

The Planetarium: Eighty-year-old Virtual Reality

Source: Johannesburg Planetarium

The lights fade slowly, stars appear overhead, and four hundred children scream in excitement. An hour later, after their "journey into space", they're shocked to realize it's still daytime, and that they're expected to go back to school. "Were we really moving?" they ask. That evening, a forty-something year-old asks: "How did you get the roof open so quietly?"

The latest, greatest, virtual reality experience? No - an eighty-year old inspiration of Walther Bauersfeld, chief engineer at the Carl Zeiss optics company. In 1923, Bauersfeld invented the planetarium, a projector that re-creates the night-sky on a domed ceiling for audiences of up to 500 people. The stars and planets are accurately positioned, and the projector can be commanded to display our view of the heavens from any position of the Earth, and to fast-forward (or backward) through time.

Every year, about 90 million people around the world visit a planetarium. They come to see the skies of 2,000 years ago over Bethlehem, to learn how to find Scorpius and Sagittarius, or just to chill-out under the Milky Way. Nowadays, they also come to see the latest view of the rocky deserts of Mars, sent back to Earth by NASA's Spirit rover, re-created as the rover sees it - all around you.

Planetariums have evolved since Bauersfeld's time. The first planetariums were big - in domes up to 20m diameter. Today, there are large planetariums at universities and at museums, smaller planetariums in schools, and portable planetariums with inflatable domes that travel to schools and shopping malls. There are planetariums that run like movies - almost entirely automated - and planetariums that encourage the audience to help find pictures in the stars, or to argue about sending astronauts to Mars. There are planetariums that do both. South Africa has two of these larger planetariums, and a handful of portable planetariums.

South Africa's two large planetariums are in Cape Town (the Iziko Planetarium, at the SA Museum) and Johannesburg (at Wits University). The Iziko Planetarium has a Japanese Minolta star-projector, while the Johannesburg Planetarium houses a German Zeiss star-projector in a huge 20m dome. Between them, they host over 100,000 learners and 40,000 members of the general public each year.

It's not easy to compare South Africa's planetariums with the rest of the world. Most other African countries do not have planetariums. Brazil, with four times our population, has fifteen. The USA has about 1,500, and some US school curricula require a visit to a planetarium every year. This is a continuing part of the heritage of the "space race" - in 1958, the year after Sputnik was launched, the US government passed the National Defense Education Act, which put money into education in general and school planetariums in particular. This trend continues, planetarium suppliers are struggling to keep up, and in January the world's first ocean-going planetarium was installed on the Queen Mary 2.

So what is the purpose of a planetarium? Planetariums do educate - people walk out saying "Now I REALLY believe that the Earth spins - it made me dizzy!". We can speed-up planet Earth's annual journey around the Sun, passing and leaving behind slow Mars, being overtaken by Venus, while looking out away from the Sun to the

distant stars of summer, then autumn ... Sitting under the perfectly dark planetarium sky and hearing the cosmic stories of Greek heroes and San hunters is also a great equaliser. But maybe Jim Sweitzer (de Paul University) got it right in a recent comment to the planetarium e-mail community: the planetarium can provoke a sense of the sublime - a strong emotional effect sometimes accompanied by terror. How? By re-creating the infinity of the Universe around us, and then adding to that some sense of how limited is our understanding of that Universe and how small we really are: living on a little planet orbiting one of a hundred billion stars in one of unknown millions of galaxies.

Since thinking humans first gazed up in awe at the Milky Way, people have been fascinated by the Universe. Many countries (including South Africa) invest in telescopes and research, in the global effort to understand our Universe better. Planetariums are the community centres where the two connect. They are place where people gather to both understand and experience eclipses. Where you appreciate that the story of the scorpion chasing Orion across the sky explained the passing of time to people who just couldn't know how big the Universe really is. They are also the phone-number you call to find out when the new crescent Moon will appear to end Ramadhan, or to get help with a school project on black holes or Planet-X.

And what do planetarians dream about under their starry domes? Of having enough time and resources to achieve that goal of connecting people with the cosmos. Of inspiring and educating enough people to spread this beyond the planetarium. Not everyone can get to a planetarium, but most of us can get outside and look up at the night sky. It's your choice whether you see scorpions or unbelievably distant Suns or an astronomy career searching for black holes out there - your planetariums are just one small but unique asset to help you do it.