

exposed to the rain, the snow, and all other atmospheric inclemencies, and yet they have lost absolutely nothing of their original lustre. And lest I should be accused of raising expectations which I do not justify, I will do my best in a digression, probably not unwelcome, to bring them before the eyes of my readers.

“The larger of these instruments were four in number. First we inspected a great globe [A], graduated with meridians and parallels; we estimated that three men would hardly be able to embrace its girth. . . . A second instrument was a great sphere [B], not less in diameter than that measure of the outstretched arms which is commonly called a geometric pace. It had a horizon and poles; instead of circles it was provided with certain double hoops (*armillæ*), the void space between the pair serving the purpose of the circles of our spheres. All these were divided into 365 degrees and some odd minutes. There was no globe to represent the earth in the centre, but there was a certain tube, bored like a gun-barrel, which could readily be turned about and fixed to any azimuth or any altitude so as to observe any particular star through the tube, just as we do with our vane-sights; *—not at all a despicable device! The third machine was a gnomon [C], the height of which was twice the diameter of the former instrument, erected on a very large and long slab of marble, on the northern side of the terrace. The stone slab had a channel cut round the margin, to be filled with water in order to determine whether the slab was level or not, and the style was set vertical as in hour-dials.† We may suppose this gnomon to have been erected that by its aid the shadow at the solstices and equinoxes might be precisely noted, for in that view both the slab and the style were graduated. The fourth and last instrument, and the largest of all, was one consisting as it were of three or four huge astrolabes in juxtaposition [D]; each of them having a diameter of such a geometrical pace as I have specified. The fiducial line, or *Alhidada*, as it is called, was not lacking, nor yet the *Dioptra*.‡ Of these astrolabes, one having a tilted position in the direction of the south, represented the equator; a second, which stood crosswise on the first, in a north and south plane, the Father took for a meridian; but it could be turned round on its axis; a third stood in the meridian plane with its axis perpendicular, and seemed to stand for a vertical circle; but this also could be turned round so as to show any vertical whatever. Moreover all these were graduated, and the degrees marked by prominent studs of iron, so that in the night the graduation could be read by the touch without a light. All this compound astrolabe instrument was erected on a level marble platform with channels round it for levelling. On each of these instruments explanations of everything were given in Chinese characters; and there were also engraved the 24 zodiacal constellations which answer to our 12 signs, 2 to each.§ There was, however, one error common to all the instruments, viz. that, in all, the elevation of the Pole was assumed to be 36°. Now there can be no question about the fact that the city of Nanking lies in lat. 32½°; whence it would seem probable that these instruments were made for another locality, and had been erected at Nanking, without reference to its position, by some one ill versed in mathematical science.||

* “Pinnulis.”

† “*Et stilus eo modo quo in horologiis ad perpendicularum collocatus.*”

‡ The *Alidada* is the traversing index bar which carries the *dioptra*, *pinnules*, or sight-vanes. The word is found in some older English Dictionaries, and in France and Italy is still applied to the traversing index of a plane table or of a sextant. Littré derives it from (Ar.) *adad*, enumeration; but it is really from a quite different word, *al-idadat* **أصالة** “a door-post,” which is found in this sense in an Arabic treatise on the Astrolabe. (See *Dozy and Engelmann*, p. 140.)

§ This is an error of Ricci's, as Mr. Wylie observes, or of his reporter.

The Chinese divide their year into 24 portions of 15 days each. Of these 24 divisions twelve called *Kung* mark the twelve places in which the sun and moon come into conjunction, and are thus in some degree analogous to our 12 signs of the Zodiac. The names of these *Kung* are entirely different from those of our signs, though since the 17th century the Western Zodiac, with paraphrased names, has been introduced in some of their books. But besides that, they divide the heavens into 28 stellar spaces. The correspondence of this division to the Hindu system of the 28 Lunar Mansions, called *Nakshatras*, has given rise to much discussion. The Chinese *sieu* or stellar spaces are excessively unequal, varying from 24° in equatorial extent down to 24'. (*Williams, op. cit.*) [See *P. Hoang, supra* p. 449.]

|| Mr. Wylie is inclined to distrust the accuracy of this remark, as the only city nearly on the 36th parallel is P'ing-yang fu.