



# GRACE H. FLANDRAU PLANETARIUM

University of Arizona • Tucson, Arizona 85721 • (602) 884-4515

August 5, 1977

## ASIMOV SCRIPT

### STARSHOW OUTLINE

Good evening. My name is \_\_\_\_\_, and I would like to welcome you to the Flandrau Planetarium. The University of Arizona built this Planetarium using a bequest from the estate of Grace Flandrau, a frequent winter visitor to Tucson. We would like to use the Planetarium to bring you the splendour of the night sky. Our forefathers experienced this every night, but for us it is almost unknown, because city lights have turned our nights into near day.

We will also try to bring you programs about some of the topics that are just as puzzling to astronomers as they are to you and me. Science can tell us a great deal about the details of the way things happen, but most of the ultimate questions have not been answered, and the peace and quiet of the night gives us a good time to think about them.

Our program tonight is "The Last Question" by Isaac Asimov, and the star of our show is our Minolta Star Projector. Please take a bow. Thank you. The projector can show the positions of the sun, moon, stars and planets in the sky as they would appear from any place on earth. We can see the sky as it would appear at any time within a range of tens of thousands of years.

The sun will set, there, in the west (start sunset, Barber Adagio for Strings-fades to low). The stars will rise, here, in the east. The pole star will appear fixed, there, in the northern sky. This time of year the dipper is hidden below the horizon, making it rather hard to find.

The most conspicuous stars that you will see are a giant triangle, there. These stars are called the summer triangle because they are overhead most of the summer night. Now that it is fall, they will be setting in the late evening.

ASIMOV SCRIPT

STARSHOW OUTLINE

PAGE 2

Of course we aren't seeing very much at the moment because the sky is too bright. In most cities we would have to go out a very long way to get away from the glare and see the night sky properly. Tucson is much better than most cities. When you next see a Tucson street lamp, look at it closely. It has a little conical metal night cap on it. This keeps a lot of the light down away from the sky, so that astronomers on the mountains around Tucson can continue to work without the city lights bothering them.

Lets then go out into the desert and see the night sky without any stray light. Here is the summer triangle. These stars have Arab names; there is Vega, Altair, and Deneb. Deneb looks at first as though it is the head of a cross. See. But if you look closer you can recognize that he is the tail of a swan. See the outstretched neck, here, and the wings, here. (Stick figures on)

Altair can be recognized because of these two close, but dimmer stars on either side of him. He is in the Eagle. The swan looks rather like one, but the Eagle is hardly recognizable. The person that named him must have had a very vivid imagination.

Vega is on the edge of a clump of stars supposed to look like a Greek harp or lyre. This is the harp that Orpheus used to charm wild beasts. It's effects were so powerful, that when Orpheus died, Zeus the king of the gods sent a raven down to earth to take it away from mankind. The harp was changed into a group of stars, and so was the raven. He is the bright star there, Vega.

I hope that you will find the summer triangle in the next few nights. There they are again, Deneb, Altair and Vega.

While you look at the stars, try to imagine what they are. Each one of those points of light is a fiery globe of matter like our sun. Think of the sun being moved further and further away, until it was so far that the light from it looked that faint. You'd have to move the sun a million times further away to get it that faint. Every one of those stars that you see is rather like the sun, and some of them are even bigger and brighter. Take Deneb there. It is so

big and bright that if you put it in place of our sun, we would be on the surface and the earth would be totally vaporized. Stars that big are very rare. However they are so bright that they shine like beacons across immense reaches of space.

Now that your eyes are accustomed to the dark, look at the Milky Way. You see a faint band of light stretching right around the sky. The stars that you see tend to cluster towards the Milky Way, and if you were to look through a telescope, you'd see that the Milky Way is made up of myriads of faint stars. The Milky Way stars are really like the other stars you see, just much further away. Here in Cygnus there seems to be a dark rift in the Milky Way. Here. In this direction the light of the distant stars is obscured by interstellar smoke. Both smoke and gas are found between the stars. There is enough gas to be able to remake a tenth of the stars in the Milky Way. And there is enough solid matter in the smoke to make ten planet earths for every star in the Milky Way.

As you look further round the Milky Way, into the constellation Andromeda, here, you will see a small fuzzy patch of light called the Andromeda Nebula. This is a distant group ~~to~~ stars similar to our entire Milky Way. Of course it is very far away, in fact it is the most distant object you can see without a telescope. Let me tell you how far away it is.) Light from the sun that is now falling on the earth left the sun some 8 minutes ago, just as you were walking into the Planetarium. Light travels 10,000 times faster than our fastest rocket, but it is pretty far from here to the sun. However, the Andromeda Nebula is so far away that the light that you are seeing from it left 2 million years ago. When it left, the creatures walking around on earth were barely human.

But first you have to realise that astronomers have a different view of distances than you do, and distances you think of as "far", they regard as "near". For example, the sun is "near" because it is only about 90 million miles away

We have no records that go back that far. In fact the oldest record we have of the appearance of the night sky is less than 1000 years old, and tells us how the sky looked some 2000 years ago. The stars today appear almost unchanged from that time, and though some, like Vega and Altair have moved a very slight amount, about one third of the width of this pointer --. But the overall impression is so much the same that we still use the constellations that were used by the ancient Greeks. The myths and legends about the sky that were told to Socrates when he was a child are the same ones we tell our children today, and the sky looked to him almost identically as it does to us. The figures he imagined around the stars are the ones we imagine tonight. And there they are---

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_
9. \_\_\_\_\_
10. \_\_\_\_\_

(Lute music: Dowland - Bream)