsburgh | D. Thayer          | Gen. Supt.         | A    |
| East Tenn., Virginia & Georgia  | C. H. Hudson       | Gen. Man.          | A    |
| East Tenn., Virginia & Georgia  | J. W. Fry          | Supt.              | B    |
| East Tenn., Virginia & Georgia  | H. Fink            | V. Pres. & G. Man. | B    |
| East & West of Alabama          | John Postell       | Gen. Man.          | B    |
| Eureka & Palisade               | B. Gilman          | Gen. Supt.         | B    |
| Eureka Springs                  | Powell Clayton     | V. Pres. & G. Man. | B    |
| Evansville & Terre Haute        | T. A. Allen        | Ch. Eng.           | 1891 |
| Fairhaven Southern              | J. J. Donovan      | Ch. Eng.           | 1891 |
| Fall Brook Coal Co.             | G. R. Brown        | Gen. Supt.         | 1892 |
| Fall Brook Coal Co.             | W. A. Foster       | Supt.              | 1890 |
| Fitchburg                       | H. A. Phillips     | Supt.              | 1890 |
| Flint & Pere Marquette          | Sanford Keeler     | Supt.              | 1891 |
| Flint & Pere Marquette          | D. Edwards         | Asst. Gen. Man.    | B    |
| Flint & Pere Marquette          | W. F. Potter       | Supt.              | B    |
| Flint & Pere Marquette          | Geo. M. Brown      | R. Master.         | B    |
| Florida Ry. & N. Co.            | J. J. Phillips     | Asst. Gen. Man.    | A    |
| Fort Wayne, Cincin. & L.        | H. W. Worthington  | Gen. Supt.         | A    |
| Fort Worth & Denver City        | C. L. Frost        | Supt.              | B    |
| Fort Madison & N. Western       | Chas. A. Gilchrist | Rec. & Supt.       | 1891 |
| Georgia                         | J. W. Green        | Gen. Man.          | 1891 |
| Georgia                         | S. A. Hamphill     | Supt.              | A    |
| Georgia Midland & Gulf          | G. Gunby Jordan    | Gen. Man.          | 1891 |
| Georgia Pacific                 | T. G. Sage         | Gen. Man.          | A    |
| Georgia Pacific                 | J. W. Sage         | Gen. Supt.         | B    |
| Georgia Southern & Florida      | J. Lane            | Gen. Man.          | 1891 |
| Grand Trunk of Canada           | J. L. Seargeant    | Gen. Man.          | —    |
| Grand Trunk of Canada           | Sir Joseph Hickson | Ex. Gen. Man.      | —    |
| Grand Trunk of Canada           | Wm. Wainwright     | Asst. Man.         | B    |
| Grand Trunk of Canada           | J. Stephenson      | Supt.              | B    |
| Grand Trunk of Canada           | Samuel Barker      | Man N. Div.        | F    |
| Grand Trunk of Canada           | Charles Stiff      | Supt.              | A    |
| Galveston, Sabine & St. L.      | B. Barnes          | V. Pres. & G. Man. | B    |
| Galveston, Harr. & San Antonio  | W. G. Van Vleet    | Supt.              | B    |
| Grand Southern                  | F. W. Holt         | Supt. & Eng.       | B    |
| Green Bay, Winona & St. Paul    | Timothy Case       | Gen. Supt.         | B    |

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| 891 | Gulf, W. Texas & Pacific.....           | M. D. Monserate.....    | Pres.....                | B    |
| B   | Gulf, Colorado & Santa Fé.....          | J. H. Scott.....        | Gen. Supt.....           | 1890 |
| B   | Hartford & Connecticut Western.....     | R. P. Martin.....       | Supt.....                | 1890 |
| B   | Hartford & Connecticut Western.....     | John F. Jones.....      | Gen. Supt.....           | B    |
| 891 | Houston & Texas Central.....            | G. A. Quinlan.....      | Gen. Supt.....           | 1890 |
| 891 | Houston & Texas Central.....            | J. Waldo.....           | V. Pres.....             | B    |
| A   | Houston & Texas Central.....            | Donald Allen.....       | Eng. & Supt.....         | B    |
| 891 | Houston, E. & W. Texas.....             | W. H. Wentworth.....    | Asst. Gen. Man.....      | B    |
| A   | Houston, E. & W. Texas.....             | M. G. Howe.....         | Receiver.....            | 1890 |
| 890 | Illinois Central.....                   | E. T. Jeffrey.....      | Gen. Supt.....           | B    |
| 890 | Illinois Central.....                   | C. M. Shaeffer.....     | Supt.....                | B    |
| B   | Indiana, Ill. & Iowa.....               | T. P. Shouts.....       | Gen. Supt.....           | B    |
| 893 | Indianapolis, Decatur & Western.....    | L. A. Boyd.....         | Supt.....                | 1890 |
| 890 | Indianapolis, Decatur & Sp'gfield.....  | G. W. Bender.....       | Supt.....                | A    |
| B   | Indianapolis & St. Louis.....           | T. W. Burrows.....      | Supt.....                | A    |
| 890 | International.....                      | D. E. McFee.....        | Supt.....                | B    |
| A   | Jacksonville, Tampa & K. W.....         | C. O. Parker.....       | Asst. Gen. Man.....      | 1890 |
| 890 | Jacksonville S. Eastern.....            | E. S. Greenleaf.....    | Supt.....                | B    |
| B   | Jeffersonville, M. & Indianapolis.....  | E. W. McKenna.....      | Supt.....                | B    |
| 892 | Kanawha & Ohio.....                     | L. D. Button.....       | Supt.....                | 1892 |
| 892 | Kanawha & Ohio.....                     | Thos. I. Sharp.....     | Gen. Man.....            | A    |
| 892 | Kansas City B. M.....                   | W. B. Knight.....       | Ch. Eng.....             | —    |
| 892 | Kansas City, F. Scott & Memphis.....    | Geo. H. Nettleton.....  | Pres. & Gen. Man.....    | A    |
| 892 | Kansas City, F. Scott & Memphis.....    | W. W. Fagan.....        | Gen. Supt.....           | —    |
| 891 | Kansas City, C. S. & C. River.....      | W. W. Fagan.....        | Gen. Supt.....           | —    |
| A   | Kansas City, St. Joseph & C. B.....     | J. F. Barnard.....      | Gen. Man.....            | B    |
| A   | Kansas City, Wyandotte & N. W.....      | Newman Erl.....         | V.-P. & Gen. Man.....    | 1890 |
| B   | Lackawanna & Pittsburgh.....            | W. H. Badger.....       | Gen. Supt.....           | A    |
| B   | Lake Erie, Alliance & Southern.....     | E. E. Scranton.....     | Supt.....                | 1891 |
| B   | Lake Erie & Western.....                | Geo. L. Bradbury.....   | Gen. Man.....            | 1891 |
| B   | Lake Shore & Mich. Southern.....        | J. E. Childs.....       | Asst. Gen. Man.....      | 1892 |
| 891 | Lake Shore & Mich. Southern.....        | M. E. Wattles.....      | Supt.....                | B    |
| 891 | Lehigh Valley.....                      | H. Stanley Goodwin..... | Gen. Supt.....           | —    |
| 892 | Lehigh Valley.....                      | Robert H. Sayre.....    | Supt. & Eng.....         | C    |
| 890 | Little Rock & Fort Smith.....           | Henry Wood.....         | Gen. Supt.....           | A    |
| 890 | Louisville & Nashville.....             | M. H. Smith.....        | V. Pres.....             | 1891 |
| 891 | Louisville & Nashville.....             | Chas. O. Parker.....    | Supt.....                | B    |
| B   | Louisville & Nashville.....             | C. D. Purdon.....       | Div. Eng.....            | —    |
| B   | Louisville & Nashville.....             | G. K. McCormick.....    | Res Eng.....             | 1890 |
| A   | Louisville, N. Albany & Chicago.....    | John B. Carson.....     | V.-Pres. & Gen. Man..... | —    |
| A   | Louisville, N. Albany & Chicago.....    | Thos. D. Dunn.....      | Gen. Supt.....           | B    |
| B   | Louisville, N. Albany & Chicago.....    | Jas. Baker.....         | Gen. Pass. Agt.....      | 1890 |
| 891 | Louisville, N. Albany & Texas.....      | J. M. Edwards.....      | V.-Pres. & Gen. Man..... | —    |
| 891 | Louisville, Evansville & St. Louis..... | C. A. Darlton.....      | Supt.....                | B    |
| 891 | Los Angeles, Pasa & Glendale.....       | John Cross.....         | Pres.....                | 1890 |
| 891 | Los Angeles, Pasa & Glendale.....       | W. F. McClure.....      | Ch. Eng.....             | 1890 |
| A   | Mahony & Susq. Div. P. & R.....         | J. H. Olhausen.....     | Supt.....                | B    |
| 891 | Maryland Central.....                   | Samuel Rea.....         | V. Pres.....             | 1892 |
| A   | Manitow & Pike's Peak.....              | A. T. Tomlinson.....    | Div. Eng.....            | 1890 |
| B   | Manitoba & N. Western.....              | W. C. Baker.....        | Gen. Supt.....           | 1890 |
| 891 | Manitoba & N. Western.....              | Geo. H. Webster.....    | Ch. Eng.....             | 1890 |
| —   | Memphis & Little Rock.....              | Rudolph Fink.....       | Rec. & Gen. Man.....     | B    |
| B   | Metropolitan of Portland, Or.....       | Alfred F. Sears.....    | Supt.....                | —    |
| B   | Mexican International.....              | L. M. Johnson.....      | Gen. Man.....            | —    |
| B   | Mexican National.....                   | C. A. Merriam.....      | Supt.....                | B    |
| A   | Michigan Central.....                   | B. Douglas.....         | Bridge Eng.....          | 1890 |
| B   | Minneapolis, Lynd. & Min.....           | Geo. H. Cooley.....     | Ch. Eng.....             | 1890 |
| B   | Minneapolis, St. P. & S. S. Marie.....  | T. D. Underwood.....    | Gen. Man.....            | 1891 |
| B   | Minneapolis, St. P. & S. S. Marie.....  | W. W. Rich.....         | Ch. Eng.....             | 1890 |
| B   | Minnesota & N. Western.....             | E. G. Russell.....      | Asst. Gen. Supt.....     | A    |
| B   | Missouri Pacific.....                   | W. H. Boyd.....         | M. of Trans.....         | B    |

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| Mobile & Ohio.....                    | T. M. R. Talcott ...   | V. Pres. & Gen. Man. | A    |
| Montana Central.....                  | H. C. Ives.....        | Gen. Man.            | 1896 |
| Montana Central.....                  | N. C. Ray.....         | Res. Eng.            | 1891 |
| Monterey & Mex. Gulf.....             | J. A. Robertson.....   | Gen. Man.            | 1890 |
| Monterey & Mex. Gulf.....             | W. H. Wentworth.....   | Ch. Eng.             | 1890 |
| Milford F., & Prov. & Hop.....        | E. T. Logee.....       | Gen. Supt.           | B    |
| Milwaukee, L. Shore & Western.....    | H. F. Whitecomb.....   | Gen. Man.            | B    |
| Milwaukee, L. Shore & Western.....    | H. G. H. Reed.....     | Gen. Supt.           | B    |
| Milwaukee & Northern.....             | C. F. Dutton.....      | Gen. Supt.           | B    |
| Milwaukee & St. Paul.....             | T. D. Underwood.....   | Supt.                | B    |
| Morgan's St. Louis & Texas.....       | J. Kruttschmidt.....   | Eng. & Supt.         | B    |
| Nashville, Chattan. & St. L.....      | Hunter McDonald.....   | Asst. Eng.           | 1891 |
| Nashville & Florence.....             | J. T. Craik.....       | Ch. Eng. & Supt.     | B    |
| Natchez, Jackson & Col.....           | E. D. Frost.....       | Gen. Supt.           | B    |
| Naugatuck.....                        | George W. Beach.....   | Supt.                | A    |
| Nevada Central.....                   | F. W. Dunn.....        | Gen. Supt.           | B    |
| New Haven & Northampton.....          | S. B. Opdyke, jr.....  | Supt.                | B    |
| New Orleans, Natchez & Ft. Scott..... | H. D. Jenkins.....     | Ch. Eng.             | 1891 |
| New Orleans & Selma.....              | Norman Webb.....       | Rec.                 | B    |
| Newport News & Miss. Valley.....      | J. L. Frazier.....     | Supt.                | 1891 |
| Newport & Northern.....               | H. H. Vreeland.....    | Supt.                | 1891 |
| Newport & Wickford.....               | Theo. Warren.....      | Supt.                | B    |
| New York & Boston R. Trans.....       | W. Rotch.....          | Eng.                 | 1891 |
| New York & New England.....           | A. A. Jackson.....     | Gen. Supt.           | —    |
| New York & New England.....           | J. W. Perkins.....     | Asst. Rec.           | B    |
| New York Central & H. River.....      | J. M. Toucey.....      | Gen. Supt.           | A    |
| New York, New Haven & Hartford.....   | C. S. Davidson.....    | Supt.                | C    |
| New York, New Haven & Hartford.....   | O. M. Sheppard.....    | Gen. Man.            | 1891 |
| New York, Lake Erie & Western.....    | E. S. Bowen.....       | V. Pres.             | B    |
| New York, Lake Erie & Western.....    | S. M. Felton, jr.....  | Asst. Pres.          | B    |
| New York, Out. & Western.....         | S. W. Lampher.....     | Supt. Tran.          | 1890 |
| New York, Out. & Western.....         | J. E. Childs.....      | Gen. Supt.           | B    |
| New York, Prov. & Boston.....         | J. W. Miller.....      | Gen. Man.            | —    |
| New York, Prov. & Boston.....         | J. B. Gardiner.....    | Supt.                | B    |
| New York, Susq. & Western.....        | Chas. M. Heald.....    | Pre.                 | 1890 |
| New York, Susq. & Western.....        | C. D. McKelvey.....    | Supt.                | B    |
| New York City & Northern.....         | G. N. B. Edwards.....  | Gen. Supt.           | A    |
| New York, West Sh. & Buffalo.....     | J. D. Layng.....       | Gen. Man.            | B    |
| New York & Sea Beach.....             | W. O. McDowell.....    | P. Pres. & Gen. Man. | B    |
| New York, Pitts. & Chicago.....       | G. W. Dixon.....       | Supt.                | B    |
| New York, Chic. & St. Louis.....      | G. H. Kimball.....     | Supt.                | B    |
| Nicaragua C. C. Co.....               | J. F. Le Baron.....    | Gen. Supt.           | 1892 |
| Norfolk & Western.....                | Joseph H. Sands.....   | Gen. Man.            | A    |
| Norfolk & Western.....                | Charles Blackwell..... | Supt. M. P.          | B    |
| Norfolk & Western.....                | Emile Low.....         | Div. Eng.            | 1890 |
| North Western C. & N.....             | E. T. Galt.....        | Man.                 | 1890 |
| North Western C. & N.....             | J. Bailey.....         | Supt.                | 1890 |
| Northern Pacific.....                 | T. F. Oakes.....       | V. Pres. & Gen. Man. | A    |
| Northern Pacific.....                 | Robert Harris.....     | Pres.                | B    |
| Northern Pacific.....                 | D. R. Taylor.....      | Supt.                | B    |
| Ohio & Mississippi.....               | J. P. Barnard.....     | Pres. & Gen. Man.    | 1890 |
| Ohio & L. R. W.....                   | B. S. Henning.....     | Pres.                | C    |
| Ohio Central.....                     | J. E. Martin.....      | Rec.                 | B    |
| Old Colony.....                       | J. R. Kendrick.....    | Gen. Man.            | 1891 |
| Ohio River.....                       | Chas. P. Hatch.....    | Ex-Gen. Traf. Man.   | 1891 |
| Ohio Southern.....                    | W. H. Van Tasell.....  | Supt.                | 1891 |
| Oregon & Washington T.....            | F. Riffle.....         | Ch. Eng.             | 1891 |
| Oregon Ry. & Nav.....                 | H. S. Rowe.....        | Supt.                | B    |
| Pennsylvania.....                     | S. M. Prevost.....     | Gen. Supt. Trans.    | 1890 |
| Pennsylvania.....                     | L. F. Loree.....       | Supt.                | 1891 |
| Pennsylvania.....                     | Thos. J. Brereton..... | Supt.                | 1890 |

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|  | Pennsylvania.....                       | O. G. McClellan.....   | Supt.....              | B    |
|  | Pennsylvania.....                       | R. P. Snowdon.....     | Asst. Eng.....         | B    |
|  | Pennsylvania.....                       | S. S. Blair.....       | Supt.....              | B    |
|  | Pennsylvania.....                       | M. W. Thomason.....    | Eng. Mair. W.....      | B    |
|  | Pennsylvania.....                       | Robt. Piteairn.....    | Gen. A. & Supt.....    | 1890 |
|  | Pensacola & Atlantic.....               | W. D. Chipley.....     | V.-Pres. & Gen. Supt.  | B    |
|  | Peoria, Decatur & Evansville.....       | G. L. Bradley.....     | V.-Pres.....           | B    |
|  | Philadelphia & Reading.....             | J. A. Sweigand.....    | Gen. Supt.....         | —    |
|  | Philadelphia & Reading.....             | M. F. Bonzano.....     | Supt.....              | 1390 |
|  | Philadelphia & Reading.....             | I. A. Higgins.....     | Sta. Agent.....        | 1390 |
|  | Philadelphia & Reading.....             | W. Lorenz.....         | Ch. Eng.....           | B    |
|  | Philadelphia, Wil. & Baltimore.....     | H. H. Carter.....      | Supt.....              | 1891 |
|  | Pittsburgh, Cincinnati & St. Louis..... | M. J. Becker.....      | Ch. Eng.....           | 1891 |
|  | Pontiac, Oxford & Port Austin.....      | James Houston.....     | Gen. Supt.....         | 1890 |
|  | Pittsburgh & Lake Erie.....             | E. Holbrook.....       | Gen. Supt.....         | 1890 |
|  | Pittsburgh, Shenango & Lake Erie.....   | I. T. Blair.....       | Gen. Man.....          | 1890 |
|  | Portland & Ogdensburg.....              | I. Hamiltou.....       | Supt.....              | B    |
|  | Providence & Springfield.....           | W. Tinkham.....        | Pres.....              | B    |
|  | Providence & Worcester.....             | Chas. Howard.....      | Supt.....              | A    |
|  | Providence & Worcester.....             | W. E. Chamberlain..... | Supt.....              | B    |
|  | Providence, W. & Bristol.....           | W. Stone.....          | Supt. & Eng.....       | B    |
|  | Pullman Palace Car Company.....         | G. F. Brown.....       | Gen. Supt.....         | B    |
|  | Prince Edward Island.....               | L. B. Archibald.....   | Supt.....              | C    |
|  | Quebec & Lake St. John.....             | I. J. Scott.....       | Man.....               | A    |
|  | Queensboro & Falls of R.....            | Chas. Seymour.....     | Cons. Eng.....         | 1891 |
|  | Qu'Appelle & Long Lake.....             | H. S. Holt.....        | Eng.....               | 1892 |
|  | Richmond & Allegany.....                | Decatur Axtell.....    | Rec. & Man.....        | B    |
|  | Richmond & Dunville.....                | Julien A. Hall.....    | Asst. Eng.....         | 1892 |
|  | Richmond & Danville.....                | F. M. Rutherford.....  | Asst. Eng.....         | 1892 |
|  | Richmond, Fred. & Potomac.....          | E. T. D. Myers.....    | Pres. & Gen. Supt..... | —    |
|  | Richmond & Petersburg.....              | J. R. Kenly.....       | Supt.....              | B    |
|  | Rio Grande Western.....                 | D. C. Dodge.....       | Gen. Man.....          | 1891 |
|  | Rock Island & Peoria.....               | H. B. Sndlow.....      | Supt.....              | 1890 |
|  | Rochester & Pittsburgh.....             | James T. Gardner.....  | Gen. Supt.....         | B    |
|  | Rogersville & Jefferson.....            | Chas. M. Lentz.....    | Supt.....              | B    |
|  | Rome, W. & Ogdensburg.....              | H. M. Britton.....     | Gen. Man.....          | A    |
|  | San Antonio & Ar. Pass.....             | B. F. House.....       | Asst. Eng.....         | 1891 |
|  | Savannah, Florida & West.....           | H. W. Reed.....        | Mast. R. W.....        | 1891 |
|  | San Pete Valley.....                    | S. Bamberger.....      | Man. Director.....     | B    |
|  | Seaboard Air Line.....                  | John T. Winder.....    | Gen. Man.....          | 1891 |
|  | Seaboard Air Line.....                  | I. T. Myers.....       | Gen. Supt.....         | 1891 |
|  | Seattle Lake Shore & East.....          | F. W. D. Holbrook..... | Man.....               | 1892 |
|  | Shenango & Allegany.....                | J. T. Blair.....       | Gen. Man.....          | B    |
|  | Shenandoah Valley.....                  | David W. Flickwir..... | Supt.....              | 1891 |
|  | Silverton.....                          | C. W. Gibbs.....       | Ch. Eng.....           | 1890 |
|  | Skaneateles.....                        | J. McNamara.....       | Supt.....              | A    |
|  | South Florida.....                      | B. R. Swoope.....      | Supt.....              | A    |
|  | South Carolina.....                     | John B. Peck.....      | Gen. Man.....          | B    |
|  | Southern Pacific.....                   | J. A. Fillmore.....    | Gen. Supt.....         | 1891 |
|  | Southern Pacific.....                   | A. C. Bassett.....     | Supt.....              | B    |
|  | Southern Pacific.....                   | J. Krutttschmidt.....  | Supt.....              | —    |
|  | Southern Pacific.....                   | A. C. Hutchison.....   | Gen. Man.....          | A    |
|  | Split Rock Cable.....                   | W. B. Cogswell.....    | Gen. Man.....          | 1890 |
|  | Staten Island, R. T.....                | Frank S. Gannon.....   | Gen. Man.....          | 1891 |
|  | St. Joseph & Desloge.....               | T. T. Onderdonk.....   | Gen. Supt.....         | B    |
|  | St. Johns & Lake Eustes.....            | W. J. Jarvis.....      | Supt.....              | B    |
|  | St. Louis, Alton & T. Haute.....        | Geo. W. Parker.....    | Gen. Man.....          | B    |
|  | St. Louis & San Francisco.....          | H. L. Morrill.....     | Gen. Man.....          | A    |
|  | St. Louis, Arkan. & Texas.....          | A. H. Swanson.....     | Rec.....               | 1891 |
|  | St. Louis, Arkan. & Texas.....          | H. G. Kelley.....      | Res. Eng.....          | 1890 |
|  | St. Louis & Cairo.....                  | C. Hamilton.....       | Gen. Supt.....         | B    |

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| St. Louis, Des Moines & North  | H. H. Wade        | Supt.                | A    |
| St. Louis, Des Moines & North  | C. F. Meek        | Supt.                | B    |
| St. Louis, Ft. Scott & Wichita | J. F. Miller      | V.-Pres.             | B    |
| St. Louis, Ft. Scott & Wichita | W. H. Norris      | Train Mas.           | B    |
| St. Paul, Minn. & Manitoba     | James J. Hill     | Pres.                | B    |
| St. Paul, Minn. & Manitoba     | H. C. Ives        | Asst. Gen. Man.      | B    |
| Stoney Creek                   | G. B. Boggs       | Supt. & Eng.         | B    |
| Suburban R. Transit            | J. J. R. Croes    | Ch. Eng.             | 1892 |
| Syracuse, Ont. & N. York       | Albert Allen      | Gen. Supt.           | A    |
| Taveres, Orlando & Atlantic    | T. M. T. McKennan | Gen. Man.            | A    |
| Terra Haute & Indianapolis     | W. R. McKeen      | Pres.                | 1890 |
| Tennessee Coal & Iron          | A. M. Shook       | Gen. Man.            | B    |
| Texas & Pacific                | John A. Grant     | V.-P. & Gen. Man.    | 1892 |
| Toledo & Ohio Central          | J. M. Ferris      | Gen. Man.            | 1891 |
| Toledo & Ohio Central          | Clifford Buxton   | Ch. Eng.             | 1891 |
| Tioga                          | R. Du Puy         | Supt. & Eng.         | B    |
| Toledo, Peoria & Western       | E. N. Armstrong   | Gen. Supt.           | 1891 |
| Toledo, St. Louis & Kansas     | A. H. Pettibone   | Gen. Supt.           | B    |
| Toledo, St. Louis & Kansas     | S. R. Callaway    | Ch. Eng.             | 1890 |
| Toledo, Ann Arbor & N. M.      | H. W. Ashley      | Gen. Supt.           | B    |
| Toledo, Col. & Cincinnati      | Clifford Buxton   | Ch. Eng.             | 1891 |
| Troy & Boston                  | J. Crandell       | Supt.                | A    |
| Ulster & Delaware              | J. M. Jones       | Gen. Supt.           | 1891 |
| Union Pacific                  | E. Dickinson      | Gen. Man.            | 1891 |
| Union Pacific                  | S. T. Smith       | Gen. Supt.           | B    |
| Union Pacific                  | T. Appleton       | Res. Eng.            | 1891 |
| Valley                         | W. Thornburgh     | Gen. Man.            | 1891 |
| Virginia & Truckee             | H. M. Yerrington  | V.-Pres. & Gen. Man. | B    |
| Wabash                         | K. H. Wade        | Gen. Supt.           | A    |
| Wagner Sleeping Car Co.        | C. D. Flagg       | Gen. Supt.           | —    |
| Western Maryland               | J. M. Hood        | Pres. & Gen. Man.    | B    |
| Western Maryland               | B. H. Griswold    | Gen. F. Agent        | 1891 |
| Western N. York & Pennsylvania | R. Bell           | Gen. Supt.           | 1890 |
| Wisconsin Central              | S. B. Auslie      | Gen. Man.            | 1890 |
| West Shore                     | C. H. Bradley     | Gen. Supt.           | A    |
| Warren & Farnsworth            | A. C. Wood        | Gen. Man.            | B    |
| West Virginia Central          | C. L. Bretz       | Gen. Man.            | 1892 |
| Wichita & Western              | D. H. Rhodes      | Supt. & C. E.        | 1891 |
| West Virginia, C. & Pittsburgh | W. E. Porter      | Gen. Supt.           | B    |
| Worcester, Nashua & Roch.      | C. S. Turner      | Pres. & Gen. Man.    | B    |
| Williamsport & N. Branch       | Ben. G. Welsh     | Pres. & Gen. Man.    | B    |
| York and Peachbottom           | S. M. Manifold    | Supt. & Eng.         | B    |

## APPENDIX No. 3.

The following memorandum, prepared by Sandford Fleming, Chairman of the Special Committee on Uniform Standard Time, has been submitted to the British Government through the Governor-General of Canada, at the instance of the Canadian Institute, Toronto, and referred to a committee of the Department of Science and Art, London, consisting of the following well-known eminent men, viz.:

|                            |                                       |
|----------------------------|---------------------------------------|
| W. H. M. CHRISTIE          | Astronomer Royal, Greenwich.          |
| Professor J. C. ADAMS      | University of Cambridge.              |
| Lieut.-General R. STRACHEY | Royal Engineers, India Office.        |
| Dr. HIND                   | Superintendent Nautical Almanac.      |
| Captain WHARTON            | Hydrographer to the Admiralty.        |
| Maj.-Gen'l DONNELLY        | Secretary Science and Art Department. |

These gentlemen expressed their concurrence in the views advanced in the memorandum, recognizing the advantages which would result from the reform advocated, and the ease with which it may be carried out. On their recommendation the British Government has transmitted the correspondence to the Governments of the several British possessions around the globe "with a view to the adoption of the Hour Zone System in reckoning time generally, and of the 24-hour notation for railway time tables."

The same Committee, in reporting to the British Government, advised that all the railway companies of the United Kingdom be recommended to adopt the 24 hour notation.

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*MEMORANDUM on the movement for reckoning time on a scientific basis, by which the greatest possible degree of simplicity, accuracy and uniformity will be obtainable in all countries throughout the world.*

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1. Notwithstanding the great advance which has been made during the present century, in all the arts and sciences and their application to the affairs of human life, the reckoning of time is still in a primitive condition in many countries, and in an imperfect condition in every country. Difficulties have been developed since the introduction of rapid means of communication, through the twin agencies, steam and electricity, which when examined prove that time is computed generally on principles which are untenable. The world's time-reckoning is in fact an exceedingly complicated combination; it is productive of confusion, and the confusion is apt to be increased and intensified as population increases and lines of rapid communication are multiplied.

2. During the last ten years efforts have been made to overcome the evils referred to by establishing a remedial system on a sound scientific basis which would be acceptable to all nations, and by which perfect accuracy, uniformity, and simplicity would everywhere be obtainable.

3. The subject has been carefully considered by many individuals, and by scientific societies in Europe and America. It has been discussed at geographical and geoletic congresses at Venice and Rome, and at Conventions of Scientists and practical business men in America. On all these occasions the solution of the problem has been promoted. As an outcome of these various meetings and efforts, the President of the United States, under the authority of an Act of Congress, invited the governments of all civilized nations to appoint delegates to meet in conference at Washington to consider the whole question and take decisive action in respect thereto.

4. The Washington Conference embraced delegates from twenty-five nations; they had eight sessions; the first was held on 1st October, 1884; the last on 1st November following. After patient deliberation and discussion the object of this International Conference was accomplished by the passage, with substantial unanimity, of a series of resolutions determining the principles upon which all the nations of the world may unite in the adoption of a universal system of reckoning time.

5. The important results of the Conference are the establishment of (1) a prime meridian for reckoning longitude; (2) a zero for time-reckoning, and (3) a unit measure of time to be common to the whole world.



6. The prime-meridian corresponds with the Greenwich meridian.
7. The zero of time may be defined as the moment of mean solar passage on the anti-prime meridian.
8. The unit-measure of time, designated the universal day, may be defined as the interval between two successive mean solar passages on the anti-prime meridian.
9. The Conference further determined that the hours of the universal day shall be counted in a single series from zero to 24.
10. The universal day as defined by the Washington Conference begins and ends at the same moment as the civil day at Greenwich, but it differs from the Greenwich civil day in respect to the numbering of the hours. While the universal day has a single set of hours numbered from 0 to 24, the Greenwich civil day is divided at noon into halves, the half days before and after noon being subdivided into separate sets of hours, each numbered from 0 to 12 and distinguished as anti-meridian and post-meridian. Greenwich time is the local time so-called of the meridian of Greenwich. Universal time, on the other hand, is understood to be common to all localities, and the universal day is held to be the date of the world.
11. Considerable progress has been made in the adoption of the principles of universal time, and the practical success which has attended the application of these principles goes to show that the unification of reckoning by the several civilized nations can best be effected step by step.

#### RECKONING BY HOUR MERIDIANS.

12. The first important step is the adoption of the "HOUR ZONE System," commonly designated in America "STANDARD TIME." It may be stated that in the theory of universal time the fundamental principle is unity; it is held that there is not more than one time in the whole universe, and that the idea of separate and distinct times in each separate locality is incorrect. While the essential principle of Universal time is indisputable, it cannot be denied that a perfectly uniform notation of time throughout the entire globe comes into direct conflict with our preconceived notions and habits of thought. The hour zone system is introduced as an easy means of transition from old to new ideas, and it is found that by adopting hour meridians as local standards for reckoning, grave difficulties are in a large measure overcome without any violent departure from our inherited usages and prevailing customs. The hour zone system also furnishes the means of applying the correct principles of universal time in ordinary affairs.
13. In the hour zone system the circumference of the globe is divided into twenty-four sections or zones. The central line of each zone is an hour meridian, and the hour meridians are fifteen degrees of longitude apart. The accompanying chart of the world on Mercator's projection shows the geographical position of the twenty-four hour meridians. They are numbered in consecutive order towards the west from zero, the ante-prime meridian.
14. The hour zones theoretically extend seven and a half degrees of longitude on each side of the hour meridians, but in practice that is by no means an essential rule. The boundary line of contiguous zones may be governed by national, geographical or commercial circumstances.

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15. As the earth rotates on its axis in twenty-four hours, an hour elapses between the solar passage on each successive hour meridian; it is obvious therefore that if the reckoning in each zone be governed by its respective meridian, the reckonings everywhere will be directly related. There will be differences, but the differences will in every case be known and they will invariably be multiples of an hour. Throughout the globe there will be complete identity in the minutes and seconds. For example, when the reckoning in the tenth zone is six hours twenty-five minutes, in the eleventh zone it will be five hours twenty-five minutes, in the twelfth zone four hours twenty-five minutes, and so on, each successive zone differing by an exact hour. Thus the only departure from complete uniformity in reckoning around the globe will be in the numbers of the hours, but the numbers of the hours being governed by the numbers of the hour meridians, the passage to universal time is simple and direct.

16. As the reckoning in the zone of the twelfth hour meridian corresponds with universal time the reckonings in all zones to the east of that meridian will be one or more full hours in advance of universal time, and in all zones to the west of the twelfth hour meridian the reckonings will be behind universal time. Universal time will be the mean of all possible reckonings under the hour zone system, and the universal day the mean of all possible local days.

17. The hour zone system has been adopted for ordinary use in portions of the three continents of Asia, Europe and America. In 1887 an imperial ordinance was promulgated directing that on and after the first day of January in the year following, time throughout the Japanese Empire would be reckoned by the third hour meridian. The reckoning in England and Scotland is by the twelfth hour meridian, in Sweden the eleventh hour meridian is the standard, and quite recently it has been resolved in Austria-Hungary to be governed by the same meridian. Efforts are now being made to follow the same course in Germany and in other European countries. In North America the hour zone system has been in general use for six years, the reckoning of time being governed as follows, namely:

By the 16th-hour meridian in Nova Scotia and Prince Edward Island.

By the 17th-hour meridian in New Brunswick, Quebec, Ontario, Maine, Vermont, Massachusetts, New Hampshire, Connecticut, New York, Pennsylvania, Rhode Island, New Jersey, Maryland, Virginia, North and South Carolina, Georgia, Florida.

By the 18th-hour meridian in Manitoba, Keewatin, Minnesota, Wisconsin, Michigan, Iowa, Ohio, Illinois, Indiana, Kentucky, Missouri, Arkansas, Tennessee, Alabama, Mississippi, Louisiana.

By the 19th-hour meridian in Assiniboia, Saskatchewan, Alberta, Athabasca, Montana, Dakota, Wyoming, Nebraska, Colorado, Kansas, New Mexico, Texas, Utah, Arizona.

By the 20th-hour meridian in British Columbia, Washington, Idaho, Oregon, Nevada, California.

18. The adoption of the hour zone system has been the means of removing the chaos of local times which in many quarters previously caused much friction. Wherever the reckoning is governed by the same standard meridian there is complete uniformity in every division of time. In Japan, Central Europe, Great Britain, United States, Canada and

Mexico identity of reckoning prevails. In all these countries the hours are struck at the same moment, the only difference is in the numbers by which they are locally known; with that single exception, every division of the day is simultaneous.

#### THE 24-HOUR NOTATION.

19. The second important step in regulating the reckoning of time throughout the world is to abandon the division of the day into ante-meridian and post-meridian hours, separately numbered, and to substitute a single series of hours numbered from 0 to 24. This change was resolved upon by the Washington Conference with respect to the universal day.

20. The old practice of dividing the day into separate sets of twelve hours, however it arose, has not only no advantage to recommend it, but the usage has been found to have positive disadvantages, which have been brought into prominence within the past generation. The division of the day into halves doubles the chance of error, and tends to confusion in connection with the running of railway trains. The misprint or mistake of a single letter, A. M. for P. M., or *vice versa*, will easily arise to cause inconvenience, loss of time, possibly loss of property or loss of life.

21. The 24-hour notation, so-called, removes all doubt and uncertainty and promotes safety. Where it has been adopted in Canada there is no ambiguity; moreover the change has been effected without difficulty and without danger. The hours having a lower number than twelve are known to belong absolutely to the first part of the day, and those having a higher number to the afternoon and evening.

22. The 24-hour notation is strongly recommended by prominent men in Russia, Germany, Italy, Austria, Belgium, France, Spain, Great Britain—indeed it may be said in every country in Europe. It is brought into daily use on the great lines of telegraph leading from England to Egypt, India, China, Australia and South Africa. It is received with very great favor in America. It has been in use for nearly four years on 2 354 miles of the Canadian Pacific Railway, and for nearly three years on the Canadian Government Railway, the Interoceanic, 986 miles in length. The managers of these railways and all the employes speak of the 24-hour notation in the highest terms. It is the only system in use, at this date, north of the 49th parallel and west of the 89th meridian. There is not a province in Canada where it is not already in use. It has been adopted on the railways in Nova Scotia, New Brunswick, Prince Edward Island, Manitoba, Assiniboia, Alberta, British Columbia and partly in Quebec and Ontario; so satisfactory are the results of the new notation that it has been determined to extend its application, and it is expected that before long it will be in general use for railway purposes throughout the Dominion.

23. In the United States a strong expression of opinion in favor of the 24-hour notation has been obtained. The American Society of Civil Engineers, deeply concerned in the perfection of the railway system of the republic, has, since the year 1880, taken an active interest in time reform. This Society led the way in preparing the minds of men for the general acceptance of the hour zone system six years ago, and since then it has vigorously directed attention to the 24-hour notation. It has a special committee whose duty under the authority of the Society is to correspond with railway managers on the subject, and in every

proper way to promote the adoption of the new notation. The communications which have been sent out by the American Society of Civil Engineers to the leading railway men throughout the country have elicited a very large number of replies. They embrace the opinion of, it is believed, a considerable majority of the managers of all the railway companies in North America; and of all who have been heard from about 97 per cent. are in favor of the adoption of the 24-hour notation in the railway service of the country at an early date. It is quite obvious that there is a widespread feeling in favor of the change, and it only remains for the General Time Convention, an organized body, representing all the railways in the United States, to take decisive action in the matter, so that the new notation may be brought into use simultaneously in every section of the country.

24. Canada, in adopting the hour zone system, and in introducing the 24-hour notation, has undoubtedly taken the lead in carrying into effect, in the most practical manner possible, the essential principles of universal time. The 24-hour notation has likewise been introduced in the railway service of China, and it is not a little remarkable that one of the oldest Eastern civilizations, conjointly with the youngest Western civilization, should set an example in breaking through the trammels of custom to inaugurate a reform which every intelligent person believes to be desirable. Universal time will be substantially adopted in North America so soon as the 24-hour notation is brought into use throughout the United States. There is but one step necessary to secure to Great Britain all the advantages of universal time—that is the adoption of the 24-hour notation; this one reform concerns the railway system and railway travelers especially, and in a country where all travel more or less, I cannot but think that if English railway managers were informed as to the ease with which the change has been introduced in Canada and the satisfactory results which have followed, they would very speedily take means to obtain similar advantages. I am confirmed in this view by an examination of the letters which have been received by the Science and Art Department, South Kensington, copies of which I have been favored with. These letters go to show that the resolutions of the Washington Conference on this subject are cordially favored by the following important bodies and departments, viz.:

1. Royal Astronomical Society.
2. The Royal Society.
3. The Board of Trade.
4. The General Post Office.
5. The Eastern Telegraph Company.
6. The Eastern Extension Telegraph Company.
7. The Eastern and South African Telegraph Company.
8. The Society of Telegraph Engineers.
9. The Trinity House.
10. The India Office.
11. The Colonial Office.
12. The Admiralty.

To these may be added the Committee of Council on Education and the Board of Visitors of the Royal Observatory, Greenwich. Indeed, I cannot learn that a single objection has been received from any quarter.

25. As the fundamental objects of the Washington Conference were to remove all doubt and ambiguity in time-reckoning, to prevent discrepancies, to secure simplicity and introduce uniformity, it is mani-

festly important that the changes proposed, supported as they were at the Conference by the representatives of twenty-five nations, and subsequently looked upon in so many quarters as in themselves intrinsically desirable, should without unnecessary delay be accepted, and as far as practicable put in force generally. The first important step is the selection of hour meridians and the adoption of the hour zone system. With these objects in view the accompanying map has been prepared; it shows the position of the 24-hour meridians and indicates in a general way the country or section of country to which any particular hour meridian has greatest proximity. It would greatly advance the unification of time throughout the world, and greatly promote the common good of mankind, if every nation, with all convenient speed, would take means to select the hour meridians on which its reckoning of time may be based. Appended hereto will be found a table indicating the hour meridians which in each case may be found eligible for selection, but in a matter of this kind each nation must judge for itself. (See Table No. 1.)

26. I have mentioned what has been done in America, more especially in Canada, in furtherance of this movement. If means be taken to extend the use of the hour zone system to all the British possessions around the globe they will individually and collectively participate in the advantages of a common reckoning of time. I venture to submit, suggestively, the appended list of the principal British colonies and dependencies with the hour meridians which appear the most suitable for standards in each case. (See Table No. 2.)

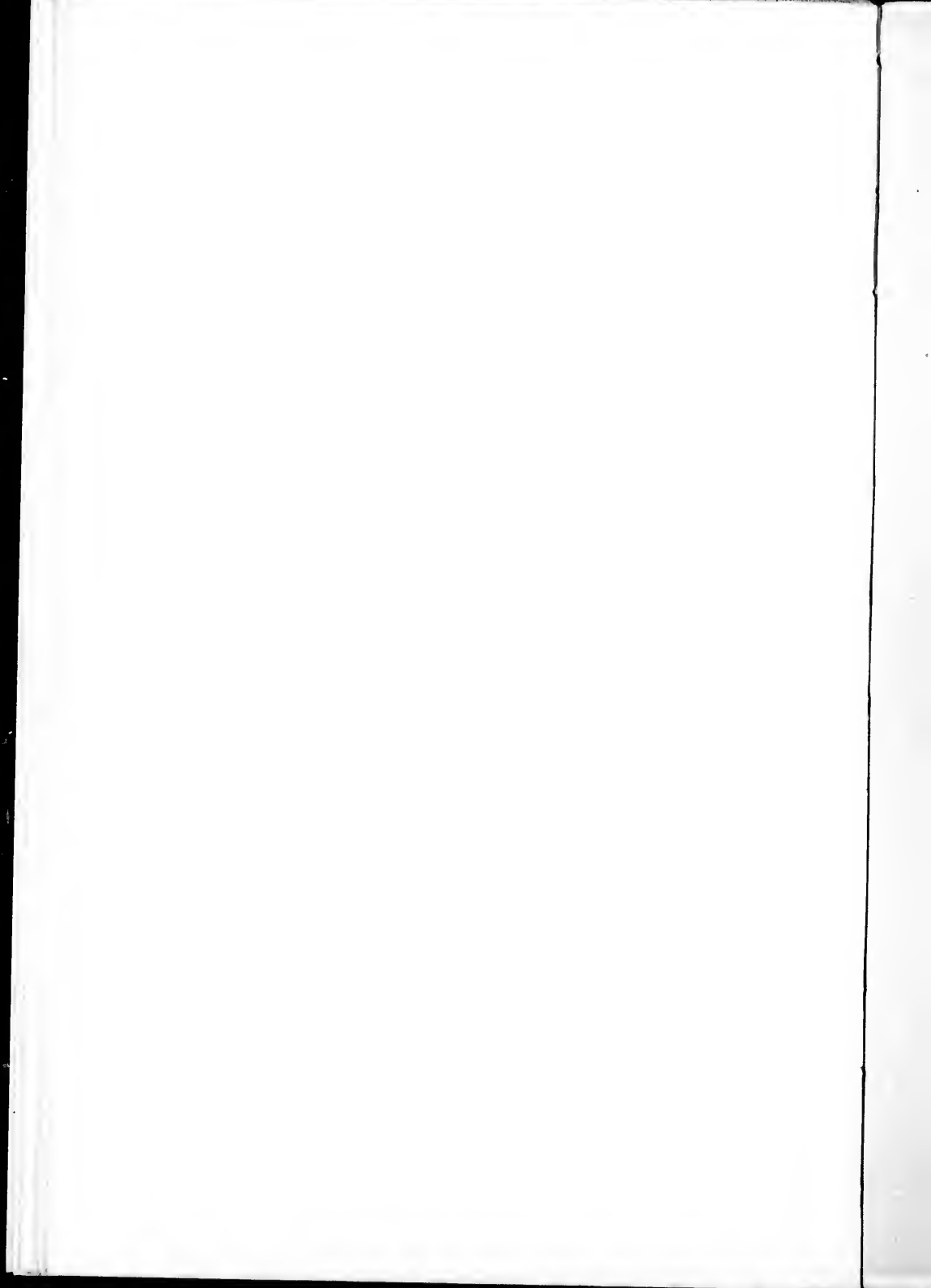
SANDFORD FLEMING.

OTTAWA, 20th November, 1889.

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## NOTE.

## RESPECTING THE HOUR MERIDIANS AS NUMBERED ON THE MAP.

It is obviously desirable that the hour meridians or sub-standards, for reckoning time by all nations, should be designated in a manner which will render them easily distinguished and readily known throughout the world. A nomenclature based on geographical terms or derived from local names may appear appropriate in one country, while in another, or in an opposite hemisphere, it might be quite inapplicable. Moreover, not only would differences of opinion arise as to the appropriateness of such terms, but owing to the diversity of languages among the nations, the difficulty of selecting names universally acceptable would be so increased as to render a common agreement respecting them scarcely attainable.

These objections do not apply to numbers. A nomenclature based on numbers would be common to all nations, and each term would have the same precise meaning in all languages and in both hemispheres. The numbers given to the hour meridians, as shown on the map, begin at zero and follow the sun in its apparent motion. The solar passage on the anti-prime meridian being the zero of the "universal" or "world" day, at the end of the first hour the solar passage would be on the first hour meridian, at the end of the second hour it would be on the second hour meridian, and so on for each of the twenty-four hours—the hour in each case agreeing with the number of the hour meridian at the instant of mean solar passage. Thus it will be evident that with the hour meridians so numbered the solar passage would be the perpetual index of "world" time. Local "Standard Time" as reckoned in any hour zone would be *faster* or *slower* than "world" time according to the following formula: Let  $h$  be the number of the hour meridian, then *East* of the prime meridian, S. T. hours  $fast = 12 - h$  *West* of the prime meridian, S. T. hours  $slow = h - 12$ .

The principle of this simple means of distinguishing the twenty-four meridians constituting the sub-standards for reckoning time the world over, and the advantages to accrue from its universal application, are further explained in the Smithsonian Report for 1886, pages 351-2.

S. F.

January 21st, 1891.

TABLE No. 1.

## FOREIGN COUNTRIES.

Table showing the hour meridians numbered as on the accompanying map and conveniently situated for reckoning time under the hour zone system.

The last column gives the differences between local reckonings and the time of the world—universal time.

The sign PLUS indicates that local reckonings are in advance of, and MINUS that they are behind, world time in each case.

| COUNTRIES.              | HOUR MERIDIANS.               |                         | Hour Zone<br>Reckonings<br>faster or slower<br>than World<br>Time. |
|-------------------------|-------------------------------|-------------------------|--|
|                         | East or West of<br>Greenwich. | Numbered on<br>New Map. |  |
| Argentine Republic..... | 60 West                       | 16                      | — 4 Hours.   |
| Austria-Hungary.....    | 15 East                       | 11                      | + 1 "  |
| Belgium.....            | 0 —                           | 12                      | + 0 "  |
| Bolivia.....            | 60 West                       | 16                      | — 4 "  |
| Brazil.....             | 45 "                          | 15                      | — 3 "  |
| ".....                  | 60 "                          | 16                      | — 4 "  |
| Bulgaria.....           | 30 East                       | 10                      | + 2 "  |
| Costa Rica.....         | 90 West                       | 18                      | — 6 "  |
| Chili.....              | 75 "                          | 17                      | — 5 "  |
| China.....              | 120 East                      | 4                       | + 8 "  |
| ".....                  | 105 "                         | 5                       | + 7 "  |
| Colombia.....           | 75 West                       | 17                      | — 5 "  |
| Congo.....              | 15 East                       | 11                      | + 1 "  |
| Denmark.....            | 15 "                          | 11                      | + 1 "  |
| St. Domingo.....        | 75 West                       | 17                      | — 5 "  |
| Egypt.....              | 30 East                       | 10                      | + 0 "  |
| France.....             | 0 —                           | 12                      | + 0 "  |
| Germany.....            | 15 East                       | 11                      | + 1 "  |
| Greece.....             | 30 "                          | 10                      | + 2 "  |
| Hawaii.....             | 150 West                      | 22                      | — 10 "   |
| Honduras.....           | 90 "                          | 18                      | — 6 "  |
| Hayti.....              | 75 "                          | 17                      | — 5 "  |
| Heligoland.....         | 15 East                       | 11                      | + 1 "  |
| Italy.....              | 15 East                       | 11                      | + 1 "  |
| Japan.....              | 135 "                         | 3                       | + 9 "  |
| Mexico.....             | 105 West                      | 19                      | — 7 "  |
| Netherlands.....        | 0 —                           | 12                      | + 0 "  |
| Nicaragua.....          | 90 West                       | 18                      | — 6 "  |
| Norway.....             | 15 East                       | 11                      | + 1 "  |
| Paraguay.....           | 60 West                       | 16                      | — 4 "  |
| Persia.....             | 60 East                       | 8                       | + 4 "  |
| Peru.....               | 75 West                       | 17                      | — 5 "  |
| Roumania.....           | 30 East                       | 10                      | + 2 "  |
| Siam.....               | 105 "                         | 5                       | + 7 "  |
| Servia.....             | 30 "                          | 10                      | + 2 "  |
| Spain.....              | 0 —                           | 12                      | + 0 "  |
| Sweden.....             | 15 East                       | 11                      | + 1 "  |
| Switzerland.....        | 15 "                          | 11                      | + 1 "  |
| Turkey.....             | 30 "                          | 10                      | + 2 "  |
| Russia in Europe.....   | 45 "                          | 9                       | + 3 "  |
| ".....                  | 30 "                          | 10                      | + 2 "  |
| Russia in Asia.....     | 165 "                         | 1                       | + 11 "   |
| ".....                  | 150 "                         | 2                       | + 10 "   |
| ".....                  | 135 "                         | 3                       | + 9 "  |
| ".....                  | 120 "                         | 4                       | + 8 "  |
| ".....                  | 105 "                         | 5                       | + 7 "  |
| ".....                  | 90 "                          | 6                       | + 6 "  |
| ".....                  | 75 "                          | 7                       | + 5 "  |
| ".....                  | 60 "                          | 8                       | + 4 "  |
| Uruguay.....            | 60 West                       | 16                      | — 4 "  |
| United States.....      | 75 "                          | 17                      | — 5 "  |
| ".....                  | 90 "                          | 18                      | — 6 "  |
| ".....                  | 105 "                         | 19                      | — 7 "  |
| ".....                  | 120 "                         | 20                      | — 8 "  |
| Alaska.....             | 135 "                         | 21                      | — 9 "  |
| ".....                  | 150 "                         | 22                      | — 10 "   |
| Venezuela.....          | 60 "                          | 16                      | — 4 "  |





24 HOUR MERIDIANS FOR REGULATING STANDARD TIME.

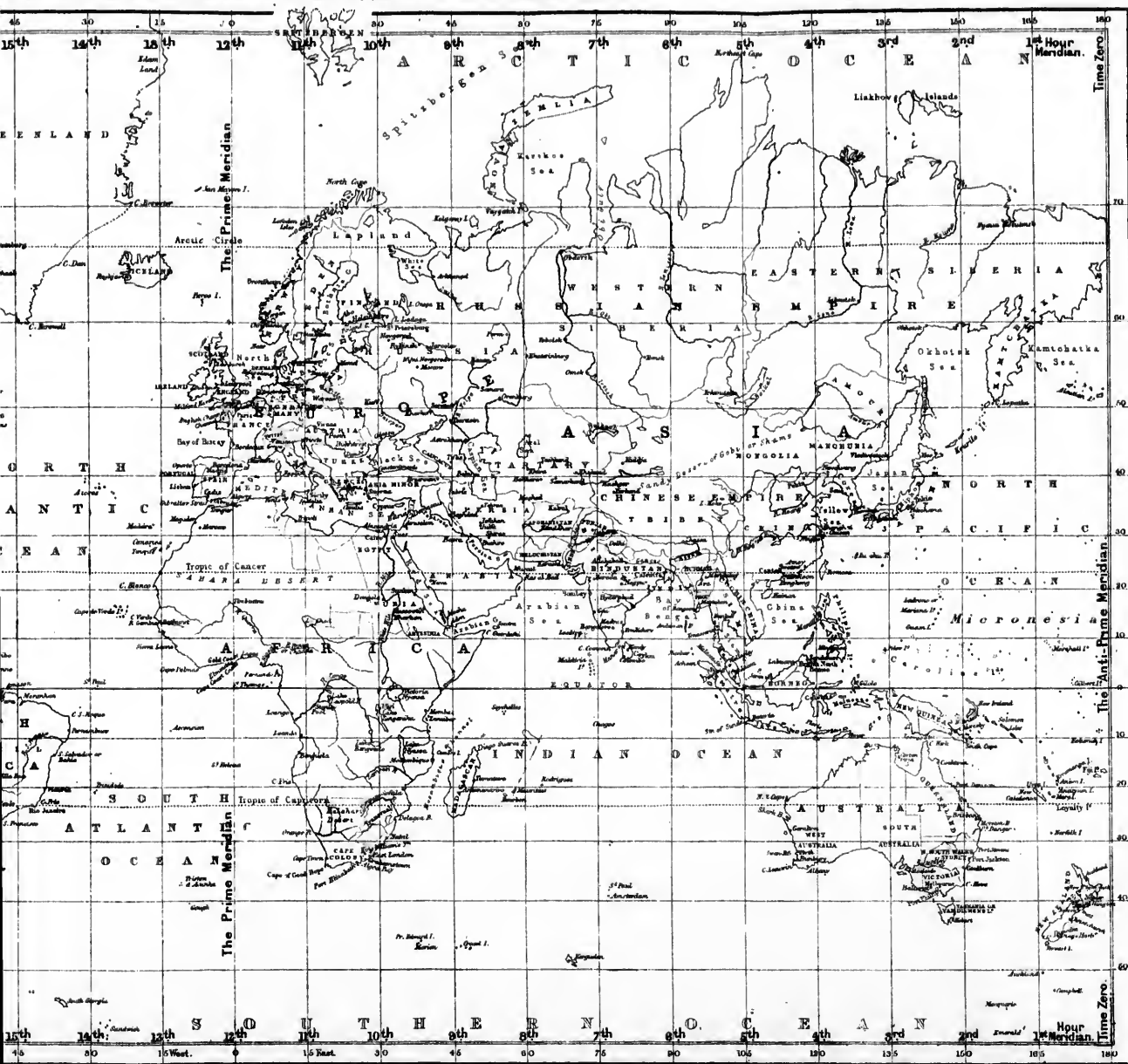


PLATE III.  
 PRO. AM. SOC. C. E.  
 VOL. XVII.  
 MAP OF 24-HOUR MERIDIANS  
 FOR REGULATING STANDARD  
 TIME.

Sanford, Geog. Estab. London

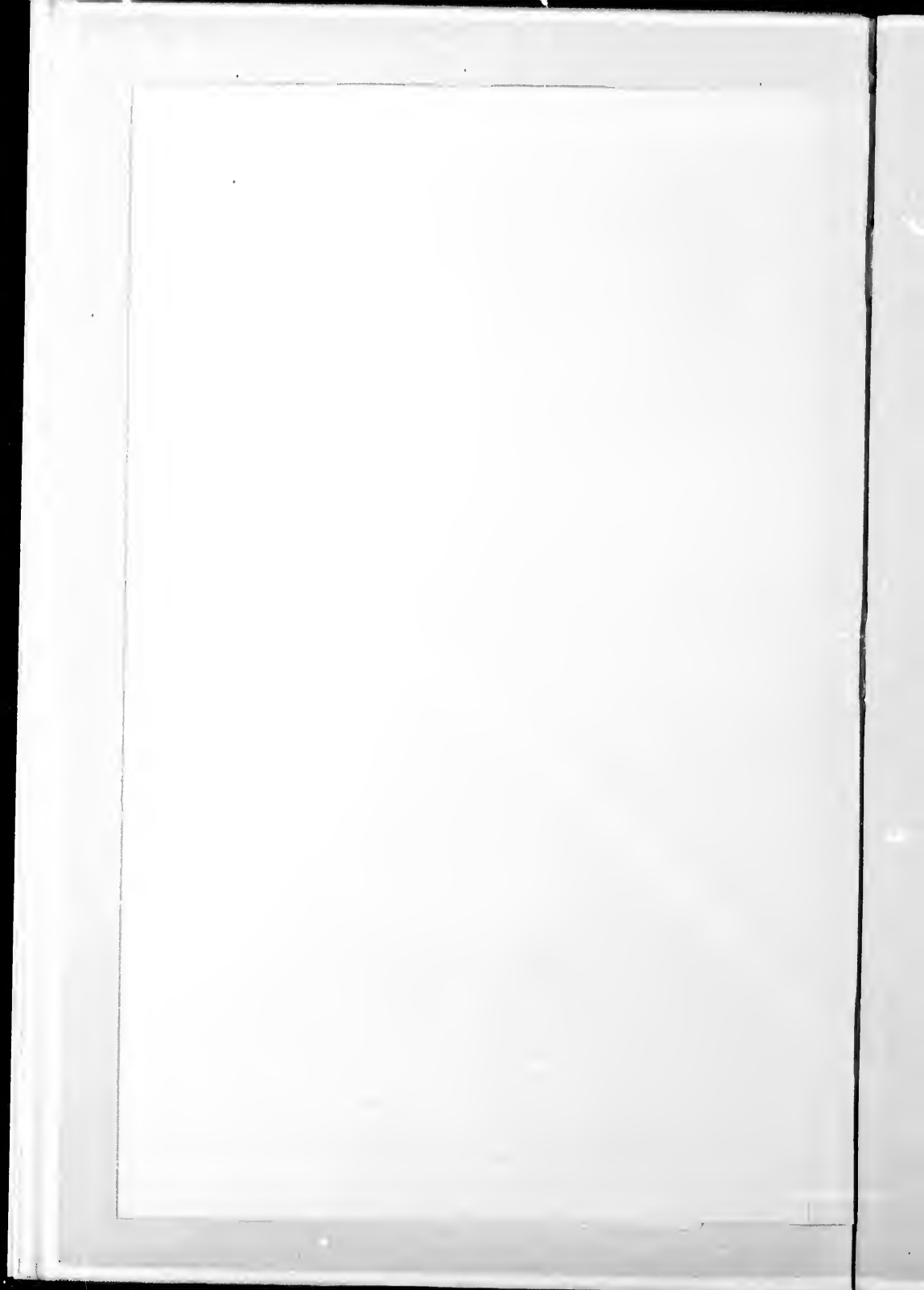


TABLE No. 2.

BRITISH POSSESSIONS.

Table indicating the hour meridians, numbered as on the accompanying map, which may be selected as local standards for reckoning time in each of the several British possessions.

The last column gives the differences between local reckonings and the time of the world—universal time. The sign PLUS indicates that local reckonings are in advance of, and MINUS that they are behind, world time in each case.

| COUNTRIES.                        | HOUR MERIDIANS.               |                     | Hour Zone<br>Reckonings<br>faster or slower<br>than World<br>Time. |
|-----------------------------------|-------------------------------|---------------------|--|
|                                   | East or West of<br>Greenwich. | Numbered on<br>Map. |  |
| The British Islands (comprising)— |                               |                     |  |
| England and Wales.....            | 0                             | 12                  | 0 Hours.   |
| Scotland.....                     | 0                             | 12                  | 0 "  |
| Ireland.....                      | 0                             | 12                  | 0 "  |
| Canada (comprising)—              |                               |                     |  |
| Nova Scotia.....                  | 60 West                       | 16                  | -- 4 "   |
| New Brunswick.....                | 75 "                          | 17                  | -- 5 "   |
| Prince Edward Island.....         | 60 "                          | 16                  | -- 4 "   |
| Quebec.....                       | 75 "                          | 17                  | -- 5 "   |
| Ontario.....                      | 75 "                          | 17                  | -- 5 "   |
| Manitoba.....                     | 90 "                          | 18                  | -- 6 "   |
| Assinibola.....                   | 105 "                         | 19                  | -- 7 "   |
| Saskatchewan.....                 | 105 "                         | 19                  | -- 7 "   |
| Alberta.....                      | 120 "                         | 20                  | -- 8 "   |
| Athabasca.....                    | 130 "                         | 20                  | -- 8 "   |
| British Columbia.....             | 120 "                         | 20                  | -- 8 "   |
| Australasia (comprising)—         |                               |                     |  |
| New South Wales.....              | 150 East                      | 3                   | + 10 "   |
| Victoria.....                     | 150 "                         | 2                   | + 10 "   |
| Queensland.....                   | 150 "                         | 2                   | + 10 "   |
| Tasmania.....                     | 150 "                         | 2                   | + 10 "   |
| South Australia.....              | 135 "                         | 3                   | + 9 "  |
| Western Australia.....            | 120 "                         | 4                   | + 8 "  |
| New Zealand.....                  | 165 "                         | 1                   | + 11 "   |
| Fiji.....                         | 165 "                         | 1                   | + 11 "   |
| New Guinea.....                   | 150 "                         | 2                   | + 10 "   |
| Possessions in Asia (comprising)— |                               |                     |  |
| India.....                        | 75 "                          | 7                   | + 5 "  |
| Burmah.....                       | 90 "                          | 6                   | + 6 "  |
| Ceylon.....                       | 75 "                          | 7                   | + 5 "  |
| Hong Kong.....                    | 120 "                         | 4                   | + 8 "  |
| Straits Settlements.....          | 105 "                         | 5                   | + 7 "  |
| Labuan.....                       | 120 "                         | 4                   | + 8 "  |
| West India (comprising)—          |                               |                     |  |
| Jamaica.....                      | 75 West                       | 17                  | -- 5 "   |
| Turk's Island.....                | 75 "                          | 17                  | -- 5 "   |
| British Guiana.....               | 60 "                          | 16                  | -- 4 "   |
| Bahamas.....                      | 75 "                          | 17                  | -- 5 "   |
| Trinidad.....                     | 60 "                          | 16                  | -- 4 "   |
| Barbadoes.....                    | 60 "                          | 16                  | -- 4 "   |
| Grenada.....                      | 60 "                          | 16                  | -- 4 "   |
| British Honduras.....             | 90 "                          | 18                  | -- 6 "   |
| St. Vincent.....                  | 60 "                          | 16                  | -- 4 "   |
| St. Lucia.....                    | 60 "                          | 16                  | -- 4 "   |
| Tobago.....                       | 60 "                          | 16                  | -- 4 "   |
| Antigua.....                      | 60 "                          | 16                  | -- 4 "   |
| Montserrat.....                   | 60 "                          | 16                  | -- 4 "   |
| St. Christopher.....              | 60 "                          | 16                  | -- 4 "   |
| Virgin Islands.....               | 60 "                          | 16                  | -- 4 "   |
| Dominica.....                     | 60 "                          | 16                  | -- 4 "   |



TABLE No. 2—Continued.

| COUNTRIES.                                 | HOUR MERIDIANS.               |                     | Hour Zone<br>Reckonings<br>faster or slower<br>than World<br>Time. |
|--|-------------------------------|---------------------|--|
|  | East or West of<br>Greenwich. | Numbered on<br>Map. |  |
| <b>Possessions in Africa (comprising)—</b> |                               |                     |  |
| Cape of Good Hope.....                     | 30 East                       | 10                  | + 2 Hours.   |
| Bechuanaland.....                          | 30 "                          | 10                  | + 2 "  |
| Basutoland.....                            | 30 "                          | 10                  | + 2 "  |
| Natal.....                                 | 30 "                          | 10                  | + 2 "  |
| Sierra Leone.....                          | 15 West                       | 13                  | - 1 "  |
| Gambia.....                                | 15 "                          | 13                  | - 1 "  |
| Gold Coast.....                            | 0                             | 12                  | - 0 "  |
| Lagos.....                                 | 0                             | 12                  | 0 "  |
| <b>Miscellaneous (comprising)—</b>         |                               |                     |  |
| St. Helena.....                            | 0                             | 12                  | 0 "  |
| Gibraltar.....                             | 0                             | 12                  | 0 "  |
| Malta.....                                 | 15 East                       | 11                  | + 1 "  |
| Cyprus.....                                | 30 "                          | 10                  | + 2 "  |
| Bermuda.....                               | 60 West                       | 16                  | - 4 "  |
| Falkland Islands.....                      | 60 "                          | 16                  | - 4 "  |
| Aden.....                                  | 45 "                          | 9                   | + 3 "  |
| Ascension.....                             | 15 West                       | 13                  | + 1 "  |
| Fanning Island.....                        | 150 "                         | 22                  | - 10 "   |
| Mauritius.....                             | 60 East                       | 8                   | + 4 "  |
| Newfoundland.....                          | 60 West                       | 16                  | - 4 "  |



