cultivators of which are most accustomed to the conversion of local into standard or Greenwich time. An unavoidable inconvenience associated with the system is the uncertainty in many cases whether local or Greenwich mean time is under­stood. This must be especially the case with magnetic and seismic phenomena, the designation of which should be uniform for the whole earth; at present, however, we cannot invariably expect local observers to convert their observations from local into Greenwich mean time.

Associated with this question is that of the moment when the day should begin, or from which the hours should be counted. The civil division of the day into a.m. (*ante meridiem,* before mid-day) and p.m. (*post meridiem,* after mid-day), now practi­cally universal in household and ordinary civil life, is impracti­cable for scientific purposes, where a count of the hours from o up to 24 is necessary. In railway schedules the necessity of distinguishing a.m. from p.m. when our civil time is used is found so troublesome that in some countries, especially Italy and Canada, the 24-hour system is used. Hours after noon are there designated as 13, 14, &c., up to midnight, at which moment a new day begins. On the other hand, with some few exceptions, astronomers have almost from time immemorial begun their day at noon, and navigators have very generally adopted the same practice, but for a quite different reason. In astronomy the day begins at noon for two reasons of convenience. One is that as the day is fixed by the transit of the sun over the meridian, it is more natural to start the count of the hours from this moment than from that when the sun is on the invisible antimeridian at midnight. This practice also coincides with that of counting the hours of sidereal time from the transit of the vernal equinox, and leads to the simple rule that the local mean time is equal to the hour angle of the mean sun. The other reason is that, as the astronomer makes most of his observations at night, and often after midnight, it is inconvenient to begin a new day at the latter hour. This consideration is however reversed in day observations, especially those on the sun, but these are few in number.

Navigators began the day at noon because their latitude is determined by observations of the sun, while the longitude is also generally determined during the daytime. Thus, in doing the “ day’s work ” in the log, the position of the ship was always computed for noon. Such being the case, it was found more convenient to begin the count of a new day at this hour, to be continued through the night until the following noon. But the navigator’s count of days was one day in advance of that of the astronomers; for example, March the 10th, astronomical time, begins on the 10th day of March at noon, and this count continues until noon of the day following, so that the forenoon of March the nth, civil time, is still March the 10th, astronomical time. But the navigator begins March the nth at noon on March the 10th. This difference is worthy of mention because a widespread misapprehension exists that the navigator was forced to count his days from noon owing to the adoption of the same system in the *Nautical Almanac.* The fact is that the practice of the navigator, like that of the astronomer, was adopted purely for his own convenience, and for the reasons just set forth. It is, however, being changed so as to conform to civil time, but as yet no general law prescribes the change.

At the Meridian Conference of 1884, it was proposed that the practice of beginning the day at midnight should be adopted universally in astronomy and navigation, and that the hours should be counted from that moment in all the nautical and astronomical ephemerides. The question of adopting this system became a subject of international correspondence. The views of the directors of the astronomical ephemerides, so far as elicited, were strongly against the change. The considerations which determined them were the confusion which the change would introduce into the tables and the count of time in the ephemerides, including the relation of sidereal and solar time; the unavoidable doubt as to whether the one or the other system was used in astronomical publications; and the danger of placing in the hands of the navigator an ephemeris in which

the hours should have a different meaning from that to which he was accustomed. On the other hand, the reasons of con­venience which led to the practice of beginning the day at noon still continued, so that nothing could be shown to counterbalance these drawbacks. Still, in works to be used by the public, especially almanacs and other astronomical annuals, it is neces­sary to convert astronomical into civil time. This roust con­tinue to be done, but offers no difficulty to the authors of such works, who are acquainted with the difference, nor to the public, which has no interest in the ephemerides and measures of time used by the professional astronomer. (S. N.)

**TIME BARGAINS,** a financial or commercial term for opera­tions in securities or commodities which are to be completed at a future date, as opposed to bargains which are settled immediately. (See Market.)

**TIMGAD,** a ruined city 23 m. S.E. of Batna in the department of Constantine, Algeria. Timgad, the Thamugas of the Romans, was built on the lower slopes of the northern side of the Aures Mountains, and was situated at the intersection of six roads. It was traversed by two main streets, the Cardo Maximus running north and south, and the Decumanus Maximus east and west. The residential part of the town was on a lower level than the capitol and most of the other public buildings. The ruins of the capitol occupy a prominent position in the south­west of the city. Some of the columns of the façade (which are of the Corinthian order and 45 ft. high) have been re-erected. The dimensions of the capitol correspond with those of the Pantheon at Rome. Immediately north of the capitol are the remains of a large market; to the east are the ruins of the forum, basilica and theatre. The auditorium of the theatre, which held nearly 4000 persons, is complete. A little west of the theatre are baths, containing paved and mosaic floors in perfect preservation. Ruins of other and larger thermae are found in all four quarters of the city, those on the north being very extensive. Across the Decumanus Maximus just north-east of the market is the arch of Trajan—still erect, and restored in 1900. The arch is of the Corinthian order, and has three openings, the central one being 11 ft. wide. Each façade has four fluted columns 19 ft. high. The chief material used in building the arch was sandstone. The fluted columns are of fine white limestone and smaller columns are of coloured marble. At the other (eastern) end of the street are the remains of another triumphal arch. West of the capitol are the ruins of a large church, a square building with circular apse, built in the 7th century. There are also remains of six other churches. About 400 yds. south of the city, the walls nearly entire, is a ruined citadel, a quadrangular building 360 ft. by 295 ft., with eight towers. It was built (or rebuilt) by the Byzantine army in the 6th century. Near the northern thermae is the house of the director of the excavations and a museum containing small objects found in the ruins.

Numerous inscriptions have been found on the ruins, and from them many events in the history' of Thamugas have been learnt. In the year A.D. 100 the emperor Trajan gave orders to build a city on the site of a fortified post on the road between Theveste and Lambaesis. This city, called Colonia Marciana Trajana Thamugas (Marciana in honour of Trajan’s sister) appears from the inscriptions to have been completed, as far as the principal buildings were concerned, in seventeen years. A legion of Parthian veterans was stationed in the newly founded city. From the time of its foundation to the 4th century Thamugas seems to have enjoyed a peaceful and prosperous existence. Numerous inscriptions testify to the manner of life of the citizens. In the 3rd century Thamugas became a centre of Christian activity, and in the next century espoused the cause of the Donatists. The city declined in importance after the Vandal invasion in the 5th century, and was found in a ruinous condition by the Byzantine general Solomon, who occupied it a.d. 535. It is believed that the Berbers from the neighbouring mountains destroyed the city, hoping thus to prevent it being used as a stronghold from which to harry them. Thamugas was, however, repeopled, and in the 7th century was a Christian