

second and more complete Calendar is the *Annual Calendar*, which, under the preceding dynasties, was named *Li-je, Order of Days*, and is now called *Shih-hsien-shu, Book of Constant Conformity (with the Heavens)*. This name was given by the Emperor *Shun-chih*, in the first year of his reign (1644), on being presented by Father John Schall (*Tang Jo-wang*) with a new Calendar, calculated on the principles of European science. This *Annual Calendar* gives the following indications: (1°) The cyclical signs of the current year, of the months, and of all the days; (2°) the *long* and *short* months, as well as the *intercalary* month, as the case may be; (3°) the designation of each day by the 5 *elements*, the 28 constellations, and the 12 *happy presages*; (4°) the day and hour of the new moon, of the full moon, and of the two dichotomies, *Shang-hsien* and *Hsia-hsien*; (5°) the day and hour for the *positions* of the sun in the 24 zodiacal signs, calculated for the various capitals of China as well as for Manchuria, Mongolia, and the tributary Kingdoms; (6°) the hour of sunrise and sunset and the length of day and night for the principal days of the month in the several capitals; (7°) various superstitious indications purporting to point out what days and hours are auspicious or not for such or such affairs in different places. Those superstitious indications are stated to have been introduced into the Calendar under the *Yüan* dynasty." (*P. Hoang, Chinese Calendar*, pp. 2-3.)—H. C.]

We may note that in Polo's time one of the principal officers of the Mathematical Board was *Gaisue*, a native of *Folin* or the Byzantine Empire, who was also in charge of the medical department of the Court. Regarding the Observatory, see note at p. 378, *supra*.

And I am indebted yet again to the generous zeal of Mr. Wylie of Shanghai, for the principal notes and extracts which will, I trust, satisfy others as well as myself that the instruments in the garden of the Observatory belong to the period of Marco Polo's residence in China.\*

The objections to the alleged age of these instruments were entirely based on an inspection of photographs. The opinion was given very strongly that no instrument of the kind, so perfect in theory and in execution, could have been even imagined in those days, and that nothing of such scientific quality could have been made except by the Jesuits. In fact it was asserted or implied that these instruments must have been made about the year 1700, and were therefore not earlier in age than those which stand on the terraced roof of the Observatory, and are well known to most of us from the representation in *Duhalde* and in many popular works.

The only authority that I could lay hand on was *Lecomte*, and what he says was not conclusive. I extract the most pertinent passages:

"It was on the terrace of the tower that the Chinese astronomers had set their instruments, and though few in number they occupied the whole area. But Father *Verbiest*, the Director of the Observatory, considering them useless for astronomical observation, persuaded the Emperor to let them be removed, to make way for several instruments of his own construction. The instruments set aside by the European astronomers are still in a hall adjoining the tower, buried in dust and oblivion; and we saw them only through a grated window. They appeared to us to be very large and well cast, in form approaching our astronomical circles; that is all that we could make out. There was, however, thrown into a back yard by itself, a celestial globe of bronze, of about 3 feet in diameter. Of this we were able to take a nearer view. Its form was somewhat oval; the divisions by no means exact, and the whole work coarse enough.

"Besides this in a lower hall they had established a gnomon. . . . This observatory, not worthy of much consideration for its ancient instruments, much less for its situation, its form, or its construction, is now enriched by several bronze instruments which Father *Verbiest* has placed there. These are large, well cast,

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\* Besides the works quoted in the text I have only been able to consult *Gaubil's* notices, as abstracted in *Lalande*; and the Introductory Remarks to Mr. J. Williams's *Observations of Comets* . . . . extracted from the *Chinese Annals*, London, 1871.