Lecture 3

The Planetary Hours: the Timing

We now know about the planetary days. They are the periods of time from one sunrise to the next sunrise, and they are ruled by the planet, corresponding to the day of the week, on which the sunrise occurs.

Now, these planetary days are made of the planetary hours. There are twenty four planetary hours in each planetary day.

The important point to remember is that the length of a planetary hour is a variable, not a constant. Planetary hours do not coincide with the hours we see on our clocks and watches, they are practically never equal to 60 minutes of time, although they might be close to that twice a year. Let's learn the rules, how to define the length of a planetary hour.

First, each planetary day contains 12 day hours and 12 night hours. No surprises here.

Second, the 12 day hours are equal to each other and occupy the time from the sunrise to the sunset. The 12 night hours are also equal to each other, and they occupy the time from the sunset to the next day's sunrise.

As the day is shorter than the night in winter, so the planetary hours of the day in winter are shorter than the planetary hours of the night, and the reverse is true for the summer. Around the equinoxes, close to the 21st of March and the 23rd of September, the length of the day is approximately equal to the length of the night, and so the day hour is close to the night hour and close to the 60 minutes of our normal time.

Speaking about the difference between the day hours and the night hours, how significant is it? Well, it depends on the latitude of the location. The closer the place to the equator, the smaller is the difference, and the closer it is to the arctic circle, the more prominent is the difference. In the locations to the North of the arctic circle, there are periods of time when the planetary hours cannot be defined, as there are no sunrises and sunsets there.

But let's take a practical example. Let's define the timing of the planetary hours in New York on the Christmas Day of 2018.

Now, a side note: if you are not a technical person and you find all this nitty-gritty of planetary hours calculation too tedious for your liking, you can simply skip it. After all, there are few people who calculate planetary hours manually nowadays. There are convenient tools to do that for you, and I will show you a couple of them. But still, it is good to have at least a general idea of how it works, so that if some website will be offering you a suspicious data, you could easily check whether it is correct or not.

But let's return to the practical example.

First of all, we should find out the time of the sunrise and the sunset in New York on that day, as well as the time of the sunrise on the next day. Remember that these times are location-specific, as they depend on the latitude and the longitude of the place. As a result, the time of the sunrise in New York will be different from the time of the sunrise in Philadelphia, even though they are in the same time zone. But how do we find out the time of the sunrise and the sunset for a particular location? These days, it is very easy, just make a Google search.

For example, I searched for “sunrise New York 25 December 2018”, and immediately got the result: "07:18, Tuesday, 25 December 2018 (GMT-5) Sunrise in New York, NY, USA”. Excellent, this is exactly what I needed, and I can find out the remaining two bits of information, the sunset time and the next sunrise time, making similar requests. However, if you look at the top two links provided by Google, in my case they are both to the pages titled “Sunrise and sunset times in New York, December 2018”, and they lead to two excellent websites, TimeAndDate.com and Sunrise-and-Sunset.com.

Let’s open the first of the links. Scroll a little bit down, and you’ll see a table titled December 2018 — Sun in New York. Here you can see all the necessary details at once: the sunrise on December, 25 is 07:18, the sunset on the same day is at 16:34, which is 4:34 PM, and the sunrise on the next day, December, 26 is also at 07:18. We even have the day length listed for each day, and for the Christmas Day it is 9:15:47. We’ll need this in our calculations, but maybe we’ll calculate it ourselves, just for an exercise.

Now, we have all the necessary information, let me list it altogether in one place:

New York, December 25, 2018

Sunrise: 07:18

Sunset: 16:34

Next sunrise: 07:18

The next step is to find out the length of the day on the Christmas Day. Let’s just check if we’ll be able to reproduce the value given by the TimeAndDate.com website.

We need to subtract the sunrise time from the sunset time, remembering that there are 60 minutes in an hour.

16:34 - 7:18 = 9:16. This is the length of the day, and it is close to the more precise value given by the website.

Now let’s find out the length of the night by subtracting the sunset time from the next sunrise time. To make this easier, we might decide to add to the next sunrise time 24 hours:

7:18 + 24:00 = 31:18

31:18 - 16:34 = 14:44

As a sanity check, the sum of the length of the day and the length of the night should be very close to 24 hours, and it is exactly 24 hours in our case.

The next step is to divide the length of the day by 12 to get the length of a day hour, and then to do the same with the length of the night to get the length of the night hour.

The length of the day is 9:16, and it will be more convenient to convert this to the number of minutes.

(9 x 60) + 16 = 556

556/12 = 46.3333

Now, I am going to round up the result. In practice, we don't need a split-of-a-second precision, it's just not practical with a sort of things we'll be using the planetary hours for. But also, as I already mentioned before, you will seldom, if ever, calculate planetary hours manually, and your tools will do the calculation with the maximal precision they are able for.

So, at this point, I'll decide that the length of a day hour on December 25, 2018 is 46 minutes.

We'll do a similar calculation to define the length of a night hour:

(14 x 60) + 44 = 884

884 / 12 = 73.6666

Or, approximately, 74 minutes, or 1 hour 14 minutes.

Another sanity check: the lengths of the day hour and the nigh hour, added up, should produce something close to 2 hours, and this is exactly the case in our calculation.

Finally, we'll create a table with the timing of the planetary hours for the Christmas Day in New York. We start with the sunrise, this is the beginning of the first planetary hour of the planetary day, and then keep adding the length of the day hour until we reach the sunset, 12 times. The sunset is the beginning of the first night hour, so we keep adding the length of a night hour 12 times, until we reach the next day's sunrise. You will see that this table isn't perfect, just because I've rounded up the lengths of the hours. It is here to simply give you an idea of how the timing works. To make it precise, you would use the precise lengths, with seconds, but then the calculations would become too tedious for a lesson.

That's it, we now know how to define the timing of the planetary hours for the particular day and the particular location. Two questions might arise at this point: what if you don't have access to the internet? How do you find out the sunrise and sunset times? And second, what if you are somewhere away from a big city, how do you find out the sunrise and sunset times in that particular location?

There are a few possible answers, with different degrees of technical sophistication. I would personally recommend a smartphone app I've created for working with planetary hours. It is named Hours, and I will offer you an overview of this app closer to the end of this section.

Right now, the most important question is: how do we figure out, which planet rules each of the planetary hours? And that's exactly what we are going to learn in the next lesson.