

## Standard Railway Time.

PEOPLE whose journeyings have been limited to short distances can hardly appreciate the perplexity experienced by a traveler who undertakes to make a long tour in this country, when he endeavors to ascertain by what standard he must time his movements in order to catch a train advertised to depart at a certain hour. It is a lamentable fact that our railways are run to-day by no less than fifty different meridian times, varying from each other by all sorts of odd combinations of minutes. The roads using the various standards cross and interlace each other in such a puzzling manner as to render any ready acquisition of knowledge of the standard by which each is governed a sheer impossibility. Studying a map of the system is like tracing the intricacies of a labyrinth.

This condition of affairs has largely arisen from the fact that, in the early days of railroads, the several lines were isolated from each other, and each, as a rule, adopted as its standard the meridian time of the city in which its head-quarters happened to be located. As these lines were extended and branches were constructed, each adhered to its original standard, or compromised upon some intermediate meridian suitable for its own system, without regard to the standards of other lines in the same section. Many new lines of road, using standards varying from all the others, have been constructed across the original lines, thus adding to the confusion, which was bad enough before. So generally does this condition of affairs exist, that there is to-day scarcely a railroad center of any importance in the United States at which the standards used by the roads entering it do not number from two to five. The inconvenience this causes was aptly expressed, not long since, by a bright and intelligent Virginia lady, one of a party of tourists. Finding herself utterly unable to reconcile the time shown by her usually reliable watch to the varying times shown by the railway clocks at different points, she turned to the writer, and, using a provincial expression, asked appealingly: "Please tell me what is *sure enough* time?"

An effort is now being made in railway circles to arrive at a "sure enough" time, which has been not only indorsed but strongly recommended for adoption by the managing officers of a large number of important railway lines.

The system proposed is based, so far as it affects the railway lines, upon readily understood principles.

*First.* That the same standard should be used by all lines within sections as largely extended as may be possible, without entailing such a difference between local and railroad time as to cause inconvenience to the public. It is believed, however, that as exact time is seldom required except for purposes connected with transportation, standard time could be readily substituted for local time in all cases where the difference would not be much over thirty minutes.

*Second.* That where a second standard becomes necessary, it should differ from the first by the simplest and most readily calculated variation,—an even hour.

*Third.* That the changes from one standard to another should be made at well known points of departure, and so far as may be possible at points where changes now occur, and where no practical difficulty would cause danger or inconvenience to railway operations.

The section of country which includes within its limits over eighty per cent. of all the railways lies within thirty degrees of longitude westward from the eastern boundary of the State of Maine.

In railway circles, all roads east of Buffalo, Pittsburg, Wheeling, Bristol (Tennessee), etc., are distinctively known as Eastern roads, and the lines west of those points as Western roads. In examining a map of these Eastern roads, grouped together, we find that a meridian line, drawn centrally between their eastern and western extremities, coincides almost exactly with the seventy-fifth meridian west from Greenwich. A similar grouping of the Western roads between Buffalo, Pittsburg, etc., on the east, and the western boundary of Kansas on the west, develops the fact that the ninetieth meridian west from Greenwich is very approximately the central meridian for the system of roads embraced within that section.

The seventy-fifth and ninetieth meridians being fifteen degrees apart, their time differs, of course, by an even hour. It is proposed that all railroads east of Buffalo, Pittsburg, etc., shall use the seventy-fifth meridian time, which is approximately four minutes slower than the meridian time of New York; and that the Western roads shall use the ninetieth meridian time, which is nine minutes slower than Chicago time.

The meridian equidistant from these central meridians crosses the railway lines in Ohio and other States at points where the peculiarities of railway operations prevent the change being made from one standard to another, and the difficulty has been met by extending the Western standard to the eastern termini of such roads at Buffalo, Salamanca, Pittsburg, etc. Similar practical questions decide the standards for all roads south of the points named to Charleston, South Carolina. In Canada, all roads between Quebec and Detroit would use the seventy-fifth meridian time. The western limit of the ninetieth meridian, or "central time" system, is fixed at points on the great transcontinental lines, where a complete change is now made in the personnel of the hands in charge of trains, or, more technically speaking, at the ends of divisions. The standard for the next western or "Mountain" system is the time of the one hundred and fifth meridian, which coincides with Denver (Colorado) time, and, for the Pacific coast, that of the one hundred and twentieth meridian. The change from the Mountain to the Pacific system is proposed to be made at Yuma, Ogden, and Missoula, all convenient locations. For the extreme eastern section, east of Quebec and Vanceboro, the sixtieth meridian time may be employed.

By the adoption of this system over eighty per cent. of the railroads will use but two standards where they now use forty, and these standards will differ from each other by an even hour. The standard for each section will differ from every other section by one, two, three, or four hours; hence the minutes will be identical in all the sections. At points where the changes are made from one standard to the next, as Pittsburg, Wheeling, etc., similar changes are now made, the distinction being that instead of the readily calculated difference of one hour these changes now consist of differences of odd minutes varying from thirteen to thirty-six, numbers inconvenient to calculate and which constantly cause annoying mistakes.

It has been pretty generally conceded that the system proposed will be, *per se*, advantageous to the railway companies. As affecting the general public, the traveling portion will certainly be benefited. For the rest, numerous instances now exist where railroad time is exclusively used without inconvenience in localities where the railroad standard differs by over thirty minutes from true local time.

Multiples of Greenwich time have been adopted for the system proposed, because they have been found to be the meridians best adapted for the purpose desired to be accomplished. It is a petty, school-boy patriotism which urges that Washington time should be adopted as the prime meridian, in the face of the fact that its adoption would aggravate rather than diminish the difficulties of the situation, so far as the railways at least are concerned.

The adoption of the system proposed will reduce the present uncertainty to comparative if not absolute certainty; and as Greenwich time is the standard by which all navigators' chronometers are regulated, it will give us a national standard time that will be in harmonic accord with a system which may be extended to include within its limits the whole world. For reasons of this nature, every scientific society in this country which has considered the subject has recommended the adoption of the seventy-fifth, ninetyeth, etc., meridians west from Greenwich as those upon which time standards should be based.

But the question whether these meridians are also best adapted for the use of the railways, and how they can be practically adopted without serious inconvenience, has been heretofore an open one in railway circles. It is hoped and believed that a solution has now been reached. The question is to be finally decided at conventions of railway managers to be held in Chicago and in New York City in October, 1883.

W. F. Allen.

#### Reforming the Alphabet.

IN "Science" for June 1st, Mr. Alexander M. Bell designates six consonant sounds in the English language as having no proper letters to represent them, and proposes that the deficiency be supplied with "Visibl Speech" symbols. Five of the six sounds which he mentions ar the same as five of the six usually designated by spelling reformers as not properly represented; but he puts in *wĥ* and leaves out *ch*. Now that the combination *wh* represents, not a singl sound, but two sounds, any one can prove for himself. If there is but one sound it will be possibl to "hold" it, in the musical sens; but the result of a trial in this case is the sound of *h* followed by that of *u* in *quack*, or els som noise never represented by *wh*.

Then why is *ch* omitted? From his spelling *catch* in his list of exampls with the sign for *sh*, it may be inferred that Mr. Bell would reply that *ch* is made up of *t* and *sh*. The holding test does not giv a distinct result in this case, owing to the peculiarity of the sound; but a trial wil prove that *ch* is pronouncd with the vocal organs in one position, and hence stands for a singl sound. That the sound of *ch* does not include that of *sh* becoms evident from it being necessary,

after pronouncing the former, to change the positions of the tongue and lips slightly before *sh* can be spoken.

Mr. Bell givs the six "Visibl Speech" letters which he proposes as substitutes, and invites the reader to judg as to the simplicity of their forms and their adaptability for intermixture with Roman letters. They are not prepossessing, for, not having any structural elements in common with Roman characters, they look even more out of place than script letters would if mixt with Roman. The sign for *sh* is almost exactly like an eye such as ar used with hooks on ladies' dreses; that for *zh* (*z* in *azure*) is the same with an aded mark; those for the two sounds of *th* resembl script *w's*; that for *ng* is not so easily described, but the main part of it resembls the apothecary's scrupl mark. Their foreign look is, of course, the least rational objection, but practically it would be found the hardest one to remove. Another disadvantage is that the similarity of two pairs of these letters would cause many mistakes in distributing type. The argument that by these and other fysiological signs the pronounciation of foreign words can be represented, is no reason for introducing them into the alfabet in which our daily papers, our Bibls, and school-books ar printed. "Why not hav two alfabet?" Mr. Bell asks; an excellent suggestion, but let the "Visibl Speech" alfabet be kept distinct for the use of def mutes, for grammars of foreign languages, and other filological uses. There is no more need of continually reminding the reader of the vocal proces he uses in speaking each letter, than of reminding him as often as he sees the word that *husband* was originally *house-band*.

What shal we do, then? for, as Mr. Bell says, the new letters advised by som reformers hav failed to be adopted by the rest. Wel, here is a plan which the writer formed over three years ago, and which he stil deems the most feasibl. Reformers ar agreed that *g*, *x*, and either *c* or *k* must go. The retaining of *k* rather than *c* would seem preferabl, because when a person sees a *k* he knows alreedy what it stands for, and would not hav to forget that it sometimes denoted the same sound as *s*. A tendency in this direction has begun in the spelling of Sokrates, Sanskrit, and som other foreign words. The fact that *k* is preferred in German, to which the Anglo-Saxon part of our language is so closely allied, also pronounces in its favor, for, as Mr. Bell insists, international agreement is highly desirabl. Now, why not use these discarded familiar letters for thre of the unrepresented sounds, insted of offending the eye unnecessarily with newly devised signs, and requiring every foreigner who lerns our language to share the burden? In deciding which sound each letter shal represent, let us invoke again the principl of international agreement. Thus, in Italian, *c* in certain situations has the sound of *ch* in *church*; why not choose a change that makes one more point of agreement between the two languages insted of one that makes another point of differenc? The use of *x* for the *zh* sound would not be far from its present initial use, as in *xylofone*; and, if no weightier determining reason arose, let *q* take the place of *ng*, because it resembls *g* in projecting below the line. Perhaps it wil be decided to replace *w* and *y* by vowels, as in Franklin's scheme; if so, these with one Anglo-Saxon letter, alreedy lookt upon with favor, would make up the six lacking consonants.

of the person for whom the letter was intended. He discovered the error almost instantly, and tearing up the envelope and throwing the fragments upon the floor, he addressed another. Late that evening, after I had gone to bed, there came a knock at my door. I opened it cautiously, and was confronted by Prince Krapotkin. He was embarrassed and confused, and apologized for calling at that late hour, but said that he could not sleep without finding and destroying every fragment of the envelope upon which he had inadvertently written the name of his brother. "This may seem to you," he said, "like absurd timidity, but it is necessary. If the police should discover, as they probably will, that I visited you to-day, they would not only examine the servants as to everything which took place here, but would collect and fit together every scrap of waste paper found in your room. They would then find out that I had addressed an envelope to my brother, and would jump at the conclusion that I had written him a letter, and had given it to you for delivery. How this would affect you I don't know, but it would be fatal to me. The least I could expect would be the addition of a year to my term of exile, or banishment to some more remote part of Siberia. I am strictly forbidden to communicate with my brother, and have not heard directly from him or been able to write to him in years." I was familiar enough with the conditions of exile life in Siberia to see the force of these statements, and we began at once a search for the fragments of the envelope. Every scrap of paper on the floor was carefully examined, but the pieces which bore the dangerous name, "Pierre A. Krapotkin," could not be found. At last my traveling companion, Mr. Frost, remembered picking up some torn scraps of paper and throwing them into the slop-basin. We then dabbled in the basin for twenty minutes until we found and burned every scrap of that envelope upon which there was the stroke of a pen, and only then could Prince Krapotkin go home and sleep. "Two years hence," he said to me as he bade me good-night, "you may publish this as an illustration of the atmosphere of suspicion and apprehension in which political exiles live. In two years I hope to be beyond the reach of the Russian police." Poor Krapotkin! Less than two years have elapsed, and his hope is already realized, but not in the way we then anticipated.

When I kissed him good-bye on the following day he was full of anticipations of freedom and a new career outside the limits of Russia. His term of exile would have expired in September of the present year, and it was his intention to go at once to Paris. His only fear was that at the last moment an addition of two or three more years would be arbitrarily made to his term of exile. That, he admitted, would be a terrible blow to him, because he had nearly exhausted the little money which remained from the wreck of his small private fortune, and he could not support his family upon the pittance of three dollars a month which is the allowance made by the government to political exiles in Western Siberia.

The evil which he dreaded probably came upon him. I have no information as to the circumstances which brought about his suicide, but there would seem to be little doubt that late in August he was informed that he would not be permitted to return in September to European Russia, and that, in a fit of despair, he

took his own life. It would be easy for such a man, in the bitterness of his disappointment, to reason himself into the belief that his wife and children would be better off without him than with him, and when once this morbid belief had taken possession of him, there would be little to restrain him from suicide. In Prince Alexander Krapotkin's death Russia loses an honest man, a cultivated scholar, a true patriot, and a gallant gentleman.

*George Kennan.*

#### Time-Reckoning for the Twentieth Century.

IS THERE not a necessity for reform in our system of time-reckoning? Scientific authorities and railway managers are pretty generally agreed that there is, but they are not sure that the public is prepared for what at first sight may appear too radical changes on use and wont. I am inclined to think that the public is more intelligent and more ready for useful changes than doubters suppose. There is certainly room for reform. According to the system of local time, there are in the world as many different days as there are meridians round the circumference of the globe.

"These days overlap each other, but they are as perfectly distinct as they are infinite in number. There are no simultaneous days on the earth's surface, except those on the same meridian, and as the different days are always in the various stages of advancement, difficulties must necessarily result in assigning the precise period when an event takes place. The telegraph may give the exact local time of an occurrence, but it will be in disagreement with the local time on every other meridian around the earth. An event occurring on any one day may on the instant be announced in a locality where the time is that of the previous day, and in another locality where the time is that of the following day. About the period when the month or year passes into another month or year, an occurrence may actually take place, according to our present system of local reckoning, in two different months or in two different years. Indeed, there can be no certainty whatever with regard to time, unless the precise geographical position be specified as an essential fact in connection with the event described. Under these circumstances it must be conceded that our present system of notation is most defective. Certainly it is unscientific, and possesses every element of confusion. It produces a degree of ambiguity which, as railways and telegraphs become greatly multiplied, will lead to complications in social and commercial affairs, to errors in chronology, and to litigation, and will act as a clog to the business of life, and prove an increasing hindrance to human intercourse."

Thus argues Mr. Sandford Fleming, who has done so much to press this subject on the attention of the world, in a memoir read by him before the Royal Society of Canada, in May last, and prepared for publication in the Smithsonian Institution Reports. To show how unscientific is the system of reckoning time by our position on the earth's surface, we have only to reflect that every meridian converges at the pole. If we ever get there, we can take our choice between the days of Berlin, Paris, London, New York, Winnipeg, San Francisco, Pekin, Calcutta, and as many others as we like, and live at the same moment of time in the different hours, days, months, or years of different places. What a blissful place for the Irishman who pathetically complained that he wasn't a bird, and therefore could not be in two places at once!

The present system has human inertia on its side, and nothing else. It leads to loss of time and loss of

life. It subjects travelers and men in business in particular to innumerable annoyances and perplexities. It is altogether unsuited to an age of railways, telegraphs, and submarine cables. What is needed to secure a perfect system? Simply this, that as we have in the revolution of the earth on its axis a standard of time accepted by all men, all should agree on a zero or prime meridian from which the revolutions are to be counted, and accept a common subdivision and a common notation by which parts of the revolution shall be known by all. Canada and the United States have already taken important steps in this direction. By the scheme of hour meridians, the days in North America, which formerly were as numerous as the number of places that observed their own local time, have been reduced to five. We have thus recognized the absurdity of each town, State, or Province choosing its own zero, and maintaining a separate reckoning. This reform was accepted by the people with a unanimity and promptitude that ought to show that the nineteenth-century public may be trusted. A more important step was taken when the President of the United States, influenced largely, I believe, by President Barnard of Columbia College, invited delegates from all nations to a scientific conference at Washington to consider the subject of time-reckoning.

At this International Conference, which met in the autumn of 1884, and at which twenty-five nationalities were represented, Greenwich was accepted as the most expedient zero, and a proposal for a universal day, to begin for all the world at the moment of mean midnight of the initial meridian, and the hours of which should be counted continuously from zero to twenty-four, was adopted.\* The advantage of having the day unbroken will be appreciated by travelers who have puzzled over railway guides and been particularly baffled by the A. M's and P. M's. They will be glad to know that a special committee of the American Society of Civil Engineers has announced (January, 1886) that one hundred and seventy-one managers and officers of railways in the United States and Canada have declared their readiness to abandon the division of the day into half-days, known as ante and post meridian, and to accept the numeration of the hours in one series from midnight to midnight. The Canada Pacific Railway has actually adopted the twenty-four-hour system on its main line and branches between Lake Superior and the Pacific. Mr. Fleming now suggests the beginning of the twentieth century as the best starting-point for the general adoption of the cosmic day of twenty-fours counted continuously.† The only question to be asked is, Why not sooner, if it must be soon or late?

It has been objected that this universal or cosmic day may be accepted for scientific purposes, but that it would never do to change the hours to which we have been accustomed in ordinary life for ordinary uses; that, for instance, it would be impossible for us to associate noon with seven o'clock instead of twelve. But such persons forget that no thing, no fact of nature, would be changed, and that it is not a law of Heaven that noon should be known as twelve o'clock. Sunrise and sunset, dawn

and noon, "early candle-lighting," as our fathers denominated the gloaming, and bed-time, would come as usual. Only the numbers of the hours with which we have associated those facts would be changed, and in an incredibly short time we would become accustomed to the change. In some countries the day is divided into four parts. To the people in whose minds noon is associated with six o'clock, it must sound very oddly when twelve o'clock is used as the equivalent for noon. In ancient times each nation had its own chronology, just as it had its own language, laws, and religion. When the Roman Empire became practically coextensive with the world a general system of chronology was required. Hence the introduction of the Julian Calendar, which, with the rectification made under the direction of Pope Gregory, has regulated the Christian centuries. But, like everything else, the Gregorian Calendar itself is now seen to be antiquated. It is unsuited to modern facts and conditions. The world is much larger than when Rome spoke "*urbi et orbi*," and, thanks to steam and electricity, it is at the same time much smaller. New discoveries and inventions are annihilating space, and everything that interferes with the full recognition of the unity and solidarity of the race must be shaken and disappear. "If," says Mr. Fleming, in the memoir from which I have already quoted, "the reforms of 46 B. C. and 1582 A. D. owed their origin to the dominant necessity of removing confusion in connection with the notations which existed in the then conditions of the human race, in no less degree is a complete reform demanded by the new conditions which are presented in this age. The conclusions of the Washington Conference make provision for the needed change, and they will in all probability be held by future generations to mark an epoch in the annals of the world not less important than the reforms of Julius Cæsar and of Pope Gregory."

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#### Genius and Matrimony.

THE literary taste of our day inclines strongly in the direction of personal memoirs, private letters, and biographical and autobiographical sketches. It is not surprising, therefore, that amongst the most widely read books which have issued from the Anglo-American press of late years, we should find those edited by James Anthony Froude, unfolding to a curious public the home life of Thomas Carlyle, and the "Nathaniel Hawthorne and His Wife," by their son, Mr. Julian Hawthorne. The lives of these two men of genius, Carlyle and Hawthorne, disclose such a startling difference of experience on the part of their wives that they may seem to preach very different gospels to romantic and ambitious young women. But do they? Mrs. Carlyle, after years of married life, cries from the bitterness of a nagged-out spirit, "My ambition has been more than gratified in Carlyle, and yet I am miserable!" Mrs. Hawthorne, after eight years of daily companionship, and the endurance of trials and comparative poverty more severe than any her English sister had to contend with, writes to her mother: "I never knew such loftiness so simply borne. I have never known him to stoop from it in the most trivial household matter, any more than in a large or more

\* The names of the delegates on the part of the United States were Admiral C. R. P. Rodgers, Professor Cleveland Abbe, Commander W. T. Sampson, Louis M. Rutherford, and William Frederick Allen.—EDITOR.

† This suggestion was first made by Prof. Simon Newcomb, in December, 1884.—EDITOR.