The President then showed some lantern slide pictures of Mars, Jupiter and Saturn received from Prof. Lowell of the Flagstaff Observatory, America.

Mr. Holmes—I notice the dark rings round the Polar Caps. Is this supposed to be water ?

The President—Yes, I think so. I believe Prof. Lowell puts them down to the melting of the Polar ice.

A vote of thanks was accorded to Prof. Lowell.

The President—There are just two things which I forgot to announce—the first is that the Library is now open to members, and those wishing to remove books may send in their deposits to the Treasurer; and the second is that at the last Council Meeting it was decided to extend membership of the Society to people in foreign countries, and the Society would be glad to hear from members who may have any such names to propose.

The Meeting was then adjourned to 5 p.m. on Tuesday, the 25th April 1911, in the Imperial Secretariat Buildings.

Paper on Standard Time.

BY C. K. SARKAR, C.E.

The question of a standard time has once more been brought to the fore by Reuter's message that the Republic of France has after all adopted the Greenwich time as the standard for their country, and the patriots have ultimately capitulated before the advance of the idea of uniformity in scientific methods. Attempts have of late been made to have a common standard of measurement of time, space and weight in all the civilised countries of the world.

The method of measuring time, or at least the primary one, was by watching the revolution of the heavenly bodies, such as the Sun, the Moon or the Stars. To a casual observer the diurnal motion of the heavenly bodies may appear to be uniform, but a close study at once reveals the fact that such a belief is an erroneous one. It is no easy task to measure the absolute length of time. The difficulty lies in fixing a common standard of measurement. For astronomical purposes, the standard is taken as the period that elapses from the culmination of one star to the culmination of the same star the next day. This is called a siderial day. The siderial day commences when the first point of Aries passes the meridian, and a clock correctly adjusted to siderial time will read 0 hrs. 0 mts. 0 secs. at that period.

It will be apparent to a careful observer that this standard, though suitable to astronomers, is not well adapted for regulating the ordinary functions of our life. The diurnal motion of the sun furnishes us with a more convenient standard for measuring the sequence in every day affairs of our life. We shall now try to understand how the two standards differ. If a star and the sun are supposed to be on the meridian on a day, on the day following the meridian will meet the star at the same place, but the sun will have advanced 59′, and the meridian will have to describe that arc before it can reach the sun; or in other words, the period that elapses from the transit of the sun any day to the transit of the sun the next day is longer than the period that elapses from the culmination of a star any day to the culmination of the same star the next day, by a period that the meridian takes to move through an arc of 59′ or by 3 mts. 56 secs. nearly. On account of the variable motion of the sun and the inclination of the axis of rotation of the earth to the plane of its rotation round the sun, the length of a solar day is not uniform throughout the year, and to regulate and adjust our clocks, the astronomers have to take recourse to the motion of an imaginary sun that is supposed to rotate with a mean uniform velocity.

The ancient Hindu astronomers at one time tried to have a standard for measurement of time by taking the motion of the moon as its foundation, and the lunar month was found to agree with the phases of the moon. This was not altogether satisfactory, and the solar day and month were next introduced. At a still later period endeavours were made to reconcile the two systems. All the systems are in vogue in different parts of India and Burma, but for all practical purposes a mean solar day is now taken to be the standard. But a considerable divergence still exists in the method of reckoning a day. The Hindus calculate their day as commencing from sunrise and ending at a period immediately before sunrise the next day; the Muhammadans, if I am not mistaken, measure a day from sunset to sunset. In all European countries a civil day commences from midnight, while an astronomical day is reckoned from noon, when the sun crosses the meridian. The question of adopting a universal day was discussed at the Washington Meridian Conference, but the great number of American and Continental astronomers expressed themselves against the change.

Simultaneously with this arises the question of fixing a point from which the lines of longitude are to be reckoned. In ancient India the longitudes were reckoned from Ujjain

or from Lanka or Ceylon. In all English-speaking countries longitudes are reckoned from the observatory at Greenwich, and all English charts or maps give the longitude so reckoned. The French astronomers and geographers reckon their lines of longitude commencing from the observatory at Paris, which is less than 10m. east of Greenwich. It was recommended by the Washington Prime Meridian Conference in 1884 to exclusively use the Greenwich Meridian. If we could agree to have a universal day commencing from an exact period all over the world, it will be one factor that will work towards the unification of human races.

During the Viceroyalty of Lord Curzon standard time was adopted for India. It was fixed at 5h. 30m. in advance of Greenwich time. India lies between longitude 67° E. and 98° E. approximately. This shows that when it is noon at Greenwich the local time at the easternmost point in India is 6-32 p.m., while at the westernmost point it is 4-28 p.m. The mean between the two is 5-30 p.m. This was probably one of the considerations for adopting a time 5h.30m. in advance of the Greenwich time as the standard for India. A difference of 5h. 30m. represents a difference of 82° 30′ of longitude. The standard time in India is the exact local time at all places situated on longitude 82° 30′ E. Jagadispur in the district of Azimgarh, longitude 82° 39′ 14″ E., Jaunpur 82° 43′ 38″ E., and Mirzapur 82° 37′ 23″ E. are the only places of any importance that are situated close to this line of longitude. The line passes through the western border of Chutia Nagpur, runs close to the town of Champa on the Bengal-Nagpur Railway, along the western border of the Orissa Tributary Mahals and to the east of Cocanada in the Madras Presidency.

For Burma, which politically forms a part of British India, a different standard has been fixed. This is 6h. 30m. in advance of the Greenwich time. Burma lies between longitude 93° E. and 101° E. approximately. Continuing our enquiry on the same line, we find that when it is noon at Greenwich it is 6-12 p.m. near about Akyab and 6-44 p.m. at or about Hsup Lwi on the Eastern border of the Southern Shan States. The mean of the two periods is 6-28 p.m. or 2 minutes behind the standard time in Burma as fixed by the Government of India. A difference of 6h. 30m. brings us to longitude 97° 30′ E., except Bhamo, 96° 58′ E., Moulmein 97° 39′ 47″ E., Amherst 97° 36′ 12″ E., Kalagouk Island off the coast of Amherst, longitude 97° 42′ 1″, and Yeh, longitude 97° 53′ 48″, head-quarters of a small township, there is no town of any importance close to this line.

With the growth of civilized methods of living, with national and international commercial relations springing up fast amongst us, for the management of a system of railways in a country, for steamer service, and for the Telegraph Department, a uniform standard time is almost a pressing need. When the construction of a railway line between India and Burma has come within the range of practical politics, it will be necessary to have a common standard of time between the two parts of the Empire.

The nautical almanac gives us a list of countries that have adopted standard time referred to the meridian at Greenwich. France has lately added its name to this list, and it seems to me that it is an example that might well be followed by Calcutta, where the existence of two systems of time gives rise to extreme inconvenience. I cannot conceive that difficulties would arise from such standardisation, though it is with some diffidence that I make the suggestion. It is with the purpose of getting the views of the members of this Society that I have introduced the subject.

A Meteoric Phenomenon.

By H. B. Holmes.

It was about last Xmas I noticed in the *Times of India Illustrated Weekly*, among the Snapshot Competition photographs, one that had obtained the first prize and which struck me as very extraordinary.

The title of this picture was "A Meteorite recently seen at Mhow (24th November 1910)."

Through the courtesy of the Editor of the *Times of India Illustrated Weekly*, I am now able to reproduce this photograph for your inspection, and I have been able to communicate with Sergt. A. Hempstead, Divisional Office, Mhow, who took the photograph, for further particulars of this very unique picture and his account, which to my mind makes the subject more interesting than I had anticipated.

When I saw the reproduction the first thought that came to my mind was how was it possible for any one to have been able to snapshoot a meteor in its flight. The next thing that struck me was that the meteor's path did not commence right from the top of the plate, but some little distance down, and it dissolved into nothingness before it reached the tops of the trees which showed out prominently in the foreground. Another more striking point was that it was contrary to all my ideas of what the path of a meteor would be,