

# INTERNATIONAL TIME.

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[Read January 17th, 1913.]

In dealing with the subject of international time, I should like to state at once that I propose to deal with it in a popular style without any scientific terms, as I think that there have been some misunderstandings of the subject due to the elaborate scientific explanations which have been put forward, and not understood.

I propose to first explain what I mean by the expression "International Time." I refer to an arrangement between the nations who belong to the Postal Union, entered into about 1884, under which a general system of time applicable to the whole world was introduced, and recommended to the various nations who had joined the Postal Union, nearly all the civilized globe.

The general idea was that the earth was to be divided into twenty-four sections from North to South, and that all the clocks of all the territories inside any section should keep the same time, that is to say, should have all the hands of the correct clocks pointing to twelve o'clock at the same time, the clocks of the next section to the West were all to be one solid hour later, thus pointing to eleven when the Eastern were at twelve, and so on right round the world.

This, I think, is a simple and sufficient definition of what is meant by international time, but I think it will be better as regards dealing with the general subject to adopt a more historical attitude and show how the idea of sun-rise, mid-day, and sun-set arose, also the origin of months, years, days, and finally hours.

There can be little doubt that men originally reckoned by the moon, with her monthly periods of twenty-eight days. This is the Turkish system to this day; the Turk has twelve moons of twenty-eight days each, and his year is twenty-nine days out with disastrous effects on his chronology. I do not blame the Turk for his bad system. I blame him for his inherent incapacity for change and improvement, which has been the distinguishing mark of his nation.

At the same time, it is only fair to point out that nations living in the torrid zone have always equal day and night, so that they have no mid-summer or mid-winter day, and even in the more southern portions of the temperate zones the change in length is not so pronounced as in the higher latitudes near the Poles, where we find the mid-summer and mid-winter, the longest and shortest days, commemorated as festivals by the pre-Christian nations.

At the same time, astronomy had made considerable progress in very early times, and, omitting the Egyptians and Chaldeans we find that Caesar and his advisers had a very considerable knowledge of astronomy and time, and had fully grasped the fact that the year did not contain an exact number of days, but some odd hours. It is true that Caesar did not provide for a few odd minutes, but the accumulated error since his time is even now only thirteen days, as we all know from the Russians Calendar, as they use the Julian year without

the correction introduced by Pope Gregory XIII., in 1582, and adopted by the United Kingdom in 1752, and by Sweden later still.

I may add that Caesar was by no means ignorant of sidereal phenomena, and that he did not follow blindly his advisers. This is evident from the fact that during the hurry of his hasty campaign in Kent he found time to record that he found by careful water-clock measuring that the summer nights in Britain were shorter than in Italy. Only a man well up in science would observe such a fact and make a note of it, and yet Caesar was in Britain in 55 B.C.

The water clock or clepsydra was a description of hour glass, filled with water falling drop by drop, instead of sand, and it was used for hundreds of years, and must have been made with much care.

After Caesar's time the development of time machines did not make much progress for hundreds of years, and though there are mentions of " clocks " about the year 1300, I am inclined to think that many of these so-called " clocks " of the Dark and Middle Ages were merely bells struck at certain intervals measured by a clepsydra or even an hour glass, and possibly fitted with some trigger arrangement for re- leasing a catch and striking a bell. I have actually seen such a machine.

In the meantime, however, men had found out that moving to the East caused an "earlier dawn, and moving West a later, and the mariner's compass had been brought from the East to Venice by Marco Polo, about 1295, and in fact mariners had travelled far, and had discovered several ways of ascertaining their position on the globe.

It was only natural that the clocks, whatever they might be, were gradually improved in the course of the ages, but the real great discovery was the uniform swing of the pendulum discovered early in the reign of Elizabeth, and then about the same time the substitution of a spring for a hanging weight as a motive power, for then, and then only a clock became portable, and watches immediately started into existence.

We find watches mentioned in Shakespeare, who was born in 1564, and who, perhaps, may have begun to write about the time of the Spanish Armada twenty-four years later.

It was, of course, recognised at an early period that a watch capable of marking perfect time would be of great assistance in navigation, as the sailor could then compare his " home time with the local and thus calculate his distance, and this led to a prolonged contest between the astronomers, who wished to proceed by observations of various sidereal phenomena, and the watchmakers, who sought to construct a perfectly accurate time-piece, and it ended in 1765 in favour of the watch makers when John Harrison produced a watch so correct that a sailor could calculate his longitude within eighteen miles by its use. After some difficulty and delay, to which I need not refer, he received the £20,000 reward which had been offered by the Government for a watch which would allow of the longitude being calculated within thirty miles.

We are not concerned at present with the calculation of a ship's position, it is sufficient for my present purpose to point out that, to be strictly accurate, no two places can have their mid-

day at precisely the same time unless they be exactly north and south of each other, if there be any difference east and west of each other, then by strict rule the mid-day of the eastern will be earlier than the western. It may be only a second or two, or twenty-five minutes as between Greenwich and Dublin, or two hours as between Petersburg and London, but there must be a difference. The great cause of all the mistakes about "national " time is the prevalent idea that it is possible to have really correct time for a whole country. Any arrangement must be the result of some compromise, for every spot has its own mid-day, so far as east and west is concerned. i( National Time " is, in fact, a modern conventional expression.

It is advisable also to remember that the distance cannot be measured in miles. The various meridian lines, or degrees of longitude pass through the Poles, and though the degrees are about 70 miles apart at the equator, they are much closer together at, say, the Arctic and Antarctic circles.

The result is that theoretically every spot should have its own mid-day, and so long as travelling was slow there could be no harm or difficulty experienced. Probably before the era of steam, no one, with the possible exception of Daedalus in his famous flight from Crete on the first recorded use of a flying machine, ever accomplished 100 miles in a day., but when locomotives began to run at. say, 30 miles an hour, twelve hours would take a traveller 360 miles, and this, if from east to west, would make a very substantial difference between the local time at the end of his journey, and that by which he started. Roughly, in the latitude of Dublin, it would amount to about half an hour.

It followed, consequently, that the introduction of railways raised a great difficulty as regards time, as a train going east would have to travel faster to keep to the various local times, while on the return journey to the west it could slow down considerably and yet keep excellent time. In travelling from London to Penzance, where the true time is twenty minutes behind the clock, the distance being 326 miles; the traveller would have twenty minutes to spend on the journey while on the return journey he would have to make up a loss of twenty minutes. Putting it another way, a traveller on arriving at London from Penzance would find his watch twenty minutes slow, while a Londoner arriving at Penzance would find his infallible chronometer twenty minutes fast according to the local time.

I merely use these two places because we have no such run east and west in this country, there is really less than ten minutes between Dublin and Galway.

This difficulty with the railways actually existed fifty years ago, it led to the introduction of the singular expression "railway time" which was used on the railways, and the ordinary local time of the place, and it was only gradually that the railway time swallowed the local.

As a matter of fact, the railways adopted the time of the capital of the country. London time was used in Great Britain, the hour of Paris in France, and of Berne in Switzerland, while in Ireland we eventually had Dublin time. So far as I can ascertain the original time in Ireland differed by forty minutes from Greenwich, but I cannot tell the reason ; forty minutes later than Greenwich would represent approximately the sun time in Cork. When I was a young man in Trinity, the College still retained this old time, and the clock was kept a quarter of an

hour later than the rest of the country. The use of the time of the capital was, of course, a make-shift ; it sufficed for Europe, but when the United States spread over their wide territory to the Pacific, across some 3,000 or 4,000 miles, there was a difference of about four hours between Boston on the Atlantic, and San Francisco on the Pacific. It would have been absurd to have a clock proclaiming some-thing like mid-day in San Francisco when the winter sun was rising, and it became necessary to adopt some different system.

The first alternative, that every State in the Union should have a time of its own would have been still worse ; it might be endured in Europe where there were well-known frontiers, and considerable difficulties and restrictions in passing them, with Custom House regulations and other similar amusements to pass the time and divert attention, but the incessant alterations of clocks and watches at irregular intervals was felt to be intolerable, and the United States accordingly adopted the plan of only altering the clock when it had got a whole hour astray, and changing a whole hour at a time. New York was, accordingly, allotted " Eastern Time " ; Chicago, 1,000 miles west, had " Central Time," exactly an hour later, and so on across the Continent.

Up to this point we have been merely dealing with the railways, but now it is time to deal with the electric telegraph, and I fear it will be necessary to make a somewhat lengthened statement.

The first practical working of the electric telegraph was in 1837, the year the late Queen Victoria came to the throne, and one of the things which attracted attention to it was an arrest for murder when the news was sent from, I think, Slough to London, that the murderer was travelling by train, and he was met by the police on his arrival at Paddington and, perhaps, furnished the striking scene in Firth's well-known picture of the railway station where the police are arresting a criminal at one compartment, while a bride and bridegroom-are taking their places in the next. The incident directed an immense amount of attention to the telegraph, and increased its popularity, and it is hardly necessary to trace its development, but it may be well to give a few leading dates.

The first public Telegraph Company was founded in 1846, the Electric and International Company, and this was followed by a number of others, involving great confusion, as their wires ran, or did not run, to various cities and places, and eventually on the 1st February, 1870, the Government took over the lines, a course generally followed by other countries.

Telegraph lines had in the meantime been introduced abroad though, as a rule, they were not so efficacious as the British, but it is not necessary to go into them at any length, and the next great step, submarine telegraphy, was first adopted between France and England, though this was nothing like so important as the celebrated cables to the United States, the first of which was laid in 1859, though partly owing to the interruption caused by the great American Civil War from 1860 to 1865, the first really successful cable was only laid in 1866. Now there are upwards of twelve cables across the Atlantic, and there are others to South America, New Zealand, Australia, Japan, China, till the whole earth is connected together, and there is hardly a place with any approach to civilization without a telegraph station.

Now came a fresh revolution, headed by, of all people in the world, the great Prince Bismarck, who brought forward the plan of a general Postal Union, with an international Board of Control, and a general rate of postage for the world.

This worked well, and with many of the telegraphs under the control of the Government of the countries it became possible through the Postal Union to deal with the question of time.

Up till then there had been a number of make-shifts. For instance, I remember a central dial marked 'London' and round it were a number of smaller dials marked Paris, New York, Melbourne, Petersburg, Capetown. If you wanted to know what hour in any of these places corresponded with, say, 10 o'clock in London, you turned the hands of the central dial till they reached 10, and each smaller dial marked the equivalent hour in the other places.

The Postal Union took up the question in a practical spirit, and eventually the Americans brought forward their plan of changing the time by solid hours without minutes, as already explained, and they suggested that instead of each country having its own time taken from some local standard, generally the hour of the capital, the whole world from north to south should be divided into sections something like the lines one sees on a peeled orange, only there were to be twenty-four sections, one for each hour. Then all the countries in each section from north to south would have the same time whether in the northern or southern hemisphere.

It is sufficient to illustrate the idea by the example of Europe, without taking the lines down to the South Pole. Roughly, there is a difference of three hours in crossing Europe from Russia to Spain, and Europe was, therefore, divided into three zones or belts running north and south, and really extending from the North to the South Pole, and these zones were named respectively, "Western Europe," "Central Europe," and "Eastern Europe," and all the nations of Europe were to belong to one or other of these zones, regardless of nationality, alliance, enmity, war or peace; all were to agree as to time. Western Europe contained Belgium, Holland, the British Isles, France, Spain and Portugal. Central Europe had a larger number, it included Norway, Sweden, Denmark, Germany, Austria, Switzerland, Italy. Eastern Europe principally contained Russia and Turkey.

Of these three zones, Eastern Europe came first, Central Europe an hour later, and Western Europe an hour later still. Hence, when the clocks of Petersburg were striking twelve, those of Frankfort are only chiming eleven, while those in Western Europe are tolling out ten.

Of course, I am only giving Europe, though the zones went from one Pole to another. Even a momentary glance at a map of Europe will show that the meridian of Greenwich runs through part of Spain and France, though not through Paris or Madrid, and continuing its course to the south, passes through Algeria, then across the Sahara, not far from the celebrated, if somewhat, legendary City of Timbuctoo, and narrowly misses St. Helena. Napoleon must have died by British time in a British Island.

Again, it does not take much examination to discover that longitude 15 East passes through Sweden, Norway, very near Berlin and Naples to Tripoli, while longitude, 30 East, passes

through Petersburg, close to Constantinople in Turkey, and Alexandria in Egypt, and by passing through Bloemfontein in the Orange River Colon gives it the same time as Eastern Europe, two hours in front of us.

As regards the first meridian, it is, perhaps, advisable to explain how the so-called "Greenwich Time " came into use, as a good deal has been said of this by people who do not know much, if anything, about it.

It really arose almost by hazard, and strictly speaking not from time at all, but from the necessity for charts, using that word for maps of the sea.

It stands to reason that if a map be prepared of any portion of the world, it is necessary for practical purposes to show- in what part of the world the country or district on the map is situated, particularly in the case of a chart, where it is of the utmost importance to know whether the ship be in safety, or close to some shoal or isolated rock below the surface of the sea.

For the purpose of fixing the position of places on the charts some standard or starting point had to be arranged or selected, and when the British fixed their first meridian at Greenwich, in 1675, in the reign of Charles II., the present United States, so far as they existed, were British Colonies and used the national maps, and the national first meridian.

When afterwards they became independent they, like sensible people, made no alteration in their charts after the Declaration of Independence, but continued to use their original prime meridian, and hence the two greatest maritime Powers use the prime meridian, or reckon from the same starting point, and commence measuring their hours from the same starting point though they differ in the name they apply to the hour. I mean that their hours begin at the same minute.

I am not quite certain, but I believe I am right in saying that at sea, at all events since 1884, the meridian lines on the charts of all nations follow those of the United Kingdom and America. My memory is that at the meeting of the Postal Union then held, the great bulk of the other nations agreed to the Greenwich meridian, which between the British Dominions and the United States was already dominant, but that France dissented and maintained the meridian of Paris, though as a kind of compromise she put both meridians on her charts.

I understand that there was another and very singular excuse for France in raising this question of longitude. I cannot remember the exact locality, but in some part of the world France and the United Kingdom had agreed upon some line of longitude as the boundary of their possessions, and France naturally claimed that if the longitude were altered to that of Greenwich she should not lose her rights, the boundary having been fixed by the Paris meridian. There are two degrees between the two observatories and, roughly speaking, this would mean a strip of territory from fifty to a hundred miles wide, and naturally France objected to giving up territory to which she claimed a title. No doubt it has all been settled long since, and I have not even taken the trouble to look up the exact locality.

I apprehend that since last year, when France adopted international time, she has even given up her Paris meridian, and that Berlin and Rome, which also had separate meridians for some of their surveys, have abandoned them, but I am not sure, and it is not important for my present purpose, in which we are dealing with time. Any man who considers the question for a moment can see how convenient it is to have a uniform prime meridian, it enables one ship to obtain its longitude from another vessel if, by any chance, such as the stoppage of a chronometer, or a continued fog, it has lost its reckoning.

Readers of Kipling's " Captain Courageous" will re- member how Disco Troop was able to oblige " the Square- rigger bellowin' for his latitude," as Long Jack called it. The vessel was a French one, and if it had had the Paris meridian it would not have understood the 46-49 which Disco Troop chalked up. Of course, the commander could have calculated it, even if there had been a different meridian but having the same saved a lot of trouble.

I fear that this is, to some extent, a digression, and I will return once more to the question of time.

The Americans, having always used the Greenwich as the starting point of their prime or first meridian in their charts, naturally adjusted their time accordingly, and hence the supposed connection of the International Time with some deep design on the part of England to destroy an Irish Institution.

I mention this as there has been a great deal of misconception as to English and Irish time. The new time is not Irish nor English either, it is International, for the benefit of the world, but we must now return to the progress of the movement.

There were, of course, various international jealousies. Holland, with its natural sympathy with the Transvaal, was not, well pleased with adopting Western Europe time like London. France differed from the new time by only ten minutes, but considered that, without any regard to maps or navigation, she ought to have a special time of her own, and yield to none, and Portugal, whose one fixed principle is opposition to Spain (which had adopted the scheme at an early date) held out resolutely against the new arrangement out of simple "cussedness." In fact there were small and very petty jealousies all over the world, but practically all have now yielded. France held out for twenty years, but gave in last year, Australia, New Zealand, Japan have all agreed, Two European Nations, and only two, are now outside the agreement, running a kind of race for the wooden spoon, Portugal and Ireland.

As to Portugal, it must be admitted that poor Portugal is not a nation to be copied. It is probably the most backward State in all Europe, particularly since the various States which formed what was once the Turkish Empire in Europe one or two hundred years ago, have just shown to an astonished world how much they have improved since the Congress of Berlin. We may pity Portugal, but it is not a nation whose example should be followed. I heard recently, since I drafted this paper, that Portugal has at last given in, but I have only heard this in conversation, and I have not seen any authoritative statement on the subject.\*

\* *Portugal adopted Western European time in January, 1912.*

As regards Ireland, the case is different. The fact seems to be that when the Conference was held she was simply forgotten. The Conference was a postal one, and the telegrams of Ireland had all along been regulated by London time, and no one probably remembered that in other matters there was another time in Ireland. Another case of injustice to Ireland!

Meanwhile, and far more since the Conference of 1884, telegrams have multiplied a hundredfold, the increase is not confined to the United Kingdom, but distributed all over the world, and telegrams from abroad form an every-day incident of commercial life, and there are elaborate codes for concentrating much news and information in very few words, and with the immense increase of foreign telegrams the difference in time between that observed in Dublin and that marked on the telegrams has become such a constant source of trouble that at long last the various Irish Chambers of Commerce took up the question, and in the interests of Ireland and her struggling commerce urged the Government to alter the Irish time to that of Western Europe.

Very unfortunately a most unhappy misunderstanding arose among the less-educated classes to the effect that England wanted to abolish the "national" time, and although it was absolutely unconnected with politics and was international, not English but American, and a very serious difficulty thrown in the way of our struggling commerce, it became a party question, and all sorts of attacks and defences were put forward by valiant combatants who did not understand the question in the slightest degree. I have read pages of print about "the natural laws of latitude and longitude" by people who were like schoolboys manifestly very uncertain which was which, and so put both in for fear of accidents, and who had not the slightest idea in talking about time as "national" that the whole theory of solar mean time is an approximation for public convenience, and has no actual existence. Even in a recent debate in the House of Lords, where better things might have been expected, there were constant references to "Greenwich Time," (1) when the term was altogether incorrect, and it should have been "Western Europe Time," shared with us by our very good friends, the French and Spanish, who certainly do not talk of Greenwich, a word they probably could not pronounce if they tried.

I have, therefore, now come to the important part of this subject, and have to show, if I can, that it affects us deeply, and if so, in what manner.

To the great majority of the inhabitants of the country the matter is not one of the slightest importance, so long as all the inhabitants agree, a half hour makes no difference if they have no connection with other countries, but as soon as you come to consider Ireland with relation to other countries, every point of difference has to be considered for or against, and with the ever-increasing influence of the electric telegraph the question of time becomes one of supreme importance, for if it be neglected we sacrifice the bone of benefit to the shadow of sentiment.

I will explain briefly. It is nothing unusual for a foreign merchant, say at Frankfort, where there is Central Europe time, to telegraph at mid-day (Central Europe time) to Dublin offering goods at a certain price, and adding a code word meaning "we will keep the offer open for an hour to enable you to telegraph in reply." That is to say, the Dublin trader has an hour within which to exercise the option, and after that the German will try elsewhere.

We have, of course, to consider the position of the parties as complicated by the playful eccentricities of the electric telegraph, and its rebellious attitude towards the ordinary rules of time and space. Twelve o'clock in Frankfort, where Central Europe time prevails, means eleven o'clock in all Western Europe, except Ireland, and in Ireland it means 10.35 a - m - Of course, Portugal is also excepted, but we are not dealing with Portugal at present

(1.) Uniform Time Bill (Ireland), H. L., July 10, 1912 j Parl. Deb. Vol. 12, pp, 386-394.

If we suppose that no time is lost on the way to Ireland, and that the telegram reaches Dublin in 5 minutes after it has been sent, it arrives at 11.5 Western-Europe time, and is so marked in the delivery office, but the clocks of Dublin are all pointing to twenty minutes to eleven.

There are several assumptions in this sentence, one of them, and perhaps the boldest, being the assumption that all the clocks of Dublin coincide ; I have not found it true, even of the public clocks. This, however, is a detail.

Now, suppose that the messenger manages to spend twenty-five minutes on the way in delivering the message, which is by no means an unwarrantable assumption, it occurred to me the very day I wrote this sentence, and the messenger had only to come from College Green to the nearest corner of Dawson Street, which is certainly not two hundred yards, the telegram will still be delivered to the consignee at five minutes past eleven by his own clock, but that is Irish time, thirty minutes have elapsed since the message left Frankfort, and only thirty minutes are left for consideration, the reply, its despatch, the return journey and its delivery in Frankfort. No wonder that the Irish merchant is very apt to suffer seriously in his business with such a handicap against him, and to find that by no fault of his own he has lost the opportunity of making a successful venture.

The case is not by any means an imaginary one, any trade with foreign business knows that it occurs not only with Central Europe, but with India, America, Australia, with all the world, except his own island. The odd twenty five minutes are a constant source of trouble between the uncertainty and the messengers taking their time in delivering the telegrams, tolerably secure by the fact that the great majority of those who receive telegrams imagine that they are dated by the ordinary time. Remember too, and it is important, that the time difficulty cuts against him in the business arising out of his own exports. Every telegram he sends from Ireland loses half an hour as against the rest of the world, because he starts half an hour late every morning, a serious matter with 300 working days in the year. In commerce and trade every point tells, for good or for evil, and every defect constitutes a hindrance or impediment. Ireland has several disadvantages already, and it is simply criminal to add to them.

I have only alluded, so far, to the telegraph, but it would be hard to say where the disadvantages end. Apart from the case of the telegrams, the difference affects every voyage to and from Ireland. Tourists who miss trains, and carry away a memory of their misfortunes, are only a class. There are men who cross the Channel at frequent intervals, for instance there are a number of those connected with the cattle trade who cross once a week, the ordinary commercial travellers cross about once a month, not to mention the Members of Parliament. Every time they cross they must alter their watches or run the risk of losing their trains, and watches suffer if frequently altered

It may be said, and it is said, that these are special cases, and that the majority must rule. I do not agree with the doctrine as of universal application, but in this case of time I do not admit it at all. If it benefited the rest of the nation, something might be said, but it is the opposite, it is no advantage whatever to them, and would give them half an hour more daylight. As a matter of fact, no one at the end of two days would know that there had ever been any other time in Ireland than Western Europe time. It is notorious, and I have it on the word of one who was in Paris when the change was made last year, on which occasion the clock was put back ten minutes, that the very next day things went on as usual, and the whole incident was forgotten.

I put it with confidence to my audience that when they have once crossed to England, and have got their watches by Western-Europe time, perhaps in Penzance, where the clock is twenty minutes out, not a single one of them remembers next day that he is getting up twenty-five minutes earlier than usual. I have twice landed at Falmouth, which is very near Penzance, and I certainly did not recognise next morning that I had been defrauded of half an hour's sleep.

The real fact is that the adoption of international time would not be noticed at all by the great bulk of the nation. It would, on the other hand, be a great benefit to commerce, and if adopted in Ireland, it would not only bring Ireland into line with other progressive nations, but remove one of the hindrances to Irish trade and commerce of which there are so many. So far from supporting the continued existence of a separate time for Ireland, degrading her to the level of Portugal, those who really love their country should do all in their power to benefit her, and remove all difficulties from her path to progress and prosperity.

I am no politician, but if I were, I should certainly press for the benefit of International Time being conferred on Ireland, and the sooner the better.

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